

Digital Palace Explorers:

An On-site Storytelling Application for Families at the Tower of London

An Interactive Qualifying Project submitted to the faculty of

Worcester Polytechnic Institute

In partial fulfillment of the requirements for the Degree of Bachelor of Science

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This report represents the work of four WPI undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on its web site without editorial or peer review.



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Abstract

Our team adapted key elements of The Palace Explorers Program, an activity that combines online and on-site sessions to teach Key Stage 2 pupils about the Tower of London, to create an on-site, mobile digital application for families. We also provided the Education Department of Historic Royal Palaces a framework for our design process and a template for programming the application so that it could be modified and replicated at other sites overseen by Historic Royal Palaces.

Authorship Page

Through each team members' considerable contribution in the research behind our program, creation of the application, and writing of our report, we were able to successfully complete the Digital Palace Explorers project. Each group member had equal participation in the research and writing of the report. While creating the program, only one member could program at a time, therefore, Ilea Graedel, Julie Cullen, and Katherine Whittier created the detailed content of the program through storyboards and Andrew Feeney programmed the application in AppFurnace. The final application and report are a culmination of our ideas, thoughts, and lessons learned throughout this project. The equal division of work throughout this project, with each member working to the best of their ability, has resulted in the successful and effective completion of our project and prototype.

Acknowledgments

Our team would like to thank our sponsor, Ina Pruegel, the Education Department at the Tower of London, and Historic Royal Palaces for the opportunity to work on this project. We would especially like to extend our thanks to Ina Pruegel for making our time in London possible. Thank you to Michelle Barton, Alex Drago, David Souden, and the rest of the Education Department for their assistance, knowledge, and hospitality during our time at the Tower of London. Finally, we would like to thank our project advisors, Kathryn Fisler, Paul Davis, and Terri Camesano for their guidance throughout this program.

Executive Summary

Historic Royal Palaces (HRP) created a program for school groups entitled the Palace Explorers Program at the Tower of London. The goal of our project was to create an on-site digital resource for families that encompassed the historical education, interactive concepts, and storytelling aspects of the original program. The project team designed and developed an interactive and engaging prototype application for use at the Tower of London. We also created a framework for the application that can be adapted and modified by Historic Royal Palaces for future use at other heritage sites.

Originally, the Palace Explorers Program was created for Kensington Palace but when renovations began at the palace the entire program was moved to the Tower of London. When the palace's renovations were near completion, the education department began planning their return to Kensington Palace, carrying out their plans in September of 2012. To create a legacy at the Tower of London, our project team created a usable prototype application incorporating interactive components such as storytelling and QR Codes to engage an entire family while learning historical information about the Tower of London.

The original Palace Explorers program uses a live character actor to lead Key Stage Two students, ages 7 to 11, through educational activities at the Tower in order to convey the importance of storytelling and heritage. HRP believes that telling stories based on personal experiences at historic venues will help visitors, especially children, remember the historical information they learned on-site.

The Palace Explorers Program is lead by Michelle the Librarian, who is on a quest to free the bookkeeper, a friend imprisoned in the Tower after he lost his stories. She enlists the help of Key Stage Two students and their overall objective throughout the program is to help re-create the missing stories to free the bookkeeper. Over a series of four sessions, two on-site and two in the classroom, the Librarian leads students through a series of historical, educational activities about the Tower that teach them the components necessary to write a story: Character, Action, Time, and Setting (C.A.T.S.). The program also teaches digital literacy by having children use iPads to scan QR Codes, update blogs, and view videos. The Education Department was able to

foster collaboration, problem solving, and creativity by asking questions, encouraging group discussion, and instructing children to act as Tower characters.

Our project team's objectives were to take the original Palace Explorers Program and transfer material into an on-site digital resource for families. This proved to have many challenges in our initial design ideas. The largest challenge we needed to address was how to create a resource that successfully replaced the role of a live narrator, a key to the success of the program. Additional challenges included condensing four, daylong sessions of material down into an approximately hour-long program. The prototype needed to keep the original program's educational value while engaging varied family dynamics. It was also important to incorporate different forms of supplemental activities to provide families with key design components determined from archival research on children's interactions with museum exhibitions. These components included: choice of activities, ease of use, digital literacy, incentive structure, engagement, storytelling, and closure; similar to methods Michelle used incorporating the components in the original program.

Our application guides visitors to six sites within the Tower. Activities at each site teach Tower history, engage visitors with the exhibits, place visitor's word choices into a personalized story about their trip to the Tower, and address our design components. Components of our application targeted the key design goals: QR codes allowed families to choose the amount of information they learned; fill-in-the-blank stories prompted children to answer questions to help understand the pieces needed to write their own story; multiple choice comprehension questions provided repetition needed for families to retain given historic information; and creative drawing based on historic references provided a creative way to engage children. Utilizing these components resulted in an application that was educational and entertaining for families.

In addition to a digital application prototype, our project team presented Historic Royal Palaces with a series of charts we developed to explain how we went from the original program to our new application. The explanation provided with these charts provides step-by-step instructions to repeat our creation process. We are also leaving behind our application code template so the Education Department can adapt our programming to their future needs. Our charts and code templates will give HRP a step-by-step process to allow them to modify and recreate the design process we used in creating our digital application.

To evaluate the effectiveness of the design principles in our application, we tested our prototype with two families visiting the Tower of London. The first family tested specific sections of the application including storytelling, collaboration, incentive structure, and ease of use. After modifying the application, the second family tested the run time of our entire prototype as well as all design components. Visitor feedback from prototype testing was important in confirming our project team's overall objectives and identifying areas of improvement for increased visitor enjoyment. Since we completed only two family interviews our results do not constitute a conclusive evaluation, however, they were valuable for prototype improvements and recommendations. After each prototype testing, changes were made to the application and all interview communication was documented. The project team also adjusted the appearance of the application to reflect the appearance of HRP.

Based on our initial prototype creation and testing, we were able to make three major conclusions. First, creating a full-featured application that incorporates audio recording and photography within the interface was not possible in AppFurnace, the application creation platform we used to create our prototype. Instead, we recommend HRP use an open-source platform such as PhoneGap or RhoMobile. Both require an iOS developer account and are relatively inexpensive to use when programming and publishing applications. Their ease of use creating and designing the user interface also makes them a good choice for programming an application. Second, through the drafting of our fill in the blank stories, our project team was able to determine the best method to create an effective resource that incorporated C.A.T.S and contingency without disrupting the overall flow of the narration. The fill-in-the-blank method was used to help facilitate storytelling on a smartphone or tablet, the devices used by families during the application. Children were prompted to insert answers by being asked very specific questions about character, action, time, and setting. Using these questions to slightly limit the creativity of children's response enhanced the effectiveness of the overall story. The testing of our prototype verified that the digital application incorporated interactive narration, a variety of engaging activities, and logical progression through the Tower that appealed to an entire family. This made it a successful resource that leaves a legacy for the Palace Explorers Program.

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1. Introduction

Presenting ancestral narratives is a consistent approach used by Historic Royal Palaces in the historical education of children. Due to varied learning styles and needs, children learn more effectively when engaging directly in the experience as it relates to their personal background. Storytelling has often been an effective teaching tool, but the emphasis on visitor-centric, free-choice learning in museums and the increasing use of digital technologies offer new opportunities.

The Tower of London has had great success with the Palace Explorers Program, a project designed for school age children in Key Stage 2, ages 7 to 11. This program explains historical concepts and ideas through on-site and online resources and storytelling. Our goal was to create a mobile application to teach history, storytelling, literacy, collaboration, problem solving, communication, digital literacy and creativity in an interactive experience based on the original Palace Explorers Program.

To enhance visitors' experience, our project team researched the feasibility of integrating effective, technological designs by creating a digital prototype of the Palace Explorers Program for the Tower of London. We accomplished this task by identifying key design components the education department used to create educational resources as well as the storyline and concepts they conveyed to students in the original program. We adapted these concepts to create a concise, interactive digital resource that families could enjoy together at the Tower.

Our project aimed to aid Historic Royal Palaces to overcome the challenges of transferring the program into an on-site application. Although the Tower of London already uses technology to enhance the learning experience of primary school children in the current Palace Explorer's Program, the program still lacks depth, drama and contingency. An effective way to transition the program into an on-site application for families is the use of technology in transmedia storytelling. In our research there were many sources of information discussing how the entertainment industry focused on transmedia, but there was little in the form of how it is used in education, museums, or families. With our project we offered a case study implementing transmedia storytelling for families in a museum setting through the use of fill-in-the-blank stories.

The Palace Explorers digital application created a framework for designing applications, and our post-creation family testing provided recommendations to HRP for future modifications and development. Additionally, we created a set of charts detailing exactly how the education department could recreate the work we completed during our time in London as well as a template to help them adapt our initial programming of the application to meet their future needs. Using the Palace Explorers digital application as a framework, future HRP applications can be created to engage new audiences at the Tower of London and other Historic Royal Palaces.

2. Literature Review

2.1 The Importance of Museums as Educational Institutions

2.1.1 The Role of Museums

Museums play an important role as supplemental educational institutions in everyday life and culture. In recent years museums have evolved from static affairs to become effective communicators that use engagement and entertainment to educate a variety of visitors. Museum exhibits have moved from didactic, static activities to more constructivist, interactive experiences for visitors of all ages. During the 20th Century, the needs of visitors were second to the demands of museum professionals and curators. These specialists felt their educational opinion was superior to capturing the desires of the public (Chang, 2006); Hooper-Greenhill, 1999 as cited in (Chang, 2006). In the last 10 years, museums have shifted their focus to creating effective exhibitions that engage visitors while also providing knowledge about a specific collection (Chang, 2006). Today, people worldwide visit museums for social experiences, education of children, and overall learning opportunities (Borun, 2002). The American Association of Museums reported that, “museums can no longer confine themselves simply to preservation, scholarship, and exhibition independent of the social context in which they exist” (AAM, 1992, p.8 as cited in Chang, 2006). Hooper-Greenhill (2000) also acknowledges that with this shift in ideology there have been many social, cultural, and economic changes. One major change is increasing demands placed on museums to continue to improve their role in the world (Hooper-Greenhill, 2000). As time progresses, museums’ practices need to adapt in order to facilitate changes made to ideology and technology.

2.1.2 The Goals of Museums

Museums strive to meet three basic goals: maintaining collections, conducting research, and educating visitors. These three key elements have not changed over time; however, the way they are achieved has evolved. Museum environments have now entered an age where virtual exhibits and experiences are supplementing, even replacing, authentic objects. However, it is important for museums to effectively adapt to a new learning environment for visitors without supplementing authentic objects entirely. Historic Royal Palaces (HRP) has already begun adapting by incorporating technology into exhibitions and displays. The Tower of London places

an emphasis on the locations and stories that surround the Tower so it is important to enhance the authenticity of the area with our project team's application technology, not replace its presence. Technology is not only changing the learning experiences for visitors but also placing pressure on museums to create interactive and engaging technological resources.

2.1.3 Museum Dynamics

For museums to create interactive, technological experiences they need an understanding of how visitors engage in an exhibition or location. Dennis M. Bartles and George E. Hein believe that the ability to understand the connection between exhibits, visitors, and museums is “fundamental to our understanding of how museums function as educational, cultural, and leisure settings” (Bartels & Hein, 2003). It is necessary to understand what the audience desires in order to provide engagement and education within the museums capabilities. “Millions of people visit museums every year, and the vast majority, if not all, learn as a consequence of these visits” (Teixeira, 2010). Technology is being used to bridge the gap between learning and entertainment by transforming didactic exhibits into interactive, hands-on experiences. This progression has improved the relationship between exhibits, visitors, and museums. When designing exhibits for visitors, museums have to accommodate for a variety of visitor demographics including individuals, families, and school groups.

2.1.4 Museum Demographics

Studies conducted that classify museum patrons are used to determine the largest visitor demographic and engineer exhibits accordingly (Hooper-Greenhill, 1994; Schuster, 1991; Hooper-Greenhill, 2001; Hood, 1983; Falk & Dierking, 1992; Falk, 1998 as cited in Chang, 2006). Typically, families are the greatest percentage of museum visitors with adults ranging in age from 25 to 44 and children ages 5-9 (Chang, 2006), however, the target audience can vary depending on the type of museum. In 2011, at the Tower of London, 38% of visiting groups had children ages 0-15 in attendance (BDRC Continental, 2011). Subsequently, the same year the Tower also experienced 62% of visitors between the ages of 16-54 (BDRC Continental, 2011). Therefore, museums often focus on families and visitors within the aforementioned age range as their target for exhibits. An emphasis is also placed on targeting visitors with children since it is believed that introducing children to museums at an early age will carry over into adulthood (Hall & Bannon, 2006). Csikzentimihalyi and Mermanson said, “one often meets successful

adults, professionals, or scientists who recall that their life-long vocational interest was first sparked [as a child] by a museum” (1995, p.35 as cited in (Hall & Bannon, 2006). Because of this children are a key part of museum interaction and it is important to consider their learning development and styles when creating exhibitions and activities (Camellia W Sanford, 2010; Hall & Bannon, 2006). This subject will be explored in greater depth in section 2.3.

There has been a large increase in the proportion of United Kingdom residents who visited a museum, gallery, or archive in the past few years and the most dramatic change has been in children ages 5-10. In 2007/08, participation by young children in historic venues was nonexistent. However, in one year’s time, 66% of children in that age range were participating in museums, galleries, or archives. In addition, there is a clear upward trend, from 66.0% to 70.3%, in a similar age group for the 2009/10 calendar year (*Taking Part – Statistical Release*, 2010). In recent years, Historic Royal Palaces (HRP) has seen an increase in children participation by international visitors. From 2010 to 2011, the percentage of children from Traditional Europe who attended the Tower of London increased from 33% to 42% (BDRC Continental, 2011). Furthermore, the increased proportion of young visitors will simplify the creation of an engaging experience because it has been said that, “across all sectors, children are more likely than adults to engage in culture and sport” (*Taking Part – Statistical Release*, 2010). In response to this trend, HRP’s Palace Explorers Program is designed to interest families with children in the age range of Key Stage 2, 7-11 years old.

2.1.5 Exhibit Interaction

Museums strive to create a cultural, social, and educationally life enhancing experience through visitor’s interaction with objects and locations in exhibitions. The level of engagement of objects differs with the degree of interaction. Evaluation research indicates that valuable, authentic, unique, and large objects are more engaging for visitors (Teixeira, 2010). Historic Royal Palaces places a greater emphasis on location instead of objectivity. However, since location encompasses similar characteristics there is a prominent connection between object interaction and location interaction at the Tower of London.

“Most learning that occurs in museums, has more to do with consolidation and reinforcement of previously understood ideas than with the creation of totally new knowledge structure” (Falk, 1999). Therefore, museums attempt to fill gaps in visitor awareness and

understanding. Through short bursts of learning students receive information that is repeated throughout each of the lessons; this repetition reinforces knowledge and understanding in schoolchildren. This approach to educating visitors helps them retain more information into the future.

Objectivity and interaction are important in developing successful experiences for children because it allows them to immediately engage in their environment (Camellia W Sanford, 2010; Hall & Bannon, 2006). Acting out characters, touching artifacts or replicas, and dressing up in traditional apparel fosters physical engagement as well as allows for interpretive communication amongst families (Camellia W Sanford, 2010). According to Ellenbogen (2003a), families “operate as a learning system” (as cited in Camellia W Sanford, 2010), talking and interacting with each other to discern the meaning behind exhibitions. Fostering this behavior in families aids in retention of information because visitors preserve exhibit goals when engaging directly with the program, exhibition, or artifact (Eason & Linn, 1976; Shettel, 1973; Wolf, 1985; as cited in (Camellia W Sanford, 2010). By adapting this principle, museums have been adding technical components to experiences as a way to engage their audiences (Elizabeth Vallance, 2004; Mark Guzdia & Elliot Soloway, 2002).

2.1.6 Family/Child Learning Behavior

Children have a different learning style than adults and museum developers must take both groups into consideration when designing exhibitions. This requires use of a variety of educational tools to accommodate for children’s communication skills (Camellia W Sanford, 2010), curricular educational levels, and attention spans (Hall & Bannon, 2006). One effective method of implementation for children includes storytelling and application of sensory skills for immediate engagement in current surroundings (Camellia W Sanford, 2010; Elizabeth Vallance, 2004; Hall & Bannon, 2006).

2.1.6.1 Sensory Skills

Sensory skills play an important role in childhood learning. Howard Gardner created the “Multiple Intelligences” theory that discovered children have several different sensory learning styles that operate independently. These intelligences include logical, mathematical, spatial, linguistic, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalistic (Gardner, 2008). Through the means of acting out what they see, hear, and feel, families apply bodily-

kinesthetic intelligence to observe their personal experience associated with their visit. Through spatial intelligence, families become aware of their surroundings and actions. By incorporating a combination of the elements, more users will be engaged in a museum setting.

2.1.6.2 *Storytelling in Education*

Storytelling allows the audience to form a connection with the museum curriculum in a very intimate and personal way (Chang, 2006; Vallance, 2004). The narrative, or storytelling approach, has a ‘full circle’ method that encompasses a beginning, middle, and end that allows museum educators to tailor educational experiences to adapt with each visitor (Vallance, 2004). Museum educators create a storyline for an exhibit that encourages visitors to engage with the exhibition. However, stories change based on visitors’ previous understanding and background. Visitors also add their own personal element to standard museum concepts (Vallance, 2004; Hall & Bannon, 2006). Even though stories carry different interpretations for each visitor, if constructed properly, they can still tell the intended background designed by the museum’s curriculum (Vallance, 2004). Storytelling can encompass multiple physical and contextual pieces such as objects and artifacts, creative components, and material designed for stimulation and interpretive thinking (Sanford, 2010; Vallance, 2004). Historic Royal Palaces uses these ideologies to educate young visitors about the history of its venue. Using character, action, time, and setting (C.A.T.S) as the main criteria, they educate children about history as well as how to create their own stories. Through personal communication with Education Department staff it is evident that HRP is continuing to integrate different forms of storytelling into their programs to facilitate learning in a museum setting. Storytelling was the most prominent theme in the original program and was transferred into the new application.

2.1.6.3 *Design Components*

To evaluate programs, the Tower of London utilizes a system called Generic Learning Outcomes (GLO’s) to improve learning and organize museum objectives. The five areas of focus are Knowledge and Understanding; Skills; Attitudes and Values Enjoyment-Inspiration-Creativity; and Activity Behavior and Progression (*Museums, libraries and archives - learning - Generic Learning Outcomes, 2012*). With feedback from Tower of London Education Department staff we decided on three GLOs to use in our program evaluation. By tailoring the

list to our prototype, the project team decided to use Knowledge and Understanding; Skills; and Enjoyment: Inspiration: Creativity.

2.1.6.3.1 Design Characteristics

Using the Generic Learning Outcomes, it is easy to classify design characteristics, such as critical thinking, sociality, and comprehension; a master list was created that encompasses every characteristic aspect that we wanted our application to encompass. The list included 36 design characteristics compiled from archival research. Each characteristic was included under at least one GLO heading. Several characteristics appeared under multiple GLO headings depending on the context it was referencing. Knowledge and Understanding, the largest heading, categorized design principles such as education and pedagogical activity. The Skills heading was used to evaluate storytelling, collaboration, and digital literacy. Enjoyment, Inspiration, and Creativity heading encompassed principles such as narrativity, creativity, and exploration. Each sub-heading was used to describe more detailed design principles. Charts were the easiest method to display design headings and principles and each chart has several layers to demonstrate the relationship of characteristics used to create the prototype application.



Figure 1: Generic Learning Outcomes (*Museums, libraries, and archives-learning-Generic Learning Outcomes*)

2.2 Transmedia Storytelling

Transmedia storytelling is changing how people engage with education and entertainment and is already present in everyday lives. According to Poister, transmedia storytelling “...absorbs audience[s] into the story across all available means of communication and allows the audience to participate and even influence the story’s direction” (Poister, 2010). Transmedia storytelling encompasses various forms of current technology and uses them to communicate stories to a diverse audience. These include film, books, television, blogging, social networks, alternate reality games and video sharing sites (Poister, 2010; Edmonds, 2010; Scolari, 2009).

Transmedia storytelling plays off the natural human desire to tell stories as a way of communication and remembrance (Edmonds, 2010). Since storytelling is a natural human tendency, audiences enjoy transmedia storytelling because it allows them to interact and become involved in a particular storyline, adding to their own individual lives (*Plymouth Rock Studios Chairman Predicts Transmedia Will Save Storytelling*, 2009; Edmonds, 2010; Jenkins, 2003; Poister, 2010). As co-founder and executive creative director of Campfire, a marketing agency utilizing storytelling and digital aspects, Michael Monello stated, “Give people an experience they want to share and they will” (Poister, 2010). In transmedia storytelling the story becomes the center of focus for the audience and uses key human emotions, such as humor and sadness, to connect with the viewer on a personal level (*Plymouth Rock Studios Chairman Predicts Transmedia Will Save Storytelling* 2009; Edmonds, 2010).

One of the key factors in the rapid growth of transmedia storytelling is the age of its users. In what is described as the MTV/Nintendo Generation, viewers are brought up interacting with one franchise on multiple levels and as they grow to adults look for similar interaction in their grown-up interests (Guzdial & Soloway, 2002; Jenkins, 2003). Transmedia storytelling takes a storyline and transmits the information over multiple technological resources to reach as many viewers as possible. However, if one central story is broadcasted through various media it must keep its authenticity and be an autonomous entity, capable of conveying a separate story without requiring additional technical resources (*Plymouth Rock Studios Chairman Predicts Transmedia Will Save Storytelling* 2009; Scolari, 2009; Jenkins, 2003). An example of technological resources being separate from each other would be the ability to watch a movie without first having to research online and vice versa. The use of transmedia storytelling should

be to compliment and add additional information to a franchise, thus enhancing the viewer's experience.

2.2.1 Museum Relevance

While most references to transmedia storytelling revolve around social media and entertainment the concept can be easily applied to the educational realm of museums. Marshall McLuhan, scholar of media theory, said that “anyone who tries to make a distinction between education and entertainment doesn't know the first thing about either” (Edmonds, 2010). Transmedia storytelling incorporates many different forms of communication and allows for participation among visitors. This permits a more interactive, engaging and educational experience. Since museums represent educational institutions, it is only natural for them to want to make a transition to the application of transmedia storytelling in their exhibitions. With the majority of visitors to museums comprising families and 52% of children, ages 5 to 8 years old, using mobile devices it is important for museums to make use of technology that appeals to their patrons (Center on Media and Child Health, 2007). Since children, especially those currently under the age of 16, have grown up with mobile devices they are often seen as a personal extension of their being and capable of readily producing their own media, all the while learning as they go (*Plymouth Rock Studios Chairman Predicts Transmedia Will Save Storytelling*, 2009; Guzdial & Soloway, 2002). Television and film carry the most diverse group of viewers and museums have the opportunity to reach members who might not be able to visit the physical location, increasing patronage in another storytelling capacity (H. Jenkins & Deuze, 2008). Today transmedia is increasing in appeal because it uses multiple technological resources to reach vast audiences while communicating through relatable stories.

2.3 Using Technology to Create an Interactive Experience

The incorporation of technology in an educational setting has been an increasing trend in recent years. It is not surprising that different museums worldwide have taken a variety of approaches to incorporating technology with museum visitation, and the incorporation of these technologies was successful by making a series of decisions in the structure of the digital resource. An important starting point lies in the decision to bring technology on-site or use an

online resource to supplement on-site education (Hawkey, 2006). Currently, Historic Royal Palaces staff has focused on combining on-site and online components in some of their educational resources, including the Palace Explorers Program, but these components are a small supplement of the overall experience.

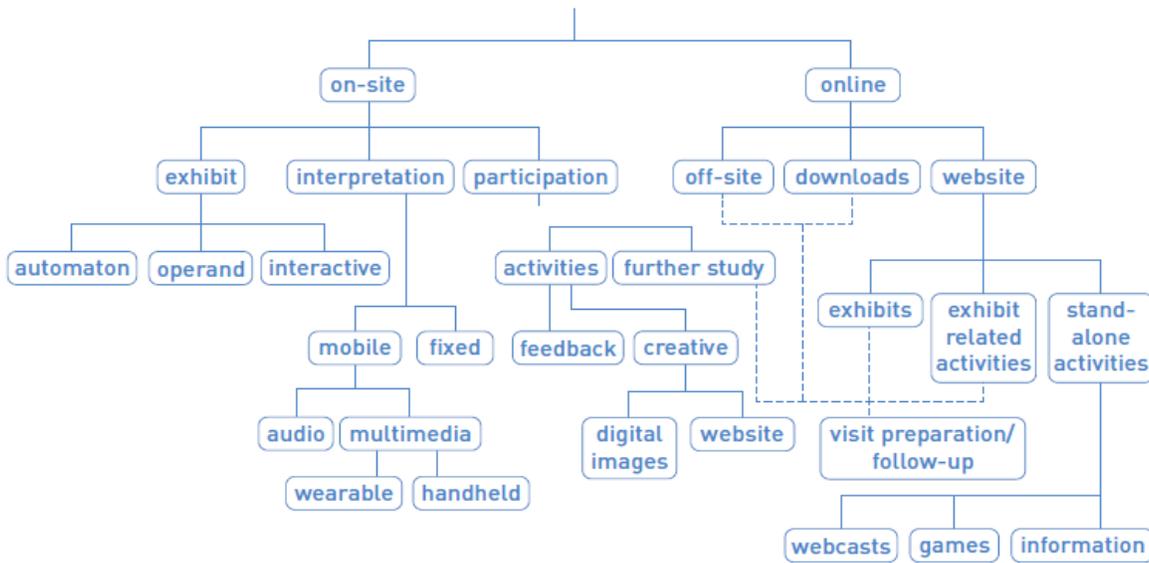


Figure 2: Taxonomy of Museum Learning and Opportunities with Digital Technologies (Hawkey, 2004)

Using the structure of Figure 2, the project team has researched many approaches to increase the role of technology into the Tower of London’s Palace Explorers Program. Using the initial split between online and on-site technologies, we were able to conduct focused research to determine which technologies will work best for our project.

In the analysis of on-site and online experiences, Hawkey has provided insight into the development of future museum exhibits when using technology. Personalization is a key component of his ideology, believing that museums should offer the tools to allow visitors to take responsibility for their own learning. Museums should provide visitors with the appropriate stimulation to facilitate interaction while giving them the freedom to look and interact with exhibits as they please. As social and personal aspects of learning become increasingly important, Hawkey is able to convey that personal, hand-held technology provides an individual learning experience (Hawkey, 2004). In support of this research, HRP has placed a greater focus on beginning to design an on-site digital experience that connects to an online component to be

used post-visit. That way, families can have choice in what they want to learn as well as where they would like to learn about it.

2.3.1 On-site Technology

From an on-site perspective, many technologies have been created to help enhance visitor experiences at museums (Hume, Mills, 2011, p. 280). At museums, collaborative learning is conducted through in-person engagements with a variety of objects, exhibits, and interactives, often through the use of digital media (Bartlett, Myers, Pfizenmaier, and Waring, 2012). Overall, integrating technology into museums has focused on boosting the educational and entertainment value for visitors (Hume, Mills, 2011, p. 280).

Mobile devices, especially for use as museum guides, are one of the most popular ways to integrate technology in museum experience. Primarily, mobile guides are used to provide supplementary information. When creating a new guide some goals include: attracting new visitors, developing an interactive experience, and keeping up with similar museums. 72% of mobile guides provide supplementary information while 40% provide an interactive experience (Petrie, M., Tallon, L. 2010). This information validates the importance of creating an educational mobile application that facilitates visitor interaction with the location as well as the application.

Mobile applications for museums often provide some way for users to easily obtain information about a particular exhibit. One interesting prototype was the use of radio frequency tag identification (RFID) in smartphones, which incorporate high frequency sound waves at museum locations to help the smartphone detect a user's location. After detecting the location using audio recordings, the application was able to provide more information to the phone's owner (Bihler, Cremers, Imhoff, 2011). Another innovative idea included using a phone's camera as a barcode scanner. Reading a two-dimensional barcode at a specific exhibit would provide a visitor with more information about the exhibit directly on their phone with just the use of a simple application (Kawsar, Kortuem, Rukzio, 2010; Bihler, Cremers, Imhoff, 2011). The current Palace Explorers Program uses a type of bar code scanning on iPads, QR Codes, to supplement learning through storytelling. By scanning the different codes, the children are directed to a website where they are able to describe how they feel about different parts of the Librarian's story. This action helps facilitate the students' creation of their own stories, a main

component used to help retain information learned. As our project team designed the transfer of the program on-site for families, it was important to continue to incorporate the use of QR Codes.

Past case studies of on-site museum guide applications show a potential solution to the creating an effective museum guide in an application. In particular, most museum guides used a combination of video and audio components in a mobile guide_(Petrie, M., Tallon, L. 2010). This information will be extremely useful in designing a mobile guide for the Tower of London, since there will be no longer be a personal guide through the program. Video and audio components seem to be the best substitution to the Librarian, who is currently the leader for the program.

2.3.2 Conclusions Regarding Technology in Museums

Based on our group's research of relevant technologies as well as the current Palace Explorer's Program, we determined what components allowed us to create a successful, engaging program. The project team believes that combining an application for a smartphone with an online supplement will be the best structure since, according to Marty, a combination of online and on-site technology has produced a system where kiosks and mobile devices can help archive the museum visitor's on-site experience so that it can be accessed from home in the future (Marty 2011). In addition, our research provided strong evidence that QR Codes are a vital component to an engaging digital resource because they enhance a visitor's ability to be engaged in museum learning. Our overall goal is to give each family the tools they need to have the best experience possible when touring the Tower of London using our program.

3. Methodology

The main goal of the Palace Explorers project is to assist the creation of an interactive and engaging learning experience for families that allows them to play out the Palace Explorers Program onsite at the Tower of London. To achieve this goal our project team: (1) clarified key elements, innovative features, and goals of the Palace Explorers Program; (2) learned from other state-of-the-art, interactive, educational programs; (3) determined technological criteria and constraints; (4) designed an interactive learning experience for families on-site; and, (5) tested and evaluated the created resource.

3.1 Understanding the Current Palace Explorer's Program

3.1.1 Background Literature

From the project team's initial location in the United States, it was difficult to fully understand the purpose of the Palace Explorers Program, complicating the beginning of our design process. To address this problem, we researched archival documents used in the creation and maintenance of the program. During archival research, our team looked at an overview of the program on Historic Royal Palaces' (HRP) website. The overview was helpful in explaining the location and target audience of the program. Ina Pruegel, our sponsor liaison, sent us several documents and resources detailing our project's goals and objectives. With documents and resources from our sponsor liaison, Ina Pruegel, detailing our project's goals and objectives we examined the overview of the current program. It also included the intended outcomes of the current program as well as an explanation of the desired outcomes of the on-site project and their relationship to the existing Palace Explorers Program. Additionally, our project team reviewed online information, such as Palace Explorers YouTube videos and Tower of London maps, to become familiar with the program's components. We also viewed detailed reports that were assembled regarding the current Palace Explorers Program. The Palace Explorers Final Report included the project description, methodology for project evaluation, key findings from evaluations, and a recommendation for improvements for future use with the Palace Explorers Program. There was also a compilation of appendices in the final report that included teacher evaluations, observational reports, analysis of parent surveys, and reflections of HRP staff who worked directly with the Palace Explorers Program. All of these appendices clarified the

program's current goals and how it was executed. After initial background research, the project team determined our creation of a digital resource was needed to reinforce the importance of heritage, storytelling, and digital literacy to families, similar to the way the Tower had done in the original Palace Explorers Program.

3.1.2 Interviews at the Tower of London

Upon our arrival at the Tower of London, the team used a series of interviews with employees to justify our initial design ideas. While conducting interviews, our project team kept the setting informal and conversational with a lead interviewer, scribe, and Ina Pruegel, our sponsor liaison, present with one interviewee. We began by asking a set of open ended, qualitative questions to allow the interviewee to share as much information as possible. We found that by introducing early interview questions, our interviewees were so interested in helping us create a successful application they took over the interview, giving us more than we had hoped to obtain from the pre-set interview questions. We used the notes from these conversations to answer the questions created for each interview. Appendix B contains the blank interview questionnaire as well as the completed forms.

Our initial interview with Ms. Pruegel on March 12th, 2012 helped us gain a broader understanding of the original Palace Explorers Program. Ina Pruegel, Digital Learning Resources Officer at HRP, is in a technology-based department and was able to answer our initial questions about development, design, and evaluation of an application. However, she also was deeply involved in the Palace Explorers Program and the Education Department and able to supply information about the program's components. Working at the Tower for just less than two years, Ina had vital information about what the Tower has done in the past and the direction in which the Education Department would like to see a digital resource go. The Education Department wanted to create an application to leave a legacy of the Palace Explorers Program that was modified for the Tower of London. Ina was introduced us to other interactive resources available outside the museum to help influence our design ideas.

After interviewing Ms. Pruegel, our interview with Joy Ekpeta, the Intergenerational Outreach Officer, on March 14, 2012 gave insight into the relationship between parents and children in a museum or heritage site setting. She stressed the need to focus on the battle between parents and children using technology, mainly how the group would be able to successfully

engage in an application without getting distracted by who would handle the device. Additionally, Joy mention that it was important to give families information represented in the original Palace Explorers Program without overwhelming them by the volume that is included throughout the four sessions. Other areas of focus in our discussion included producing a tangible result for families and designing a program that engaged users.

Interviewing Michelle Barton, the Librarian during the quest, the Palace Explorer Trainer, and Schools Outreach Officer, on March 15, 2012 offered information about the most important aspects that need to be transferred over to a digital application. Michelle mentioned that parents do not want to feel unintelligent in front of their children and they would like information beforehand so that they can be in charge of the situation. This comment connected back to Joy's conversation about the problems with communication barriers and the generational technical differences. Michelle also informed us that the Tower would like the parents and children to collectively use the iPad. She found that the parent is not necessarily the leader with this type of technology, but that children are able to learn how to use technology of this nature in school. Because of this, at times children have been seen leading while parents are left to act out the activities designed to entertain and engage children. In other instances, the parents naturally take on the leadership role and are reluctant to let the children use the tablets at all due to their cost. Michelle also reminded us that we needed to use very basic language since many international visitors and could have only a basic knowledge of English. In regards to designing an educational component, it was suggested we take the strategy of short bursts of information and incorporate that into our application. This approach maintains interest and makes it easier for families with time restrictions. She also told us that the engagement of children in the original program is significant since students say they can even hear and see the Bookkeeper once they discover where he is imprisoned. Michelle's interview gave us incite to begin preparations for the actual design of our application prototype.

3.1.3 Initial On-site Research

Our project team began understanding the Tower's atmosphere and how the original program interacted in this environment before creating an adaptation for a new program. During our first day on-site, we used the audio guides and trails available at the Tower; giving us

knowledge of history behind the vast structure. We also observed Session Four of the original Palace Explorers Program, which one of two sessions completed on-site. We observed the children interact with Michelle, the Librarian, different Tower locations, the iPad provided, and the interactions with a live storyteller throughout the day. The level of engagement the children had with Michelle, the iPads, and the storyteller conveyed to our project team three major components that were vital to incorporate in our new program.

To determine what aspects of the current program were transferable our team created a checklist of design characteristics before we arrived in London. This checklist displays the main differences between a classroom oriented program and an on-site family program. Upon our arrival, we witnessed the original program, assisting us in creating a list of the broader themes and aspects present in the program. These aspects were the key ideas and concepts that we want to transfer into the new digital application. This directly related to the Generic Learning Outcomes we had become familiar with in our research. By examining how aspects of Palace Explorers Program fit into these traits we were able to determine which were suited to an on-site family program. The full list can be seen in Appendices I, J, and L.

3.2 Determine Role of Non-Transferable Aspects

In addition to the key concepts we wished to transfer into our prototype, it was important to identify and address the non-transferable aspects that were incorporated in the original program. For instance, since the new program cannot have a person facilitating the group, the project team needed to create a concrete system with explicit instructions to guide the family throughout the Tower and the application. To aid in this process, we created a series of charts that allowed us to identify each aspect individually so we could determine what adaptations we needed to make in our design. This is discussed in detail in Design Section 4.1.1.

3.3 Investigate Existing Interactive Educational Resources

The project team examined how other exhibits in Historic Royal Palaces tailored their programs and exhibits to captivate their audiences, especially families. The project team also investigated the existing interactive educational family resources, looking at transmedia

storytelling, storytelling/history resources, games, and quests in and outside of Historic Royal Palaces in order to remain aware of how other museums are using technology.

3.4 Investigating Current Historical Royal Palaces Applications

To fully grasp the capabilities of an online resource in a museum, we reviewed and evaluated other supplemental resources that are already in use in Historic Royal Palaces. To assess the programs the project group researched, the project group created an evaluation form that can be reviewed in Appendices F, G, and H. This form created an organized way for the project group to assess the program for ease of use, an appropriate engagement level, and the program's ability to achieve its objective. These resources helped make our time spent evaluating programs more effective.

In preparation of creating our interactive we evaluated *Escape from the Tower*, a free smartphone application available online at Historic Royal Palaces website. This application brings children through an on-site adventure to help four worthy prisoners escape from the infamous Tower of London. The prisoners consist of a polar bear, Ranulf Flambard (The Bishop of Durham), John Gerad, and/or Henry Lauren, and families can choose to help one, two, three, or all four of the characters. Combining real historic events with fictional embellishments creates the storyline for the application's progression (*Escape from the Tower App.*, 2012). This structure was similar to our program since the families that use the Palace Explorers application will be helping the Bookkeeper escape from the Tower. Although the program was very slow moving, resulting in a loss of engagement, it was successful in providing contingency, a design characteristic that caters to different time constraints families have when using the application. The evaluation form for *Escape from the Tower* is in Appendix H.

In addition to looking at *Escape from the Tower*, our project team also used the audio guides at the Tower as well as Hampton Court Palace to evaluate its effectiveness. Audio guides are very popular among museums in the United Kingdom. The Tower of London was one of the most engaging and useful ones that we used due to its appropriate lengths and the listener options provided throughout. The audio guides at Hampton Court Palace were not nearly as interesting or engaging, mostly due to the lengthy narratives. The audio guides at the Tower were a shorter length and had more option about where the person was going and when the guide was playing. This comparison left a frame for the adequate length needed at a heritage site

The project team evaluated family trails available at all Historic Royal Palaces, such as The Tower, Hampton Court and Kensington Palace, to decide if they would be an adequate platform to use to create a legacy for the original program. The Tower of London hands out around 30 - 40 thousand printed trails to families. This is a small number compared to the overall number of visitors. The trails are handed out at the Welcome Centre, to which only a small number of visitors come, as the trails are high in printing costs and can't be offered to all visitors. Each trail's progression appeared to incorporate many components of the original Palace Explorers Program except that family trails are facilitated with the hard copies received at the museum entrance. While using these hardcopies at the Tower, the project team saw that they made it easier for us to map out the progression of the original program before we transferred it to an on-site resource. We also found that the trials did not engage the entire family, the trails were created solely for the children. This showed us that we needed to be creative with how we were to get the families interested in the program.

3.5 Investigating Additional Museum Programs

The project group viewed many other interactive programs. Michelle suggested in her interview that our design would benefit from research and evaluation of applications offered at the Tate Modern and the Natural History Museum. To evaluate these applications, we used an evaluation sheet that can be seen in Appendices F, G, and H.

At the Tate Modern we evaluated "Tate Trumps," an interactive game where the families select pieces of artwork to create a hand of artwork playing cards. They select a piece by entering a code found on the artwork's description card. Once the players have seven cards, they play the cards against each other and receive points for winning. There was also not much room for collaboration since each member needed their own tablet or smartphone and the members have to split up in order to ensure they do not pick the same pieces of art. This is not very plausible since children may not have their own device and they children cannot go off on their own to collect artwork. Also, as we were finishing the game (playing card 5 of 7) the program froze and we were unable to finish. This design did not seem suitable to use to create our collaborative family program.

The Natural History Museum's Darwin Exhibit was not directly related to the creation of a smartphone application, but provided valuable insight into the objectives an interactive exhibit

encompasses. It has visitors use a bar code scanner and large computer screens allow them to decide which information they would like to collect on their personal card. This card is designed so visitors can bring information they learn home with them. The exhibit seemed to be successful overall, but some implementations of interactive overlapped with the computer needed to scan a card. On a busy day, this would hinder visitors' ability to enjoy all aspects of the exhibit. The use of touch-screens and the ability to continue visitor learning post-visit were the main objectives we took away from the exhibit's evaluation, both of which we integrated into the design of our program.

3.6 Investigation of Suitable Technologies

With an understanding of the criteria we needed to structure our on-site resource, the next step was to utilize other members of the Tower of London's insightful technical support. As technical employees of the Tower, they have experience in creating on-site applications for supplemental use with exhibits. Currently, the Tower of London does not have consistent access to Wi-Fi or a 3G network inside Tower walls. However, there is wireless available at the Welcome Center outside of the Tower entrance. In addition, many visitors of the Tower of London are not from the London area, so roaming charges they would receive would outweigh the benefits of them connecting to a 3G network to use the application. Finally, GPS capability in the palace is not reliable and is not an option in helping visitors navigate through their historic exploration.

We interviewed Nigel Randall, the Head of IT at the Historic Royal Palaces, on March 20, 2012 to understand the technology at the Tower, since he is in charge of setting up digital strategy for the entire HRP. He gave insightful information to application creation. He was also able to bring up points of interest and barriers that we needed to overcome such as: the battery life of phones, international roaming charges, an application's ability to work offline, advertising our program on-site and online, and that HRP would like to obtain user's email and other information. These suggestions helped us design an application that would function properly with the limited technology included in the Tower.

4. Design

4.1 Overview of the Problem

The Palace Explorers Program teaches historical education, storytelling, and digital literacy to schoolchildren in Key Stage 2. During four sessions completed over seven weeks, two at the Tower of London and two in the classroom, a facilitator introduces the C.A.T.S (character, action, time, setting) storytelling approach, how to use QR Codes, and the history of the Tower. The structure of the program is to teach children how to write effective stories to free a fictional character, the Bookkeeper, who is imprisoned at the Tower. The program was initially created at Historic Royal Palace's Kensington Palace in 2010. It moved to the Tower of London when construction began at Kensington Palace in 2011. Moving the program to the Tower was not a simple process; HRP's education department was forced to use the format of the Palace Explorers Program at Kensington Palace to create a similar program incorporating the historical content from the Tower of London. Now that renovations are complete, the program is moving back to its original design and location at Kensington Palace. Because the education department spent a great deal of time and effort on the successful creation of the Palace Explorers Program at the Tower, they believe it is important to leave a legacy of their program behind as they depart. As a result our project team was given the opportunity to design legacy for use at the Tower, an educational resource that embodied the design principles of the Tower's Palace Explorers Program.

4.1.1 Creating Program Structure

As the design process began for the new application, our team was given a great deal of information regarding the original program at the Tower. These resources included lessons plans used by the facilitator who lead these sessions, evaluations of the program, as well as digital components the children were able to use during the sessions. In addition, our project team was given the opportunity to observe one of the sessions first-hand. We planned to use these vast resources to create a digital resource that embodies as many components of the original program as possible.

Creating series of charts, graphs, and lists was the most concise approach to evaluating the original program and designing the new digital application. Microsoft Office Excel allowed the greatest flexibility when adapting and modifying the charts as the project evolved. This structural and organizational framework is also easily transferable from our project team to Historic Royal Palaces, allowing them to modify the program to meet evolving needs.

The Original Program Flow Chart, located in Appendix I, shows the progression of the original Palace Explorers Program during each of the four sessions and was instrumental in understanding the overall structure. The chart was separated by each session and listed high-level educational content conveyed during the program. Since the original program covered a great deal of material over four separate visits, the flow chart presented a clear structure for each session. Figure 3 shows the school group’s sequential progression through activities in each session as well as identifies children’s interactions. For example in Figure 3, the green box at the top of chart shows that the green progression describes the events in Session 2. Beneath the session title, boxes describe the children’s actions, both receiving information and presenting information. The lines connecting the boxes demonstrate the progression of locations and activities while the different colors distinguish one session from the others. This structured overview permitted easier transfers of material from the original program to a new application.

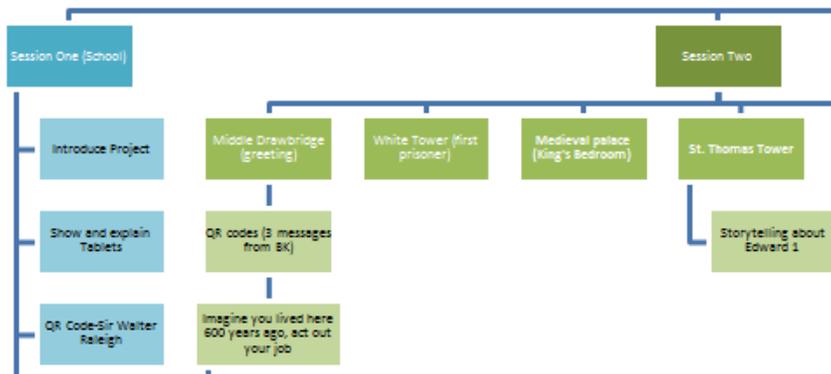


Figure 3: Segment of Original Program Flow Chart (Refer to Appendix I for full chart).

Following the completion of the Original Program Flow Chart was the creation of the Original Program Session Lists. The flow charts displayed high level material while the session lists cover key details present in each session. Each session was characterized by its interactive concepts: the characters introduced, QR Codes used, actions taken by children, material

presented by the facilitator, and questions directed to the school group. These concepts were present in every session and by isolating each concept within the list our project team could easily identify educational trends. Since the digital application was directly related to the original program these lists helped determine the best material to transfer to our design. Figure 4 is an example of a list detailing the information presented to school groups during the original Palace Explorers Program. At the top is a title describing which session is referenced as well as where the session takes place. For example, Session 1 occurs in the classroom. Directly to the right of the title shows which storytelling aspect (CATS) is the focus of in the lesson; Figure 4 focuses on “Character.” From there, the session is separated into its interactive components. Figure 4 lists the interactive component of questions posed to the students. The entire list, located in APPENDIX J, also describes the actions done by the school group, all characters presented in the session, and actions taken by the facilitator, Michelle.

Session 1 School	<i>Cats Focus-Character</i>
Questions What is an Explorer- clothes, find, look for, equipment	
	Why was Sir Walter Raleigh imprisoned
	What is a fortress
	What do you protect in a fortress
	What do you find in a fortress
	Where would you build your fortress
	Why
	Who was the character in the story (story read to children)
	Can you describe what he looks/smells like
	What does he feel like

Figure 4: Segment of Original Program Sessions Lists (Refer to Appendix J for full list).

Our project team wanted to remain consistent with the goals and objectives of the Palace Explorers Program. Because of this, we utilized the Generic Learning Outcomes (GLOs) used initially to evaluate the original program. Later in our project’s design, these same GLOs were used to justify the components of our design. HRP focuses on two or three GLOs at a time to facilitate a more focused and direct evaluation of a program. Three out of five Generic Learning Outcomes were chosen to design the digital prototype after speaking with members of the Tower’s education department. Knowledge and Understanding, Skills, and Enjoyment:

Inspiration: Creativity covered the main objectives of our project and closely related to the original program evaluation. However, these three GLOs did not explicitly state every design aspect that was needed to develop an application. From archival research, thirty-six design characteristics were chosen that suited our project goals. To keep everything concise and organized, flow charts, titled Design Heading/Characteristics Charts, were developed that related each design characteristic to a GLO heading. When evaluating the application our project team could evaluate the high-level design headings instead of each design characteristic separately.

Below is an example of one of these charts. The Generic Learning Outcome is located in the box at the top and design characteristics are in the boxes below as supporting evidence for the main GLO. The lines connecting the boxes indicate how the characteristics relate to each other.

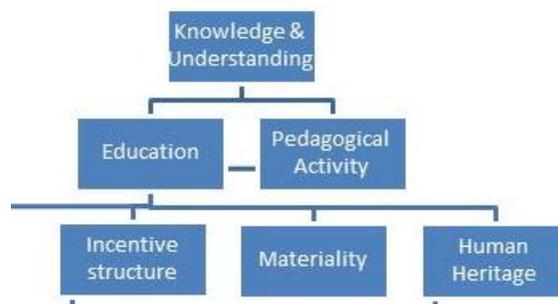


Figure 5: Segment of Design Heading/Characteristics Chart (Refer to Appendix K for full chart)

In determining which original components were transferable we created a chart showing how the original program related to the three Generic Learning Outcomes our group chose. The correlation between the original program and our design characteristics demonstrated why each aspect of the Palace Explorers was necessary to convey the program’s overall objectives. The list below shows how the information presented in the original program sessions relates to the Generic Learning Outcomes. The GLOs and their abbreviations are shown on the right with the information presented in Session 1 of the original program is featured on the left. The overarching activities and concepts are directly related to each GLO to understand how the ideas met the design characteristics. With this information we could determine if aspects from the original program were transferable to our creation of a digital application. If a component could not be transferred our project team considered which design characteristic it satisfied to successfully incorporate an alternative activity. This chart, titled “Original Program Relation to

Design Headings/Characteristics Chart”, gave a clear understanding of how the elements of the original program embodied key design features.

Session 1

Introduction

Explorers: **EIC, KU**

QR Codes: **SK**

Sir Walter Raleigh: **KU**

Tower of London Fortress: **EIC, KU**

Storytelling (CATS): **SK, EIC**

Ranulf Flambard: **KU**

1st Letter of Password: **EIC**

Helping the Bookkeeper: **EIC**

Generic Learning Outcomes:

Knowledge and Understanding (**KU**)

Skills (**SK**)

Enjoyment, Inspiration, Creativity (**EIC**)

Figure 6: Segment of Original Program Relation to Design Heading/Characteristics List (Refer to Appendix L for full list).

It was vital to determine a clear progression through the locations and activities of the new application before it was created. The New Program Flow Charts detailed how a family user would move through each location in our prototype. An example of this is shown below using the Royal Menagerie. This chart shows the concepts and user interactions of the new prototype application. The box at the top is the current location of the user and the boxes below show the progression from one activity to the next. The boxes in black demonstrate when a user receives information and the yellow boxes describe when a user does an activity. These charts gave a high level overview of the progression of activities. This high level design was helpful when editing the overall structure of the application’s general flow through the Tower. These charts gave our team the ability to interchange applications and activities without spending a too much time focusing on the details of each. This framework set up an outline that our project team was able to fill out as we began the storyboarding process. Because of their flexibility, the New Program Flow Charts can be adjusted to describe varying types of programs.

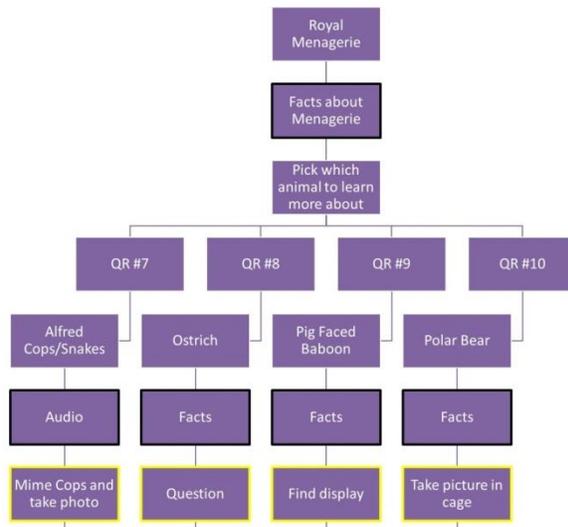


Figure 7: Segment of New Program Flow Chart (Refer to Appendix M for full chart).

Due to the creation of New Program Flow Charts, the individual components were defined in detail with ease. New Program Location Information Lists comprehensively listed every user action and interface aspect that occurred throughout the prototype. Without this level of information the project team would not have confirmation that we were successful in including our main design components in our application. This set of charts allowed our project team to organize which aspects of the application were included in our design as well as what location(s) incorporated them. The lists include the educational content, types of QR codes, and overarching concepts the prototype displays. This list describes the information and interactions that occur at each location of our new prototype application. The location is listed at the top and the information presented explicitly stated. The key interactions are taken from the New Program Flow Chart and broken down to show lower level detail. This structure allows ideas to be interchanged, added, or removed throughout the digital resource and incorporates a straightforward organizational approach.

Royal Menagerie

1) Introduce Menagerie

1210 the first animals arrived at TOL, with the first being lions

Under the reign of King John came the first animals

A Menagerie is similar to a zoo

In 1829 there was 1 zebra, 1 pig faced baboon, 1 African sheep, 1 alligator, 2 tigers, 2 cheetahs, and 100 rattle snakes at the TOL

In 1832 after several attacks the animals were moved to the London Zoo.

Figure 8: Segment of New Program Location Information List (Refer to Appendix N for full list).

To make sure our design met the design characteristics determined in earlier graphs, the project team needed to evaluate the finalized list of ideas and concepts developed. Our project team used the Design Headings/Characteristics graph to insure that our program design satisfied the characteristic criteria present in the original program. The New Program Relation to Design Heading/Characteristics Charts (example in Figure 9) demonstrates how our project team related the content in the new application to our design headings. In Figure 9, the information at the top of the image describes the three Generic Learning Outcomes we used to evaluate our program. Beneath the GLO's are the location and high-level information and interactions presented in that location. The material is related to as many of the GLO's as is relevant to that information. For example, in Figure 9, "Introducing Storytelling" satisfies the Generic Learning Outcomes of Knowledge and Understanding as well as Enjoyment: Inspiration: Creativity. This system served as a checks and balances approach to verify our prototype design suitably conveyed key concepts from the original program.

White Tower

Introduce Quest: **KU**

Introduce Librarian/Bookkeeper: **KU**

Introduce Storytelling: **KU, EIC**

Introduce Coins/Ranking: **KU, EIC**

White Tower Facts: **KU**

Draw your Fantasy Fortress: **SK**

Generic Learning Outcomes:

Knowledge and Understanding (**KU**)

Skills (**SK**)

Enjoyment, Inspiration, Creativity (**EIC**)

Figure 9: Segment of New Program Relations to Design Heading/Characteristics Chart (Refer to Appendix O for full chart).

4.2 Design Decisions

4.2.1 The Importance of Creating a Digital Application

In the beginning of the design process, Ina Pruegel, our sponsor liaison, suggested that we research the option to create a family trail in addition to the initial proposal to create a mobile application. After investigating both resources, our group determined that we wanted to create a digital resource for families to use at the Tower. The main reason for this decision was because the original Palace Explorers Program was able to use multiple forms of technology, also known as transmedia, to help educate students. Also, when we used family trails at the Tower , Kensington Palace, and Hampton Court, the lack of a facilitator made it very easy for users to get distracted by the space they were in and not finish the resource's activities.

After determining that we wished to create a digital application, it was important to decide what platform we would want to use to create our prototype. We chose to use AppFurnace because it was a cost effective method that allowed for quick creation of a prototype that could be tested on an iPad without an IOS developer account.

Our project team was required to make many detailed design decisions in order to begin creating our application prototype. These decisions were made based on the charts we created, advice from members of the education staff, as well as knowledge we gained from using educational resources already available at the Tower.

4.2.2 Selection of Locations for Application

There are a variety of locations within the Tower of London that each incorporate a unique addition to the history of the historic venue, making it difficult to decide which locations an on-site resource would want to highlight to its users. Because of the application's use of sound, physical interaction with the space, and necessity of remaining stationary at some points, it is important to give each family plenty of space at each location. Due to the high number of visitors the Tower of London receives each day, it is important to create an application that utilizes the less traveled areas of the historic site. We were able to find six ideal locations based on the previous program as well as observing the foot traffic at each location within the Tower as a group.

Beyond determining the locations needed, it was important to determine how the families would travel to each of the locations effectively. Initially, our group attempted to give families contingency and allow them to choose what order they visit the locations in the application. With the difficulty our group had finding locations, we decided that it would be most efficient to pre-determine where families and provide a supplementary map to aid families ability to navigate through the application effectively. Now, if families wished to skip a portion of the application, we hoped to be able to give them a menu that allowed them to skip to the end. (This portion of design was not implemented because of the limitations of AppFurnace but this was noted in our recommendations for the future.)

4.2.3 Supplementary Map

After determining the necessity of a supplementary map, we were able to add other engaging components to our prototype. We were able to incorporate drawing at some of the locations since the map had adequate space to include blank bubbles for drawing. This will give families something tangible to take away from their experience. Finally, the incorporation of a paper supplement gave our project team a convenient place to provide all the QR codes needed to complete the application. This map can be seen in Appendix X.

4.2.4 Incorporation of Storytelling Component

In the incorporation of storytelling in our application, our project team determined that creating an entire story during the application was not the most effective means of implementation. In the original application, students are able to complete the four sessions that comprise the Palace Explorers Program before they began creating their own stories. This gives them plenty of time to create a personalized, well-thought-out story that describes their experiences at the Tower. However, attempting to create a story of that level would take away from a family's visit to the Tower, not to mention the length of time it would require to complete. In addition, it would be fairly difficult to attempt to type an entire story on a small smartphone screen. Due to these two constraints, our group determined it would be easier to create a series of fill in the blank stories, one at each location, that gave the children an ability to incorporate the four main components of storytelling without spending too much time entering

information onto the screen. Then, we encourage children to go home and use these stories as examples of how they can write their own stories.

4.2.5 Visual Components

To ensure that the application was engaging while also emphasizing the locations the families were interacting with, the project team used both video and images in the application. If the application only had images then the family would lose interest in the application and solely focus on the areas around them. This was evident in our evaluation of *Escape from the Tower* (see Appendix H) and to overcome this, we included both images and videos. This created an environment where the family was engaged in the application while the videos are playing and then are given a chance to interact with the location while we are asking questions or are showing a background picture.

4.3 Design Principles

After creating charts to display the most commonly used design principles and finalizing our initial design decisions, we were able to create a list of vital design components for the evaluation of our project. These components were education, contingency, strategic placement, creativity, storytelling, and closure.

4.3.1 Repetition

The current program incorporates repetition in order to help the students remember key characters and events. Certain topics are brought up at each location in a slightly different way and the same questions are asked numerous times throughout their visit. Repetition was also incorporated into the new application since we will reinforce ideas and facts while the families are at different locations.

We can clearly see repetition when we break down our application. At each location in our application, we present families with some history of the Tower, allow them to process the information while we give them an on-site activity and a storytelling component, and then reinforce the information they received with a comprehension question. To keep the children engaged in the original program, the facilitator (Michelle) splits the day into smaller activities

with short burst of knowledge in order to teach the children while also engaging them. In our application, we will also give them a series of activities, including presentation of facts, a storytelling component, an on-site activity, and a comprehension question so they are not focusing on one thing for too long. Since we are creating a program with different time lengths, we made each activity relatively short (approximately fifteen minutes) so that the family stays engaged while also learning about storytelling and the history of the Tower of London. We will be able to measure this by observing the people using our application to see how long they spend at each location and to observe the interactions of the family with the application.

4.3.2 Contingency

Contingency is the ability to give children the ability to make choices in what you are learning. That way, they are able to feel in control of elements in their personal learning experience. The current program has a few chances thought the day where the students are able to pick between two locations at the Tower. Since the original program only gave a few options to the children, the education department's evaluation of their work explained that they wish to create more choices in a revised version of the program.

Contingency FIX will be incorporated in the new application in a variety of ways. First, families will be able to choose how many locations they would like to go to when using the app to accommodate families with limited time to spend at the Tower. Each family will be introduced to the application at one location and then will have the choice complete up to three additional the locations. In addition, we will provide three to four QR Codes at each location so families will be able to choice the amount of information they wish to receive. Finally, the storytelling component of our prototype allows families to decide the key elements that will be included in their stories (CATS). We can evaluate contingency in our prototype by measuring how many times the participants are able to make their own decision whether it is by place or character.

4.3.3 Ease of Use

Due to the fact that the current program is designed so children are constantly under the supervision of a facilitator, it is very easy to use. The new application will be lead by a recorded narrator, meaning the only aid to families' experiences will be the application and the

supplemental map, which we have discussed earlier. The application will need to be easily navigated to promote a positive experience for families. As our group has seen in our analysis of museum applications, easy of use is a major reason to terminate the use of application before the end. In addition, ease of use will be essential in order to promote digital literacy. This will be measured in our evaluation with families and the Tower and with the family focus groups.

4.3.4 Storytelling

This is the main theme and deliverable from the original program. It is the belief of the education department that through the recollection that is required to tell stories, children are able to remember more of what they learned during their experiences at the Tower. To incorporate this component, children learn the history of the Tower and how to create stories while they are at the Tower and then create their own at home. They then come to the Tower to present their story to the bookkeeper and their families. To incorporate storytelling into our application we will be teaching the basics of storytelling without explicitly explaining it to the families (very similar to the original program). Throughout the usage of the application, there will be questions, fill in the blanks (of Character Action Time and Storytelling), and ways to decide which additional information they would like to receive through QR codes. Since there are limitations with the technology and time at the Tower, the application will focus on introducing ideas such as imagination, brainstorming, and other tools necessary for storytelling. Then, when the family is back at their home or hotel, they will have the option to write their own story in full. We can evaluate this by evaluating the application for its effectiveness in incorporating all components of C.A.T.S. at each of the four locations in the Tower.

4.3.5 Engagement

To engage children, they are given the opportunity to answer questions, take pictures, record audio, and partake in role-playing in the original program. In the new application, we will not be able to transfer all of these aspects but we were still able to engage children. Depending on the capabilities of the platform, the children should be able to take pictures, role play with their parents, answer questions on the iPad and out loud. Engagement can be measured by the amount

of time interacting with the area, a person, or the application. This interaction time should be significantly more than the time spent listening.

4.3.6 Closure

The current program comes to a close for the students on presentation day with their families and the bookkeeper. This gives the students a final goal to look forward to while also tying everything that they have done together by freeing the bookkeeper. Our application provided closure both at each location throughout the application as well as at the completion of the application. Throughout their journey through the Tower, families were trying to answer as many comprehension questions as they could correctly so that they could earn a high ranking in the Tower Court. Each correct answer gave them 5 tokens toward earning their ranking. These questions are administered at the conclusion of each location, giving the families a brief summary of what they have learned from their time there.

After the families visit as many locations as they choose, they will have collected the stories and answered the questions that were required to free the bookkeeper. This gives them a sense of completion of the overall task the application presented at the beginning. Once the bookkeeper is freed, the family will be given information on continuing their quest at home and they will also be given recommendations of what else to see at the Tower. We ensured that there is closure by having a reward at the end of the program and the ability to go home and write their own story. As we completed our design process, our project has determined that these key components will be the most important elements for creating a successful digital resource for use at a heritage site.

4.3.7 Storyboarding

Storyboarding is a vital component to designing an application because you are able to quickly organize your ideas without going into too much detail. With the storyboard structure we used, our group was able to easily make edits to individual pieces of our design. The structure of the storyboard pages also allows our group to display the design of the narration, images, and concepts that will be included on each page of the application. Because of the nature of these storyboards, we were able to transfer to the actual programming of our application very quickly.

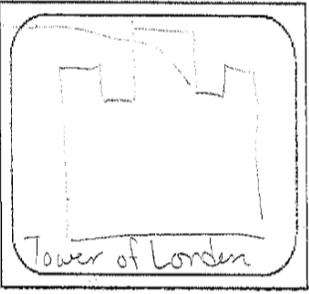
<u>PAGE:</u> 1	<u>DATE:</u> 31-Mar	<u>PROJECT NAME:</u> PEP	<u>AUTHOR:</u> Ilea
		<u>FRAME DESCRIPTION</u> <ul style="list-style-type: none"> · picture of the TOL · text: TOL · Narrator's voice 	<u>MEDIA LIST AND DESCRIPTION</u> <ul style="list-style-type: none"> · photo · text · voice recording ..
<p><u>NARRATION:</u> Narrator: Welcome to the Tower of London but we can't talk here. It's not safe, someone might hear us. We must be somewhere private. Quick, hurry down to the Ravens's cages, remember @ on your map and press play. When you get there. Be quick and watch out for guards.</p>			

Figure 10: Example fo 'Digital Storytelling Storyboard' used for prototype creation (Refer to Appendix P for all storyboards).

4.4 Formative Evaluation

We had two families visit the Tower of London to test the two drafts of prototypes what we created. The first family tested the introduction at the Ravens Cages, the Menagerie, and the ending at the Queen's house in order to test the overall concepts. The second family was able to run through the program in its entirety, giving us incite into the length as well as design concepts of our program.

4.4.1 The First Family

The first family that we had test the prototype visited the Tower of London on April 10, 2012. The family consisted of a mother, father, seventeen-year-old son, and a nine-year-old son. Two of the project team members observed the family use the prototype to see how they interacted with the application, the Tower of London, and each other. We saw that the seventeen-year-old had control of the iPad throughout the family's usage but that the nine-year-old always answered the questions. Additionally, we observed that the family collaborated well, interacted with both the application and the Tower, but had trouble using the QR codes. The codes were placed too close together on the supplemental map, causing the family to accidently scan the

wrong one. This observation demonstrated that the project team would need to reorganize the map that was provided to the family in order to make scanning the QR codes easier.

The project team also interviewed the entire family after the completion of the prototype. We received a lot of encouraging feedback while also learning what the family took away from the program and what would make the application easier to use. The family suggested that we implement back buttons to make navigation of the application easier. This would also help with the QR code sensitivity since if they accidentally chose the wrong one, the program can easily be set back to where they want to be.

4.4.2 The Second Family

The second family visited the Tower of London on April 14, 2012. They consisted of a mother, father, two eight-year-old daughters, and one six-year-old daughter. The daughters used the iPads the majority of the time and typed in answers with ease. Since we had made the changes with the map, the QR codes were less sensitive but were slightly harder to scan.

In the post-testing interview, we were given a lot of insightful feedback from the entire family. They thought the questions towards the end were too tedious since there were many questions throughout the application. Because of this, we have removed some of the questions in order to make the program shorter and easier to use. The family also suggested that we have a menu at the beginning of the program so that the family can move around by location and pick where they would like to go. This idea was not implemented in the short time we had after the formative evaluation but will be discussed in the recommendations section. Finally, the run time on this testing was approximately one hour and forty minutes, which far exceeded our ideal time limit. Nevertheless, with the changes that we made and the recommendations we gave, the program should last approximately an hour.

4.4.3 Overview of Initial Evaluations

The responses that we received from the visiting families made it possible for us to make many revisions of our application while making it more user-friendly, engaging, and entertaining. The families gave us many useful suggestions on how to make the application and the printed material easier to understand and use. These suggestions prompted the creation of

back buttons, a new format of the map, and indicators of progress throughout the application. There were also many suggestions that would make the application easier to use but were far above the technical capabilities of our platform. These included GPS location map of where they families were and where they are going.

To improve how engaging and entertaining the application was the families suggested that we cut down on some of our information and focus more on the middle sections rather than the introduction. The main suggestion the project team received in regards to engagement from the first family was to have a shorter video of the bookkeeper during the introduction. The family liked the video overall and connected to it throughout the application but was too long. This video was replaced for the second family's visit but because of this change the family had less of a connection with the bookkeeper. To re-create this experience we altered the narration at the beginning of the application. The overall introduction section took longer than some of the middle sections where the family is learning more information. We reduced and condensed the instructions to more the introduction along at a faster past.

4.5 Success of Our Prototype

Our design principles were the key in the successful creation of our prototype. With the use of design principles, we were able to verify that we designed components of the application that incorporated the key elements the education department felt would be necessary to include. After verifying that we included all key elements that were said to be important in creating an engaging, educational, digital resource, we were able to test the effectiveness of these components on two live families. With the success of the initial testing of our prototype, we were given confirmation that our design principles were appropriate to recommend for future use in design processes for similar programs.

5. Conclusions and Recommendations

Through our project team's work to design and create a digital application, we were able to better understand the how to apply our previous research. Through our implementation of background research and original ideas, we were able to determine what aspects of our prototype were successful as well as many recommendations that could produce an improved future design.

5.1 Creating a Framework for an Effective Transmedia Resource

Our project team found that the organization of our transmedia family resource was successful in engaging families while also incorporating key concepts including storytelling and critical thinking. By utilizing seven of Historic Royal Palace's (HRP) pre-determined design components in our application, we were able to create a resource that encompasses the goals of the original program, such as storytelling, ease of use, repetition, short burst of learning, contingency, strategic placement, and closure. These seven components were all present in the original program and we wanted to ensure that they were properly transferred into our application. By utilizing these design components, our project team was able to overcome many obstacles, such as replacing a live facilitator and transferring a program created for schoolchildren to a program that will engage the entire family. Because of this, we concluded that our design process would be successful in creating applications of this nature in the future. To leave HRP with the framework to recreate our design, we referred them to sets of charts demonstrating our design process's organizational structure, especially the Design Heading/Characteristic Charts, which encompass all seven of these components. We used these charts to create our prototype, and they provide step-by-step instructions on how to re-create and adapt our process. These charts can be seen in Section4.4.1.

5.2 Incorporating Storytelling into a Digital Application

Our use of prompting the user with questions for characters, actions, times, and settings (C.A.T.S.) in order to fill in blanks in pre-created stories was an effective way of incorporating storytelling into a digital application. The education department at the Tower used the elements of Character, Action, Time, and Setting (C.A.T.S.) to aid in children's creation of stories about

their journey through the Palace Explorers Program. In the on-site application, the project team incorporated storytelling by providing families with pre-determined stories in each location and allowing them to provide the elements of C.A.T.S. We presented families with questions that stimulate their imagination and guide them to fill in these blanks with relevant words. By answering these questions, children were able to understand the necessity of these key ingredients to help encourage them to continue to create. This adaptation of storytelling was very successful in our prototype testing, as our team members were able to observe a high level of engagement from all family members during the storytelling pieces of the application, as can be seen by their sharing of the iPad as mentioned in sections 4.4.1 and 4.4.2. Additionally, we received feedback from our first family that the storytelling component was one of their favorite parts of the program.

The creation of the short, fill in the blank stories for our application was not a short process; it took many drafts of writing to create stories that were acceptable. To create stories for our application, we found that removing too many elements C.A.T.S in our story produced an incomprehensible result; families were given too much control over the major components and the flow of the story was ultimately lost. We needed to find the balance between giving families a role in each story's creation without undermining the overall content. Through trial and error, we found the best way to produce a cohesive story was to carefully word the fill in the blank questions to encourage families to provide narrow, one to two word answers. The short answers made it hard to deviate from the target concept we had designed the story to include.

The overall reaction to our implementation of storytelling was positive. While the overall concept of storytelling as an educational tool had already been validated in the original program, our application shows that storytelling can be effective in a digital form. The families answered many fill in the blank questions throughout the application that indirectly teach the children about character, action, time, and setting (C.A.T.S.). Learning the aspects of storytelling will help the children learn beyond the classroom and teach them tools that will aid their learning in the future.

5.3 Benefits of a Digital Resource

The results from our initial testing indicated that a digital resource was more engaging and effective at capturing the original program than a family trail would have been. We observed the application's ability to create an atmosphere where every member of the group can be educated while also entertained which can be seen in section 3.4. The parents were especially interested in the historic information or identification of points of interest included in the narration, a feature that is not available in a family trail. In addition, during our visit to Kensington Palace we observed parents idly watching as children spent time alone completing the activities in the family trail. The family trail failed to achieve the same level of family engagement as our prototype. Overall, we were able to incorporate more of the original design into the application than we would have been able to into a family trail built around written signs.

The project team found that if there were solely pictures in a supplemental museum resource, then the family would lose interest and engage in the surroundings instead, especially when using a family trail. Since the design of a family trail is limited to pictures and text, this was another argument in favor of creating a more interactive digital application. To find a balance between engagement with our application and engagement with the surroundings, we implemented a combination of pictures, video, and audio. The portions that contain pictures allow the family to explore and look around the Tower while listening to audio. The video portions bring the families attention back to the application and re-engages them in the goals and objectives of the activities. We wished to include the ability for users to record audio and take pictures within the application, but this was not possible due to limitations in the platform used to create our prototype. We believe that by incorporating these elements, the application will further integrate user interaction with the application and their surroundings, a design limitation found in family trails.

5.4 Platform

For the future use of this application, we recommend that the Tower of London and other Historic Royal Palaces consider using more advanced platforms than AppFurnace to further enhance the user experience. The two main aspects that we would have liked to integrate into our application were the families' ability to take and record their voices for use within the

application. The framework of our prototype without these additions is still effective, but more components of the original program could be added with use of these tools.

We found that an open source platform, such as PhoneGap or Rho Mobile, is able to incorporate all aspects in our AppFurnace application while also including audio recordings and pictures. The ability to use these features would incorporate more key concepts from the original program and would make the application more engaging. In the current digital prototype, the children are able to take the map with their drawings and their stories home with them. By incorporating photo capabilities into the application, we would increase the sentimental and nostalgic experience for the families, as they would also be able to return home with photos and audio recorded at the Tower. Also, the ability of the children to record and playback their own voice would increase their interest in the application and technology. The addition of these components would create a larger interest in the quest and digital literacy for families overall.

From an application programming standpoint, the use of open source platforms, such as PhoneGap or Rho Mobile, have advantages over AppFurnace. AppFurnace was the ideal program platform for the creation of our prototype due to its low learning curve and the ability to test designs for free. However, AppFurnace cost to publish and programming limitations would not be able to create a full-featured app such as the one we designed. Open source platforms require a bit more background programming knowledge as well as an iOS developer account, which is used to publish iPad and iPhone applications. The only cost associated with open source platforms is the \$99 dollar yearly fee for an iOS developer account. In addition, the ease of use is a large factor in choosing to create an application in either of these platforms. PhoneGap's programming interface integrates with Dreamweaver, software HRP is already familiar with while Rho Mobile's layout is divided into sections so the programmer can easily edit one without disturbing the other. Overall, these platforms are more fully featured and cheaper to publish an application with than Appfurnace, making them more suitable to use by HRP for future application creation.

5.5 Replacement of Live Facilitators

There are many challenges to overcome when transferring a program with a live facilitator into a digital resource. These include an application's ability to direct families to the

correct location as well as guiding them enter a logical response to fill in the blank prompts. Throughout our prototype testing and revisions, we observed that the families found it difficult to follow the map and arrive at the correct location, even when we integrated colored paths onto the map. We also received suggestions such as incorporating a GPS tracker into the GPS to help guide the group. However, this would not be plausible at the Tower of London since the thick stonewalls disrupt GPS signals. To improve the navigation of the application, we concluded that the integration of the map within the application at each location of transition would be more successful. We also recommend that the map in the user interface include the approximate duration at each location, giving families the ability to see their progress in the application. This will make it possible for the family to engage in as many locations as possible while also having more control over their experience. The current map can be seen in Appendix X.

5.6 Presence for Characters

From our prototype, we concluded that narration of the quest allowed families to connect to the application and location both during their visit to the Tower and after their visit has ended. In our application, we hoped to create a strong connection between the families and the Bookkeeper, since that was one of the main successes of the original program. In the original program, the children would believe that they had heard the Bookkeeper yelling from the Queen's house even though he was not actually present. Since our digital application didn't give families an opportunity to meet the Bookkeeper, we incorporated a short video to achieve a personal connection. Our first prototype had a five-minute video introducing the bookkeeper which provided a family with a solid connection to him. However, the length of the video led the family to become less engaged in the application.

We addressed this issue in our second prototype by using a forty-eight second video. This video kept the family's interest but did not leave them with a lasting impression of the bookkeeper, and they had forgotten who he was by the end. We believe that by using the bookkeeper's voice to narrate portions of the application in conjunction with the short video will give the family a strong connection with the bookkeeper all the way to the end. This addition would also add continuity to our application, aiding in the closure families receives once the Bookkeeper is freed.

Since our project team created this application to highlight areas of the Tower that would interest children while not being extremely crowded, we found families were still interested in visiting the Tower's popular exhibits upon the application's completion. We concluded that an effective way to conclude the application would be to tie the Bookkeeper back into the structure by having him recommend his favorite locations within the Tower to the families. This would allow the children to have one last interaction with the Bookkeeper where they are shown him thanking them for their help and are guided to other historic locations within the Tower.

5.7 Extending to Hampton Court Palace and Kensington Palace

Since Hampton Court Palace has open spaces, inside and out of buildings, and an environment that is suitable for children of all ages, we suggest that this application is reproduced for the use at Hampton Court. There would need to be content changes in regards to locations within Hampton Court, the narratives, and the stories but the overall structure of the application will still function well overall. The structure of the fill-in-the-blank, multiple choice questions, the QR codes and the end result of the story will remain the same and should remain equally effective. The main concepts of the application such as the freeing of bookkeeper, the overall explorers concept, and incentive structure of the Tower Court will all also remain effective at Hampton Court Palace. The following design steps will assist in the adaptation of the new prototype application to fit the needs of Hampton Court Palace.

1. Determine the educational content and desired user interactions. Use a chart containing the questions and characters portions of the Original Program Session List (Design Section 4.1.1 Creating Program Structure) to organize this information.
2. The Design Heading/Characteristics Graph (Design Section 4.1.1 Creating Program Structure) allows Historic Royal Palaces to develop a chart comparing their desired program to design characteristics and Generic Learning Outcomes. The Original Program Relation to Design Heading/Characteristics Chart (Design Section 4.1.1 Creating Program Structure), is a tool used to check the program before development to ensure that any prototype meets key design components chosen by HRP.

3. After educational content and desired user interactions have been compared to chosen design characteristics then a New Program Flow Chart can be created (Design Section 4.1.1 Creating Program Structure). A flow chart will show logical progression of activities and locations the new program will entail.
4. Similar to the session lists created for original educational content, lists are then created explaining the details of the new program. These lists, New Program Location Information Lists (Design Section 4.1.1 Creating Program Structure), are a crucial step before storyboarding because they explain all the educational content and desired user interactions for a new program.
5. Finally comparing the new program content to the Design Headings/Characteristic Charts will ensure that the new program ideas meet the design goals and objectives. The chart, New Program Relation to Design Heading/Characteristic Chart (Design Section 4.1.1 Creating Program Structure), allows HRP to adjust the program as necessary to meet design characteristic requirements before proceeding to the storyboarding phase.

Kensington Palace is much different than the Tower of London since it is much more sophisticated, has smaller areas, and is not suitable for children of all ages. If the application were to be used at Kensington Palace, we believe that it should be placed in the Victoria Revealed section, where the family leaflets take place. Kensington Palace has live music and an environment that may be disrupted by the audio in our application. There would need to be some changes to how the family engages with the iPad for the application to be effective at Kensington.

5.8 Continuing the Connection with HRP

We recommend that HRP incorporate a way for families to email themselves their stories and also provide a link between the application and HRP website to increase interest in the organization. Due to technical limitations, the project team was unable to implement this suggestion by connecting the application to an online source such as a blog or HRP website. By creating a way for the families to email the stories that they have written to themselves, it would not only act as an incentive but also create a more personal memory for the child and the family

overall. The link between the application and HRP website would create an opportunity for the children to write their own stories once they arrive back home. This thought is modeled after the original program where the children learn about the history of the Tower and the key aspects of storytelling and then is instructed to write their own story at home. This would also be a chance for the families to revisit the Tower of London and HRP website which would improve their patronage.

5.9 Implementation Recommendations

Through our different stages of prototyping we have found that the families prefer to have options on what activities they partake in, to use an application that is an appropriate length, is easy to use, and is not an inconvenience to them. These can be easily provided in the implementation of the application. While applying these changes, we need to keep in mind that Key Stage Two children will be using the application and hopefully have control of the tablet or smartphone as in our prototype testing sessions. The application must be usable for people of all ages and technological knowledge.

Both the literature and our previous knowledge of the application show that people respond better to activities when they have a choice. Choice of location to visit can be implemented more obviously and effectively through a menu at the beginning of the application so that the family can choose early in their visit. The menu will also contribute to the navigation of the overall program.

To maintain a family's interest in the application we recommend that the playing time of the application be reduced from approximately one hundred minutes to the range of forty-five to sixty minutes. We believe that the application should be within these time limits since many visiting families do not have an entire day to spend at the Tower of London and there are many other attractions, tours, and activities at the Tower that the families may want to partake in. We incorporated contingency into this aspect of the application since the families have the chance to skip locations or scan as many or as few QR codes as they would like during their usage. To reduce the length of our prototype, we suggest that the fill in the blanks are reduced. In many cases the fill in the blank sections have three words or phrases to fill in and we believe it would be just as effective if there was only one. Since the effectiveness of the application would not be

compromised and the changes are relatively simple, the shorter length seems much more appropriate.

With the audio limitations of smartphone and tablets, it is vital that the application leads the families to areas that have minimal foot traffic. The original program was able to use locations that an entire class could fit in and hear the facilitators. In our application we needed to ensure that the family was in a relatively open area where they could hear the narration and take their time. If a family is in a crowded area it will make it difficult for them to hear and it will also take away from their engagement in the activities.

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Appendix A: Sponsor Description

What was once a private country house, Kensington Palace has now become not only a place for members of the royal family to stay, but also a place for preserving history and educating those who visit. After William III and Mary II bought the palace in 1609, it was used as a royal residency until George III made Buckingham Palace his permanent residence in 1760. From this point on, Kensington Palace no longer housed the Monarch but the private apartments were still used by other members of the Royal Family including the late Princess Diana. Kensington Palace, the Tower of London, Hampton Court Palace, Banqueting House, and Kew Palace are all currently overseen by the Historic Royal Palaces (HRP).

Prior to the 18th century, before Historic Royal Palaces was created, The Crown Lands Act of 1851 allowed the British government to maintain and manage the palaces. HRP buildings are owned by the reigning queen but she does not have the right to “sell, lease or otherwise dispose of any interest in the palaces.” In 1989 HRP was established “as an Executive Agency of Government within the Department of the Environment” (Historic Royal Palaces 2004-2012). Later, in 1995, what is now the Department of Culture, Media and Sport gained control of HRP. On April 1, 1998 HRP became an independent charity by Royal Charter with a Board of Trustees.

Kensington Palace has been under heavy renovations since 2010 with a scheduled completion date in March of 2012. However, this is not the first time that the palace has been under restoration. In the late 19th century, Kensington Palace was in dire need of restorations since it had been used to store goods from other palaces. In April 1897, Parliament agreed to fund the restoration with the requirement that the State Apartments would be opened to the public. When renovations finished in 1899, both the King’s and Queen’s Apartments and the Royal Ceremonial Dress Collection were made available to the public. Currently, one large scale project being added is a new learning center, funded by the Clore Duffield Foundation. Several other changes are the repositioning of the Royal Ceremonial Dress Collection, creation of more opportunities for adults in education programs, a music book gifted to the palace that belonged to Queen Victoria’s mother, a historical view of Queen Victoria’s personal life and new gardens, designed and landscaped by the Garden and Estates crew.

While the main part of Kensington is under renovation the palace did not close entirely until mid-January of 2012. In order to receive visitors during restoration the Enchanted Palace Experience was created in the state apartments of the palace. The Enchanted Palace Experience was designed to showcase some of Kensington’s rich historical presence in a new and engaging atmosphere. The palace worked with Wildworks, a theatrical company from Cornwall as well as famous fashion designers to interactively tell the story of the palace and the seven princesses that once occupied its walls. This exhibit opened up late March 2010 and closed with the palace just recently. The Enchanted Experience at Kensington increased the visitor numbers by 11%. However, there has been a fluctuation in the number of visitors over the past few years which can be linked to the recent renovations. The success of the engaging and storytelling method is also being used to branch out the history of the palace in other ways including the ‘Palace Explorers’ project that is geared towards the historical education of school children.

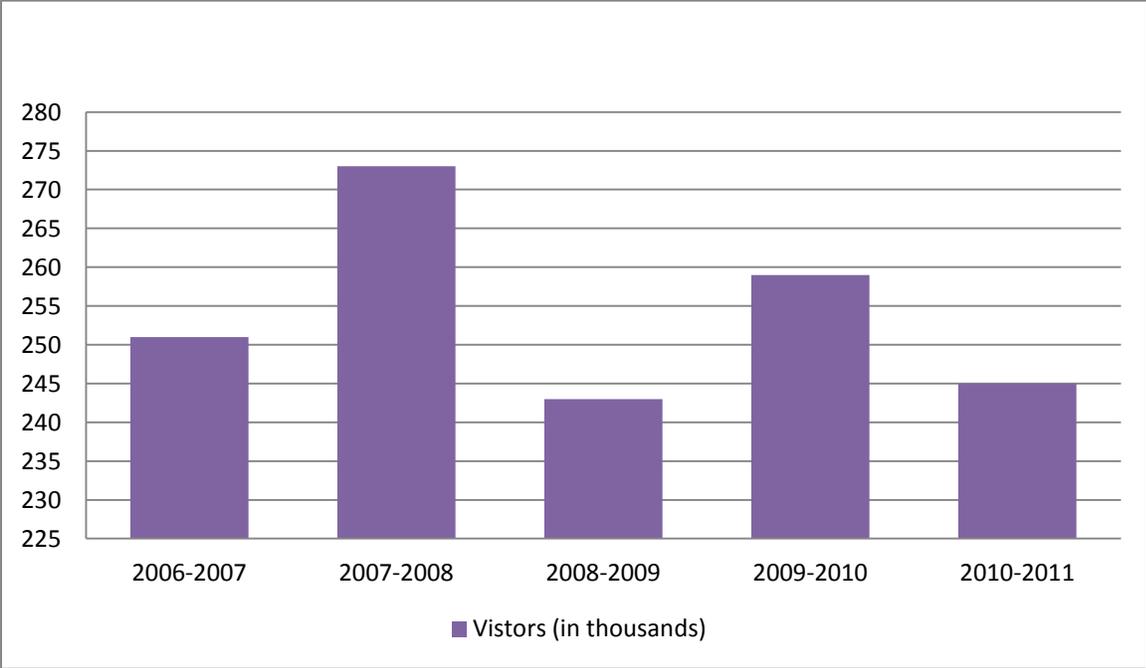


Figure 11: Visitor Information at Kensington Palace

Kensington Palace is vital in preserving and teaching history. The main objectives of the Palace, as described in its Royal Charter, are “to manage, conserve, renovate, repair, maintain and improve the Palaces to a high standard consistent with their status as buildings of royal,

historic and architectural importance” (HRP Financial Statements 2011, 2). The overall mission of Kensington Palace is “to help everyone explore the story of how monarchs and people have shaped society, in some of the greatest palaces ever built” (HRP Financial Statements 2011, 2). In order to achieve this mission Kensington Palace follows four main principles: guardianship, discovery, showmanship and independence. The palace also has five strategic aims in order to face future challenges that may arise. These aims include “give the palaces the care they deserve, transform the way visitors explore their story, have [a] wider impact in the world, build one organisation united behind our Cause, and generate the money to make it all possible” (HRP Financial Statements 2011, 3). The four principles are closely related to the five strategic aims and both manifest the beliefs that make the mission statement true.

Management also plays a key role in the preservation of these remarkable pieces of history. Kensington Palace is managed by HRP and is governed by a Chairman and Eleven trustees. The Chairman and four of the trustees are appointed by the Queen of England and the remaining seven are appointed by England's Secretary of State. Three of the trustees are appointed by the Queen, and two of the trustees are appointed by the Secretary of State. These trustees are The Director of the Royal Collection; The Keeper of the Privy Purse; The Lord Chamberlain; The Constable of the Tower of London; and The Chairman of HRP's Campaign Board. The Lord Chamberlain may give up his appointment, in which case the Queen can appoint someone to take his place. Under the Board of Trustees is the Board of Executives. This board consists of a Chief Executive and eight directors who work part-time and are un-paid. The directors are the Conservation & Learning Director, Retail Director, Tower Group Director, three Palaces Group Directors and Finance Director.

Funding is a vital aspect of the success of Kensington Palace and the other Historic Royal Palaces. The Historic Royal Palaces Enterprises, Ltd was formed in order to manage the charity's financial activities. Despite HRP not receiving funding from the Crown or Government, Kensington does receive monies from the Monarchy. Maintenance and utilities in office space and residential areas are paid for by a property service grant-in-aid. This money comes from the Department for Cultural, Media and Sport, a department to the Royal Household. In 2011 the maintenance projects performed at Kensington that were paid for by the Monarchy totaled £100,000. The grant-in-aid money also goes to the salaries of 34 staff personnel that are

distributed amongst Kensington Palace, Buckingham Palace and St. James's Palace (The Royal Public Finances Annual Report).

Membership fees are the primary funding for HRP in general but individual donations are also often made for specific projects and renovations while. Membership options range from being able to access all five historic sites to only visiting one palace as well as either a family or individual option. An admission fee to the palaces helps with the cost and maintenance of the individual sites. HRP's spending increased by 6% in 2011 largely attributed to Kensington's renovations project. By the end of the March 2011, HRP had a total of £3,197,000 as an income from grants and donations which increased from £2,086,000 in the previous year. HRP was also able to generate £17,692,000 in unrestricted funds through retail income, functions and events, licenses and rents, and sponsorship (HRP Financial Statements 2011, 17). In 2011 alone, fundraising for the palace reached £5 million, just shy of the £5.7 million that was the set target. The total cost of the project, titled "Welcome to Kensington- a palace for everyone", settled in right around £12 million. Apart from HRP, financial resources came from a variety of donors. Last year HRP had 3.26 million visitors at their historic venues in London (HRP Financial Statements 2011). In order to accommodate the amount of visitors, HRP has 709 employees and 239 volunteers who focus on maintaining the historic venues and educating its visitors. When Kensington reopens in late March the admissions cost for an individual adult will come in at just over £14, with children 16 years and under able to enter for free.

Consolidated Statement of Financial Activities

for the year ended 31 March 2011

	Unrestricted	Restricted	Total	Total
RESOURCES EXPENDED				
Costs of generating funds:				
Fundraising	946	-	946	692
Retail activities	7,917	1	7,918	7,927
Other commercial activities	2,642	-	2,642	2,293
	11,505	1	11,506	10,912
Charitable activities:				
<i>Give the palaces the care they deserve</i>	16,182	534	16,716	15,695
<i>Transform the way visitors explore their story:</i>				
Public access	19,291	107	19,398	17,389
Interpretation and learning	7,553	69	7,622	7,537
<i>Have a wider impact in the world</i>	4,021	-	4,021	3,603
Governance costs	4	480	-	480
	47,527	710	48,237	44,628
Pension finance (income)/costs	8	(58)	-	494
Total resources expended	3	58,974	711	59,685
Net incoming/(outgoing) resources before transfers		192	2,392	5,758
Actuarial profit/(loss) on pension plan	8	1,830	-	(745)
Net movement in funds		2,022	2,392	5,013
Fund balances brought forward at 1 April	5	24,011	3,968	27,979
Fund balances carried forward at 31 March	5	26,033	6,360	32,393

http://www.hrp.org.uk/Resources/HRP-Financial-Statements-2011-v4a-FINAL_2.pdf

Figure 12: Consolidated Statement of Financial Activities

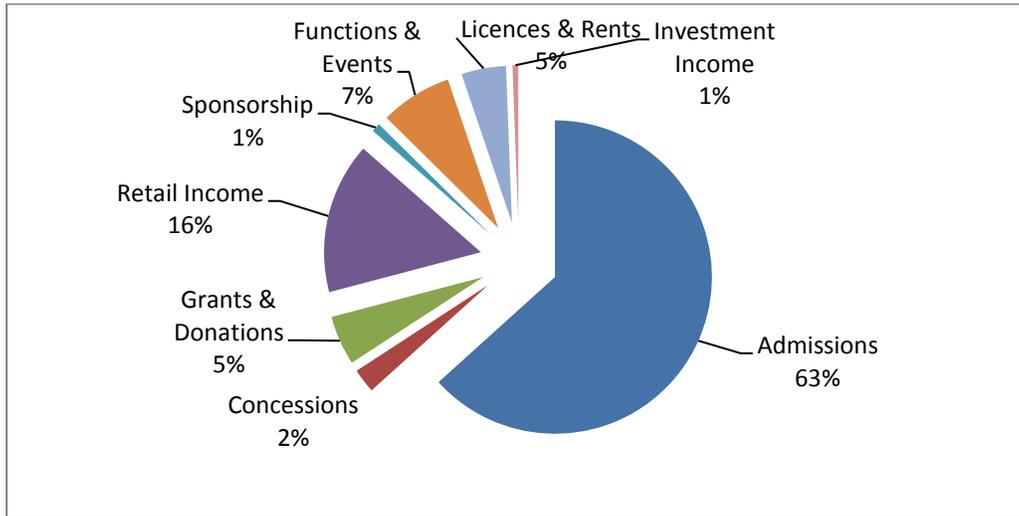


Figure 13: Income 2010-2011 at Historic Royal Palaces

Kensington Palace has become successful through its management, sound financial organization, and exciting exhibits. It has been able to educate those who have visited the museum and with the Palace Explores Online project, Kensington Palace will be able to educate people from all over the world.

Appendix B: Museum Professional Interview Form

Museum Professional Interview Form

NAME: _____

- 1. What is your professional title and how long have you worked in this position?**
- 2. Compared to other museums in the area, how effective is the technology at the Tower of London?**
- 3. How familiar are you with the Palace Explorers Program?**
- 4. What do you feel were the successful aspects of the original Palace Explorers Program? What were the shortcomings?**
- 5. What do you believe the goals of this new program are?**
- 6. Do you see any possible problems that may arise as we take the exhibit and make it a more engaging digital experience?**
- 7. More specifically, what do you believe the Tower of London hopes to do with families that they were unable to do in the classroom due to restrictions in the curriculum, time constraints, etc.**
- 8. What modifications usually take place in order to accommodate family learning? Are there other programs that have gone through a similar transformation in the past?**
- 9. What should the duration of the exhibit be for visitors?**
- 10. Will visitors be provided with iPads or iPhones in order to go through the on-site exhibit?**
- 11. If so, what will the ratio of iPads/iPhones to visitors be and how many iPads would be available?**
- 12. Should the application's design include the option to add WiFi capabilities in the future?**
- 13. Will the application be solely an on-site activity, or will it link to an online supplement?**
- 14. Can you think of any similar programs that have been implemented in the past? Were there any technological flaws with this/these program(s)?**
- 15. What steps were taken to solve these problems and avoid them in the future?**
- 16. Is there anything else you would like to tell us?**

NOTES:

Appendix C: Museum Professional Interview Form: Ina Pruegel

Museum Professional Interview Form

NAME: Ina Pruegal

DATE: 03.12.2012

1. What is your professional title and how long have you worked in this position?

Digital Learning Resources Officer. 2 years.

2. Compared to other museums in the area, how effective is the technology at the Tower of London?

...

3. How familiar are you with the Palace Explorers Program?

Works directly with PEP

4. What do you feel were the successful aspects of the original Palace Explorers Program? What were the shortcomings?

Biggest Success: Using Storytelling to facilitate education of the history of the TOL.

The main idea is story telling.

CATS (Character, Action, Time, Setting)- the important main idea conveyed to students so that they can tell stories to help free the bookkeeper

5. What do you believe the goals of this new program are?

How to create an application that facilitates collaboration between parents and children. Believes the storytelling is a great way to accomplish this task. "on a journey" "describing their expedition"

6. Do you see any possible problems that may arise as we take the exhibit and make it a more engaging digital experience?

Must create an experience engaging to a group.

No access to WiFi at the TOL (other than visitor center)

International visitors are limited with lack of access to 3G service as well as possible language barriers

Current program has museum guides helping to guide learning (on-site, in classrooms, online). Advertising will be important to help attract users.

Multiple forms of initiating journey through the TOL. In classroom there is a video of the bookkeeper on a blog. Will need to create a video for the website, pamphlets, signs, etc. to advertise to visitors.

DURING PROGRAM: IDEAS → paper trail for families, QR Codes on a map of the Tower...physical hand outs.

7. More specifically, what do you believe the Tower of London hopes to do with families that they were unable to do in the classroom due to restrictions in the curriculum, time constraints, etc.

Instead of 4 sessions, this should be 1-2 sessions. The first is onsite and the second is a follow-up to the activities completed on the visit. Depict the awe that visitors have when first entering the TOL.

8. What modifications usually take place in order to accommodate family learning? Are their other programs that have gone through a similar transformation in the past?

This is the challenge of the project. We will need to observe the interactions of families with the prototype to find out if our ideas are true.

9. What should the duration of the exhibit be for visitors?

Similar to that of the current PEP. It does a good job of taking the group through the Tower logically without overloading students with too much information and facts.

10. Will visitors be provided with iPads or iPhones in order to go through the on-site exhibit?

Visitors will not be provided with these technologies on a day-to-day basis. It may be possible to arrange for special groups to borrow iPads but that will be on a case-to-case basis.

11. If so, what will the ratio of iPads/iPhones to visitors be and how many iPads would be available?

See above.

12. Should the application's design include the option to add WiFi capabilities in the future?

...

13. Will the application be solely an on-site activity, or will it link to an online supplement?

The hope is to be able to have an off-site follow-up when they return home. Details remain up in the air. INQUIRE FURTHER.

14. Can you think of any similar programs that have been implemented in the past? Were there any technological flaws with this/these program(s)?

Not discussed in detail. "Escape from the Tower...Not very good."

15. What steps were taken to solve these problems and avoid them in the future?

Partially being worked out with this project...?

16. Is there anything else you would like to tell us?

Important people:

- Michelle-librarian for PEP
- Joy-works for parents of PEP
- Southerland might have

Notes:

PEP itinerary:

- 4 sessions (1&3 in class, 2&4 online)
- get code, crack code, get blog
- children receive letters from the bookkeeper
- bookkeeper asks for help (get passwords)
- Michelle Visits school
- Children write stories using CATS → introduce someone to help
- Pin things up on giant poster. Documents the drawings and writing, things received, etc.
- Get password
- **Second Itinerary:**
- School children come to TOL
- Meet Michelle but not bookkeeper b/c he is imprisoned.
- Tour palace, hear characters & setting
- Discuss in groups, answer questions
- Map of tower to find things (bookkeeper is in Queen's house)
- Show and tell for parents → includes audio files
- After each session receive password and task for bookkeeper

- Learning for storytelling
 - **At Celebration Event**
 - Parents
 - Children
 - Meet the bookkeeper
 - Tell their stories
 - Get certificate
-
- Bookkeeper available to record for app/collect pictures, audio recordings
 - Family forums at Kensington..?

Appendix D: Museum Professional Interview Form: Michelle Barton

Museum Professional Interview Form

NAME: Michelle Barton

DATE: 03.15.2012

1. What is your professional title and how long have you worked in this position?

- School Outreach Officer
- Contact for the schools element of project
- Deliver school sessions for the project
- Create sustainable links with local Primary Schools
- Develop pupils' confidence in exploring and engaging with historic buildings

2. What do you like best about the Palace Explorers Program? What do you like least?

EXPLORERS → key word

STORYTELLING → more detail in subsequent questions.

Not enough contingency.

3. What do you think the most effective component of the Program is? What is the worst?

Works well: Multiple engagements from multiple visits → wont get that with the app

Repetition is a part of learning

Characters and settings mentioned in session 4 are from other sessions

Ownership of knowledge → what do you know? Not just telling them

Questioning: what do you know and how will that relate to new sites

4. What do you fear the program will lose as we transfer it entirely on-site?

What level are the parents at?

Preconceive that every parent is going to be middle class → make sure language used so the parents and kids can both understand

Use visual clues

Narrative with many pictures. Add in questions.

Push parents to help engage with child

Common misconception that stories are for children, usually stand back.

Love the iPads → new technology

Make sure children are the ones using the iPad, it shouldn't be the parent leading it

5. What is the most important aspect from the current program that you would want us to transfer?

Teachers love the learning through stories

Read a story with child is more fun

More interesting to get a narrative that you can be a part of
Collaboration of kids and parents creating details of the story
Children love to role play and pretend to be adults. (look at childrens toys)

Kids like to touch, interact with people that have the costumes on (are we allowed to?)
TOL → kids are going to go up to yeomen should be integrated
Tell them where the bookkeeper is (Queens house) → must find building.
Firmly believe they can see the bookkeeper in the locked building

6. What do you would like the goals of this new program are?

Imersion of seeing, hearing, watching can make something imaginary more real

Find ways to show people the less well known things at the TOL

7. Do you see any possible problems that may arise as we take the exhibit and make it a more engaging digital experience?

Parents: wont know anything more than kids. Don't make parents look stupid. Form of engagement to find out together. Need to integrate that so parents are prepared.

Learning together

Adults: empathy and understanding the story behind it. Want the children to have fun. Often step back.
How can you engage them without making them look silly?

8. More specifically, what do you believe the Tower of London hopes to do with families that they were unable to do in the classroom due to restrictions in the curriculum, time constraints, etc.

Find out together what it is. Friendlier

Adults engage with it and child can find out what it is. Go find things together.

Kind of a family trail. Not written in formalized way

Main attractions → White Tower and Crown Jewels. What else do they do for an entire day?

9. What modifications usually take place in order to accommodate family learning? Are their other programs that have gone through a similar transformation in the past?

Adapt activities from original program in a way that engages children and adults together to achieve original program's goals.

Photographs of sections you would go and find in specific places. All related to holes. (key holes..)

Tate Modern- Tate Trumps-interactive game

Natural History Museum- Darwin Exhibit-ability to use digital resources and bring home what they want to learn more about.

10. What should the duration of the program be for visitors?

Given the choice: short or long

Can you start here and continue a lengthened version at home

National History Museum → get a key card and collect info at the site. Then go home and log in.

Object and a story. Not facts.

The children keep recognizing QR Codes. Want to inquire.

For children: short bursts. Longer engagement in chunks.

Learning style is different with families than in class. What is the attention span?

Put duration of each option on a pamphlet like it is done on the listening tour

11. Is there anything else you would like to tell us?

Opportunity to observe original program:

Celebration on the 31st of March 1030-1230, will meet BK at 11:15 and 1:15

What will they show their parents → sort of the ambassador of the cite for the parents

Possibly ask questions before and after, not while walking

Informal observation → parents that haven't taken part in family activities.

What do they know about the TOL?

NOTES:

N/A

Appendix E: Museum Professional Interview Form: Joy Ekpeta

Museum Professional Interview Form

NAME: Joy Ekpeta

DATE: 03.13.2012

1. What is your professional title and how long have you worked in this position?

Family intergenerational outreach officer. "Outreach officer" exclusively with PEP

Work with parents while Michelle in class. Relationships built post PEP. Legacy at school. Community-based. Plan is to have parents come up with own projects.

Joy Ekpeta-away from 14-26 March. Back 27th

2. Compared to other museums in the area, how effective is the technology at the Tower of London?

Answered partially in other responses.

3. How familiar are you with the Palace Explorers Program?

"Outreach officer" exclusively with PEP

4. What do you feel were the successful aspects of the original Palace Explorers Program? What were the shortcomings?

- At first found children are really familiar with iPads from class, able to help teach parents

5. What do you believe the goals of this new program are?

What we want from parents?

Want to integrate iPads.

- Difficult → Children/Parent learning
- Authoritative figure won't let intuitive children take control "don't touch that"
- Shared learning sessions. Want physical product at the end, keeps people committed
- Keen to see if we could integrate iPads
- At first found children are really familiar with iPads from class, able to help teach parents
-

6. Do you see any possible problems that may arise as we take the exhibit and make it a more engaging digital experience?

- Accessibility to technology is challenging
- Resources and time are the main challenges

7. More specifically, what do you believe the Tower of London hopes to do with families that they were unable to do in the classroom due to restrictions in the curriculum, time constraints, etc.

Working together with parent-children collaboration. Don't want the parents to be watching the children

complete progression of program. Work together.

8. What modifications usually take place in order to accommodate family learning? Are there other programs that have gone through a similar transformation in the past?

- Difficulties with family interaction
- Project where parents lead
- Too difficult for children to do alone
- Example crown jewels: wires need parental help
- How to make parents get physically involved
- How can they work together
- Arrange for parents to do part of program
- More dynamic than past products

9. What should the duration of the exhibit be for visitors?

10. Will visitors be provided with iPads or iPhones in order to go through the on-site exhibit?

- iPhones are more common with families than iPads
- Are we expecting them to have a device (probably assume families have tablets)
- Recommend tablets, hope they have available technologies

11. If so, what will the ratio of iPads/iPhones to visitors be and how many iPads would be available?

N/A

12. Should the application's design include the option to add WiFi capabilities in the future?

13. Will the application be solely an on-site activity, or will it link to an online supplement?

14. Can you think of any similar programs that have been implemented in the past? Were there any technological flaws with this/these program(s)?

15. What steps were taken to solve these problems and avoid them in the future?

16. Is there anything else you would like to tell us?

Focus Groups

- Our Lady and St Elizabeth
- Parents coming, including dads

- Arrange date with Joy to arrange with school, busy schedules...drop in session?
- Incentives for helping
- Drop in session → best times before and after school hours
- Best if we visit the school
- 5 from each school

Appendix F: Program Evaluation Form: Nature Plus

Program Evaluation Form

Application Name: Nature Plus

Location of Usage: Natural History Museum - Darwin Exhibit

Date: April 17

Device Used: Touch screen devices at the museum

Price of Program: \$

Run Time: ~ 1 hour

Comment on the programs objectives: Gives information about exploration while providing resources to learn at home.

Strongly Disagree (1), Disagree (2), Neutral (3) Agree (4), and Strongly Agree (5)

The program is appropriate for the desired age range:	NA	1	2	3	4	5
The program runs well (lack of bugs and response time):	NA	1	2	3	4	5
The program is easily navigated:	NA	1	2	3	4	5
The program is an appropriate length:	NA	1	2	3	4	5
The programs graphics are appealing:	NA	1	2	3	4	5
Instructions are easy to follow and concise:	NA	1	2	3	4	5
The program includes repetition of facts:	NA	1	2	3	4	5
The programs offers contingency:	NA	1	2	3	4	5
Frequent short burst of learning:	NA	1	2	3	4	5
The program uses strategic placement:	NA	1	2	3	4	5
The program contains storytelling:	NA	1	2	3	4	5
The program offers closure:	NA	1	2	3	4	5
The program engagements the user:	NA	1	2	3	4	5
The program promotes equal participation:	NA	1	2	3	4	5
The program promotes collaboration:	NA	1	2	3	4	5
The program provides valid information and feedback:	NA	1	2	3	4	5
There is an effective incentive structure:	NA	1	2	3	4	5
Program meets its objectives:	NA	1	2	3	4	5

Sum of scores: 45 / 90

Additional Comments: Overall idea was good but it was hard to navigate due to design flaws (i.e. touch screen)

Appendix G: Program Evaluation Form: Tate Trumps

Program Evaluation Form

Application Name: Tate Trumps **Location of Usage:** Tate Modern **Date:** March 07
Device Used: iPad **Price of Program:** 0 **Run Time:** 30, 60, or unlimited
Comment on the programs objectives: To find paintings with specific traits in a certain time period

Strongly Disagree (1), Disagree (2), Neutral (3) Agree (4), and Strongly Agree (5)

The program is appropriate for the desired age range:	NA	1	2	3	4	5
The program runs well (lack of bugs and response time):	NA	1	2	3	4	5
The program is easily navigated:	NA	1	2	3	4	5
The program is an appropriate length:	NA	1	2	3	4	5
The programs graphics are appealing:	NA	1	2	3	4	5
Instructions are easy to follow and concise:	NA	1	2	3	4	5
The program includes repetition of facts:	NA	1	2	3	4	5
The programs offers contingency:	NA	1	2	3	4	5
Frequent short burst of learning:	NA	1	2	3	4	5
The program uses strategic placement:	NA	1	2	3	4	5
The program contains storytelling:	NA	1	2	3	4	5
The program offers closure:	NA	1	2	3	4	5
The program engagements the user:	NA	1	2	3	4	5
The program promotes equal participation:	NA	1	2	3	4	5
The program promotes collaboration:	NA	1	2	3	4	5
The program provides valid information and feedback:	NA	1	2	3	4	5
There is an effective incentive structure:	NA	1	2	3	4	5
Program meets its objectives:	NA	1	2	3	4	5

Sum of scores: 52/90

Additional Comments:

- Had numerous bugs
- Each player must have an iPad, smart phone, or other tablet.
- A lot of the painting couldn't be collected
- Good ideas - encouraged people to think in a new way

Appendix H: Program Evaluation Form: Escape from the Tower

Program Evaluation Form

Application Name: Escape from the Tower Location of Usage: Tower of London Date: March 12

Device Used: iPad Price of Program: € Run Time: 20 minutes per prisoner (4 prisoners)

Comment on the programs objectives: To teach families about the Tower while also engaging them

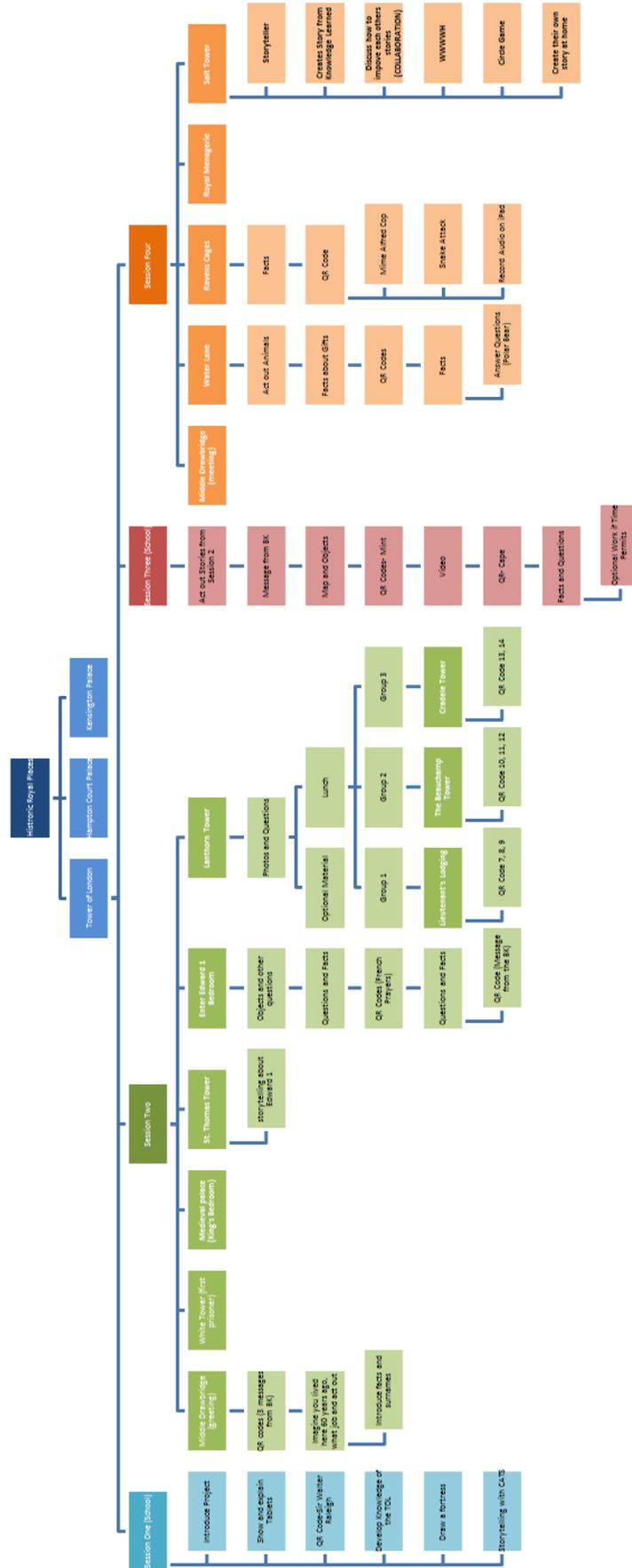
Strongly Disagree (1), Disagree (2), Neutral (3) Agree (4), and Strongly Agree (5)

The program is appropriate for the desired age range:	NA	1	②	3	4	5
The program runs well (lack of bugs and response time):	NA	1	2	3	④	5
The program is easily navigated:	NA	1	2	3	④	5
The program is an appropriate length:	NA	①	2	3	4	5
The programs graphics are appealing:	NA	①	2	3	4	5
Instructions are easy to follow and concise:	NA	1	2	③	4	5
The program includes repetition of facts:	NA	1	②	3	4	5
The programs offers contingency:	NA	1	2	③	4	5
Frequent short burst of learning:	NA	1	②	3	4	5
The program uses strategic placement:	NA	1	2	3	④	5
The program contains storytelling:	NA	1	②	3	4	5
The program offers closure:	NA	1	2	③	4	5
The program engagements the user:	NA	1	②	3	4	5
The program promotes equal participation:	NA	①	2	3	4	5
The program promotes collaboration:	NA	1	2	③	4	5
The program provides valid information and feedback:	NA	1	②	3	4	5
There is an effective incentive structure:	NA	1	2	③	4	5
Program meets its objectives:	NA	1	②	3	4	5

Sum of scores: 44 / 90

Additional Comments: - Very repetitive
- Not much happening on the screen

Appendix I: Original Program Flow Chart



Appendix J: Original Program Session Lists

Session 1 School	Cats Focus-Character	Questions	Actions	QR Code
		<p>What is an Explorer- clothes, find, look for, equipment</p> <p>Why was Sir Walter Raleigh imprisoned</p> <p>What is a fortress</p> <p>What do you protect in a fortress</p> <p>What do you find in a fortress</p> <p>Where would you build your fortress</p> <p>Why</p> <p>Who was the character in the story (story read to children)</p> <p>Can you describe what he looks/smells like</p> <p>What does he feel like</p>	<p>Imagine Explorers</p> <p>Draw Fortress</p> <p>Help in Flambard story</p> <p>Class awarded first letter of password for bookkeeper</p> <p>Class gets ID card with blog address- communicate w/ bookkeeper</p> <p>Use CATS -focus on characters</p>	Sir Walter Raleigh
		<p>Librarian</p> <p>Bookkeeper</p> <p>Explorer</p> <p>Sir Walter Raleigh</p> <p>King James I</p> <p>Elizabeth (before James)</p> <p>Ranulf Flambard</p>	<p>shows bag with tablet, magnifying glass, map, glasses</p> <p>Introduce QR codes</p> <p>Sir Walter Raleigh</p> <p>famous explorer</p> <p>tall, thick black hair, bold and fearless, dressed well</p> <p>soldier, explorer, writer</p> <p>distrusted by elizabeth's successor King James I</p> <p>1603 was accused of plotting against james</p> <p>striped of all offices and imprisoned at TOL</p> <p>remained for 13 years at TOL</p> <p>1616 released and returned to Guyana, unsuccessfully looked for gold</p> <p>his men captured and burned a spanish settlement</p> <p>spanish ambassador to england demanded punishment</p> <p>James I re-arrested Raleigh, charged him w/ treason</p> <p>Raleigh was beheaded on October 29, 1618</p>	Sir Walter Raleigh

Session 2 Tower of London

Code Focus-Settings: Action

Questions

- Where should we hunt for fragments
- Who has been to ToL before
- Will you help the bookkeeper
- 600 years ago who would you be
- what job do you have
- would you like to see King's bedroom
- can we find missing objects from story
- what's difference between your room and King Edward's room
- Whose bedroom is it?
- How do we know/what are clues?
- Why curtains round bed
- what can you hear/ does it mean (DR)
- Why prayer in french
- Where else could Edward show love of god
- what language do you speak at home
- what can you see/hear/ smell in chapel room
- What happened to objects/how did they get here
- Anything you didn't expect/surprised
- Why was fortress designed to look big
- how would you defend fortress
- can spot clues to how castle defends itself
- sits on mounds, wooden staircase could be burned
- east/south walls protected by old roman london wall
- north/south walls protected by ditches
- do you remember the flambard story from S1
- where do you think flambard escaped from
- imagine how he felt climbing out the window
- how would you escape
- how old WT get its name
- lunch
- what is a prison/prisoner
- can you name prisoners
- where is bookkeeper held
- what does his prison look like
- what is countess of Nithsdale describing
- can you suggest a way michelle could disguise herself to get into queens house to see bookkeeper
- How long did Thomas Abel stay imprisoned at tower
- what symbols represent Thomas Abel's name
- what would you carve into the stone wall of prison cell
- how do carvings represent your name
- what can you do to read the blank msg from CT
- how would you escape from CT
- how would you jettie secret msg to bookkeeper
- how many fragments did you find
- what did you find out about
- what did they learn
- what was interesting

Actions

- Offer player to explore
- hunt for fragments
- hunt for QR code on Water Lane/Medieval Palace
- QR code-listen to 3 msgs from bookkeeper
- mime being fortress people
- point out missing story objects
- search for QR codes
- describe bedroom for bookkeeper
- imagine you're bookkeeper
- if set story in the chapel room describe for bookkeeper
- take photos of Lamborn Tower to help the bookkeeper
- take photos of anything surprising to help bookkeeper
- imagine king or queen
- photograph the area you'd escape from
- describe escape
- lunch
- broken into 6 groups
- 2 go to location 1
- 2 go to location 2
- 2 go to location 3
- record answers of how michelle can disguise herself
- photograph thomas abel graffiti
- type-symbols that represent your name
- imagine you're the bookkeeper
- draw graffiti carvings on pad
- draw how carvings represent name
- record group response of how to read blank msg
- read display board from DR
- type msg on pad for how to escape from CT
- type msg on pad for secret msg to bookkeeper
- work in groups for bookkeeper for description of what starts lead up to

Bookkeeper

- QB7
- moved to different cell, where from window I see two large square green laurus
- tall trees, line end of lawn
- black sentry box where guard stands
- QB8
- what does my prison look like on outside
- can you describe my prison for my story
- writing another story for book
- needs description of setting at ToL

Michelle

- shows around whichever place class picks-towers vs palace
- introduce surnames
- storytelling in St. Thomas Tower
- Talk about King's Bedroom
- Coat of Arms
- Floral wall patterns
- bright shutters
- 3 lions for England, Normandy, Aquitaine
- Not everyone sleep on bed
- Handmade oak bed
- Explain candles, fire, tapestries, rug, chest, cross throne
- Explain Lords prayer in french
- Explain Edwards chapel
- Lead to Lamborn Tower
- Explain portable altarpiece, pewter toy knight
- Explain Medieval Palace
- large rooms, fireplace, toilets, Garderoben, 4 turnets, designed to look big different floors
- White Tower
- store weapons, crown jewels, prison
- royal observatory, public records office, gunpowder store, still has royal armoures
- two stories tall, seen for miles, 1st thing ships would have seen
- symbol of Norman Power
- William built at least 3 castles to show power, protect
- WT greatest surviving example of Norman Great Tower/keep
- built as Motte and Bailey castle shortly after Norman invasion of 1066
- timber replaced by massive stone keep
- recap flambard story
- white tower
- fortress and royal palace
- over 900 years old
- no one knows exact start date
- tree-ring dating of a wood plank embedded in ground floor suggests under way by 1081
- constructed out of stone
- walls are 11 to 15 feet thick
- chief architect and master builder was Gundulf, Bishop of Rochester
- Henry III painted whitewash on walls
- lunch
- bookkeeper is locked away and kids have to explore tower by themselves and report back to michelle
- CT-collect leads to see what groups have typed to bookkeeper
- great info for bookkeeper
- take leads and place info on blog for bookkeeper to see
- ask class what they found out/what was interesting
- award second letter of password

QR Code

- bookkeeper pleas
- bookkeeper pleas
- bookkeeper pleas
- French Prayer
- msg for bookkeeper
- 7-located in Wardens black box & black fence
- bookkeeper talks
- 8-located in Wardens black box & black fence
- bookkeeper talks
- 9-located in Wardens black box & black fence
- audio file of countess of Nithsdale writing to her sister about husband's escape
- image of earl of Nithsdale disguised as a woman
- 10-BT door handle, window
- Thomas Abel was prison at Tower
- 11- BT door handle, window
- symbols of Thomas Abel
- 12- BT door handle, window
- imagine your bookkeeper
- 13- CT hook on back of door, hook in window
- secret msg but can't read bc the paper is blank
- 14-CT hook on back of door, hook in window
- kids & teachers read display board
- details about story
- 15-CT hook on back of door, hook in window
- secret msg to bookkeeper

Charters

- Librarian
- Bookkeeper
- Yeoman Guards
- Sir Walter Raleigh
- King Edward I
- Richard The Lion Heart
- Queen Eleanor, Edwards wife
- Henry III (1216-1272)
- Earl of Nithsdale
- Winifred Herbert, Countess of Nithsdale
- Thomas Abel, prisoner
- Jesuit Priest John Gerard

Locations

- Middle Drawbridge
- White Tower
- Medieval Palace
- Lamborn Tower
- lunch
- Unfinished lodgings
- Beauchamp Tower
- Crestle Tower

Session 3 School

Cats Focus Time

Questions

- do you remember secret told to you
- what does BK need you to do
- are you good at making up stories
- what are horseshoe buildings used for
- factories
- what are coins/blanks
- what happens in the factory
- what happens in coin video QR
- who do you think owned the objects
- how was the object used
- have you seen anything like this before
- is it made by hand or machine
- what do you think was made here, map question
- is it still used today
- how did it come to live in TOL
- what stories could the object tell you if it came to life
- can you describe QR mint image with senses
- what noises do you hear
- what smells
- what do you see
- do you have a job
- No!
- what sort of job do you think a child did
- how would you feel if you worked as a child
- how would you feel working 6 days a week
- how did workers keep in rhythm together
- what song do you think could be sung while working
- what time of year should william foxley story be
- what time of day
- what period
- who did you meet in story
- what did they do
- what does the story tell you about working in the mint
- what do think might happen next

Actions

- act out story learned about at TOL
- examine function of mint
- pull out objects
- unfold map
- TOL
- focus on horseshoe shape of buildings
- find QR, coins, coin blanks in shoe
- imagine mint
- describe QR image through senses
- start story and photograph a frozen moment in time
- use senses to describe sights, smells, noises associated w/ QR image
- imagine you work at TOL
- discuss in pairs what a child could do
- sweep gold dust
- sit in pit and put coins on certain area of machine
- act out what job/task a child could do
- mime action and freeze frame
- michelle asks their stak
- work in groups and make up a song that workers could sing at mint
- record song on iPad
- have to help complete story of william foxley
- students give alternate endings to william foxley story

Michelle

- CATS focus-time
- remember secret
- play BK video
- thanks for description of BK prison
- disguised myself as...
- smuggled out clues to help write story
- struggling to write stories for BK
- kids said they would help
- smuggled clues-fragments of story
- maybe make a story based on objects in my shoes
- Explain mint
- coins contained gold/silver = to value
- ruler, monarch portrait on side, crest/coat of arms on other
- mintmarks- small raised/embossed mark,
- either letter/number/picture to identify where and when coin struck
- Explain groat (4 penny piece)
- Coinage under Henry VIII
- gold sovereign, gold angel, gold crowns, silver shilling testoon
- Explain Farthing 1337
- made of hard metal copper
- farthings=1/4 penny
- issued from 1737 - 1936, has Britannia on reverse, styles varied
- laureated & cuirassed bust of George II
- britannia seated left on globe holding branch & sceptre, shield resting @ side
- Half Penny
- George III 1775 half penny made out of copper
- laureated & cuirassed bust of George III
- Britannia seated left on rock, holding branch & trident, shield resting at side, waves around, ship left
- Britannia 1799
- all coins were made at TOL
- NB Handling coins
- put coins in acid free envelopes/labels, coins usually come in trays
- pick coin up by edge of coin, hold over a surface to view coin clearly
- Coin blank
- metal disc onto which coin is struck
- coin die
- one of the two steel pieces that are used to strike one side of a coin
- die contains an inverse version of the image to be struck onto coin

Image

- engraved onto a die is back to front
- sometimes engravers made mistakes by putting a letter the wrong way around
- bandage, w/ blood on it
- many accidents occurred in the mint
- when feeding coins into coin press you could lose a finger
- working a furnace could be dangerous
- furnace was where they would melt down metal
- small hammer
- used to smoothen coin
- get big stack of coins and use hammer to smooth the edges
- could be rough when cut
- royal mint
- buildings ran for 400 ft around 3 sides of fortress
- stretched all the way to salt tower in horseshoe shape
- stretched out in narrow passage between inner and outer walls
- lots of foreign smells
- wood burning
- sweat from men and children workers
- very noisy
- hear banging hammers, coin press being turned
- labors would be singing
- work during summer because fingers would work easier if warmer
- likely to start at light around noon time and finish when its dark
- Hazards
- furnace workers could be burned, no hair/eyebrows, go blind from bright flame
- noise could cause deafness
- separation process for gold/silver done by melting, could cause burns
- separation process was also poisonous
- feeding coins into coin press could lose a finger, very hot
- mint factory is where coins are made
- coin is small piece of metal used as money
- royal mint was located at TOL for 600 years from end of 13th century until 19th century
- Edward I - George III reigns
- Edward I, in 1270's built mint in TOL
- coins were worn or damaged so to control what was made he built the mint
- evidence that started w/ Edward, referred to as "little tower where the mint was kept"
- in 1810 royal mint was moved to tower hill because there was not enough space for machinery
- Children were likely to work at the mint and have low position jobs
- one job may have been being a moneyer/labourer
- task was flicking the newly struck coins away from the dies and putting plain coins in place
- small hands and quick fingers
- remember to check blog
- gives children 3rd letter of password for the bookkeep to be released

Objects

- Coins
- blanks
- die
- map of tower w/ mint
- bandages
- Librarian
- Bookkeeper
- Henry VIII (1509-1547)
- George II
- George III
- Edward I
- William Foxley

QR Code

- michelle producing coin
- QR inside michelle cape
- What 3 clues tell you age of coin
- QR on michelles jacket
- pictures of mint workers

QR Code

- michelle producing coin
- QR inside michelle cape
- What 3 clues tell you age of coin
- QR on michelles jacket
- pictures of mint workers

Charities

- Librarian
- Bookkeeper
- Henry VIII (1509-1547)
- George II
- George III
- Edward I
- William Foxley

Session 4 TOL

Our Focus-Action

Questions

- do you want to hear about the funny gift?
- what types of animals lived in TOL?
- what other people lived here?
- what would they be doing?
- what does the animal look like?
- how does the animal move?
- what does it do?
- how would you look after the animal?
- ottrich or zebra?
- what do you think they fed the ottrich?
- nails
- was that good for a big bird?
- would it have been surprising to see a bear in the Thames?
- how do you think the p. bear felt about being at TOL?
- would you come see animals at TOL?
- can anyone guess BK favorite animal?
- can you hear that sound?
- rears sound produced
- what types of animal do we keep at TOL now?
- rears
- why are there ravens at TOL?
- what action was John Flamsteed looking at the stars?
- what was he doing?
- what animals would you keep at TOL?
- what legend would you tell?
- what action can you use to tell allied cops story?
- what did they learn at menagerie?
- what actions can they use in story?
- Lunch
- what did they think of josh's story?
- josh helps w/ story

Choose a character

- what do they look like?
- what might they wear?
- what are they doing?
- where in the tower do they do this?
- what's happening?
- what time of day/season/weather/date?

Locations

- Middle Drawbridge
- Ravens Cage
- Royal Menagerie Exhibition
- Salt Tower

Characters

- King of Norway
- King Henry III
- John Flamsteed (1564-1719)
- King Charles II
- Allied Cops
- John Gerard

Actions

- kids get to help pick route
- draws activity
- pretend to be an animal
- tell me something about yourself!
- pick an animal from QR & answer Qs. In groups
- pick two animals to care for
- imagine you're its keeper
- record how to look after animal on iPad
- from clues kids guess the polar bear questions
- imagines you're taken from house to another country
- answer how it felt at TOL
- discuss in groups what happened at TOL
- discuss in groups what happened to allied cops
- mime part of allied cops story and then freeze for pictures
- record audio on iPad
- imagine allied cops and come up w/ diff ways to escape snakes
- Lunch
- help storyteller josh with his story
- what sites did they see
- which characters should he use
- mime character with josh's help for their own stories
- josh has everyone mime being an animal
- divide groups into teams
- each child add a sentence about what happened next in the story until its done
- or
- everyone mimes out their own character and they freeze
- children picked to describe their character
- identify the problem in their story and who can help fix it.

QR Code

- on Water line
- of animals from Royal Men.
- BK telling one of legends of TOL
- Louyer Bonnyer Tower
- allied cops
- story about being attacked by a snake

Josh

- Storyteller
- introduced as palace explorers trainee
- pretends to make up a story on the spot
- children help with his story
- earn palace explorers badge when he'll a good story inspired by tower
- story
- The WT, randolf flambard fell into poop, so monkeys don't use rope to escape
- queens house, where BK is now, where Earl Fitzhaldale was and escaped as a woman
- lions at Lion tower see his escape and mention it to monkeys
- monkeys try to use womens clothes to write secret letters
- in salt tower, above, John Gerard wrote in orange juice for invisible ink
- monkeys try to hid behind orange slices
- character could include
- elephant, Lord Wellington
- little girl from DUMCO story
- what day/time/season/weather
- tells set story
- earns badge
- Helps with kids picking stuff for their stories
- choose a character
- what do they look like
- what might they wear
- what might they be doing

Michelle

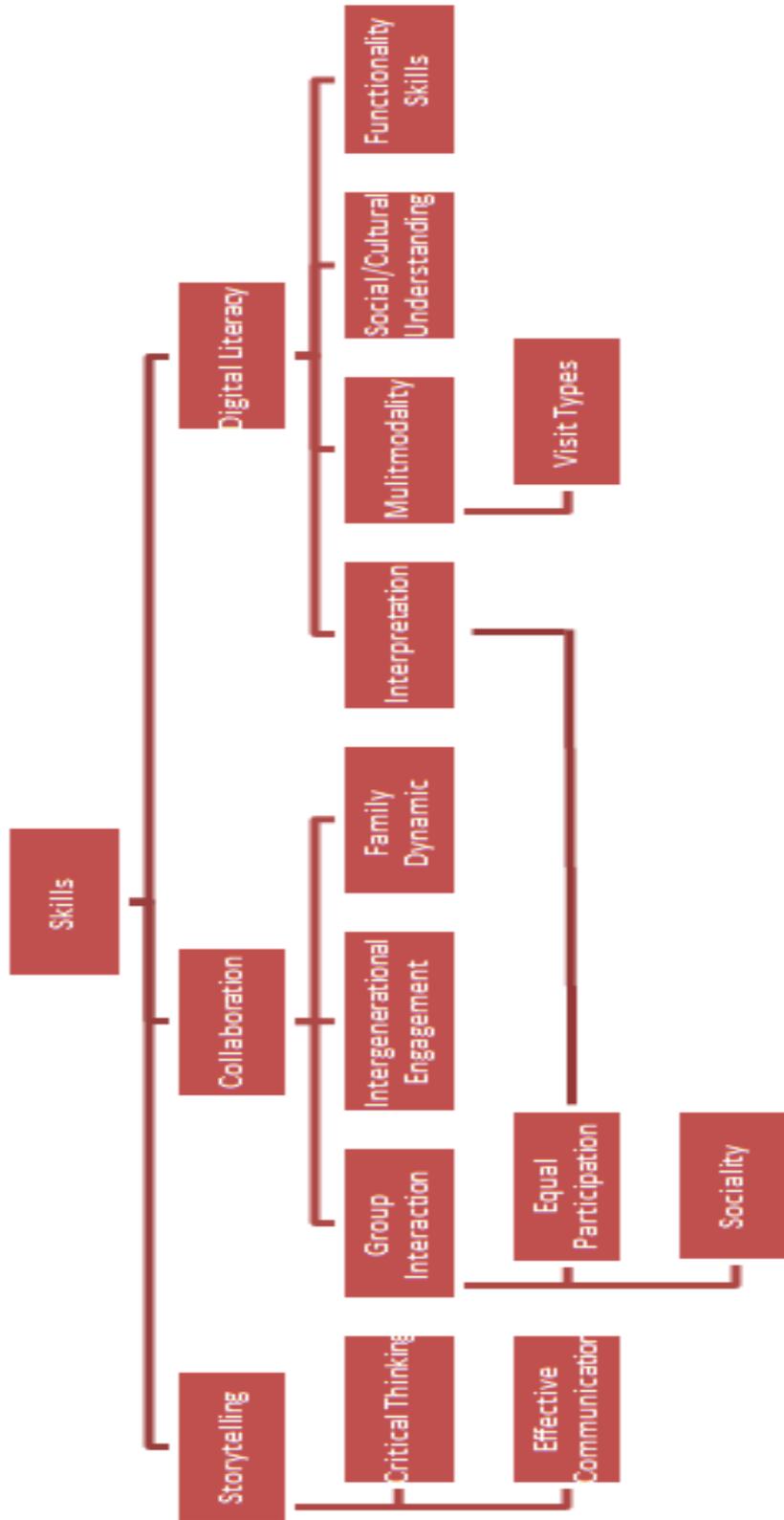
- So many roads, ask children to choose
- In 1823, copo area, one big faced baboon, 1 African sheep
- one alligator, two tigers, 2 cheetahs
- 100 snakes lived in the Royal Menagerie, like a zoo
- life for animals wasn't easy, not looked after properly
- a bear was fed bread and cake and died after a large breakfast
- Otrich
- they mostly eat plants, roots, leaves, seeds
- munch on insects, locusts, small animals like lizards
- in zoos they are fed special bird pellet diets w/ vit. min, veggies
- you will need to provide grit and gravel to aid in proper digestion
- ottrich pellets should be over 200 yards square
- provides shade, shade, although they may not use them in hot weather
- attracted to shiny objects, so don't wear around them
- ottrich at tower was not looked after properly and fed
- Zebra
- provide a fenced field or paddock
- zebra's natural habitat is African Savannah
- need plenty of space to run, stable for winter months
- eat grass and graze for hours a day
- eat leaves, bush stems
- in winter eat hay, alfalfa, carrots
- zebras are very social and was strange, they fed 1 beer
- animal who drink coffee
- looked mainly at west entrance
- semi-circle called the Lion Tower, animals also kept in the inner ward
- king/queens would impress each other by exchanging gifts
- exotic animals was a symbol of power
- Clues for polar bear
- meat eating mammal, weights up to 600kg
- avg 8 yrs old weighs 25kg
- largest and longest bear w/ diet of seals and fish
- have 42 teeth and canmouso
- fat layer, fat, fat to their can transport sun's warmth to layer of skin, converted to heat
- fat layer beneath skin acts as insulation and food reserve
- king didn't want to spend money on feeding the p. bear
- hunted for food on its own
- would have been surprising to see it swimming in the Thames river in medieval times
- in 1352 a white bear was a gift from King of Norway to King Henry III
- bear was allowed to swim in Thames to catch food
- attached by long iron chain and had to wear a muzzle
- Ravens
- lived in cages, cramped cages
- Travelers at tower: mainly, emu, merlin (pinks), baldrick, rumin, thor
- the raven gets its colour based on its diet
- identify the colour based on its diet
- lifting feathers trimmed to stop from flying away
- ate 170g raw meat/day, plus blood soaked bird biscuits
- also ate eggs and rabbit
- oldest raven at TOL was Jim Crow who died at 44 yrs old

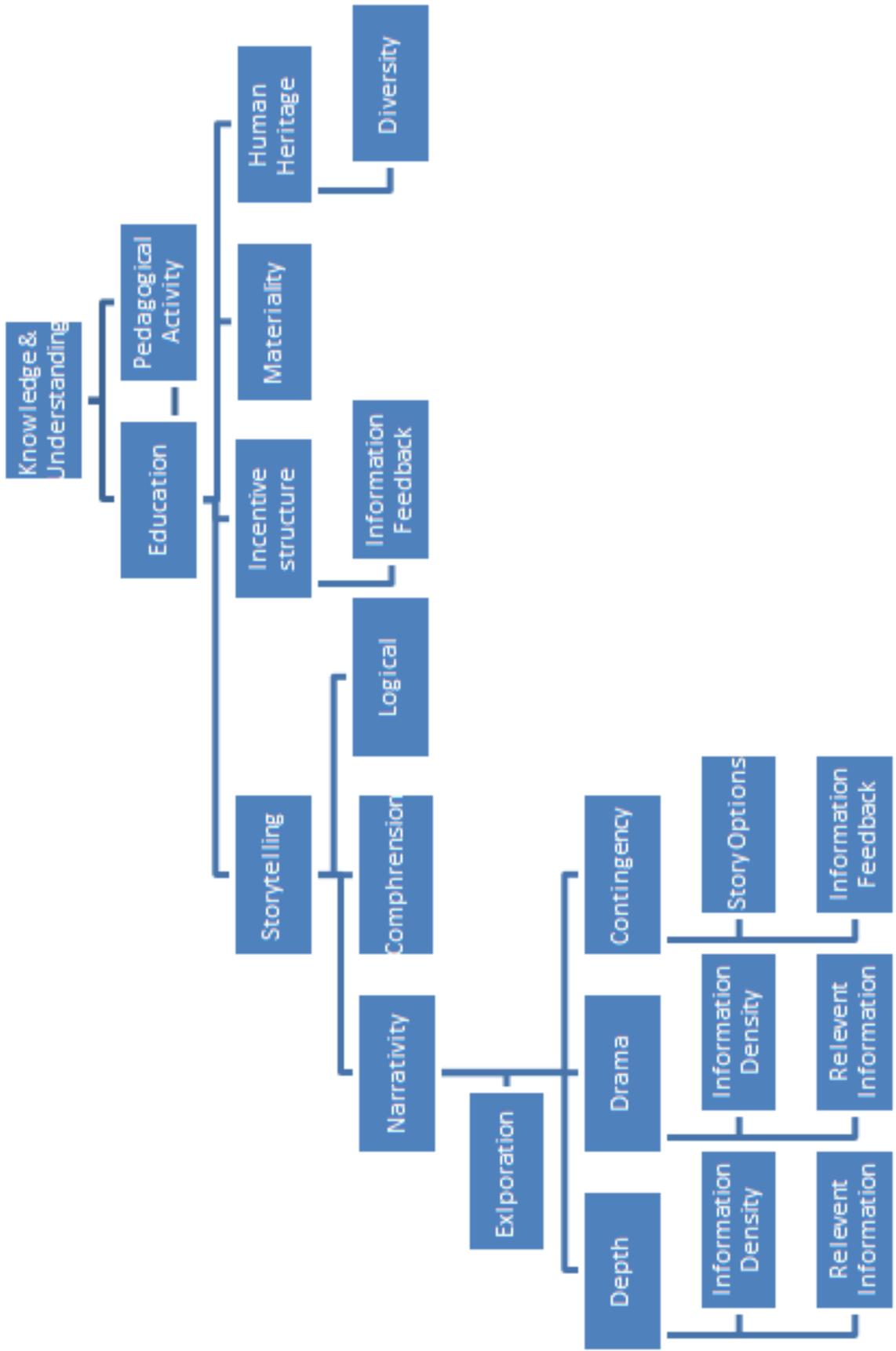
Lunch

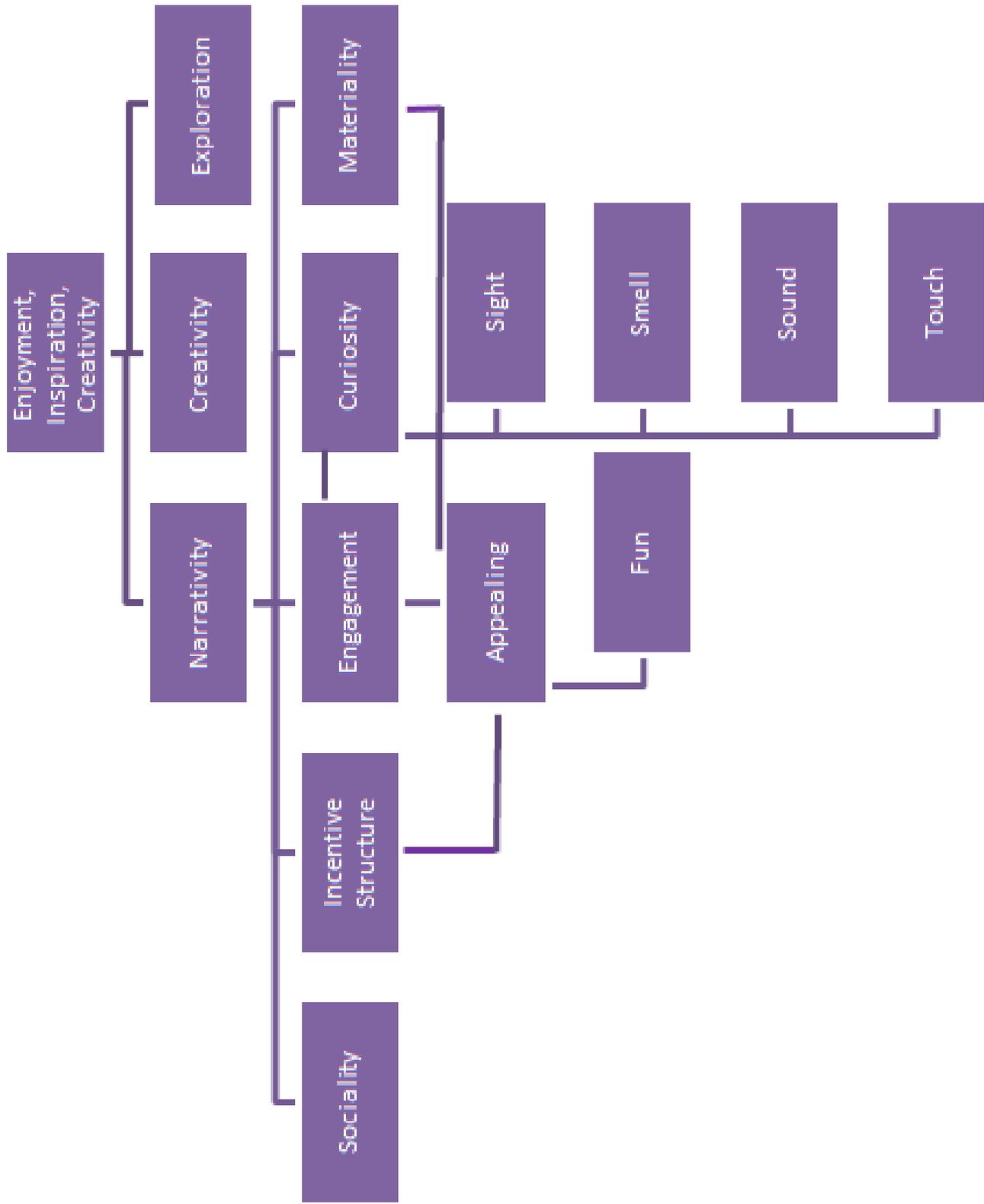
- The elephant house was built and they expected the elephant would die, then use as storage
- Royal observatory was housed in north east turret of WT
- legend has it that John Flamsteed, astronomical observator, complained to King Charles II
- birds were interfering with Johns observations
- king ordered their destruction but was told that if ravens left then WT would fall and a disaster would befall kingdom
- king changed mind and decreased raven to at least six to prevent disaster
- height of WT led to its northeast turret being used as an observatory first by astronomer John Flamsteed in 1675
- Flamsteed eventually moved to Royal Observatory in Greenwich
- Alfred Cops was the last keeper of the menagerie
- dangerous because he looked after wild animals
- Michelle starts telling a blend story after josh's story
- kids help to help
- encourage thinking about content and delivery
- story has to have a problem
- what makes a good performance
- ensure no aliens, genuine people/animals from TOL
- good stories but need to go back to school and write the stories
- to get explorers badge need to come back and tell story
- if they do that the BK will be released

Appendix K: Design Heading/Characteristics Charts

Designing Ubiquitous Computing to Enhance Children's Learning in Museums (DU)	Museum Education as Curriculum (MEC)	Interactive Experiences & Contextual Learning in Museums (IEC)	Evaluating Family Interactions to Inform Exhibit Design (EFI)	Staying Away: Why people choose not to visit museums (SA)	Plymouth Rock Studios... Transmedia will save Storytelling (PR)	Transmedia Builds Audiences, Revenue (TBA)	Transmedia Learning (TL)	Convergence: International Journal of research into new media technologies (CI)	Teaching the Nintendo Generation to Program (TNG)	Transmedia: What we've all been waiting for? (TWW)	Transmedia Storytelling: Implicit, Narrative, Branding (INB)	Transmedia Storytelling: Jenkins (TSJ)	Family Learning Research in Museums (FLR)	Museum Explorer's Program (MEP)
Appealing collaboration	MEC	IEC	EFI				TL			TWW	INB		MC	Palace Explorer's Program (PEP)
comprehension	MEC	IEC	EFI				TL			TWW			MC	PEP
contingency-want choices		IEC								TWW			MC	PEP
creativity													MC	PEP
critical thinking														
depth														
digital literacy														
drama														
education	MEC	IEC	EFI	SA	PR	TBA	TL	CI	TNG	TWW	TNB	TSJ	FLR	PEP
effective communication	MEC	IEC	EFI	SA	PR	TBA	TL	CI	TNG	TWW			FLR	PEP
engagement		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
equal participation		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
Exploration		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
family dynamic		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
fun		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
hear		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
human heritage		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
incentive structure		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
information density		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
information feedback		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
interaction		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
intergenerational engagement		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
interpretation		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
Logical		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
materiality		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
multimodality		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
narrativity		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
pedagogical activity		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
relevant information		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
sight		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
Smell		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
sociality		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
storytelling	MEC	IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
supports different types of visits	MEC	IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
sustains children's curiosity		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP
touch		IEC	EFI	SA	PR	TBA	TL	CI		TWW			FLR	PEP







Appendix L: Original Program Relation to Design Heading/Characteristic Lists

Generic Learning Outcomes:

Knowledge and Understanding (**KU**)

Skills (**SK**)

Enjoyment, Inspiration, Creativity (**EIC**)

Session 1

Introduction

Explorers: **EIC, KU**

QR Codes: **SK**

Sir Walter Raleigh: **KU**

Tower of London Fortress: **EIC, KU**

Storytelling (CATS): **SK, EIC**

Ranulf Flambard: **KU**

1st Letter of Password: **EIC**

Helping the Bookkeeper: **EIC**

Generic Learning Outcomes:

Knowledge and Understanding (**KU**)

Skills (**SK**)

Enjoyment, Inspiration, Creativity (**EIC**)

Session 2

Middle Drawbridge

QR Code: **SK, KU**

Bookkeeper: **SK, KU**

White Tower

Imagine TOL as home: **EIC**

Surnames: **EIC**

Medieval Palace

St. Thomas Tower: **Sk, KU, EIC**

King Edward's Bedroom: **SK, KU, EIC**

Describe what you see/hear/smell: **Sk, EIC**

Story: **Sk, KU, EIC**

QR Codes: **SK**

Lantern Tower

Photos: **SK**

Questions: **SK, KU**

Break into groups: **SK**

Lieutenants Lodging

Earl of Nithsdale Escape: **KU**

QR Codes: **SK**

Beauchamp Tower

Thomas Abel Imprisonment: **KU**

QR Codes: **SK**

Cradle Tower

John Gerard: **KU**

QR Codes: **SK**

2nd Letter of Password: **EIC**

Blog Task: **SK, EIC**

Generic Learning Outcomes:

Knowledge and Understanding **(KU)**

Skills **(SK)**

Enjoyment, Inspiration, Creativity **(EIC)**

Session 3

Act out stories from Session 2: **KU**

Bookkeeper Video: **KU**

Story from map/objects: **KU**

 Horeshoe shape of buildings: **SK**

 QR Code: **SK**

Mint

 Worth: **KU, EIC**

 Appearance: **KU, EIC**

 Terminology: **KU**

 Image of Mint: **KU, EIC**

 Describe through senses: **EIC**

 Child Labor: **KU**

 QR Code: **SK**

Stoytelling: **SK, EIC**

 Jobs: **EIC**

 Songs: **EIC**

 Blog: **SK, EIC**

3rd Letter of Password: **EIC**

Generic Learning Outcomes:

Knowledge and Understanding (**KU**)
Skills (**SK**)
Enjoyment, Inspiration, Creativity (**EIC**)

Session 4

Middle Drawbridge

Water Lane

Pretend to be animals: **EIC**
Animal Facts: **KU**
 Animals as gifts: **KU**
QR Codes: **SK**
 Royal Menagerie: **KU**
Polar Bear: **KU**
 Questions: **KU, SK**
Record Answers: **SK, EIC**
 Role playing: **EIC**
 Take care of animals: **EIC**

Raven's Cages

Facts: **KU**
QR Code: **SK**
 Bookkeeper Legend: **KU**
 Alfred Cops: **KU**
 Mime Cops: **EIC**
 Record on iPads: **SK**

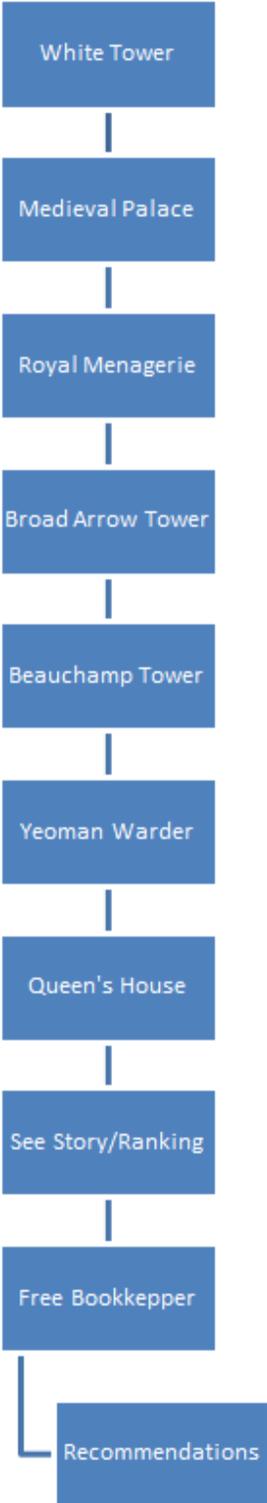
Royal Menagerie

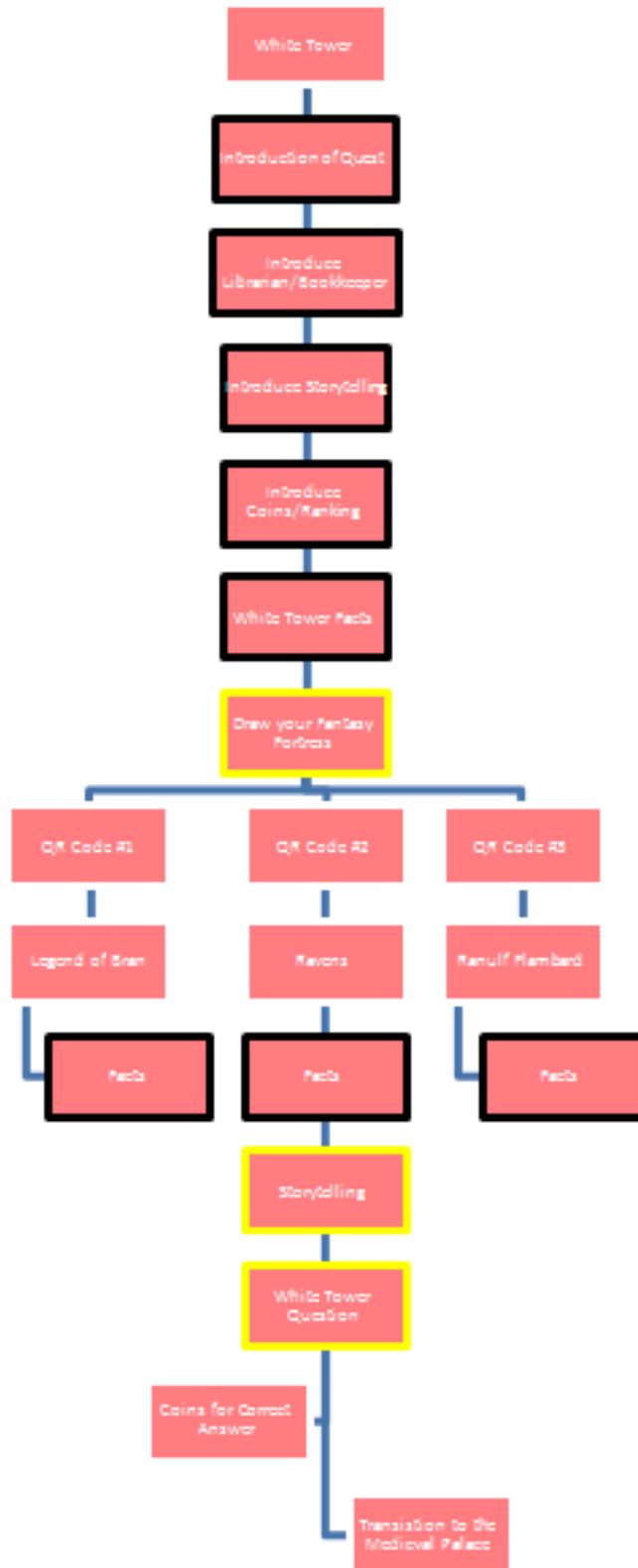
See and relate back to stories and information: **KU**

Salt Tower

Storytelling (Josh/Lily): **EIC, SK**
 Locations, dates: **EIC, SK**
 Mime being an animal: **EIC**
Divide into groups: **SK**
 Help with students stories: **SK, EIC, KU**
Think about who, what, when, where, why, how: **SK, EIC, KU**
Create their own stories to relate back to bookkeeper: **SK, EIC, KU**

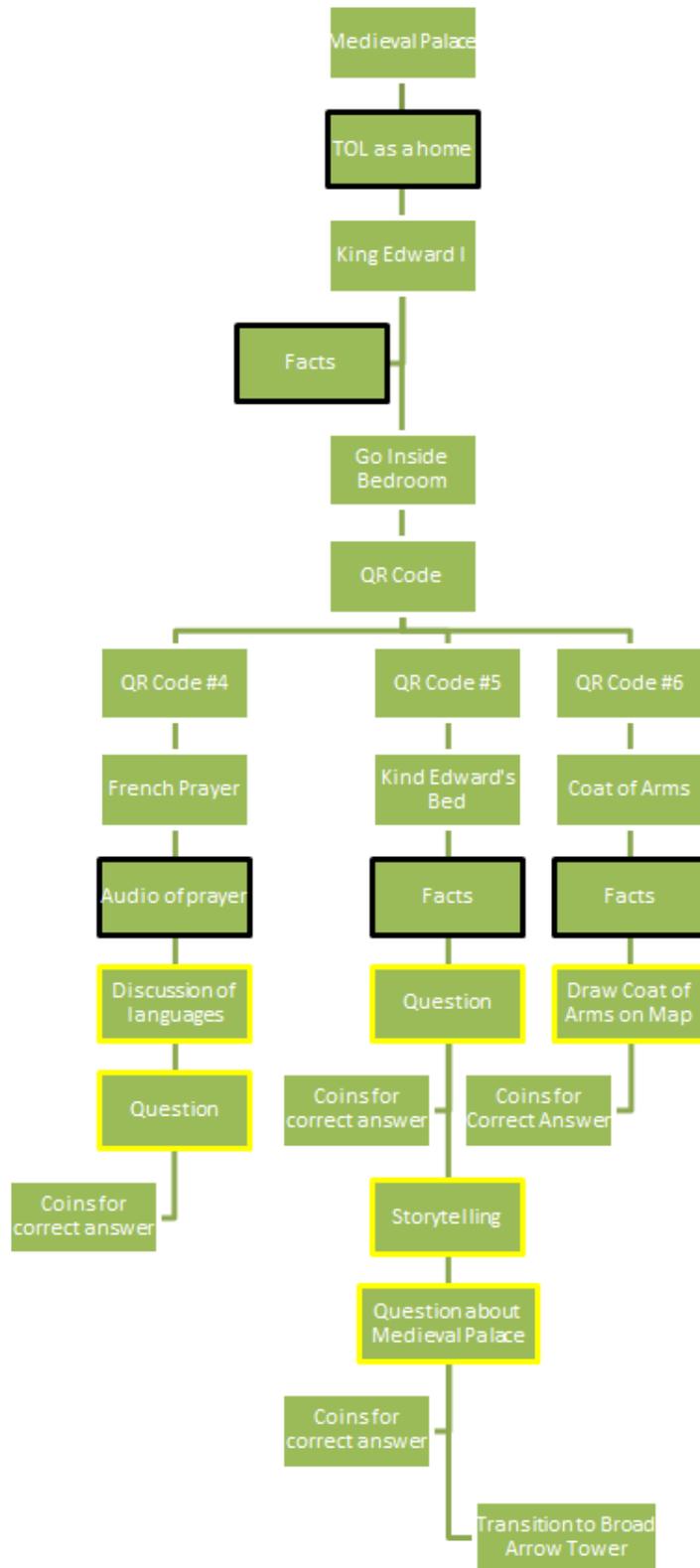
Appendix M: New Program Flow Charts





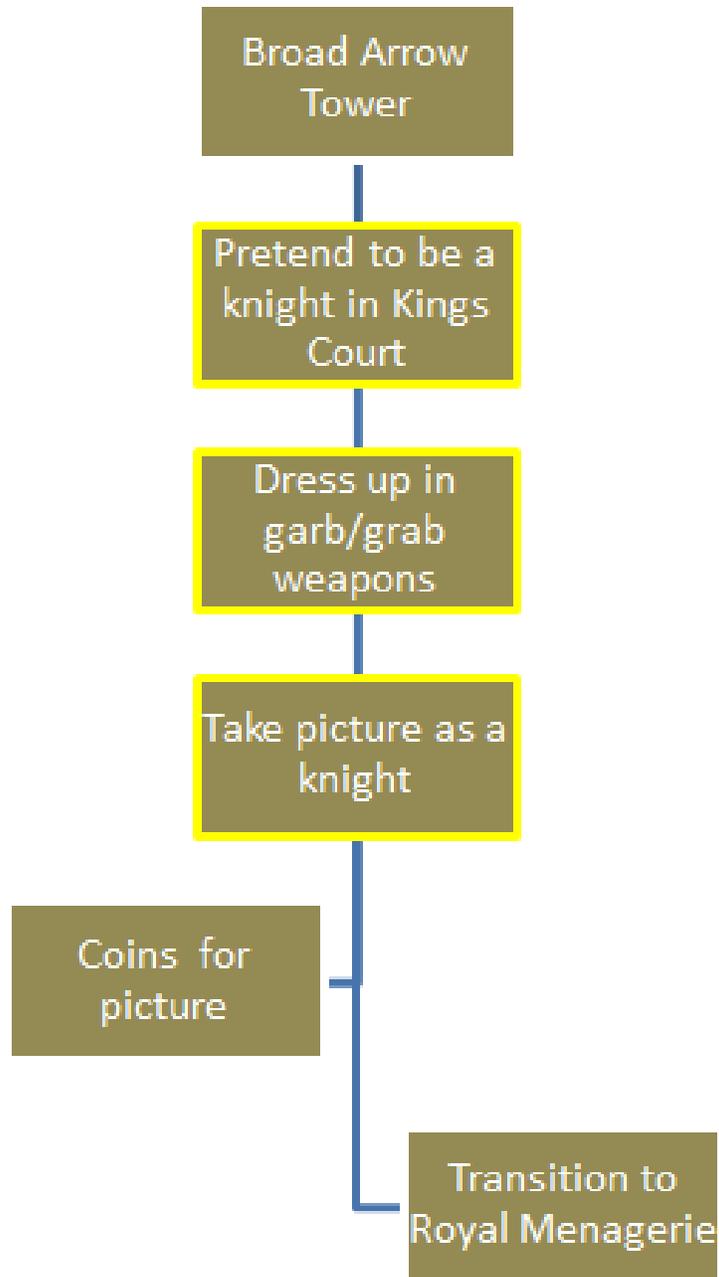
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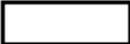
User performs an action



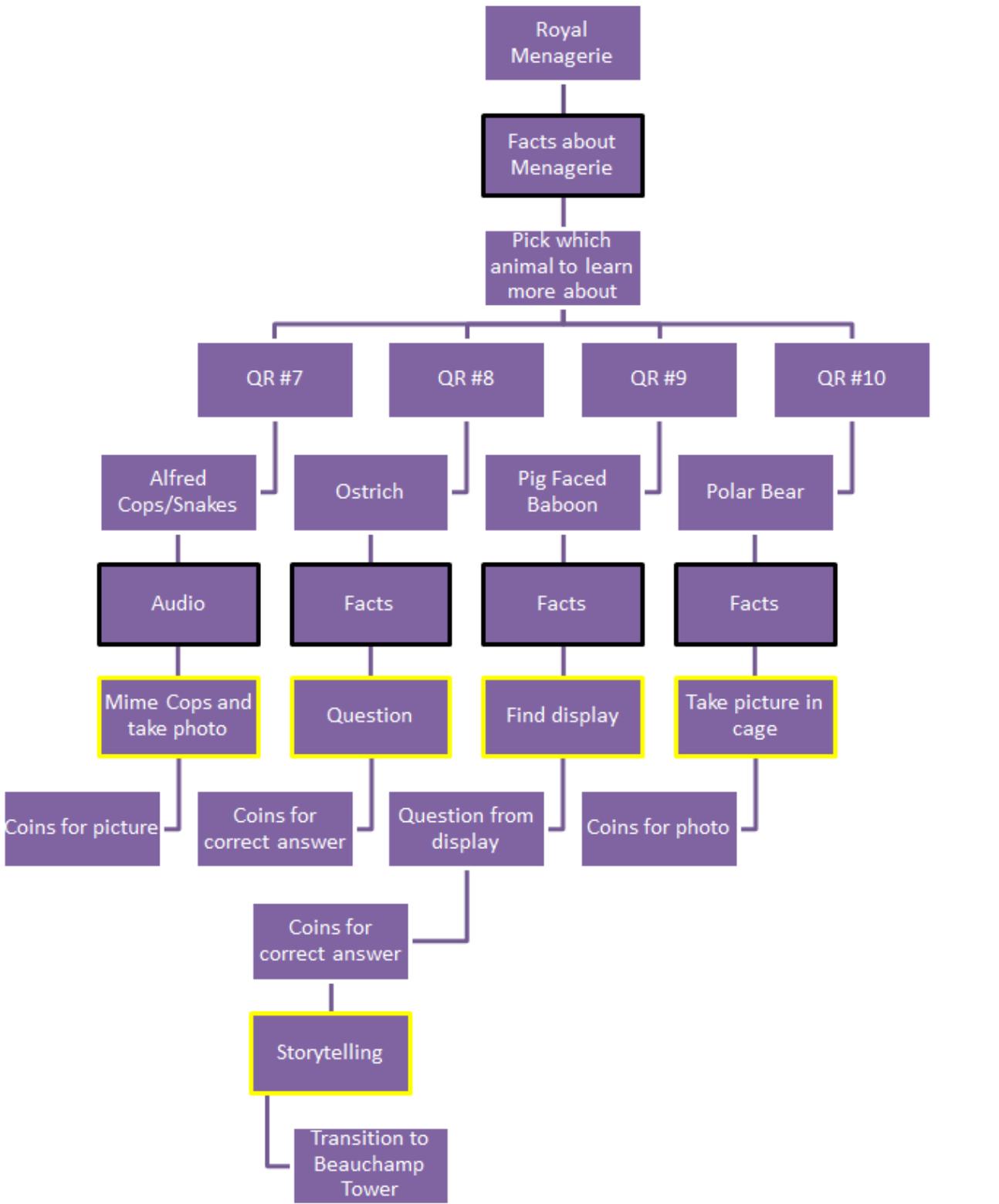
User receives information

User performs an action



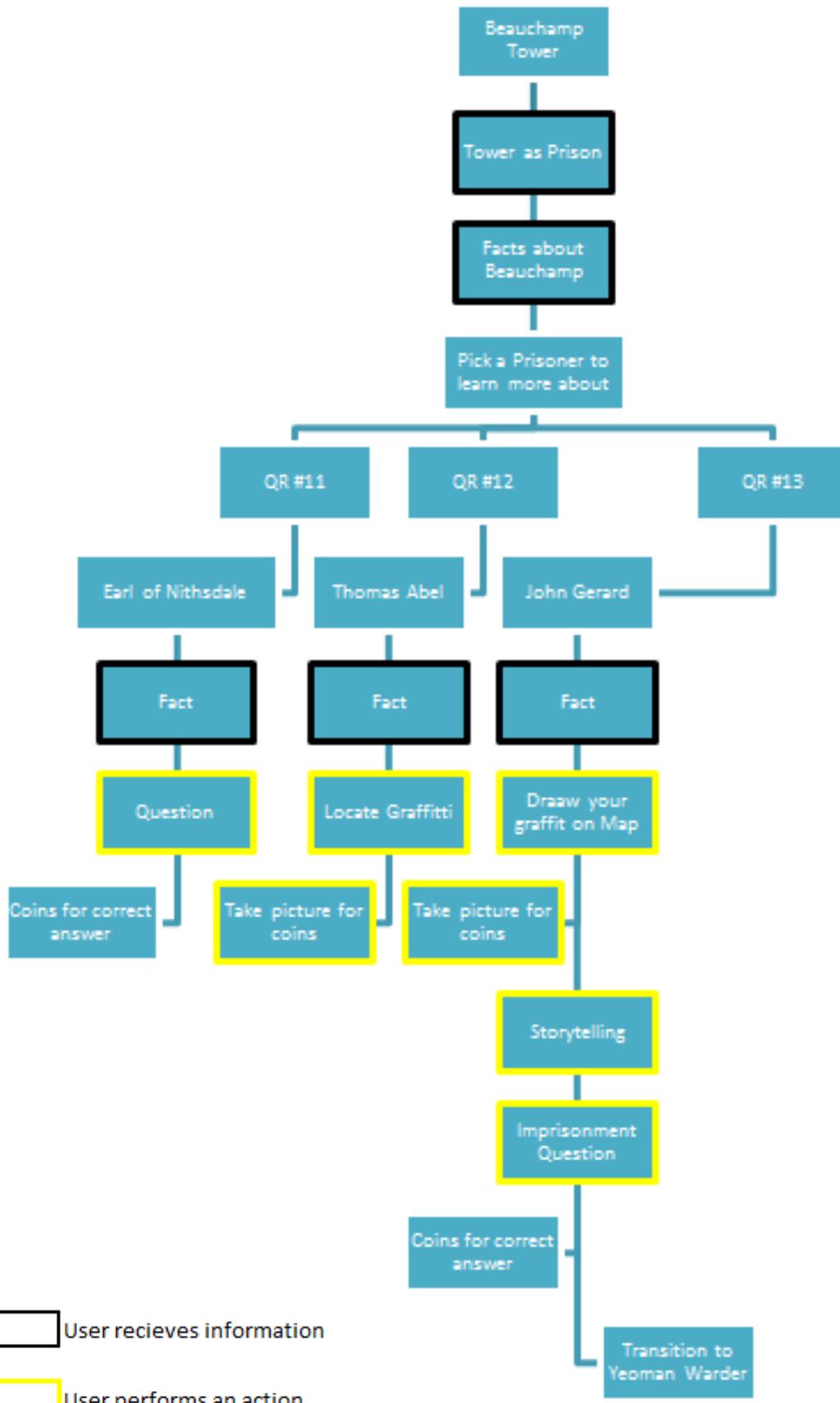
 User receives information

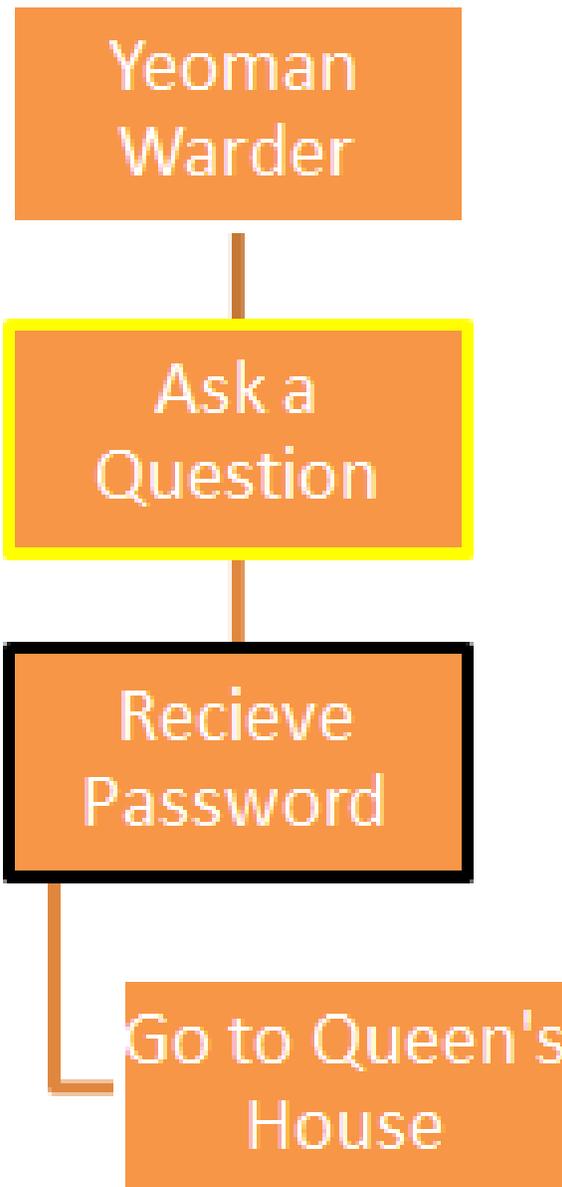
 User performs an action

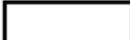


User receives information

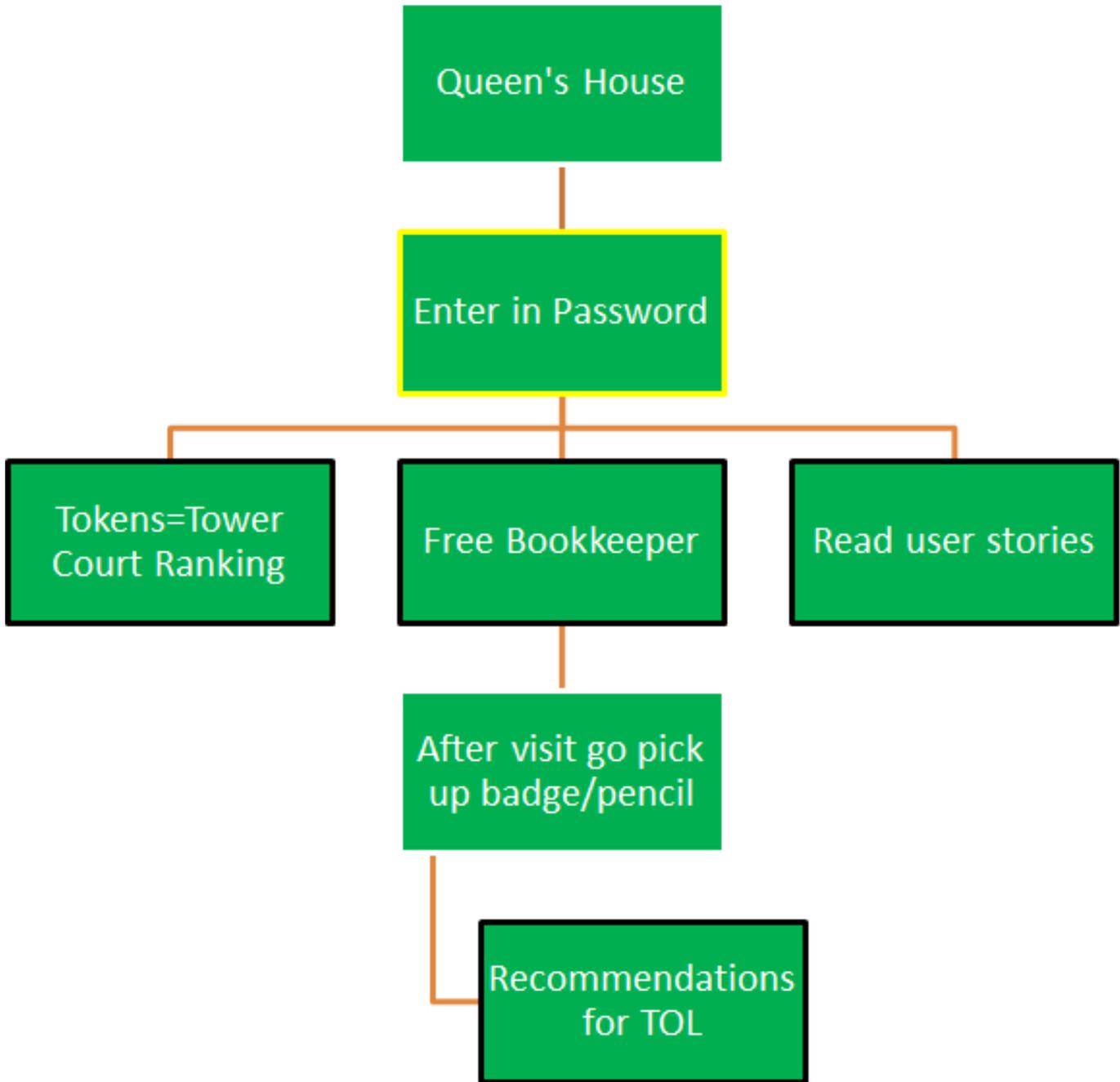
User performs an action





 User recieves information

 User performs an action



 User receives information

 User performs an action

Appendix N: New Program Location Information Lists

White Tower

1) Welcome to the Tower of London

2) Introduce Michelle the Librarian

- Introduce the Bookkeeper
- Need help to be freed from TOL
- Explore the TOL and write a story to help free the BK

3) Introduce Explorers

- What is an Explorer?
- Begin first story of an Explorer
 - Imagine being an Explorer
 - What would you wear
 - What tools would you take
 - What's in your pockets/bag
 - Who are you looking for

4) Introduce Questions/Tokens

5) Introduce QR Codes

6) Introduce Tower of London and White Tower as a Fortress

- QR Code
 - Facts
 - White Tower served as a fortress and royal palace.
 - It is believed to be over 900 hundred years old but no one knows the exact start date
 - Wood plank tree-ring dated back to 1081. (Oldest part of TOL)

 - White Tower got its name when Henry III reigned and painted walls with whitewash, hence White Tower

 - White Tower was royal palace and also used to store weapons, crown jewels.
 - It was later used as a prison and housed royals such as Richard II of England 1399.

 - Public Records Office, gunpowder store, still holds Royal Armouries
 - Identify
 - White Tower was a fortress to help keep people out.
 - Find clues of how castle could defend itself against attackers
 - Sits on a mound
 - Wooden staircase could be burned
 - Walls protected by old Roman walls and ditches

7) Imagine you were a King or Queen living in the White Tower. How would you defend your fortress?

- What would you find in a fortress?
- In your fortress?
- Where would you build your fortress?

8) Describe your fantasy fortress to your parents and draw your fortress on paper

- What rooms
- Made out of what
- Who would live there
- Why would you build a fortress
- Who would visit

9) Fortress Question

- Answer for tokens

10) Transition to Medieval Palace

- How would you like to sneak into the Medieval Palace and get a glimpse at a King's bedroom?
- Let's go!

Medieval Palace

1) Besides being a fortress the tower also served as a home. Several royalty lived here including...

2) Facts about King Edward I

King Edward I lived here for a short period of time in the winter of 1294 while preparing for war with France.

Unusually tall for a 13th Century man

He stood 188 cm or 6' 2"

The average 13th Century man was about 173 cm or 5' 8"

Since he was so tall his bed had to be big enough.

Because of his height he was nicknamed "Longshanks"

He also traveled and the bed had to be easy to take apart

Let's travel on in and take a look at King Edward's Room

3) Inside Bedroom

How do we know who's room it is?

Coat of Arms, instead of letters it uses symbols to show the name

Not everyone slept on beds

Servants slept on straw in the same room

4) QR Code

Lord's Prayer in French

Why is it in French?

Edwards prayed daily to show he was close to God

He had a chapel in his room and his court spoke French

5) Storytelling

Imagine you are royalty

Who are you

What would you have in your room

What language would you speak

6) Question about bedroom/chapel

Answer for tokens

7) Now do you want to learn about the furry gift for the King or the Bookkeepers favorite animal at the Tower?

Off to the Royal Menagerie

Royal Menagerie

1) Introduce Menagerie

1210 the first animals arrived at TOL, with the first being lions

Under the reign of King John came the first animals

A Menagerie is similar to a zoo

In 1829 there was 1 zebra, 1 pig faced baboon, 1 African sheep, 1 alligator, 2 tigers, 2 cheetahs, and 100 rattle snakes at the TOL

In 1832 after several attacks the animals were moved to the London Zoo.

2) Pick an animal to learn more about

QR Code #1

Alfred Cops and the Snakes

Facts

Question

Answer for tokens

QR Code #2

Ostrich

Facts

Question

Answer for tokens

QR Code #3

Zebra

Facts

Question

Answer for tokens

QR Code #4

Polar Bear

Facts

Question

Answer for tokens

3) Storytelling

Imagine you're an animal at the TOL

How would you feel leaving your home country

How would you feel about eating strange food

4) Menagerie Question

Answer for tokens

5) Should we now check out where they kept the enemies to the crown, the prisoners

Beauchamp Tower

1) Introduce Tower as a prison

What is a prison

What is a prisoner

Can you name any prisoners held at TOL

Not only is the BK held at the TOL but you'll also learn about who were imprisoned here

2) First Prisoner

Facts

The first prisoner was Ranulf Flambard in 1100.

Ranulf was Bishop of Durham and chief tax collector

He was arrested and imprisoned in the White Tower by King Henry I for extortion

One night he was smuggled a rope in a gallon of wine.

He got his guards drunk and when they fell asleep he climbed out the window using the rope.

Questions

Who was the character in the story

Describe what he would have looked and smelled like

3) Pick which prisoners you would like to learn more about

QR Code #1

Earl of Nithsdale

Fact

Question

Answer for tokens

QR Code #2

Thomas Abel

Fact

Locate Graffiti

Answer for tokens

QR Code #3

John Gerard

Fact

Question

Answer for tokens

4) Storytelling

Imagine you're a prisoner

What would you graffiti on walls to represent your name

What would you write in a secret message

Who would you dress up as to escape

How would you escape

5) Imprisonment Question

Answer for Tokens

6) We are so close to freeing the BK! Great job on your stories!

Yeoman Warder

1) Now that you've written your stories you can almost free the Bookkeeper.

Fact about Yeoman Warder

2) You must ask the Yeoman Warder this question.

Question

His answer will be the password to free the Bookkeeper from the Queen's House

3) Enter in the Yeoman Warder's answer

4) Go to Queen's House

Queen's House

1) Congratulations! You've freed the Bookkeeper

2) Here are all the stories you wrote to help free the Bookkeeper!

3) You've also earned... this many tokens!

You earned the rank of x, y, z

That's enough tokens to get your Palace Explorers Badge and pencil

Pick up a XXX on you're way out of the tower

4) Recommendations

Now that you've freed the bookkeeper you can go

check out some more of the Bookkeeper's favorite places at the TOL

Crown Jewels

Royal Armouries

etc

Appendix O: New Program Relation to Design Heading/Characteristics Chart

Generic Learning Outcomes:

Knowledge and Understanding (**KU**)

Skills (**SK**)

Enjoyment, Inspiration, Creativity (**EIC**)

White Tower

Introduce Quest: **KU**

Introduce Librarian/Bookkeeper: **KU**

Introduce Storytelling: **KU, EIC**

Introduce Coins/Ranking: **KU, EIC**

White Tower Facts: **KU**

Draw your Fantasy Fortress: **SK**

QR Code #1: **SK**

Legend of Bran: **KU**

QR Code #2: **SK**

Ravens: **KU**

QR Code #3: **SK**

Ranulf Flambard: **KU**

Storytelling: **SK, EIC**

White Tower Question: **KU, SK**

Generic Learning Outcomes:

Knowledge and Understanding (**KU**)

Skills (**SK**)

Enjoyment, Inspiration, Creativity (**EIC**)

Medieval Palace

Tower of London as a home: **KU**

King Edward I: **KU**

QR Code #4: **SK**

French Prayer: **KU**

Discussion of Languages: **EIC**

Question: **KU, SK**

QR Code #5: **SK**

King Edward's Bed: **KU**

Question: **KU, SK**

QR Code #6: **SK**

Coat of Arms: **KU**

Draw Coat of Arms on Map: **EIC, SK**

Storytelling: **EIC, SK**

Generic Learning Outcomes:

Knowledge and Understanding **(KU)**

Skills **(SK)**

Enjoyment, Inspiration, Creativity **(EIC)**

Broad Arrow Tower

Pretend to be knight in king's court: **SK, EIC**

Dress up in garb: **EIC**

Take picture: **SK**

Generic Learning Outcomes:

Knowledge and Understanding (**KU**)

Skills (**SK**)

Enjoyment, Inspiration, Creativity (**EIC**)

Royal Menagerie

Facts about Menagerie: **KU**

QR Code #7: **SK**

Alfred Cops/Snakes: **KU**

Audio: **KU**

Mime Cops: **EIC**

Take Photo: **SK**

QR Code #8: **SK**

Ostrich: **KU**

Questions: **KU, SK**

QR Code #9: **SK**

Pig Faced Baboon: **KU**

Find Display: **SK**

Answer Question: **KU, SK**

QR Code # 10: **SK**

Polar Bear: **KU**

Take picture in cage: **EIC**

Storytelling: **EIC, SK**

Generic Learning Outcomes:

Knowledge and Understanding (**KU**)

Skills (**SK**)

Enjoyment, Inspiration, Creativity (**EIC**)

Beauchamp Tower

Tower as a Prison: **KU**

Facts about Beauchamp: **KU**

QR Code #11: **SK**

Earl of Nithsdale: **KU**

Question: **KU, SK**

QR Code #12: **SK**

Thomas Abel: **KU**

Locate Graffiti: **SK**

Take picture: **SK**

QR Code #13: **SK**

John Gerard: **KU**

Draw your own graffiti on map: **EIC, SK**

Take picture: **SK**

Storytelling: **EIC, SK**

Imprisonment Question: **KU, SK**

Generic Learning Outcomes:

Knowledge and Understanding **(KU)**

Skills **(SK)**

Enjoyment, Inspiration, Creativity **(EIC)**

Yeoman Warder

Ask a question: **SK**

Receive password: **KU**

Generic Learning Outcomes:

Knowledge and Understanding **(KU)**

Skills **(SK)**

Enjoyment, Inspiration, Creativity **(EIC)**

Queen's House

Enter password from Yeoman Warder: **SK**

Receive Tokens and Tower Court Ranking: **EIC**

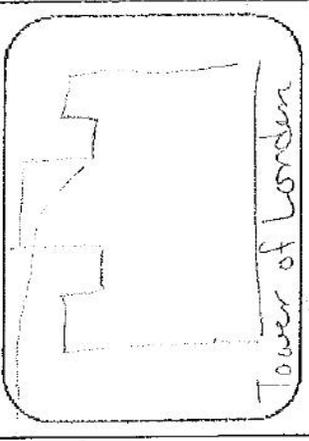
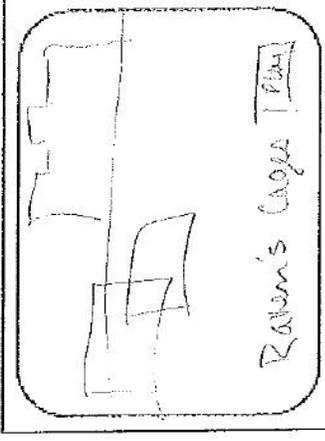
Read Stories: **EIC, SK**

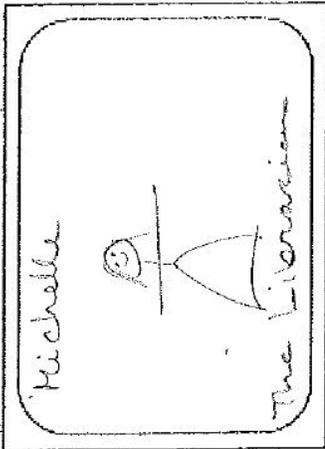
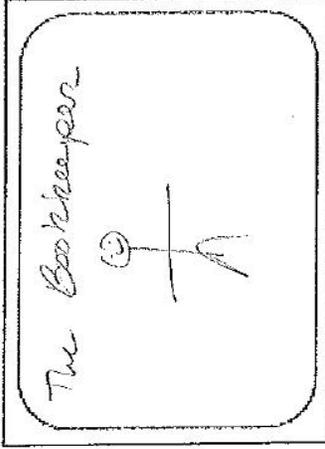
Free the Bookkeeper: **EIC**

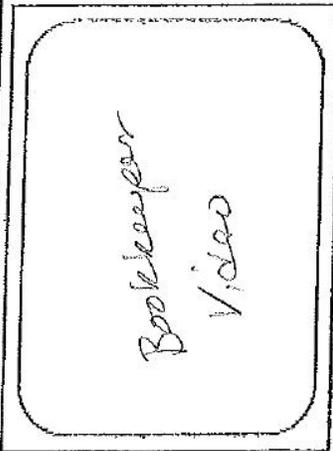
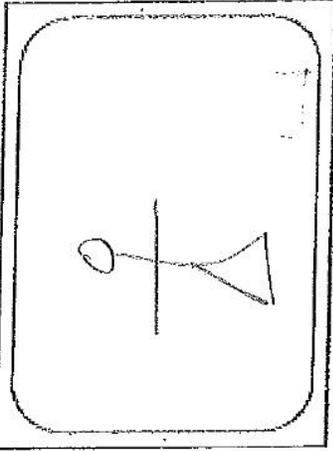
Visit Welcome Center for badge/pencil: **EIC**

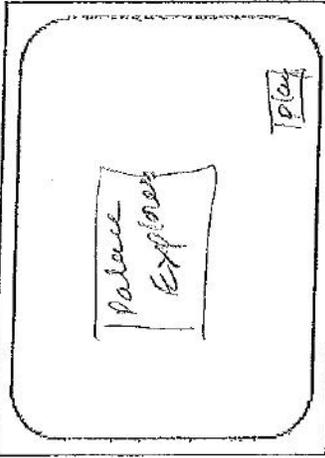
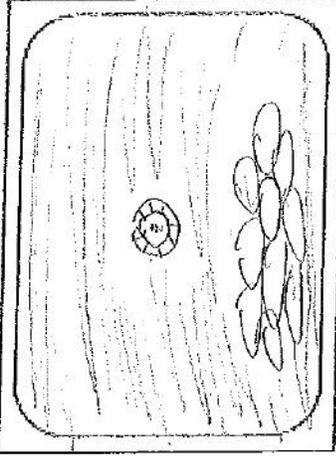
Recommendations for exhibitions: **EIC, KU**

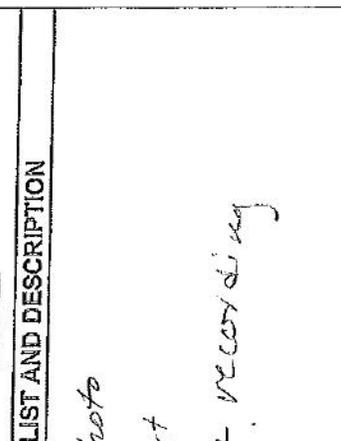
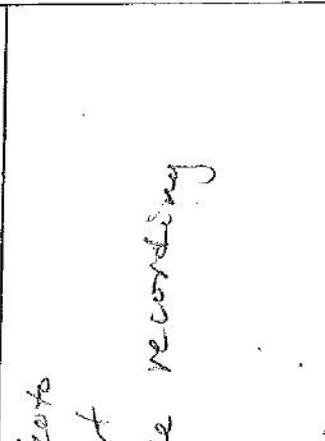
Appendix P: Digital Storytelling Storyboa

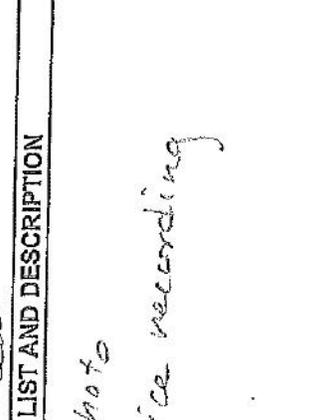
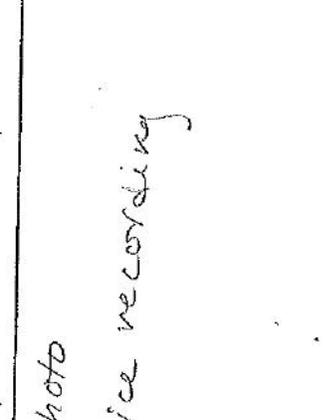
PAGE: 1	DATE: 31-Mar	PROJECT NAME: PPP	AUTHOR: Illa
FRAME DESCRIPTION		MEDIA LIST AND DESCRIPTION	
	<p>NARRATION: Welcome to the Tower of London but we can't talk here. It's not safe, someone might hear us. We must be somewhere private. Quick, hurry down to the Raven's cage, nobody @ on your map and press play when you get there. Be quick and watch out for guards.</p>	<p>· photo · text · voice recording</p>	
	<p>· picture of Raven's cage · text: Raven's cage · Green play button · Narrator's voice</p>	<p>· photo · text · voice recording</p>	
<p>NARRATION: Oh good you've made it safely! Now we can begin. Welcome to the Tower of London! My name is... let me introduce you to my good friend Michelle, the Librarian. She is in desperate need of your help.</p>			

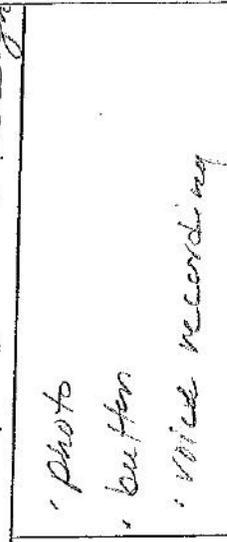
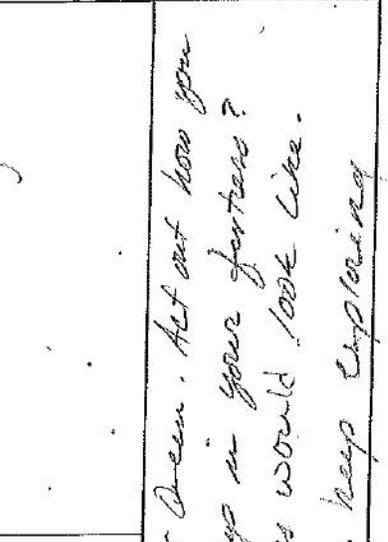
PAGE: 2	DATE: 31-Mar	PROJECT NAME: PEP	AUTHOR: Ilean
		FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
<p>NARRATION: Michelle: Hello friends. Can you keep a secret? A terrible thing has happened. My friend is in so much trouble</p>		<ul style="list-style-type: none"> picture of Michelle Michelle's voice text: Michelle, The Librarian 	<ul style="list-style-type: none"> photo Voice Recording text
		<ul style="list-style-type: none"> Picture of the bookkeeper Michelle's voice text: The Bookkeeper 	<ul style="list-style-type: none"> photo text Voice Recording
<p>NARRATION: Michelle: My friend the Bookkeeper has been taken as a prisoner in the Tower of London! He needs your help to free him.</p>			

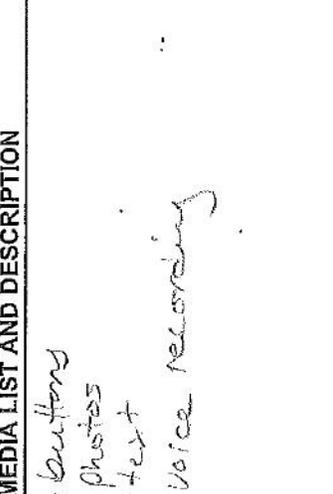
<u>PAGE:</u> 3	<u>DATE:</u> 31-Mar	<u>PROJECT NAME:</u> PEP	<u>AUTHOR:</u> Ilea
		<u>FRAME DESCRIPTION</u> Bookkeeper video	<u>MEDIA LIST AND DESCRIPTION</u> Video - PEP Bk
		<u>NARRATION:</u> Short Video	
		<ul style="list-style-type: none"> picture of Michelle Michelle's voice 	<ul style="list-style-type: none"> photo Voice recording
		<u>NARRATION:</u> Michelle: In order to free the bookkeeper you must become Palace Explorer and search the Tower of London for stories. If you write and collect your own stories my friend will be freed. Will you help free my good friend the bookkeeper? Great! Well get started!	

PAGE: 4 DATE: 31-Mar	PROJECT NAME: PEP	AUTHOR: Ilea
	FRAME DESCRIPTION <ul style="list-style-type: none"> • picture of a book • Michelle's voice • play button 	MEDIA LIST AND DESCRIPTION <ul style="list-style-type: none"> • photo • voice recording • button
<p>NARRATION: Michelle: All the people in your group can be our exploration team and help us along the way. Choose a name for your exploration team. Press play when you are ready to continue</p>		
	<ul style="list-style-type: none"> • picture of coins/tokens • Michelle's voice 	<ul style="list-style-type: none"> • photo • voice recording
<p>NARRATION: Michelle: As you explore the Tower you can learn more about certain characters and places. There will also be questions about what you are learning. If you answer correctly you can receive coins. Depending on how many coins you receive, you will earn a ranking in the Tower Court. If you can earn enough coins and free the Bookkeeper you'll earn your official Palace Explorer Badge and pencil.</p>		

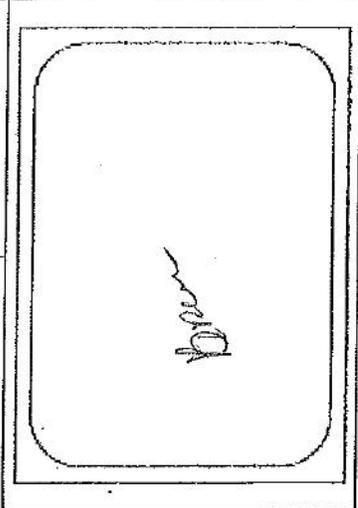
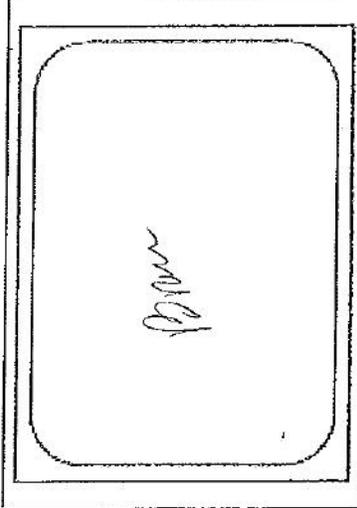
PAGE: 5	DATE: 31-Mar	PROJECT NAME: PEP	AUTHOR: Ilean
		FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
<p>NARRATION: Michelle; To learn more information about certain characters and locations you can scan the QR code on your Tower of London Map. When you are asked, all you have to do is hold your devices' camera in front of the correct code.</p>		<ul style="list-style-type: none"> · picture of QR code · text: QR code · Michelle's voice 	<ul style="list-style-type: none"> · photo · text · voice recording
		<ul style="list-style-type: none"> · white tower picture · text: white tower · narrators voice 	<ul style="list-style-type: none"> · photo · text · voice recording
<p>NARRATION: Narrator: Now lets look around. In front of you is the White Tower and to the left are the Ravens' cages. Can you see the bookkeeper in the window? The white tower served as a fortress and royal palace. It is believed to be over 900 years old but no one knows for sure. A piece of wood was dated using its tree rings back to the year 1087!</p>			

PAGE: 6	DATE: 2. Apr	PROJECT NAME: PEP	AUTHOR: Ilea
		<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> White Tower picture Narrator's voice 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> photo voice recording
<p>NARRATION: Narrator: Do you know how the White Tower got its name? (space) When King Henry III ruled he ordered the walls of the Tower be painted with white wash! From then on the Tower was called the White Tower!</p>			
		<ul style="list-style-type: none"> White Tower with water picture narrator's voice 	<ul style="list-style-type: none"> photo voice recording
<p>NARRATION: Narrator: Explorers, hundreds of years ago where you are standing would have been filled with water! The River Thames used to come right up to the walls of the White Tower; hope you all can swim.</p>			

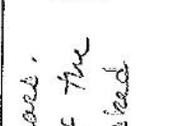
PAGE: 7	DATE: 2-Apr	PROJECT NAME: PEP	AUTHOR: Dean
FRAME DESCRIPTION		MEDIA LIST AND DESCRIPTION	
• white tower with lawn picture • narrators voice		• photo • voice recording	
<p>NARRATION: Over time the river was pushed back and piece of the Tower was built. But did you know that there was a part of the Tower that isn't here today? It's called the Missing Palace. It stood right in front of you on the lawn. It was where King Henry VIII's wife Anne Boleyn lived.</p>			
		• King/Queen picture • play button • narrators voice	
		• photo • button • voice recording	
<p>NARRATION: Now imagine you were a King or Queen. Act out how you would defend your fortress. What would you keep in your fortress? Draw on your map what your fantasy fortress would look like. Press the play button when you're ready to keep exploring.</p>			

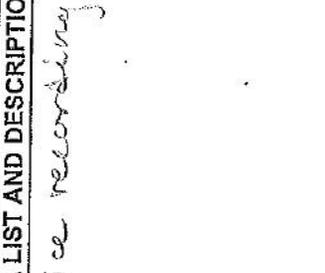
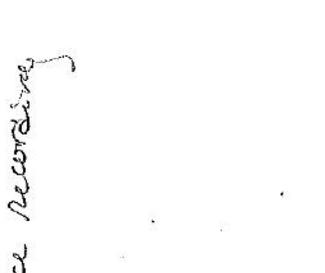
PAGE: 8	DATE: 8. Apr	PROJECT NAME: PEP	AUTHOR: Jlem
FRAME DESCRIPTION		MEDIA LIST AND DESCRIPTION	
		<ul style="list-style-type: none"> • 3 boxes / buttons • picture of legend of Bran • picture of Ravens • picture of Rannulf Plowboard • Narrator's voice • text below / or above boxes 	
NARRATION: Narrator: Great! Now that Michelle's told you how to use a QR code let's try it out shall we. Pick which character you'd like to learn more about! Find out about where the legend of Bran's head is buried, or what would happen to the Tower without Ravens, or Rannulf Plowboard and the poop! Click on the pictures to learn more information!			
		<ul style="list-style-type: none"> • Camera automatically spins • boxes showing current and recent QR Codes • text: Scan QR Code Now • voice 	
NARRATION:			

White Tower

<p>PAGE: QR code 1</p>	<p>DATE: 2-Apr</p>	<p>PROJECT NAME: PEP</p>	<p>AUTHOR: Dean</p>
	<p>FRAME DESCRIPTION Narrator's voice</p>	<p>MEDIA LIST AND DESCRIPTION -Voice recording</p>	
<p>NARRATION: Narrator: Lean in close my young explorers as I tell you about the legend of Bran. Bran was a Celtic God that lived a long time ago. One day he was horribly wounded in battle.</p>			
	<p>Narrator's voice</p>	<p>Voice recording</p>	
<p>NARRATION: Narrator: As he lay on his death bed he ordered his men to cut off his head and bury it in the White Mound, underneath where the White Tower sits! This was considered good luck and said to protect London from attacking enemies. It's also good luck because in Celtic, Bran means Raven, for the Tower.</p>			

White Tower

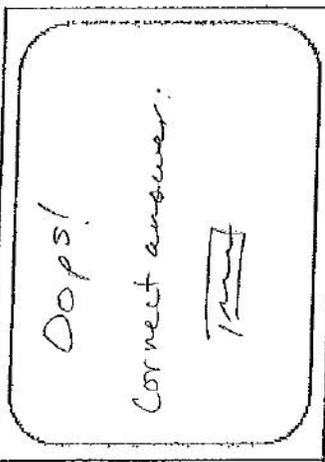
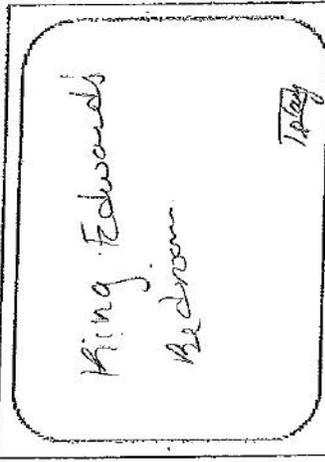
<p>PAGE: QR Code 2</p>	<p>DATE: 2-Apr</p>	<p>PROJECT NAME: PEP</p>	<p>AUTHOR: Dean</p>
	<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • Narrator's voice 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • Voice Recording 	<p>NARRATION: Narrator: Ravens have lived at the Tower of London for hundreds of years. In the middle of the 1600's Royal Astronomer John Flamsteed was trying to look at the stars through his telescope but those pesky ravens kept getting in his way! He asked King Charles II to get rid of all the ravens.</p>
	<p>• at end of narrator's speech, screen goes automatically back to QR code options</p>	<p>• Voice Recording</p>	<p>NARRATION: Narrator: Before King Charles could remove the ravens it was rumored that if the ravens left then the Tower would fall and a disaster would hit London! So King Charles clipped the Raven's wings instead so that they wouldn't fly into the telescopes. This is why six ravens live at the Tower at all times. Plus they keep an extra raven just in case something happens. Therefore, there are always six plus ravens</p>

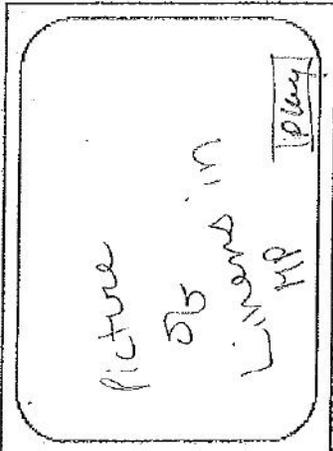
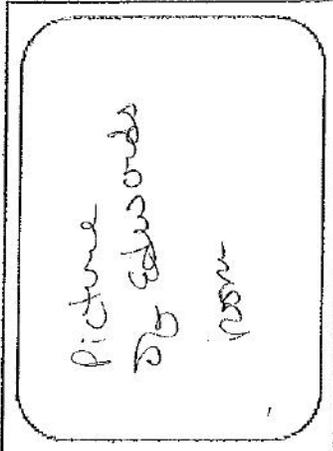
PAGE: DR Code 3	DATE: 2 - Apr	PROJECT NAME: PEP	AUTHOR: Ilea
FRAME DESCRIPTION		MEDIA LIST AND DESCRIPTION	
	<p>• Narrators voice</p>	<p>• Voice recording</p>	
<p>NARRATION: Narrator: Ramulf Flamboord was the very first prisoner at the Tower of London. His job was to collect taxes from the London people. But Ramulf Flamboord was greedy and took too much money. King Henry I locked Flamboord away in the Tower for six months.</p>			
	<p>• Narrators voice</p>	<p>• at end of narrators speech, screen goes automatically back to QR code options</p>	<p>• Voice recording</p>
<p>NARRATION: Narrator: One night, when the King was having a big feast, someone smuggled Flamboord a rope inside a gallon of wine. Flamboord invited his guards to join him in drinking the wine. All the guards drank too much wine and fell asleep. Flamboord then climbed out of the White Tower using the rope. Except the rope was too short and poor Ramulf Flamboord fell into a pile of poop. The very stinky Flamboord escaped into the night on a horse.</p>			

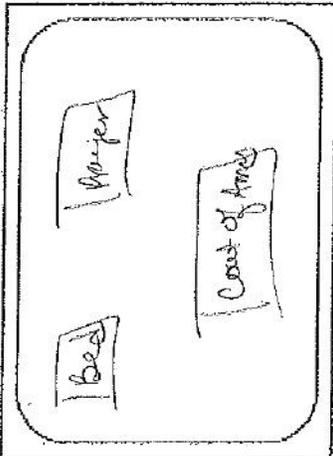
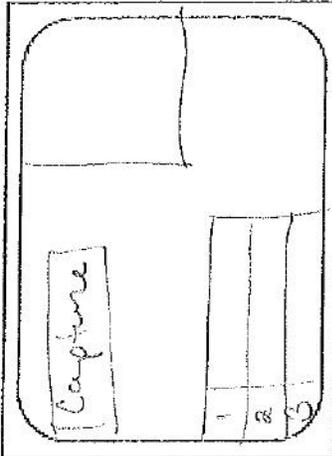
PAGE: 9	DATE: 2-Apr	PROJECT NAME: PEP	AUTHOR: Ilean
<div style="border: 1px solid black; border-radius: 15px; padding: 10px; margin-bottom: 5px;"> <p style="text-align: center;"><u>Storytelling</u></p> <p>What is the name of your exploration team? _____</p> </div>		FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
<p>NARRATION: Narrator; Let's start collecting stories. As you go along type your answers into the spaces when a storytelling question appears. Work with your exploration team to come up with the best stories for the Bookkeeper. Use your imagination to answer the questions.</p>		<ul style="list-style-type: none"> • title • Question for story • blank space for answers that transfer directly to pre-set story • narrator's voice 	<ul style="list-style-type: none"> • title • text • blank space for entry • voice recording
<div style="border: 1px solid black; border-radius: 15px; padding: 10px; margin-bottom: 5px;"> <p>What time of day is it? _____</p> <p>What season is it? _____</p> </div>		<ul style="list-style-type: none"> • questions for story • blank space for answers that transfer directly to story • narrator voices 	<ul style="list-style-type: none"> • text • blank space for entry • voice recording
<p>NARRATION: Narrator; what time of day is it? What season is it?</p>			

<p>PAGE: 10</p>	<p>DATE: 2-Apr</p>	<p>PROJECT NAME: PEP</p>	<p>AUTHOR: Ilan</p>
<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • questions for story • blank space for answers that transfer directly to story • Narrators voice 		<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • text • blank space for entry • voice recording 	
<p>NARRATION: Narrator: What is the temperature? What do you hear?</p>			
<p>What are you taking with you? What is in your pockets?</p>		<p>• questions for story</p> <ul style="list-style-type: none"> • blank space for answers that transfer directly to story • Narrators voice 	
<p>NARRATION: Narrator: What are you taking with you? What is in your pockets?</p>			
<p>• text space for entry</p> <ul style="list-style-type: none"> • voice recording 			

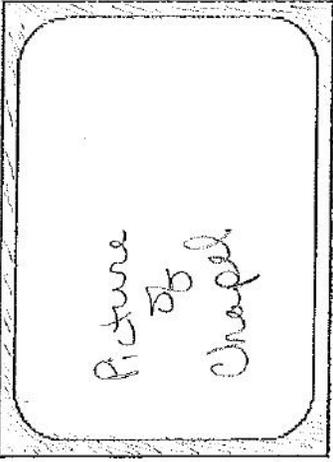
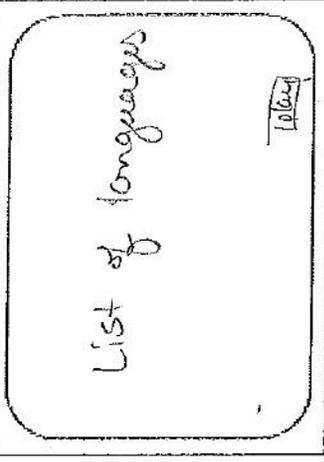
PAGE: 11	DATE: 28-Mar	PROJECT NAME: PEP	AUTHOR: Ken
FRAME DESCRIPTION • White Tower Question • boxes with different options for answers		MEDIA LIST AND DESCRIPTION • text • answers boxes • voice recording	
NARRATION: Narrator: Question Time. The White Tower got its name because? It was painted white by King Henry III, it was ruled by King White, or it was made during the White Era. Choose Carefully.		• text • answer box • voice recording	
NARRATION: Congratulations!  You've earned 5 Coins!		NARRATION: Narrator: Congratulations! You that's correct, the White Tower was named because it was painted with white wash by King Henry III. You have earned 5 coins for your answer.	

PAGE: 12	DATE: 28-Mar	PROJECT NAME: PEP	AUTHOR: Ellen
		<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • text for wrong answer • box showing correct answer • narrators voice 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • text • answer box • voice recording
<p>NARRATION: Narrator: Oops, Sorry that's not the correct answer. The correct answer is that the White Tower was named because it was painted with whitewash by King Henry III. Better luck next time!</p>			
		<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • picture of King Edwards bedroom • narrators voice • play button 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • picture • voice recording • button
<p>NARRATION: Narrator: Fantastic! your stories are off to a great start. The Town of London was a powerful fortress designed to keep enemies out but it was also a home for many people, including royalty. How would you like to sneak into the Medival Palace and see a real King's bedroom? (press) Great! Walk to @ on your map and press play when you get there.</p>			

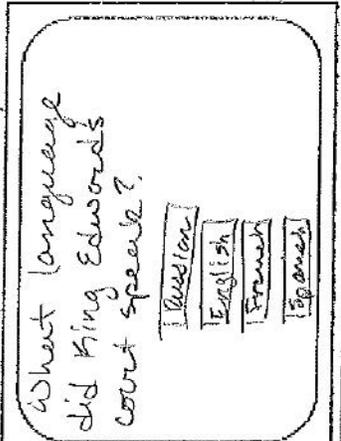
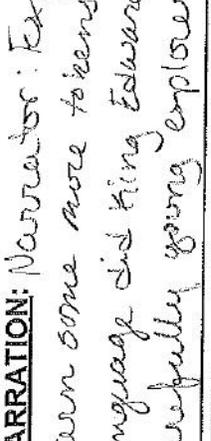
<u>PAGE:</u> 1 MP	<u>DATE:</u> 2-Apr	<u>PROJECT NAME:</u> PEP	<u>AUTHOR:</u> Ilean
		<u>FRAME DESCRIPTION</u>	<u>MEDIA LIST AND DESCRIPTION</u>
<p>picture of Linens in MP</p> <p>Narrators voice</p> <p>green play buttons</p>			<ul style="list-style-type: none"> • photo • button • Voice recording
<p>NARRATION: Welcome to the Medicinal Palace! Besides being a fortress the tower was also a home. Several royalty lived here like Henry III and King Edward I lived here! When he was preparing for war with France. In this part of the palace you can see all the Linens that King Edward would have had on his bed. Explorers, touch all the sheets then discuss in your group what sheets are on your bed. Do you have anything else on your bed? <u>Press play when you're re</u></p>			
		<u>FRAME DESCRIPTION</u>	<u>MEDIA LIST AND DESCRIPTION</u>
<p>picture of Edwards room</p>		<p>picture of bedroom</p> <p>Narrators voice</p>	<ul style="list-style-type: none"> • photo • Voice recording
<p>NARRATION: Narrator: Behold, King Edward I's bedroom. Explorers, look around, what do you see? What do you hear? Can you smell anything? Slight pause</p>			

PAGE: DMP	DATE: 2-Apr	PROJECT NAME: PEP	AUTHOR: Ilean
		FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
<p>NARRATION: Narrator: There are so many things in Edwards room! To explore about the room off of his bedroom at the colourful shield or the big bed then clicks on the buttons. Let's explore!</p>		<ul style="list-style-type: none"> Buttons with text that link to QR code Narrator's voice 	<ul style="list-style-type: none"> Voice Recording
		<ul style="list-style-type: none"> QR code page Capture button Camera Voice Recording 	<ul style="list-style-type: none"> Camera button Voice Recording
<p>NARRATION: Narrator:</p>			

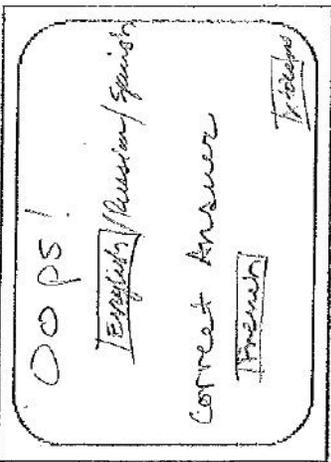
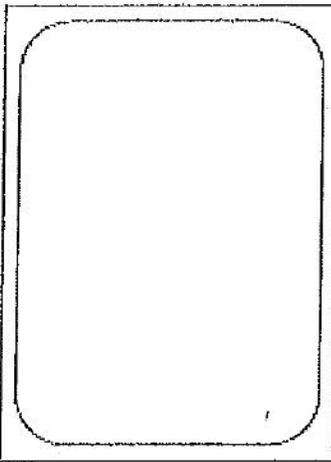
Medieval Palace

<p>PAGE: 00 Code 3</p>	<p>DATE: 02-Apr</p>	<p>PROJECT NAME: PEP</p>	<p>AUTHOR: Ilean</p>
	<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • picture of chapel • audio of French prayer • narrator's voice 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • photo • voice recording • audio clip 	
<p>NARRATION: After French prayer (starts automatically). Narrator: What you just heard was the Lord's Prayer in French. Religion was very important, especially to King Edward. He had a chapel in his bedroom and prayed 5 times a day to show he was close to God. Even though Edward was an English King his entire court spoke French.</p>	<p>• List of different languages</p> <p>• Narrator's voice</p> <p>• green play button</p>	<p>• Text</p> <p>• Voice recording</p> <p>• button</p>	
	<p>NARRATION: Narrator: If you were a King or Queen what language would you make your people speak? What language do you speak at home? Discuss with your exploration team all the different languages you know. Press the green play button when you're ready to continue.</p>		

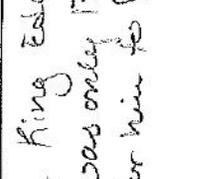
Medieval Palace

<p>PAGE: Orbcode 3 (a)</p>	<p>DATE: 2-Apr</p>	<p>PROJECT NAME: STEP</p>	<p>AUTHOR: Ilean</p>
<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • Question/text • 4 boxes that link to correct/incorrect page (buttons) • Narrators voice 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • text • buttons • Voice recording 	<p>NARRATION: Narrator: Explorers, now that you're masters of language let's earn some more tokens and make our purse heavy with coins. What language did King Edward's court speak? Russian, English, French, Spanish? Think carefully young explorers.</p>	
	<p>NARRATION:</p>	<p>• text • boxes • Voice recording</p>	<p>• text • boxes • Voice recording</p>
<p>• text: congratulations</p> <p>• box w/ answer</p> <p>• text: tokens</p> <p>• box w/ token total</p> <p>• narrators voice</p>		<p>NARRATION:</p>	

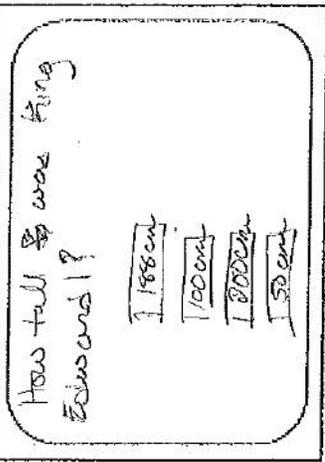
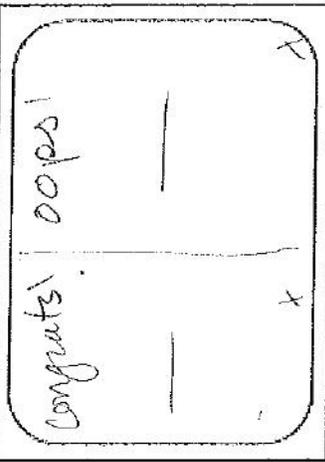
Medieval Palace

<u>PAGE:</u> OC Code 3 (3)	<u>DATE:</u> 2-Apr	<u>PROJECT NAME:</u> PEP	<u>AUTHOR:</u> Ilea
		<u>FRAME DESCRIPTION</u> <ul style="list-style-type: none">• text: oops• correct answer• box w/ chosen answer• box w/ correct answer• box w/ to hear total• Narrators voice	<u>MEDIA LIST AND DESCRIPTION</u> <ul style="list-style-type: none">• text• boxes• Voice recording
<u>NARRATION:</u> Narrator: Oops better luck next time Explorers. The correct answer is that King Edwards court spoke French.			
			
<u>NARRATION:</u>			

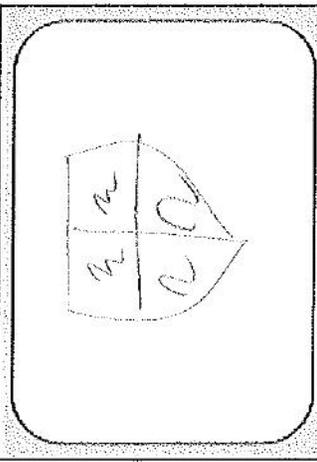
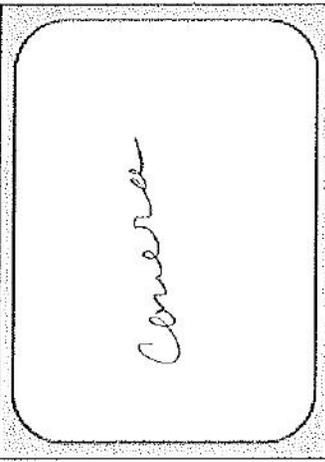
Medieval Palace

<p>PAGE: 4</p>	<p>DATE: 2-Apr</p>	<p>PROJECT NAME: PE</p>	<p>AUTHOR: Ilca</p>
	<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • picture of bed • narrators voice 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • photo • voice recording 	<p>NARRATION: Narrator: Look closely at King Edwards bed explorers. King Edward stood very tall. He was 188cm or 6'2". The average man back then was only 173cm or 5'8". Because he was so tall his bed had to be special in order for him to fit. Edward also traveled a lot so his bed had to be easy to take apart.</p>
	<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • picture of straw mattress • narrators voice 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • photo • voice recording 	<p>NARRATION: Narrator: Not everyone slept on a bed though. Servants would sleep on straw mattresses or pallets to protect the king during the night. Because of this King Edwards bed had curtains around it so he could have privacy. Can you spot the curtains on the King's bed? (pause)</p>

Medieval Palace

<p><u>PAGE:</u> OR Code 4 (a)</p>	<p><u>DATE:</u> 2-Apr</p>	<p><u>PROJECT NAME:</u> PEP</p>	<p><u>AUTHOR:</u> Ilean</p>
<p>How tall was King Edward 1? </p>	<p><u>FRAME DESCRIPTION</u></p> <ul style="list-style-type: none"> • text: Question • boxes w/ answers that link to answer pages • Narrators voice 	<p><u>MEDIA LIST AND DESCRIPTION</u></p> <ul style="list-style-type: none"> • text • boxes w/ links • Voice recording 	
<p><u>NARRATION:</u> Narrator: Question time Explorers! How tall was King Edward 1? Was he 188 cm, 100 cm, 200 cm, or even taller? Choose wisely my friends, this can earn you more tokens.</p>			
<p>congrats! oops! </p>			
<p><u>NARRATION:</u></p>			

Medieval Palace

PAGE: DL Code 5	DATE: 2-Apr	PROJECT NAME: PEP	AUTHOR: Flem
		<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • picture of King Edwards coat of arms • narrators voice 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • photo • voice recording
<p>NARRATION: Narrator: How can you tell whose room this is? (pause) you can tell whose room this is by the large coat of arms. A coat of arms is used to represent a person or group of people using symbols rather than words.</p>			
		<ul style="list-style-type: none"> • camera • narrators voice 	<ul style="list-style-type: none"> • voice recording • camera
<p>NARRATION: Narrator: In your Explorers Team can you think of a coat of arms that represents your team. You can draw it on your map and take a picture of the coat of arms you draw. If you draw an especially good coat of arms I might just give you a few tokens.</p>			

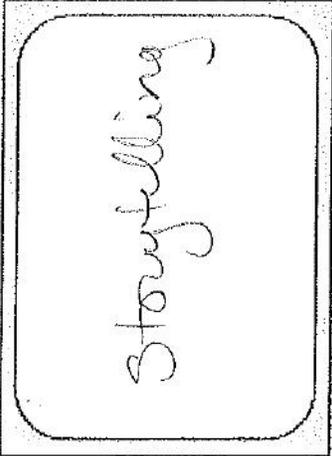
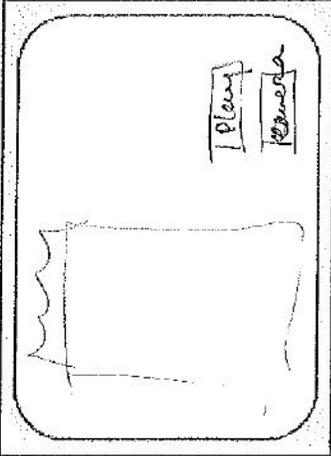
PAGE: All code 5 (a)	DATE: 2-Apr	PROJECT NAME: PEP	AUTHOR: Flea
	FRAME DESCRIPTION .text : congratulations x tokens earned .box 4 tokens total .narrators voice	MEDIA LIST AND DESCRIPTION .text .box .voice recording	
NARRATION: Narrator: Very nice coat of Arms explorers, I suppose I can give you x tokens since you did such a good job.			
			
NARRATION:			

MP

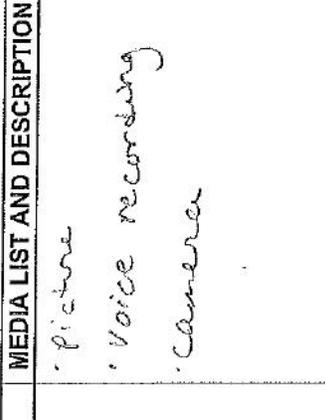
PAGE: ST #1 DATE: 4-Apr	PROJECT NAME: PEP	AUTHOR: Ilea
<div style="border: 1px solid black; padding: 5px;"> <p>What is your royal court name? _____</p> <p>What country is your court from? _____</p> </div>	FRAME DESCRIPTION <ul style="list-style-type: none"> • Story questions • blank spaces for user entry • Narrator's voice • Link answers directly to pre-set stories 	MEDIA LIST AND DESCRIPTION <ul style="list-style-type: none"> • Text • blank entry space • Voice recording
<p>NARRATION: Narrator: All right explorers, let's put our thinking hats on & collect another story for the bookkeeper. Let's think about the Tower of London as a home? Imagine you are royalty and lived a long time ago. What is the name of your royal court? What country is your court from?</p>		
<div style="border: 1px solid black; padding: 5px;"> <p>What country would you go to battle with? _____</p> <p>How many people are in your court? _____</p> </div>	<ul style="list-style-type: none"> • Story questions • blank spaces for user entry • Narrator's voice • Link answers directly to pre-set stories 	<ul style="list-style-type: none"> • Text • blank entry space • Voice recording
<p>NARRATION: Narrator: What country would you go to battle with? How many people are in your court?</p>		

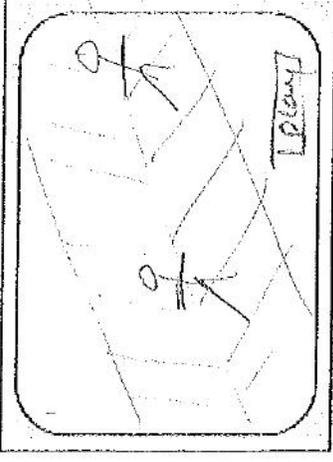
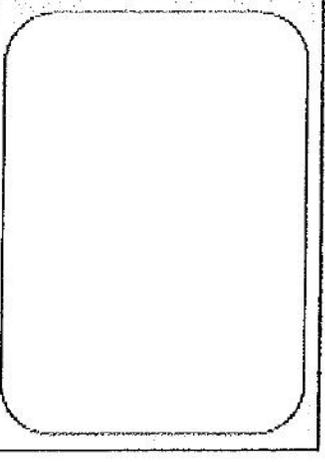
MP

PAGE: ST # 1 (2)	DATE: 4-Apr	PROJECT NAME: PEP	AUTHOR: Ilea
<p>What 3 items would you take with you on adventures? _____</p> <p>What are your 3 royal Colours? _____</p>		<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • story questions • blank space for user entry • narrators voice • link automatically to pre-set stories 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • text • blank entry space • voice recording
<p>NARRATION: Narrator: What three items would you take with you on adventures? What are your 3 royal colours?</p>			
<p>How many days until you go into battle? _____</p> <p>How would you transport your bed? _____</p>		<p>Story questions</p> <ul style="list-style-type: none"> • blank space for user entry • narrators voice • link automatically to pre-set stories 	<ul style="list-style-type: none"> • text • blank entry space • voice recording
<p>NARRATION: Narrator: How many days until you go into battle? How would you transport your bed?</p>			

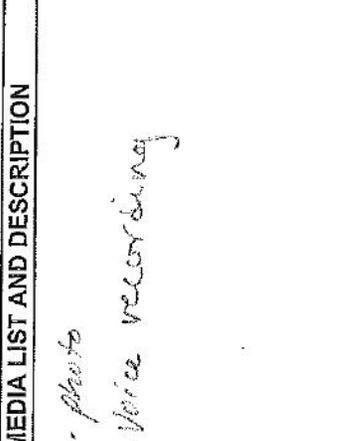
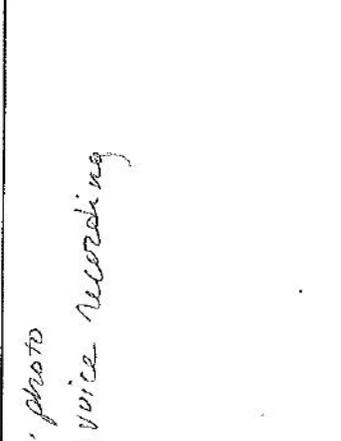
<u>PAGE:</u> 3 MP	<u>DATE:</u> 2- Apr	<u>PROJECT NAME:</u> PEP	<u>AUTHOR:</u> Ileana
		<u>FRAME DESCRIPTION</u>	<u>MEDIA LIST AND DESCRIPTION</u>
		<p><u>NARRATION:</u></p> 	
<p><u>NARRATION:</u> Narrator: The Tower of London wasn't just a home for royalty. Do you want to hear ^{about} the funny gift for the king? Or another funny friend who only ate cake? Well then my explorers lets march off to towards the Royal Menagerie. Travel along the wall to Broad Arrow Tower, ③ on your map and press play when you get there. On your way over keep on eye out for all the hidden animals! How many can you spot? Also there are soldier statues guarding the walls. See how many you can take with. Alright then! Off we go!</p>			

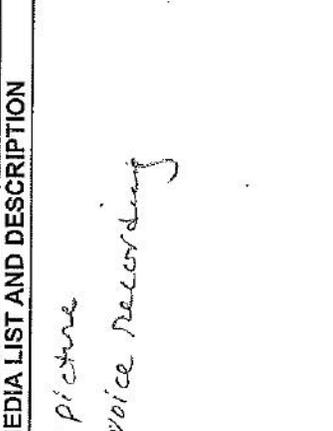
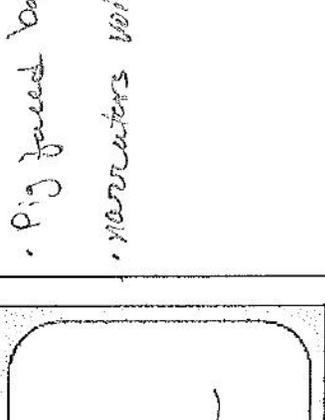
Broad Arrow Tower

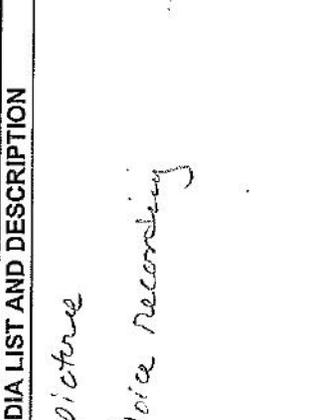
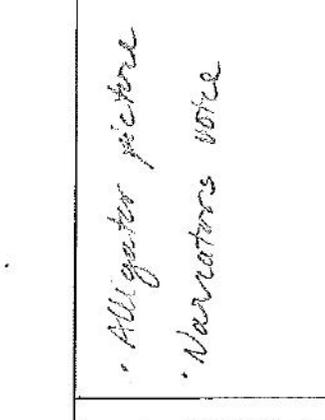
<p>PAGE: 1 BAT</p>	<p>DATE: 3- Apr</p>	<p>PROJECT NAME: PEP</p>	<p>AUTHOR: Ilea</p>
	<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> Picture of Broad Arrows Tower Narrators voice camera button 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> Picture Voice recording camera 	<p>NARRATION: I see you're made it to Broad Arrow Tower. This is very important, come in close now, gather round. The Tower needs your help defending its walls. Look around and see what you can find to dress up as a soldier. Have a member of your Exploration Team take a picture of you ready for battle.</p>
	<ul style="list-style-type: none"> Camera after user takes and saves the picture then the program automatically goes to next page 	<ul style="list-style-type: none"> Camera 	<p>NARRATION:</p>

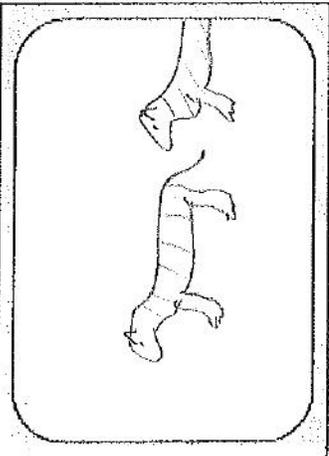
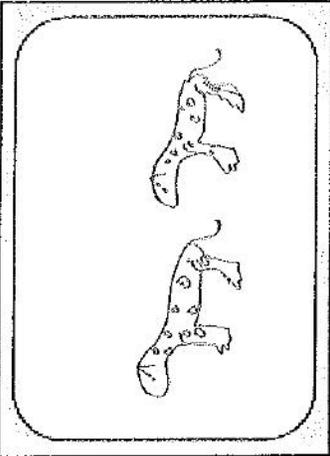
PAGE: 2 BAT	DATE: 3-Apr	PROJECT NAME: PEP	AUTHOR: Dlen
		FRAME DESCRIPTION <ul style="list-style-type: none"> Picture of Fighting platform narrator's voice press play button 	MEDIA LIST AND DESCRIPTION <ul style="list-style-type: none"> photo voice recording button
<p>NARRATION: Narrator: Imagine you're a guard for the King. As you head over to the Menagerie, number 6 in your map, keep an eye out for attackers and make sure the coast is all clear for your Exploration Team to pass. Beware on the fighting platform for stay arrows and cannon balls! Press play when you reach the Menagerie safely.</p>			
<div style="border: 1px solid black; width: 100%; height: 100%; display: flex; align-items: center; justify-content: center;">  </div>			
<p>NARRATION:</p>			

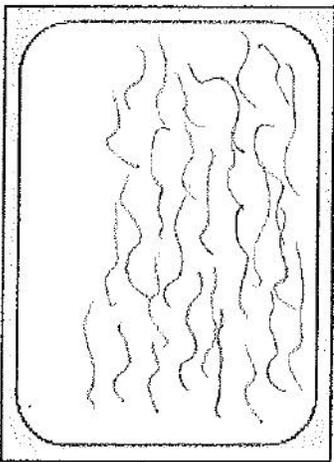
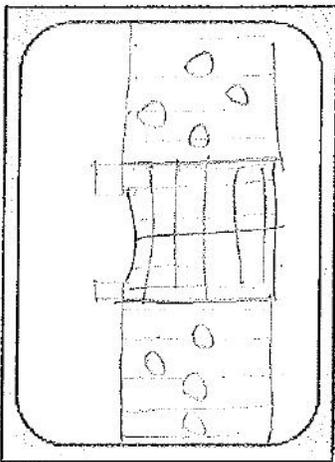
Royal Menagerie

PAGE: 1 RM	DATE: 3-Apr	PROJECT NAME: PEP	AUTHOR: Helen
	FRAME DESCRIPTION ' picture of Royal Menagerie ' narrators voice	MEDIA LIST AND DESCRIPTION ' photo ' voice recording	
<p>NARRATION: Narrator: Well done Explorers! Glad to see you made it safely. Welcome to the Royal Menagerie. Here is where they kept some of the royal beasts. As you have a look around be careful of the Tiger above the doorway, he looks very scary. Also don't go too close to the wooden boxes, the animals inside have traveled a very long way and sound extremely hungry!</p>			
	' animal picture of lion ' narrators voice	' photo ' voice recording	
<p>NARRATION: Narrator: A menagerie is similar to a zoo. In 1810, under the reign of King James I, the first animals arrived at the Tower. Lions were the first brought to the menagerie. By 1829 there was</p>			

PAGE: 2 RM	DATE: 09-Mar	PROJECT NAME: PEP	AUTHOR: Ilean
		FRAME DESCRIPTION • Zebra picture • Narrators voice	MEDIA LIST AND DESCRIPTION • picture • voice recording
NARRATION: Narrator: / zebra...			
		FRAME DESCRIPTION • pig faced balloon picture • narrators voice	MEDIA LIST AND DESCRIPTION • picture • voice recording
NARRATION: Narrator: / pig faced balloon...			

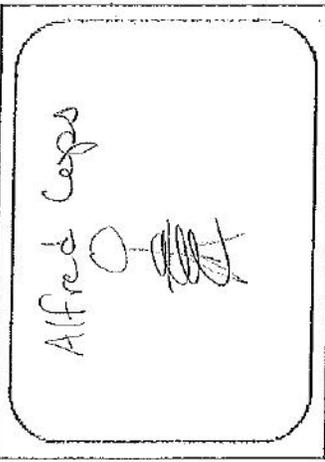
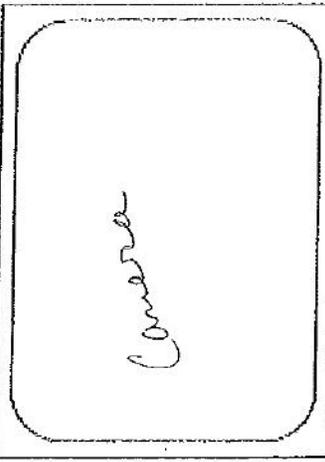
PAGE:	DATE:	PROJECT NAME:	AUTHOR:
3RM	29-Mar	PEP	Helen
FRAME DESCRIPTION		MEDIA LIST AND DESCRIPTION	
	<ul style="list-style-type: none"> • African sheep picture • Narrator voice 		<ul style="list-style-type: none"> • picture • Voice Recording
<p>NARRATION: Narrator: 1 African sheep...</p>			
	<ul style="list-style-type: none"> • Alligator picture • Narrators voice 		<ul style="list-style-type: none"> • picture • Voice Recording
<p>NARRATION: Narrator: 1 alligator...</p>			

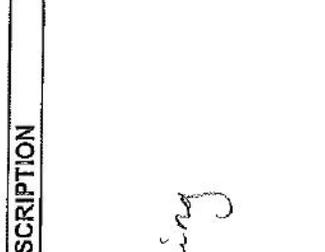
PAGE: 4RM	DATE: 29-Mar	PROJECT NAME: PEP	AUTHOR: Ilana
		FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
		<ul style="list-style-type: none"> - tiger picture - Narrator's voice 	<ul style="list-style-type: none"> - picture - Voice Recording
NARRATION: Narrator: 2 tigers ...			
		FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
		<ul style="list-style-type: none"> - cheetah picture - Narrator's voice 	<ul style="list-style-type: none"> - picture - voice recording
NARRATION: Narrator: 2 cheetah ...			

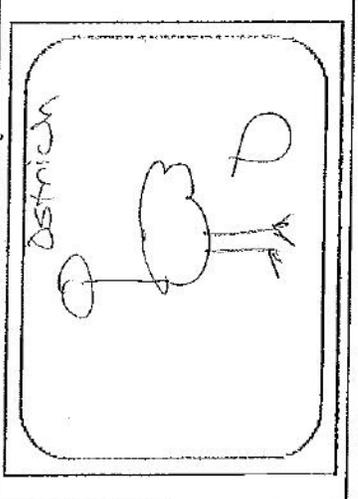
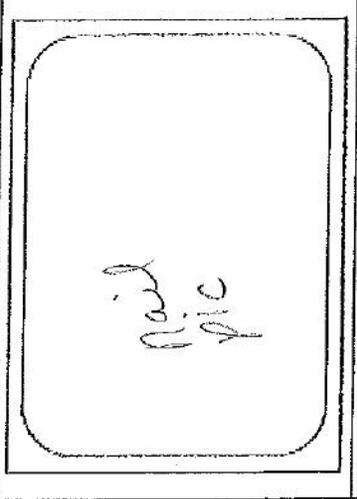
PAGE: 5 RM	DATE: 29-Mar	PROJECT NAME: PEP	AUTHOR: Ileana
		FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
<p>NARRATION: Narrator; and 100 Rattle Snakes!</p>		<ul style="list-style-type: none"> • rattle snake picture • Narrators voice 	<ul style="list-style-type: none"> • Picture • Voice recording
		<ul style="list-style-type: none"> • picture of closed zoo • narrators voice 	<ul style="list-style-type: none"> • Picture • Voice Recording
<p>NARRATION: Narrator: In 1830 after several attacks the animals were moved to the London Zoo.</p>			

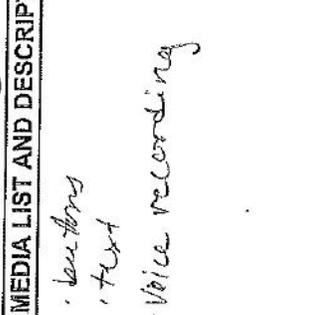
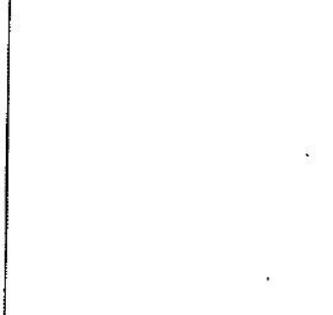
PAGE: L2M	DATE: 3-Apr	PROJECT NAME: PEL	AUTHOR: Ileen
		FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
		<ul style="list-style-type: none"> pictures: Alfred Cops, Ostrich, baboons, polar bear Manzanas voice text: Alfred Cops, Ostrich, baboon, polar bear 	<ul style="list-style-type: none"> text photos Voice recording
<p>NARRATION: Narrator: There are so many things I could tell you about the animals but I'll leave it up to you. Would you like to hear a story about the zookeeper, Alfred Cops, and his on-air accident or perhaps what happens with the Ostrichs: etc, or the baboons who acted like humans or maybe the Polar Bear who swam in the Thames River.</p>			
<p>NARRATION: QR Code Page</p>			

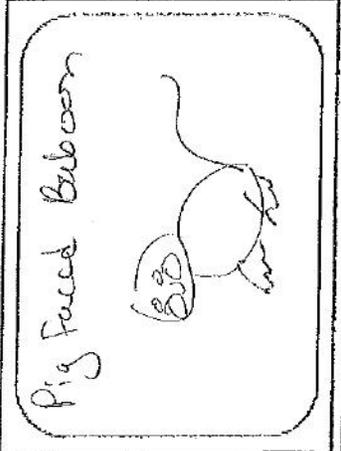
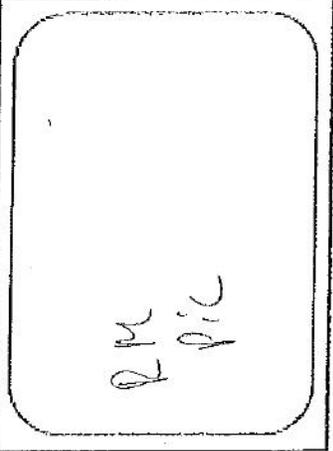
? Press who animal of would like to learn more about

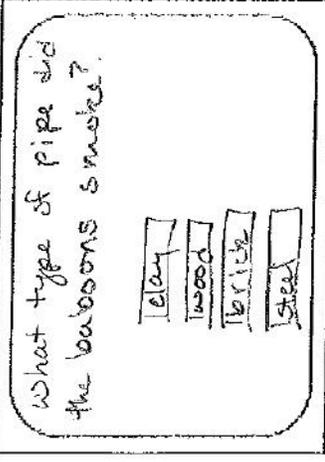
<p>PAGE: Dr Code 7</p>	<p>DATE: 3-Apr</p>	<p>PROJECT NAME: PEP</p>	<p>AUTHOR: Flan</p>
	<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • picture of Alfred Cops and snake • title : Alfred Cops • Audio clip of Alfred Cops 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • photo • title • Audio clip 	
<p>NARRATION: A audio story</p>			
	<ul style="list-style-type: none"> • Camera • narrators voice • as soon as they save the picture it links them to the next page 	<ul style="list-style-type: none"> • Camera • Voice recording 	
<p>NARRATION: Narrator: Could you imagine being squashed by a giant snake. Imagine you were Alfred Cops. Mine how you would escape from a snake. Have someone in Exploration Team take a picture of you wiggling out of its scaly grip.</p>			

<u>PAGE:</u> Oil Code 7 (a)	<u>DATE:</u> 3-Apr	<u>PROJECT NAME:</u> PEP	<u>AUTHOR:</u> Ilean
		<u>FRAME DESCRIPTION</u> .text: Great photo x tokens .box: token total narrators voice	<u>MEDIA LIST AND DESCRIPTION</u> .text .box voice recording
<u>NARRATION:</u> Narrator: Great photo Explorers! For that picture showing your quick escape I'll give you x tokens.			
			
<u>NARRATION:</u>			

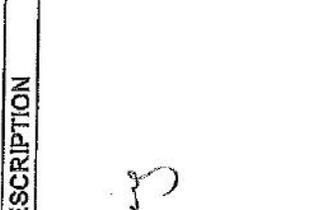
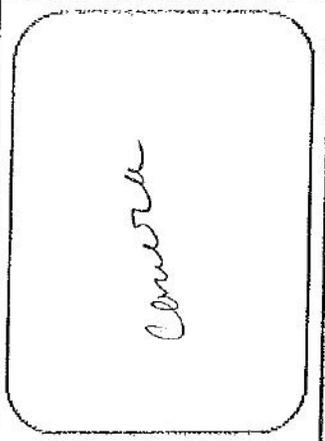
PAGE: <u>OL Code 8</u> DATE: <u>3 Apr</u>	PROJECT NAME: <u>PEP</u>	AUTHOR: <u>Zlea</u>
	FRAME DESCRIPTION • title: ostrich • picture: ostrich • narrators voice	MEDIA LIST AND DESCRIPTION • file • photo • voice recording
<p>NARRATION: Narrator: Ostriches also lived at the Tower in the Royal Menagerie. If you should ever own a pet ostrich remember to give them a big so they can run. They need shade to keep cool and they eat lots of leafy green plants and insects. The poor ostrich that lived at the Tower was kept in a very small cage and can you guess what they ate Explorers?</p>		
	• nail picture • narrators voice	• photo • voice recording
<p>NARRATION: Narrator: They were fed nails? Do you think this was good for a bird to eat? (pause) No! Of course not, this gave the bird horrible (ouch) pains (ouch) in its stomach.</p>		

<u>PAGE:</u> QR Code 8 (2)	<u>DATE:</u> 3-Apr	<u>PROJECT NAME:</u> PEP	<u>AUTHOR:</u> Ilea
<p>What was the Ostrich Sad when it lived at the Tower of London.</p> 		<p><u>FRAME DESCRIPTION</u></p> <ul style="list-style-type: none"> - text: Animation - 4 buttons linked to answer pages - Narrators Voice 	<p><u>MEDIA LIST AND DESCRIPTION</u></p> <ul style="list-style-type: none"> - buttons - text - Voice recording
<p><u>NARRATION:</u> Narrator; Since you're so smart Explorers this will be an easy question. What did the Ostrich eat when it lived at the Tower of London?</p>			
<p>congrats! oops</p> 			
<p><u>NARRATION:</u> QR Code Answer pages</p>			

<u>PAGE:</u> All Code 9	<u>DATE:</u> 3-Apr	<u>PROJECT NAME:</u> PEP	<u>AUTHOR:</u> Dean
		<u>FRAME DESCRIPTION</u> . title : Pig faced Baboon . baboon picture . Narrator's voice	<u>MEDIA LIST AND DESCRIPTION</u> . title . picture . Voice Recording
<p>NARRATION: Narrator: Several Pig-faced baboons used to also call the Tower home. The baboons would be kept in open rooms and visitors could walk in and see them. The monkeys were free to roam about and often used to snatch umbrellas, scarves, and hats. Those little thieves, hold on to your hats explorers!</p>			
		. Royal Menagerie picture . Narrator voice	. photo . Voice recording
<p>NARRATION: Narrator: The baboons used to act like humans and mime human actions. Look around the Menagerie, to see if you can find a display that talks about baboons, and answer this question...</p>			

PAGE: GC code 9 (2)	DATE: 3-Apr	PROJECT NAME: PEP	AUTHOR: Jasen
FRAME DESCRIPTION -text: Question -buttons with answers like to answer page -narrators voice		MEDIA LIST AND DESCRIPTION -text -buttons -voice recording	
NARRATION: Narrator: What type of pipe did the baboons smoke? 		NARRATION: What type of pipe did the baboons smoke? Was it a clay, wood, brick, or steel pipe? Think carefully now.	
		NARRATION: All Question Answers page	

PAGE:	DATE:	PROJECT NAME:	AUTHOR:
QR Code 10	3-Apr	PEP	Ilem
FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION		
<div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center;"> <p>Polar Bear Pic</p> </div>	<ul style="list-style-type: none"> • Polar bear picture • title polar bear • narrators voice 	<ul style="list-style-type: none"> • photo • title • Voice recording 	
<p>NARRATION: Narrator: Grrr. The mighty polar bear was a gift from the King of Norway to King Henry III in 1252. Kings and Queens used to try to impress each other by giving gifts. If you gave a King or Queen an unusual animal then it showed that you were an important and powerful person.</p>	<ul style="list-style-type: none"> • Polar bear picture • Narrators voice 	<ul style="list-style-type: none"> • photo • Voice recording 	
<div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center;"> <p>Polar bear pic</p> </div>	<p>NARRATION: Narrator: The polar bear is the largest of all bears and weighs 600kg and has 42 teeth (chomp chomp) and loved eating meat. To keep the polar bear alive the animal keepers chained the polar bear to a long chain and let him swim in the River Thames so he could catch fish. Do you think it would look funny to see a polar bear swimming in the river?</p>		

PAGE: DL Code 10 (a)	DATE: 3-Apr	PROJECT NAME: PEP	AUTHOR: Ellen
	FRAME DESCRIPTION • Camera • Narrator's voice	MEDIA LIST AND DESCRIPTION • Camera • Voice recording	
NARRATION: Explorers, imagine you're a polar bear. You've been taken a long ways from home and given as a gift to a king. How would you feel? You're kept in a cage and chained to a long chain, forced to swim in the river for your food. Take a picture in the cage in the middle of the menagerie, showing how the polar bear would have looked.			
	NARRATION: Narrator: Great photo Photo template by Thomas		

RM

PAGE:

ST #2

DATE:

4-Apr

PROJECT NAME:

PEP

AUTHOR:

Ilse

FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
<p>story question</p> <p>blank space for user entry</p> <p>Narrator's voice</p> <p>blank entry links to pre-set story</p>	<ul style="list-style-type: none"> text entry space Voice recording

What animal would you be at the Tower?

 What country do you come from?

NARRATION: Narrator: There were so many different animals that lived in the Tower of London. Let's do some exploring and gather more stories to help free the bookkeeper. Let's think about animals
 What animal would you be at the Tower? What country do you come from?

<p>Name a type of royalty _____</p> <p>Name another type of royalty _____</p>	<p>//</p>
---	-----------

NARRATION: Narrator: Name a type of royalty. Name another type of royalty. For example King, Queen, Prince, Princess.

RM

PAGE:

STAR (e)

DATE:

4-Apr

PROJECT NAME:

PEP

AUTHOR:

Ilea

FRAME DESCRIPTION

Name a country

 What type of transportation
 do you use?

- Story question
- blank space for user entry;
- Narrators voice
- blank entry links to pre-set story

MEDIA LIST AND DESCRIPTION

- text
- entry space
- Voice recording

NARRATION: Narrator: Name a country. What type of transportation do you use?

What time of day is it?

 What season is it?

NARRATION: Narrator: What time of day is it? What season is it?

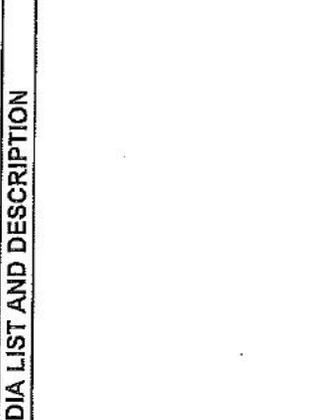
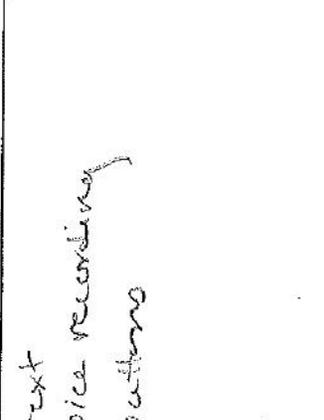
24

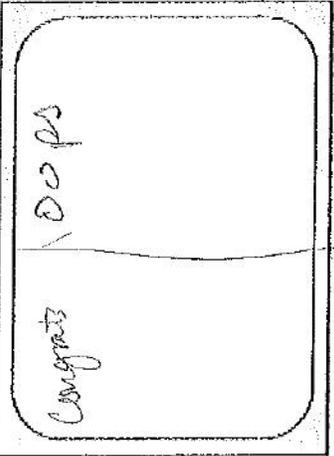
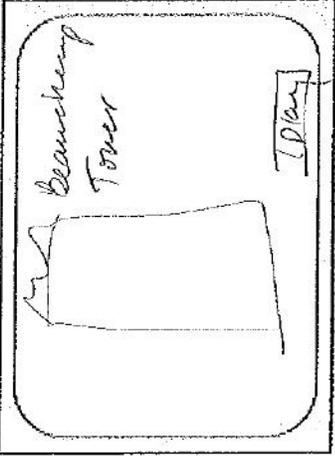
PAGE: ST# 8 (4) DATE: 4-Apr	PROJECT NAME: PEP	AUTHOR: Tea
<p>If you lived in the menagerie who would you miss? Name 3 other animals</p>	FRAME DESCRIPTION . story questions . blank space for user entry . narrators voice . blank entry links to pre-set story	MEDIA LIST AND DESCRIPTION . text . entry space . voice recording
NARRATION: Narrator: If you lived in the menagerie who would you miss? Name 3 other animals.		
<p>Name 3 countries</p> <p>What is your Zookeepers Name?</p>		
NARRATION: Narrator: Name 3 countries. What is your Zookeepers name?		

* If you were an animal in the menagerie what would you miss from home

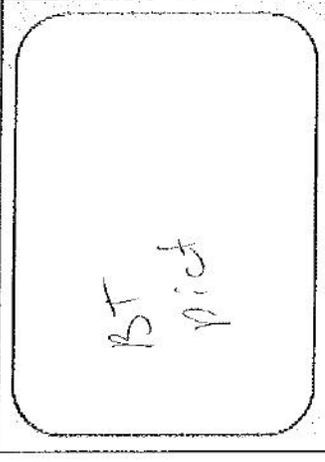
RM

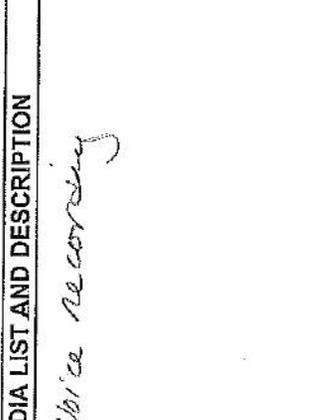
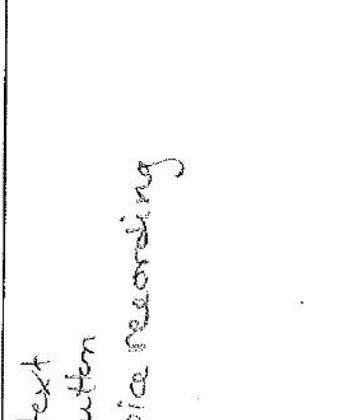
PAGE: ST #8 (3)	DATE: 4-Apr	PROJECT NAME: PEP	AUTHOR: Flea
<div style="border: 1px solid black; border-radius: 15px; padding: 10px;"> <p>How do you feel?</p> <p>_____</p> <p>What sound do you hear?</p> <p>_____</p> </div>		FRAME DESCRIPTION • story questions • blank space for user entry • Narrator's voice • blank entry links to pre-set story	MEDIA LIST AND DESCRIPTION • text • entry space • voice recording
NARRATION: Narrator: How do you feel? What sound do you hear?			
<div style="border: 1px solid black; border-radius: 15px; padding: 10px;"> <p>What do you see?</p> <p>_____</p> <p>What do you smell?</p> <p>_____</p> </div>		//	//
NARRATION: Narrator: What do you see? What do you smell?			

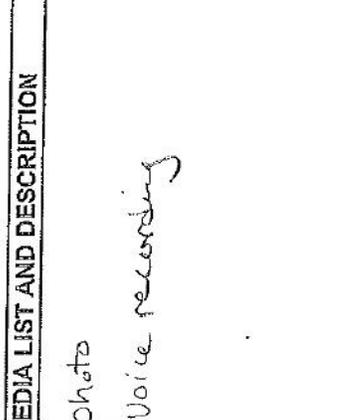
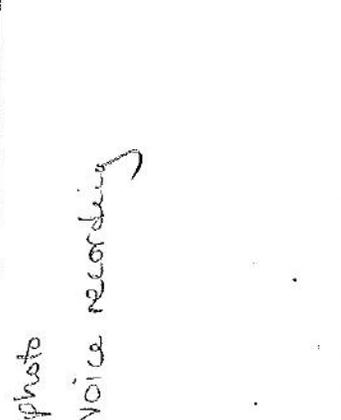
PAGE: 7RM DATE: 3-Apr	PROJECT NAME: PEP	AUTHOR: Ilean
	FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
NARRATION:		
	<ul style="list-style-type: none"> • Question • 4 box answers buttons • Narrators voice 	<ul style="list-style-type: none"> • text • voice recording • buttons
NARRATION: Narrator: You getting this story collecting thing down my young explorers. Now its question time! Who was the first animal to the Memphis?		

PAGE: 824 DATE: 3-Apr	PROJECT NAME: PEP	AUTHOR: Jlen
	FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
NARRATION: Question / Answer pages		
	<ul style="list-style-type: none"> Beauchamp Tower Picture Text: Beauchamp Tower green play button narrator's voice 	<ul style="list-style-type: none"> Text Photo Voice recording button
NARRATION: Narrator: Good job here at the Menagerie Explorers. All the royal beasts are safe in their cages now let's head over to Beauchamp Tower. But tread lightly my friends, you don't want to become the next prisoner in the Tower like our friend the bookkeeper. As you speak over to Beauchamp Tower, ⁵ on your map, see how many cameras you can spot along the way! ⁶ Mess play when you get there		

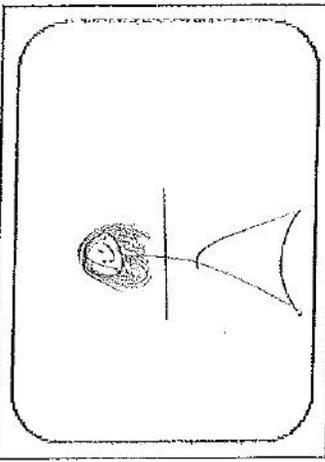
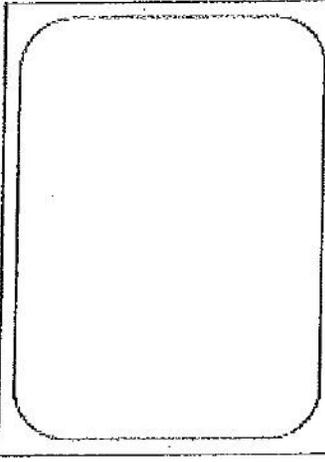
www.jasonohler.com/storytelling

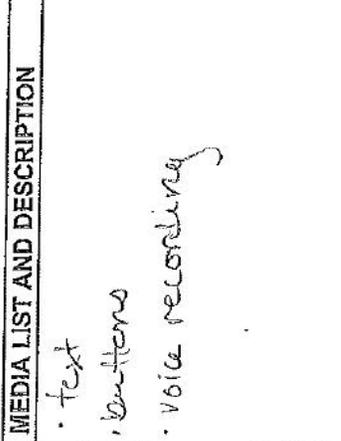
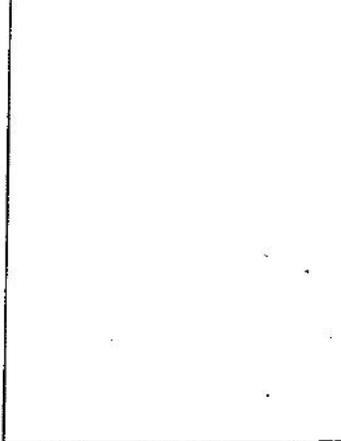
PAGE: 1 BT	DATE: 3-Apr	PROJECT NAME: PEP	AUTHOR: Ileen
		FRAME DESCRIPTION: <ul style="list-style-type: none"> Picture of Beauchamp Tower Narrators voice 	MEDIA LIST AND DESCRIPTION: <ul style="list-style-type: none"> Photo Voice recording
		<p>NARRATION: Narrator: Come on in my good friends. Look around, this here is Beauchamp Tower home for many a prisoner back in the day. Several poor, unfortunate souls were kept within this cold stark walls.</p>	
		<ul style="list-style-type: none"> Narrators voice 	<ul style="list-style-type: none"> Voice recording
<p>NARRATION: Narrator: Explorers, what is a prison? Who is a prisoner? Can you think of any prisoners who were held at the Tower of London? Think these things over with your Exploration Party and when you're ready travel upstairs and press the green play button!</p>			

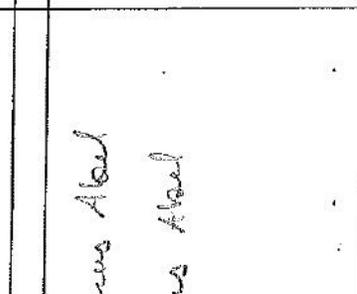
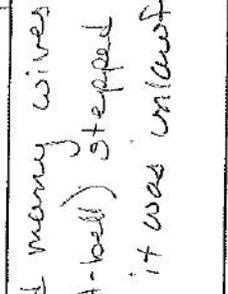
PAGE: 2 BT	DATE: 3 - Apr	PROJECT NAME: PEP	AUTHOR: Ilean
		FRAME DESCRIPTION • Narrator's voice	MEDIA LIST AND DESCRIPTION • Voice recording
<p>NARRATION: Narrator: All around you is graffiti written by some of Beauchamp Tower's more, well, infamous prisoners. These men and women actually wrote on the walls! I can't imagine you could do that at your home.</p>			
		<ul style="list-style-type: none"> • text • buttons • voice recording 	<ul style="list-style-type: none"> • text of prisoners name • buttons that transfer to QR code • narrator's voice
<p>NARRATION: Narrator: The Tower is filled with stories of the prisoners. Let's help see the Bookkeeper and gather as many as we can. Would you like to hear about the nine day Queen, Lady Jane Grey, or the Earl of Arundel who never saw his son or prisoner Abel who spoke back to the king. Pick which prisoner's gruesome tale you'd like to hear.</p>			

PAGE: DL Code 11	DATE: 3 - Apr	PROJECT NAME: PEP	AUTHOR: Deen
	<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • picture of Earl of Arundel • narrators voice 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • photo • Voice recording 	
<p>NARRATION: Narrator: Listen in closely explorers and I shall tell you of the sad tale of prisoner Philip Howard, Earl of Arundel, observed ^{observed} long time ago, in the mid 1500's when Queen Elizabeth ruled ^{ruled} England to ^{to} observe ^{observe} the Protestant religion. The Earl of Arundel was a Catholic and refused Queen Elizabeth's religion.</p>			
	<p>• picture of Philip Howard</p> <p>• Narrator's voice</p>	<p>• photo</p> <p>• Voice recording</p>	
<p>NARRATION: Narrator: Because of this the Queen arrested him and locked him away in the ^{the} Beauchamp Tower. Poor Philip Howard lived there for 10 years and got very sick. He asked the Queen to see his family one more time. Queen Elizabeth told him he could see his family if he attended Protestant Church. He refused and died in prison.</p>			

PAGE: QW Code 11 (a)	DATE: 4-Apr	PROJECT NAME: PEP	AUTHOR: Flea
<div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center;"> <p>camera</p> </div>		FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
		<ul style="list-style-type: none"> • Camera • Narrator's voice 	<ul style="list-style-type: none"> • Camera • Voice recording
<p>NARRATION: Narrator: Explorers imagine you are a prisoner. How would you feel being locked away? How would you act? Philip Howard, Earl of Arundel wrote graffiti on the walls of Tower. On your map show your own graffiti as if you were a prisoner in Beauchamp Tower. Take a picture of your art when you're done.</p>			
<div style="border: 1px solid black; border-radius: 15px; padding: 10px;"> <p>Great photo!</p> <p>x tokens earned</p> <div style="border: 1px solid black; display: inline-block; padding: 2px;">x tokens</div> </div>		<ul style="list-style-type: none"> • text: Great photo • X tokens earned 	
<div style="border: 1px solid black; border-radius: 15px; padding: 10px;"> <p>x tokens total</p> <p>Narrator's voice</p> </div>		<ul style="list-style-type: none"> • box: token total • Narrator's voice 	
<p>NARRATION: Narrator: Great photo explorers! Because you are quite the artist I'll give you x tokens.</p>			

PAGE: Dr Code 12	DATE: 4 - Apr	PROJECT NAME: PEP	AUTHOR: Ilean
	FRAME DESCRIPTION - Lady Jane Grey picture - Narrator's voice	MEDIA LIST AND DESCRIPTION	
<p>NARRATION: Narrator: In 1553 the boy-king Edward VI was very sick and picked Lady Jane Grey to be Queen when he died. However, Mary I was actually supposed to be the rightful Queen of England. When Edward died, ^{the 16 year old} Lady Jane took the throne and stayed there only nine days before Mary imprisoned her ^{her} in the Tower.</p>			
			
<p>NARRATION: Narrator: Lady Jane Grey was not imprisoned in Beauchamp Tower but her husband's family were. It is believed that they covered something in her honor into the wall of the Tower.</p>			

<u>PAGE:</u> QR Code 12 (e)	<u>DATE:</u> 4-Apr	<u>PROJECT NAME:</u> PEP	<u>AUTHOR:</u> Ilean
	<u>FRAME DESCRIPTION</u> • Question • buttons of links to answer page • narrators voice	<u>MEDIA LIST AND DESCRIPTION</u> • text • buttons • voice recording	
<u>NARRATION:</u> Narrator: See if you can find the graffiti honoring Lady Jane Grey. Here's a hint. If you get stuck there is a map near one of the windows. When you find the graffiti you can answer this question for the chance to earn more tokens.			
			
<u>NARRATION:</u> Answer / Question page			

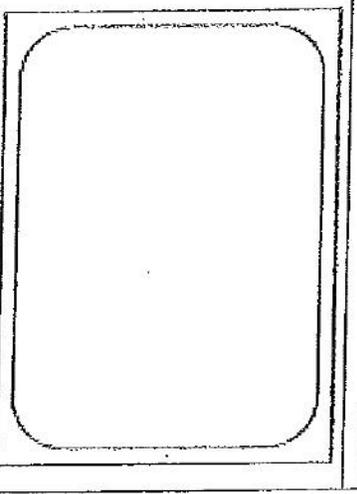
PAGE: DL Code B3	DATE: 4-Apr	PROJECT NAME: PEP	AUTHOR: Ilea
FRAME DESCRIPTION		MEDIA LIST AND DESCRIPTION	
	<p>· picture Thomas Abel</p> <p>· Title: Thomas Abel</p> <p>· Narrators voice</p>	<p>· photo</p> <p>· text</p> <p>· voice recording</p>	<p>NARRATION: Narrator: King Henry VIII had many wives, but when he wanted to divorce Catherine of Aragon, Thomas Abel (A-bell) stepped up and declared it to be illegal. The English Priest, Abel, said it was unlawful for the King to divorce his wife.</p>
	<p>· picture: Thomas Abel?</p> <p>· Narrators: voice</p>	<p>· photo</p> <p>· voice recording</p>	<p>NARRATION: Narrator: Unfortunately for him the King did not listen to his declaration and instead imprisoned him in Beaulieu Tower. Poor Thomas Abel often made sure everyone would know the correct pronunciation.</p>

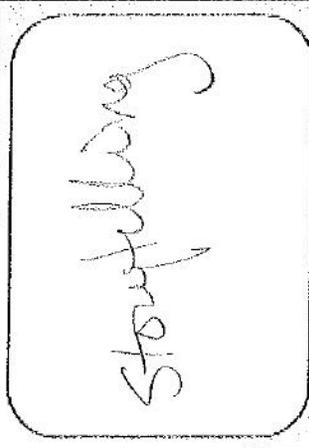
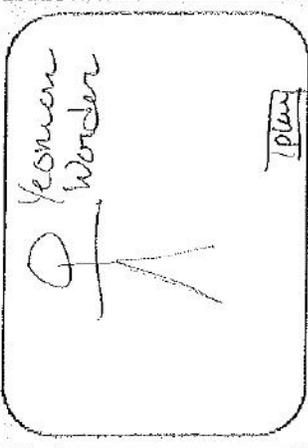
PAGE:	DATE:	PROJECT NAME:	AUTHOR:
CML Codes 13 (a)	4-Apr	PEP	Ilean
FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION		
<div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center;"> Camera </div>	<ul style="list-style-type: none"> · Camera · Narrators voice 	<ul style="list-style-type: none"> · Camera · Voice recording 	
<p>NARRATION: Narrator: Explorers, see if you can find Thomas Abel's graffiti. Discuss with your Explorer Team how the graffiti represents his name. Take a photo with your camera when you find it.</p>			
<div style="border: 1px solid black; border-radius: 15px; padding: 10px;"> Good! photo. x tokens earned 1x tokens </div>	<ul style="list-style-type: none"> · text: Good photo! · x tokens earned · box: token set · narrators voice 	<ul style="list-style-type: none"> · text · box · voice recording 	
<p>NARRATION: Narrator: Great photo Explorers! I think I can probably give you a few tokens for that one. You've guided the photographer!</p>			

BT

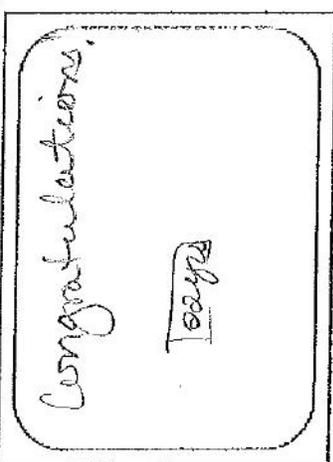
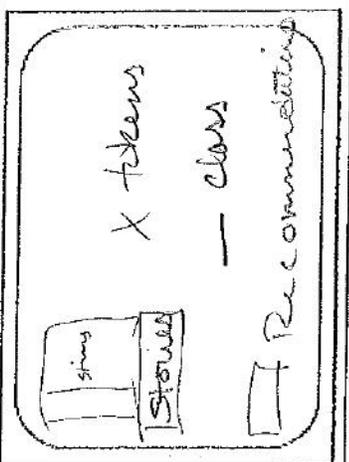
PAGE: ST #3	DATE: 4-Apr	PROJECT NAME: PEL	AUTHOR: Ellen
<p>What time of day is it? _____</p> <p>What month is it? _____</p>		<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • story questions • blank entry space for users • narrators voice • entry blanks link to pre-set story 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • text • entry space • voice recording
<p>NARRATION: Narrator: What time of day is it? What month is it?</p>			
<p>What crime did you commit? _____</p> <p>What is your last name? _____</p>		<p>//</p>	
<p>NARRATION: Narrator: what crime did you commit? What is your last name?</p>			

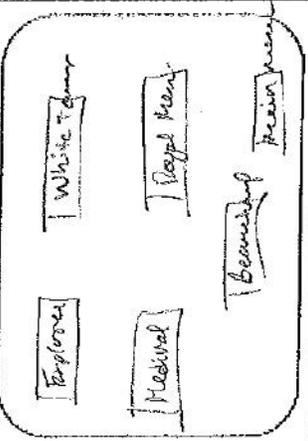
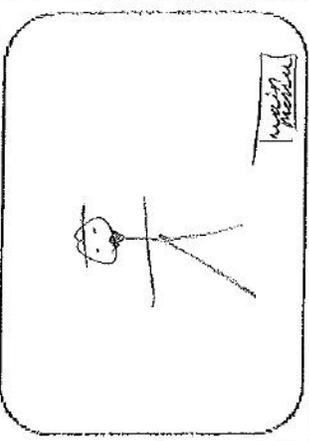
TBT

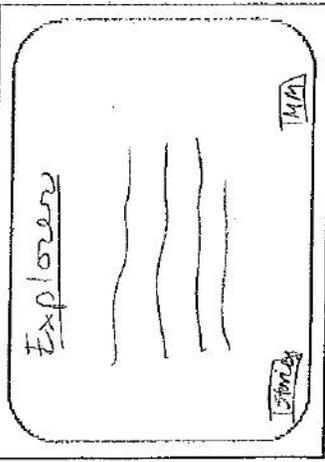
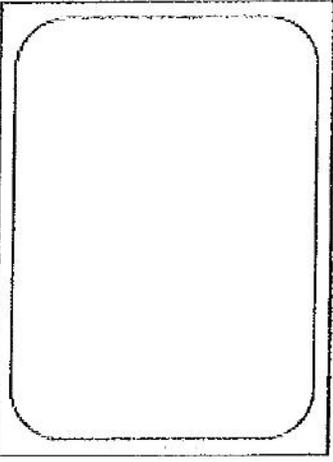
PAGE: ST # 3 (a)	DATE: 4-Apr	PROJECT NAME: PEP	AUTHOR: Alan
<p>what is your favorite activity? _____</p> <p>what would you carve into the prison walls? _____</p>		<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> • story questions • blank space for user entry • narrators voice • entry blanks link to pre-set story 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> • text • entry space • voice recording
<p>NARRATION: Narrator: what is your favorite activity? what would you carve into the prison walls?</p>			
			
<p>NARRATION:</p>			

PAGE: 3 BT	DATE: 3 - Apr	PROJECT NAME: PEP	AUTHOR: Elen
		<p>FRAME DESCRIPTION</p> <p>• Narrator's voice</p>	<p>MEDIA LIST AND DESCRIPTION</p> <p>• Voice Recording</p>
<p>NARRATION: Narrator: Now that you've heard about other prisoners stories I'd say its high time we write our own. Shall we explorers? pause</p>			
		<p>• Yeoman Warden picture</p> <p>• green play button</p> <p>• narrators voice</p> <p>• text: Yeoman Warden</p>	<p>• photo</p> <p>• button</p> <p>• voice recording</p> <p>• text</p>
<p>NARRATION: Narrator: Good job explorers! You are so close to freeing the bookkeeper! The Yeoman Wardens hold the password, the final piece to free the bookkeeper! So in search of a Yeoman Warden and ask them how they got their job. But be sneaky my friends, they must know that you're trying to free the bookkeeper. Once you've got the answer go to the Queens' tower, (C) on your map and press play.</p>			

<p>PAGE: 1QH</p>	<p>DATE: 3-Apr</p>	<p>PROJECT NAME: PEL</p>	<p>AUTHOR: Ilean</p>
<p>FRAME DESCRIPTION</p> <p>Text: Question for password</p> <p>Narrator's voice</p>	<p>MEDIA LIST AND DESCRIPTION</p>	<p>NARRATION: Narrator: Alright Explorers, You asked the Yeoman Wonder for the password. What's the minimum amount of time a person has to serve in the military before they can be a Yeoman Wonder? The answer is the password to free the Bookkeeper.</p>	
<p>What's the minimum amount of time a person has to serve in the military before they can be a Yeoman Wonder?</p> <p>1 yr 5 yr 10 yr 100 yrs</p>	<p>Oops! sorry that's not correct</p> <p>11 yr 15 yr 100 yrs</p>	<p>Text: Oops! sorry that's not correct. have this page appear for the options - Voice recording 1 yr, 5 yrs, 100 yrs. After narration it automatically goes back to previous page so they can try again Narrator's voice</p>	<p>NARRATION: Narrator: Oops! That's not quite right Explorers! Let's try that again.</p>

PAGE: 204	DATE: 3-Apr	PROJECT NAME: PEP	AUTHOR: Ellen
		FRAME DESCRIPTION	MEDIA LIST AND DESCRIPTION
<p>NARRATION: Congratulations Explorers! Yes, a Yeoman Warder must serve a minimum of 22 years in the military before he can be a Warden at the great Tower of London!</p>		<ul style="list-style-type: none"> • text: Congratulations • box 4 22 years • narrators voice 	<ul style="list-style-type: none"> • text • box • voice recording
		<ul style="list-style-type: none"> • book picture • stories button • text: X tokens — class • Recommendations button • narrators voice 	<ul style="list-style-type: none"> • Photo • text • buttons • voice recording
<p>NARRATION: Narrator: All the great stories you collected along the way and the password have freed the bookkeeper! Click on the stories button to read your adventurous tales! At the end of your visit you can journey back to the Welcome Center and use the wife to send your stories to your email! You've also earned X tokens, making you a</p>		<p>in the Tower of London Court. With all the tokens you've earned you can stop by the Welcome Center Digital Storytelling Storyboard and pick up your Official Palace Explorers www.jasonohler.com/storytelling badge and panel! Or you can click on the — button to hear the Bookkeepers favorite places to visit around the Tower and remember always keep your ears and eyes peeled for new stories! Good travels Explorers!</p>	

PAGE: 3QH	DATE: 3 Apr	PROJECT NAME: PEP	AUTHOR: Flea
		FRAME DESCRIPTION • 5 buttons that link to pages with stories • Narrator's voice • main menu button	MEDIA LIST AND DESCRIPTION • buttons • text • Voice recording
NARRATION: Narrator: See you can read all the exciting stories you wrote! Click on the boxes to read your adventurous tales.			
		• picture of Bookkeeper • Bookkeepers voice • main menu button	• photo • voice recording • button
NARRATION: Bookkeeper: Thank you so much for seeing me from the Tower going explorers and for all the wonderful stories you collected at a long the way. If you wish to keep exploring all the Towers secrets you could always hide on the into the Royal Armouries or glide on in a get a glimpse at the Crown jewels.			

PAGE: 40H	DATE: 3-Apr	PROJECT NAME: PEP	AUTHOR: Alan
		<p>FRAME DESCRIPTION</p> <ul style="list-style-type: none"> Title: Explorer story Text: story buttons: main menu & back to stories Identical layout for five all five stories 	<p>MEDIA LIST AND DESCRIPTION</p> <ul style="list-style-type: none"> title text buttons
<p><u>NARRATION:</u></p>			
			
<p><u>NARRATION:</u></p>			

Appendix Q: Coding Guide

Terms that are in italics can be searched for in the code. The major data structure in this application is the page. Each page has a kind, and other properties depending on that kind. A page is navigated to by calling the *getPage* function on its position in the list (starting at 1), which performs some bookkeeping, retrieves the page, and passes it to a function for handling a page of that kind. The important helper functions for these handlers are *removeAll*, which takes a list of widgets and removes them from the page they are on, and *startAudio*, *pause*, and *unpause* which link the playing and pausing of an audio clip to a button. Finally, *nextPage* and *getOffset* provide a way to perform navigation relative to the current page instead of using an absolute position in the *pages* list.

Adding a page to the application

The pages of the application are located in the *pages* list. To add a new page, add an entry to the list, using one of the page kinds mentioned below.

Adding a new page kind

To add a new page kind, you need to add a case to the switch in the *gotoPage* function that calls a handler function that you've created for that kind of page

Adding a QR code

To add a new QR code you need to add a case of the qrcode's value to the *handleQRCode* function, and add it to the *options* list of a qrcode page.

Page Kinds

tis - A page that displays an image and plays sound with it, with optional text

Properties:

- image – the image file to display
- top – optional – text to display above the image
- bottom – optional – text to display below the image
- sound – the sound file to play when the page starts
- next – function for the continue button to execute

tip – A page that displays an image, with a title, and plays a sound file when a play button is pressed. Allows for pausing of audio.

Properties:

- image – the image file to display

text – text to display above the image
sound – the sound file to play when the play button is pressed
next – function for the continue button to execute

video – A page that plays a video file

Properties:

video – the video file to play
next – function for the continue button to execute

qrcode – A page that presents the user with a button to go to the qr code scanning interface

Properties:

options – a list of the qrcodes that can be scanned at this point
sound - the sound file to play when the page starts
next – function for the continue button to execute

input – A page that provides the user with text boxes to write in, and saves their inputs

Properties:

sound - the sound file to play when the page starts
items – a list of the items to display on the page
item kinds:
 {'text' : 'text to display'}
 – Displays a line of text
 {'input': 'name to refer to this input later'}
 – provides a textbox for user input, saves it to a variable

slide – A page that displays for a set length of time, with an image and sound

Properties:

sound – the sound file to play when the page starts
image - the image to display
length – how long until the page should switch to the next page (usually the length of the sound file)
next – the function to execute after 'length' time has passed

question – A page that asks the user a multiple choice question

Properties:

question – the question to ask as text
sound – the sound file to play when the page starts
answers – a list of 1 to 4 choices for answers to the question
right – a list of what answers are correct as numbers indicating their position in the answers list

correct – the function to execute on a correct answer

wrong – the function to execute on a wrong answer

right – A page to use when the user answers a question correctly

Properties:

coins – the number of coins to reward the user with

answer – the correct answer to the question as text (or you could put 'that')

next - function for the continue button to execute

wrong – A page to use when the user answers a question incorrectly

Properties:

answer – the correct answer to the question as text

next - function for the continue button to execute

picture – A page to tell the user to take a picture

Properties:

image – the image file to display

sound – the sound file to play when the page starts

next – function for the continue button to execute

custom – Displays a particular Appfurnace page instead of using a template

Properties:

name – the name of the Appfurnace page to display

story – Displays text with user inputted text inserted

Properties:

items – a list what text and user inputs to display

item kinds:

{'text':'text to display'}

– a segment of text in the story

{'blank':'input name'}

– a user input into the story, referred to by the name used on the input page

Useful functions to use for 'next'

nextPage – goes to the next page in the list

getOffset(offset) – goes to the page offset from the current page by the indicated number of pages

Appendix R: Application Code

```
// Set up Data
af.storedData = null; //clears the data each time the app is started, for testing
if(af.storedData === null){
    af.storedData = {'coins':0, 'page':1}; //sets initial values
}

//Setup for the users getting their rank in the tower court
function DoneTokensAndClass(){
    var text = 'You have collected '+af.storedData.coins+' coins, <br> Making you ';
    if(af.storedData.coins <= 10){
        text += 'peasants';
    }
    else if(af.storedData.coins <=30){
        text += 'knights';
    }
    else if(af.storedData.coins <= 50){
        text += 'lords and ladies';
    }
    else{
        text += 'royalty';
    }
    text+=' at the Tower court!';
    ui.doneText.text(text);
}

//Set up the Page that displays court rank and stories button
function DoneSetup(){
    a = new af.Audio('sound/YW 3.m4a');
    a.play();
    ui.storiesButton.tapFunction(function(){a.stop();navigate.to('Stories');});
    DoneTokensAndClass();
}
ui.Done.showFunction(function(){DoneSetup(); ui.Done.showFunction(DoneTokensAndClass);});

//Sets up the buttons for the Story selection Page
function StoriesSetup(){
    ui.estorybutton.tapFunction(getOffset(1));
    ui.mstorybutton.tapFunction(getOffset(2));
    ui.pstorybutton.tapFunction(getOffset(3));
    ui.bstorybutton.tapFunction(getOffset(4));
}
ui.Stories.showFunction(StoriesSetup);
```

```
//Definitions of application pages
```

```
pages = [  
  {  
    'kind':"tis",  
    'image':"tower.jpg",  
    'top':"Tower of London",  
    'sound':"intro.m4a",  
    'next': nextPage  
  },  
  {  
    'kind':"tip",  
    'image':"images/ravens.jpg",  
    'text':"Raven's Cages",  
    'sound':"ravens.m4a",  
    'next': nextPage  
  },  
  {  
    'kind':"tis",  
    'image':"images/michelle.jpg",  
    'top':"Michelle",  
    'bottom':"The Librarian",  
    'sound':"terriblething.m4a",  
    'next': nextPage  
  },  
  {  
    'kind':"tis",  
    'image':"images/bookkeeper.jpg",  
    'top':"The Bookkeeper",  
    'sound':"bookkeepercaptured.m4a",  
    'next': nextPage  
  },  
  {  
    'kind':"video",  
    'video':"bookkeeper_short.mov",  
    'next': nextPage  
  },  
  {  
    'kind':"tip",  
    'text':"",  
    'image':"images/michelle.jpg",  
    'sound':"palaceexplorers.m4a",  
    'next': nextPage  
  },  
  {
```

```

'kind':'tis',
'image':'images/coins.jpg',
'sound':'coins.m4a',
'next': nextPage
},
{
'kind': 'tis',
'image': 'images/qrcode.jpg',
'top':'QR Code',
'sound':'qrcodes.m4a',
'next': nextPage
},
{
'kind': 'tis',
'image':'images/whitetower.jpg',
'top': 'White Tower',
'sound': 'whitetower.m4a',
'next': nextPage
},
{
'kind':'tis',
'image':'images/White Tower front.jpg',
'sound':'painting.m4a',
'next': nextPage
},
{
'kind':'tis',
'image':'images/Thames and Tower.jpg',
'sound':'water.m4a',
'next':nextPage
},
{
'kind':'tis',
'image':'images/Missing Palace.jpg',
'sound':'missing.m4a',
'next':nextPage
},
{
'kind':'tis',
'image':'images/Crowns.jpg',
'sound':'crownandarmour.m4a',
'next':nextPage
},
{

```

```

'kind':'tip',
'text':'Imagine you were a King or Queen',
'image':'images/Charles_II.jpg',
'sound':'kingqueen.m4a',
'next':nextPage
},
{
'kind':'qrcode',
'options':['bran','ravens','flambard'],
'sound': 'firstchoice.m4a',
'next': nextPage
},
{
'kind': 'input',
'sound':'sound/explorationteam.m4a',
'items': [
  {
    'text':'StoryTelling'
  },
  {
    'text':'What is the name of your Exploration Team?'
  },
  {
    'input':'team name'
  }
],
'next':getOffset(5)
},
{
'kind':'slide',
'sound':'sound/bran.m4a',
'image':'images/tower_ravens.jpg',
'length': 34000,//34 seconds
'next': getOffset(-2)
},
{
'kind':'slide',
'image':'images/ravens_cage.jpg',
'sound':'sound/ravens2.m4a',
'length':19000,
'next':getOffset(-3)
},
{
'kind':'slide',

```

```

    'image':'images/flambard.jpg',
    'sound':'sound/flambart.m4a',
    'length':12000,
    'next':nextPage
  },
  {
    'kind':'slide',
    'sound':'sound/flambart.m4a',
    'image':'images/flambard.jpg',
    'length':20000,
    'next':getOffset(-5)
  },
  {
    'kind':'input',
    'sound':'sound/timeofday.m4a',
    'items':[
      {
        'text':'What time of day is it?'
      },
      {
        'input':'time of day'
      },
      {
        'text':'What season is it?'
      },
      {
        'input':'season'
      }
    ],
    'next':nextPage
  },
  {
    'kind':'input',
    'sound':'sound/temperature.m4a',
    'items':[
      {
        'text':'What is the temperature?'
      },
      {
        'input':'temperature'
      },
      {
        'text':'What do you hear?'
      },
      {
        'input':'heard'
      }
    ]
  }

```

```

    }
  ],
  'next': nextPage
},
{
  'kind': 'input',
  'sound': 'sound/taking.m4a',
  'items': [
    {
      'text': 'What are you taking with you?'
    },
    {
      'input': 'item1'
    },
    {
      'input': 'item2'
    },
    {
      'input': 'item3'
    },
    {
      'text': 'What is in your pockets?'
    },
    {
      'input': 'pockets1'
    },
    {
      'input': 'pockets2'
    },
    {
      'input': 'pockets3'
    }
  ],
  'next': nextPage
},
{
  'kind': 'question',
  'question': 'Question: The White Tower got its name because?',
  'sound': 'sound/whitequestion.m4a',
  'answers': [
    'it was painted white by King Henry III',
    'it was ruled by King White',
    'it was made during the white era'
  ],
  'right': [1],
  'correct': nextPage,

```

```

    'wrong': getOffset(2)
  },
  {
    'kind': 'right',
    'coins': 5,
    'answer': 'it was painted white by King Henry III',
    'sound': 'sound/whiteright.m4a',
    'next': getOffset(2)
  },
  {
    'kind': 'wrong',
    'answer': 'it was painted white by King Henry III',
    'sound': 'sound/whitewrong.m4a',
    'next': nextPage
  },
  {
    'kind': 'tip',
    'text': '',
    'image': 'images/bedroom.jpg',
    'sound': 'sound/bedroom.m4a',
    'next': nextPage
  },
  {
    'kind': 'tip',
    'image': 'images/pillowsamples.jpg',
    'sound': 'sound/linens.m4a',
    'next': nextPage
  },
  {
    'kind': 'tis',
    'image': 'images/bedroom.jpg',
    'sound': 'sound/bedroom2.m4a',
    'next': nextPage
  },
  {
    'kind': 'qrcode',
    'sound': 'sound/rpchoices.m4a',
    'options': ['bed', 'prayer', 'coatofarms'],
    'next': nextPage
  },
  {
    'kind': 'tis',
    'image': 'images/broadarrowtower.jpg',
    'sound': 'sound/furrygift.m4a',

```

```

    'next':getOffset(14)
  },
  {
    'kind':'tis',
    'image':'images/chapel.jpg',
    'sound':'sound/frenchprayer.mp3',
    'next':nextPage
  },
  {
    'kind':'tip',
    'sound':'sound/languages.m4a',
    'images':'images/languagesunited.co.uk.jpg',
    'next':nextPage
  },
  {
    'kind':'question',
    'sound':'sound/prayerquestion.m4a',
    'question':"What language did King Edward's court speak?",
    'answers':['Russian','English','French','Spanish'],
    'right':[3],
    'correct':nextPage,
    'wrong':getOffset(-5)
  },
  {
    'kind':'right',
    'coins':5,
    'answer':'French',
    'next':getOffset(-5)
  },
  {
    'kind':'wrong',
    'answer':'French',
    'next':getOffset(-6)
  },
  {
    'kind':'tis',
    'image':'images/bed.jpg',
    'sound':'sound/bed.m4a',
    'next':nextPage
  },
  {
    'kind':'tis',
    'image':'images/matress.jpg',
    'sound':'sound/matress.m4a',

```

```

    'next':nextPage
  },
  {
    'kind':'question',
    'question':'How tall was King Edward I',
    'answers':['188 cm','100 cm','200 cm', '50 cm'],
    'right':[1],
    'correct':nextPage,
    'wrong': getOffset(2)
  },
  {
    'kind':'right',
    'answer':'188 cm',
    'coins':5,
    'next':getOffset(-10)
  },
  {
    'kind':'wrong',
    'answer':'188 cm',
    'next':getOffset(-11)
  },
  {
    'kind':'tis',
    'image':'images/coatofarms.jpg',
    'sound':'sound/coatofarms.m4a',
    'next':nextPage
  },
  {
    'kind':'picture',
    'image':'images/coatofarms.jpg',
    'sound':'sound/coatofarms2.m4a',
    'next':nextPage
  },
  {
    'kind':'reward',
    'text':'Great Coat of Arms!',
    'coins':5,
    'next':getOffset(-14)
  },
  {
    'kind':'input',
    'sound':'sound/rpstorytelling.m4a',
    'items':[
      {text:'What is your royal court name?'},

```

```

        { 'input': 'MPName' },
        { 'text': 'What country is your court from?' },
        { 'input': 'MPCountry' }
    ],
    'next': nextPage
},
{
    'kind': 'input',
    'sound': 'sound/rpstorytelling2.m4a',
    'items': [
        { 'text': 'What country would you go to battle with?' },
        { 'input': 'MPBattle' },
        { 'text': 'How many people are in your court?' },
        { 'input': 'MPNumber' }
    ],
    'next': nextPage
},
{
    'kind': 'input',
    'sound': 'sound/rpstorytelling3.m4a',
    'items': [
        { 'text': 'What 3 items would you take with you on adventures?' },
        { 'input': 'MPItem1' },
        { 'input': 'MPItem2' },
        { 'input': 'MPItem3' },
        { 'text': 'What are your 3 royal colors?' },
        { 'input': 'MPColor1' },
        { 'input': 'MPColor2' },
        { 'input': 'MPColor3' }
    ],
    'next': nextPage
},
{
    'kind': 'input',
    'sound': 'sound/rpstorytelling4.m4a',
    'items': [
        { 'text': 'How many days until you go into battle?' },
        { 'input': 'MPDays' },
        { 'text': 'How would you transport your bed?' },
        { 'input': 'MPTransport' }
    ],
    'next': nextPage
},
{

```

```

    'kind':'picture',
    'sound':'sound/bat1.m4a',
    'image':'images/soldier.jpg',
    'next':nextPage
  },
  {
    'kind':'tip',
    'sound':'sound/bat2.m4a',
    'image':'images/fighting.jpg',
    'text':",
    'next':nextPage
  },
  //Royal Menagerie
  {
    'kind':'tis',
    'image':'images/Royal Beasts.jpg',
    'sound':'sound/RM 1.m4a',
    'next':nextPage
  },
  {
    'kind':'slide',
    'image':'images/african lion.jpg',
    'sound':'sound/RM 2.m4a',
    'length':17500,
    'next':nextPage
  },
  {
    'kind':'slide',
    'image':'images/zebra.jpg',
    'sound':'sound/RM 3.m4a',
    'length':2500,
    'next':nextPage
  },
  {
    'kind':'slide',
    'image':'images/baboon.jpg',
    'sound':'sound/RM 4.m4a',
    'length':2500,
    'next':nextPage
  },
  {
    'kind':'slide',
    'image':'images/african sheep australian meatmaster sheep.JPG',
    'sound':'sound/RM 5.m4a',

```

```

    'length':3250,
    'next':nextPage
  },
  {
    'kind':'slide',
    'image':'images/alligator marathon books american alligator.jpg',
    'sound':'sound/RM 6.m4a',
    'length':2500,
    'next':nextPage
  },
  {
    'kind':'slide',
    'image':'images/2 tigers tiger information and facts.jpg',
    'sound':'sound/RM 7.m4a',
    'length':2750,
    'next':nextPage
  },
  {
    'kind':'slide',
    'image':'images/2 cheetahs mad black cat.jpg',
    'sound':'sound/RM 8.m4a',
    'length':3000,
    'next':nextPage
  },
  {
    'kind':'tis',
    'image':'images/100 rattlesnakes reuters.jpg',
    'sound':'sound/RM 9.m4a',
    'next':nextPage
  },
  {
    'kind':'tis',
    'image':'images/closed.jpg',
    'sound':'sound/RM 10.m4a',
    'next':nextPage
  },
  {
    'kind':'qrcode',
    'options':['baboon','ostrich','polar bear','alfred cops'],
    'next':getOffset(18)
  },
  {
    'kind':'tis',
    'image':'images/baboon.jpg',

```

```

'sound':'sound/RM PB 1.m4a',
'next':nextPage
},
{
'kind':'tis',
'image':'images/Royal Beasts.jpg',
'sound':'sound/RM PB 2.m4a',
'next':nextPage
},
{
'kind':'question',
'question':'What type of pipe did the baboons smoke?',
'sound':'sound/RM PB 3.m4a',
'answers':['clay','wood','brick','steel'],
'right':[1],
'correct': nextPage,
'wrong': getOffset(2)
},
{
'kind':'right',
'answer':'clay',
'sound':'sound/RM PB 4.m4a',
'coins':5,
'next':getOffset(-4)
},
{
'kind':'wrong',
'sound':'sound/RM PB 5.m4a',
'answer':'clay',
'next':getOffset(-5)
},
{//ostrich QR code
'kind':'tis',
'image':'images/ostrich.jpg',
'sound':'sound/RM OS 1.m4a',
'next': nextPage
},
{
'kind':'tis',
'image':'images/common_nailswire_nailsiron_nails.jpg',
'sound':'sound/RM OS 2.m4a',
'next': nextPage
},
{

```

```

'kind':'question',
'question':'What was the ostrich fed when it lived a the Tower of London?',
'answers':['nails','glass','plants','bugs'],
'right':[1],
'sound':'sound/RM OS 3.m4a',
'correct':nextPage,
'wrong':getOffset(2)
},
{
'kind':'right',
'answer':'nails',
'sound':'sound/RM OS 4.m4a',
'coins':5,
'next':getOffset(-10)
},
{
'kind':'wrong',
'answer':'nails',
'sound':'sound/RM OS 5.m4a',
'next':getOffset(-11)
},
{//Polar Bear QR code
'kind':'tis',
'sound':'sound/RM Polar 1.m4a',
'image':'images/polarbear.jpg',
'next':nextPage
},
{
'kind':'tis',
'sound':'sound/RM Polar 2.m4a',
'image':'images/polarbear.jpg',
'next':nextPage
},
{
'kind':'picture',
'image':'images/polarbear.jpg',
'sound':'sound/RM Polar 3.m4a',
'next':nextPage
},
{
'kind':'reward',
'coins':5,
'text':'Great photo!',
'next':getOffset(-15)
}

```

```

},
{//alfred cops qr code
  'kind':'tis',
  'image':'images/alfredcops.jpg',
  'sound':'sound/alfredcops.mp3',
  'next':nextPage
},
{
  'kind':'picture',
  'image':'images/100 rattlesnakes reuters.jpg',
  'sound':'RM AC 2.m4a',
  'next':nextPage
},
{
  'kind':'reward',
  'text':'Great Photo!',
  'coins':5,
  'next':getOffset(-18)
},
{//70
  'kind':'input',
  'sound':'sound/RM ST 1.m4a',
  'items':[{
    'text':'What animal would you be at the Tower?'
  },
  {
    'input':'animal'
  },
  {
    'text':'What country do you come from?'
  },
  {
    'input':'country'
  }
  ],
  'next': nextPage
},
{
  'kind':'input',
  'sound':'sound/RM ST 2.m4a',
  'items':[{
    'text':'Name a type of royalty:'
  },
  {

```

```

        'input':'royalty'
      },
      {
        'text':'Name another type of royalty:'
      },
      {
        'input':'royalty2'
      }
    ],
    'next': nextPage
  },
  {
    'kind':'input',
    'sound':'sound/RM ST 3.m4a',
    'items':[
      {
        'text':'Name a country'
      },
      {
        'input':'RMcountry'
      },
      {
        'text':'What type of transportation do you use?'
      },
      {
        'input':'RMtransportation'
      }
    ],
    'next': nextPage
  },
  {
    'kind':'input',
    'sound':'sound/RM ST 4.m4a',
    'items':[
      {
        'text':'What time of day is it?'
      },
      {
        'input':'RMtime'
      },
      {
        'text':'What season is it?'
      },
      {
        'input':'RMseason'
      }
    ]
  }

```

```

    ],
    'next': nextPage
  },
  {
    'kind': 'input',
    'sound': 'sound/RM ST 5.m4a',
    'items': [
      {
        'text': 'How do you feel?'
      },
      {
        'input': 'RMfeel'
      },
      {
        'text': 'What sounds do you hear?'
      },
      {
        'input': 'RMsounds'
      }
    ],
    'next': nextPage
  },
  {
    'kind': 'input',
    'sound': 'sound/RM ST 6.m4a',
    'items': [
      {
        'text': 'What do you see?'
      },
      {
        'input': 'RMsee'
      },
      {
        'text': 'What do you smell?'
      },
      {
        'input': 'RMsmell'
      }
    ],
    'next': nextPage
  },
  {
    'kind': 'input',
    'sound': 'sound/RM ST 7.m4a',
    'items': [
      {
        'text': 'If you were an animal in the menagerie what would you miss from home?'

```

```

    },
    {
      'input': 'RMmiss'
    },
    {
      'text': 'Name three other animals:'
    },
    {
      'input': 'RManimal1'
    },
    {
      'input': 'RManimal2'
    },
    {
      'input': 'RManimal3'
    }
  ],
  'next': nextPage
},
{
  'kind': 'input',
  'sound': 'sound/RM ST 8.m4a',
  'items': [
    {
      'text': 'Name three countries:'
    },
    {
      'input': 'RMcountries1'
    },
    {
      'input': 'RMcountries2'
    },
    {
      'input': 'RMcountries3'
    },
    {
      'text': 'What is your zookeepers name?'
    },
    {
      'input': 'RMkeepername'
    }
  ],
  'next': nextPage
},
{

```

```

'kind':'question',
'sound':'sound/RM Question.m4a',
'question':'What was the first animal at the Menagerie?',
'answers':['fish','giraffe','bird','lion'],
'right':[4],
'correct':nextPage,
'wrong':getOffset(2)
},
{
'kind':'right',
'sound':'sound/RM Answer correct.m4a',
'coins':5,
'answer':'Lion',
'next':getOffset(2)
},
{
'kind':'wrong',
'sound':'sound/RM Answer oops.m4a',
'answer':'lion',
'next':nextPage
},
{
'kind':'tip',
'image':'images/cannons.jpg',
'sound':'sound/RM exit.m4a',
'next':nextPage
},
{
'kind':'tis',
'image':'images/beauchamptower.jpg',
'sound':'sound/beauchamp1.m4a',
'next':nextPage
},
{
'kind':'tis',
'image':'images/beauchamp.jpg',
'sound':'sound/beauchamp2.m4a',
'next':nextPage
},
{
'kind':'tis',
'image':'images/beauchamptower.jpg',
'sound':'sound/beauchamp3.m4a',
'next':nextPage
}

```

```

},
{
  'kind':'qrcode',
  'sound':'sound/beauchamp4.m4a',
  'options':['arundel','grey','abel'],
  'next':getOffset(14)//TODO get the actual number for this
},
{//Arundel
  'kind':'tis',
  'sound':'sound/arundel1.m4a',
  'image':'images/arundel.jpg',
  'next':nextPage
},
{
  'kind':'tis',
  'sound':'sound/arundel2.m4a',
  'image':'images/arundel_graffitti.jpg',
  'next':nextPage
},
{
  'kind':'picture',
  'sound':'sound/arundel3.m4a',
  'image':'images/prisoner.jpg',
  'next':nextPage
},
{
  'kind':'reward',
  'sound':'sound/arundel4.m4a',
  'text':'Great Picture!',
  'coins':5,
  'next':getOffset(-4)
},
{//Jane Grey
  'kind':'tis',
  'sound':'sound/janegrey1.m4a',
  'image':'images/jane.gif',
  'next':nextPage
},
{
  'kind':'tis',
  'sound':'sound/janegrey2.m4a',
  'image':'images/jane_graffitti.jpg',
  'next':nextPage
},

```

```

{
  'kind':'question',
  'sound':'sound/janegreyquestion.m4a',
  'question':'What does the Lady Jane graffitti say?',
  'answers':['Lady','Grey','Iane','Queen'],
  'right':[3],
  'correct':nextPage,
  'wrong':getOffset(2)
},
{
  'kind':'right',
  'sound':'sound/janegreycorrect.m4a',
  'answer':'Iane',
  'coins':5,
  'next':getOffset(-8)
},
{
  'kind':'wrong',
  'sound':'sound/janegreywrong.m4a',
  'answer':'Iane',
  'next':getOffset(-9)
},
{//Abel
  'kind':'tis',
  'sound':'sound/abel1.m4a',
  'image':'images/abel_graffitti.jpg',
  'next':nextPage
},
{
  'kind':'tis',
  'sound':'sound/abel2.m4a',
  'image':'images/abel_graffitti.jpg',
  'next':nextPage
},
{
  'kind':'picture',
  'sound':'sound/abel3.m4a',
  'image':'images/abel_graffitti.jpg',
  'next':nextPage
},
{
  'kind':'reward',
  'coins':5,
  'text':'Great Photo!',

```

```

    'next':getOffset(-13)
  },
  {
    'kind':'input',
    'sound':'sound/beauchampstory1.m4a',
    'items':[
      {'text':'What time of day is it?'},
      {'input':'btime'},
      {'text':'What month is it?'},
      {'input':'bmonth'}
    ],
    'next':nextPage
  },
  {
    'kind':'input',
    'sound':'sound/beauchampstory2.m4a',
    'items':[
      {'text':'What crime did you commit?'},
      {'input':'bcrime'},
      {'text':'What is your last name?'},
      {'input':'blastname'}
    ],
    'next':nextPage
  },
  {
    'kind':'input',
    'sound':'sound/beauchampstory3.m4a',
    'items':[
      {'text':'What is your favorite activity?'},
      {'input':'bactivity'},
      {'text':'What would you carve into the prison walls?'},
      {'input':'bcarve'}
    ],
    'next':nextPage
  },
  {
    //Yeoman Warder
    'kind':'tis',
    'top':'Yeoman Warder',
    'image':'images/yeoman warder ceremony of the keys.jpg',
    'sound':'sound/Yeoman Warder 1.m4a',
    'next':nextPage
  },
  {
    'kind':'question',

```

```

'sound':'sound/YW 2.m4a',
'question':'What is the minimum amount of time a person has to serve in the military before they
can become a Yeoman Warder?',
'answers':['1 year','5 years','22 years','100 years'],
'right':[3],
'correct':nextPage,
'wrong':getOffset(2)
},
{
'kind':'right',
'sound':'sound/YW correct answer.m4a',
'answer':'22 years',
'coins':5,
'next':getOffset(2)
},
{
'kind':'recording',
'sound':'sound/YW oops answer.m4a',
'length':6750,
'next':getOffset(-2)
},
{
'kind':'custom',
'name':'Done'
},
{
'kind':'custom',
'name':'Stories'
},
{
'kind':'story',
'items':[
{text':"My team's name is "},
{blank:'team name'},
{text':" and we're a Palace Explorer Team at the Tower of London. We are exploring the
Tower and gathering stories to free the Bookkeeper who is trapped in the Queen's house inside the Tower.
It is "},
{blank:'time of day'},
{text':' in the middle of '},
{blank:'season'},
{text':'. It is '},
{blank:' temperature'},
{text':' out and we hear '},
{blank:' heard'},

```

```

    {'text': '. As explorers we are taking a '},
    {'blank':'item1'},
    {'text':', '},
    {'blank':'item2'},
    {'text':', and '},
    {'blank': 'item3'},
    {'text':' with us to explore. In our pockets we have '},
    {'blank':'pockets1'},
    {'text':', '},
    {'blank':'pockets2'},
    {'text':', and '},
    {'blank': 'pockets3'},
    {'text':'. We are looking for the missing stories to help free the Bookkeeper.'}
  ],
  'next': getOffset(-1)
},
{
  'kind':'story',
  'items':[
    {'text':'I am a '},
    {'blank':'animal'},
    {'text':' from '},
    {'blank': 'country'},
    {'text': ' and I am traveling to the Tower of London in England. I am a gift for the '},
    {'blank': 'royalty'},
    {'text': ' of England from the '},
    {'blank':'royalty2'},
    {'text': ' of '},
    {'blank':'RMcountry'},
    {'text':'. I am traveling on a '},
    {'blank':'RMtransportation'},
    {'text': ' and it is '},
    {'blank':'RMtime'},
    {'text': ' in '},
    {'blank':'RMseason'},
    {'text':'. I feel '},
    {'blank': 'RMfeel'},
    {'text': ' that I am going to a new place. While I am traveling I hear '},
    {'blank':'RMsounds'},
    {'text': ' and I can see '},
    {'blank':'RMsee'},
    {'text':'. My cage smells like '},
    {'blank':'RMsmell'},
    {'text':'. I miss '},

```

```

    {'blank':'RMmiss'},
    {'text':'. When I get to the Royal Menagerie at the Tower of London I will be kept with a
'},
    {'blank':'RManimal1'},
    {'text':', a '},
    {'blank':'RManimal2'},
    {'text':', and a '},
    {'blank':'RManimal3'},
    {'text':'. They are coming from '},
    {'blank':'RMcountries1'},
    {'text':', '},
    {'blank':'RMcountries2'},
    {'text':', and '},
    {'blank':'RMcountries3'},
    {'text':'. We will be looked after by zookeeper '},
    {'blank':'RMkeepername'},
    {'text':'.}
  ],
  'next':getOffset(-2)
},
{
  'kind':'story',
  'items':[
    {'text':"We are the Royal Court "},
    {'blank':'MPName'},
    {'text':' from '},
    {'blank':'MPCountry'},
    {'text':'. As we trael we are preparing for battle with '},
    {'blank':'MPBattle'},
    {'text':'. There are '},
    {'blank':'MPNumber'},
    {'text':' of people in our court. We always take a(n) '},
    {'blank':'MPItem1'},
    {'text':', '},
    {'blank':'MPItem2'},
    {'text':', and '},
    {'blank':'MPItem3'},
    {'text':" when we move from place to place. Each member of the royal family has their
own bed that travels with them while servants sleep on straw mattresses. The Royal colors are "},
    {'blank':'MPColor1'},
    {'text':', '},
    {'blank':'MPColor2'},
    {'text':', and '},
    {'blank':'MPColor3'},

```

```

        {'text':'. There are several layers of sheets that are used to keep the family warm. We are
going to battle in '},
        {'blank':'MPDays'},
        {'text':' of days so we must pack our belongings and move to a new place. Our beds travel
by '},
        {'blank':'MPTransportation'},
        {'text':' and will meet us in the great land of '},
        {'blank':'RMBattle'},
        {'text':', another adventure begins!'}
    ],
    'next':getOffset(-3)
},
{
    'kind':'story',
    'items':[
        {'text':'It is '},
        {'blank':'btime'},
        {'text':'in the month of '},
        {'blank':'bmonth'},
        {'text':'. I do not know what day it is because I lost track when I was thrown into
Beauchamp Tower at the Tower of London. I was put in prison because I am charged with '},
        {'blank':'bcrime'},
        {'text':'. This is not fair, I am innocent! I did not commit the crime! I come from the good,
decent family of '},
        {'blank':'blastname'},
        {'text':'. There is nothing to do in this cold, dark tower so I spend my days doing '},
        {'blank':'bactivity'},
        {'text':'. Yesterday I carved a(n) '},
        {'blank':'bcarve'},
        {'text':'into the walls in my prison. I might not be here long but I will always be
remembered for years to come on the Tower wall.'}
    ],
    'next':getOffset(-4)
}
];

```

```

//Returns a function to go to a particular page number
function goTo(pagenum){
    return function(){gotoPage(pagenum);};
}

```

```

//Scan a QR Code
function scan(){

```

```

    af.codeReader.start();
}

//Set up the functions each QR Code will trigger
function handleQRCode(code){
    log('here');
    switch(code){
        case 'bran':
            return getOffset(2());
        case 'ravens':
            return getOffset(3());
        case 'flambard':
            return getOffset(4());
        case 'baboon':
            return getOffset(1());
        case 'ostrich':
            return getOffset(6());
        case 'polar bear':
            return getOffset(11());
        case 'alfred cops':
            return getOffset(15());
        case 'prayer':
            return getOffset(2());
        case 'bed':
            return getOffset(7());
        case 'coatofarms':
            return getOffset(12());
        case 'arundel':
            return getOffset(1());
        case 'grey':
            return getOffset(5());
        case 'abel':
            return getOffset(10());
        default:
            log('unknown qr code');
            gotoError();
    }
}
af.codeReader.setCodeRead(handleQRCode);

var currentPage=0;
//Goes to the next page by page number
function nextPage(){

```

```

    gotoPage(currentPage+1);
}

//Returns a function that moves you offset pages from the current page
function getOffset(offset){
    return function(){gotoPage(currentPage + offset);};
}
function gotoOffset(offset){
    gotoPage(currentPage + offset);
}

//dispatches page to a handler for pages of its kind
function gotoPage(pagenum){
    if(pagenum > 1 && !page.hasOwnProperty("back")) page.back = currentPage;

    currentPage=pagenum;

    page = pages[pagenum-1];

    kind = page.kind;
    switch(kind)
    {
        case "tis":
            return gotoTIS(page);
        case "tip":
            return gotoTIP(page);
        case "video":
            return gotoVideo(page);
        case "input":
            return gotoInput(page);
        case "story":
            return gotoStory(page);
        case "recording":
            return gotoRecording(page);
        case "slide":
            return gotoSlide(page);
        case "question":
            return gotoQuestion(page);
        case "right":
            return gotoRight(page);
        case "wrong":
            return gotoWrong(page);
        case "reward":
            return gotoReward(page);
    }
}

```

```

    case "qrcode":
        return gotoQR(page);
    case "picture":
        return gotoPicture(page);
    case "custom":
        return navigate.to(page.name);
    default:
        return gotoError();
}
}

//page kind handlers

//tis page handler
function gotoTIS(page){
    if('top' in page)
    {
        ui.TISTop.text(page.top);
        ui.TISTop.hidden(false);
    }
    else
    {
        ui.TISTop.hidden(true);
    }

    if('bottom' in page)
    {
        ui.TISBottom.text(page.bottom);
        ui.TISBottom.hidden(false);
    }
    else
    {
        ui.TISBottom.hidden(true);
    }

    var a = new af.Audio(page.sound);

    ui.TISImage.backgroundImage(page.image);
    ui.TISContinue.tapFunction(function(){a.stop();page.next();});
    ui.TISContinue.hidden(false);
    if(page.hasOwnProperty('back')){
        ui.TISBack.tapFunction(function(){a.stop();gotoPage(page.back);});
        ui.TISBack.hidden(false);
    }
}

```

```

else ui.TISBack.hidden(true);

navigate.to("Page 2");

a.play();

}

//tip page handler
function gotoTIP(page){
  ui.TIPImage.backgroundImage(page.image);
  ui.TIPText.text(page.text);
  ui.TIPPlay.text("Play");

  var a = new af.Audio(page.sound);
  ui.TIPPlay.tapFunction(function(){startAudio(a, ui.TIPPlay);});
  ui.TIPContinue.tapFunction(function(){a.stop(); page.next();});
  if(page.hasOwnProperty('back')){
    ui.TIPBack.tapFunction(function(){a.stop();gotoPage(page.back);});
    ui.TIPBack.hidden(false);
  }
  else ui.TIPBack.hidden(true);

  ui.TIPContinue.hidden(false);
  navigate.to("Page 3");
}

//video page handler
function gotoVideo(page){
  ui.video.video(page.video);
  navigate.to("Page 4");
  ui.VContinue.tapFunction(page.next);
  if(page.hasOwnProperty('back')){
    ui.VBack.tapFunction(getGoTo(page.back));
    ui.VBack.hidden(false);
  }
  else ui.VBack.hidden(true);
}

//input page handler
function gotoInput(page){
  var items = page.items;
  var widgets = [];
  for(var i = 0; i<items.length; i++){

```

```

var item = items[i];
if(item.hasOwnProperty('text'))
{
    var txt = new af.Label();
    txt.x(0);
    txt.y(480/(items.length + 1) * (i));
    txt.width(320);
    txt.height(40);
    txt.text(item.text);
    widgets.push(txt);
    ui.TextPage.add(txt);
}
else if(item.hasOwnProperty('input')){
    var inp = new af.TextInput();
    inp.x(0);
    inp.y(480/(items.length + 1) * (i));
    inp.width(320);
    inp.height(40);
    inp.changedFunction(getSet(item.input));
    widgets.push(inp);
    ui.TextPage.add(inp);
}
}

a = new af.Audio(page.sound);
a.play();

ui.TextPageContinue.tapFunction(function(){ af.saveStoredData();removeAll(widgets); a.stop();
page.next();});

if(page.hasOwnProperty('back')){
    ui.TextPageBack.tapFunction(function(){ removeAll(widgets);a.stop();gotoPage(page.back);});
    ui.TextPageBack.hidden(false);
}
else ui.TextPageBack.hidden(true);

navigate.to("Page 5");
}
//helper function that gets a set function for a variable
function getSet(input){
    return function(value){af.storedData[input] = value;};
}

//story page handler

```

```

function gotoStory(page){
  items = page.items;
  var text = "";
  for(var i = 0; i < items.length; i++){
    item = items[i];
    if(item.hasOwnProperty('text')){
      text += item.text;
    }
    else if(item.hasOwnProperty('blank')){
      text += '<font color=red>'+af.storedData[item.blank]+'</font>';
    }
  }
  ui.storyText.text(text);
  navigate.to('Page 6');
  ui.storyContinue.tapFunction(page.next);
}
//clears the widgets in widgets from the page
function removeAll(widgets){
  for(var i = 0; i<widgets.length; i++){
    widgets[i].remove();
  }
}

//recording page handler
function gotoRecording(page){
  navigate.to("Blank");
  a = new af.Audio(page.sound);
  a.play();
  setTimeout(page.next, page.length);
}

//slide page handler
function gotoSlide(page){
  ui.TISTop.hidden(true);
  ui.TISBottom.hidden(true);

  var a = new af.Audio(page.sound);
  ui.TISImage.backgroundImage(page.image);
  ui.TISContinue.hidden(true);
  navigate.to("Page 2");

  a.play();
  b=setTimeout(page.next, page.length);
  if(page.hasOwnProperty('back')){

```

```

        ui.TISBack.tapFunction(function(){ clearTimeout(b);a.stop();gotoPage(page.back);});
        ui.TISBack.hidden(false);
    }
    else ui.TISBack.hidden(true);

}

//question page handler
function gotoQuestion(page){
    a = new af.Audio(page.sound);
    a.play();
    buttons = [ui.answer1, ui.answer2, ui.answer3, ui.answer4];
    ui.questionText.text(page.question);
    var i = 0;
    for(i=0; i<page.answers.length; i++){
        buttons[i].text(page.answers[i]);
        buttons[i].hidden(false);
        if(page.right.indexOf((i+1))>=0){
            buttons[i].tapFunction(function(){ page.correct();a.stop();});
        }
        else{
            buttons[i].tapFunction(function(){ page.wrong();a.stop();});
        }
    }
    for(;i<buttons.length;i++){
        buttons[i].hidden(true);
    }
    navigate.to("Question");
    if(page.hasOwnProperty('back')){
        ui.questionBack.tapFunction(function(){ a.stop();gotoPage(page.back);});
        ui.questionBack.hidden(false);
    }
    else ui.questionBack.hidden(true);
}

//right page handler
function gotoRight(page){
    navigate.to("Answer");
    ui.answerTitle.text("Congratulations!");
    ui.answerText.text(page.answer + " was the correct answer<br><br>"+"You've earned "+page.coins+"
coins");
    af.storedData.coins += page.coins;
    af.saveStoredData();
    ui.answerCoins.text(af.storedData.coins);
}

```

```

    ui.answerContinue.tapFunction(page.next);
}

//wrong page handler
function gotoWrong(page){
    navigate.to("Answer");
    ui.answerTitle.text("Oops!");
    ui.answerText.text("The correct answer was:<br>" +page.answer);
    ui.answerCoins.text(af.storedData.coins);
    ui.answerContinue.tapFunction(page.next);
}

//reward page handler
function gotoReward(page){
    navigate.to("Answer");
    ui.answerTitle.text("Congratulations!");
    ui.answerText.text(page.text + "You've earned " +page.coins+" coins");
    af.storedData.coins += page.coins;
    af.saveStoredData();
    ui.answerCoins.text(af.storedData.coins);
    ui.answerContinue.tapFunction(page.next);
}

//picture page handler
function gotoPicture(page){
    ui.pictureimage.backgroundImage(page.image);

    a = new af.Audio(page.sound);
    a.play();

    next = function(){a.stop();page.next();};
    ui.picturebutton.tapFunction(function(){takePicture(next);});//doesn't work on all platforms
    ui.picturecontinue.tapFunction(next);

    if(page.hasOwnProperty('back')){
        ui.pictureBack.tapFunction(function(){a.stop();gotoPage(page.back);});
        ui.pictureBack.hidden(false);
    }
    else ui.questionBack.hidden(true);
    navigate.to('Picture');
}

//qr page handler

```

```

function gotoQR(page){
  a = new af.Audio(page.sound);
  a.stop();

  //make it so that the audio only plays the first time the page is visited
  if(!(page.hasOwnProperty('visited'))){
    a.play();
  }
  page.visited = true;

  //Set the code reader to check the code against the options for the page
  af.codeReader.setCodeRead(function(code){checkCode(page.options, code);});

  //set up buttons
  ui.qrcontinue.tapFunction(function(){a.stop();page.next();});
  ui.qrbutton.tapFunction(function(){a.stop();scan();});

  //Set up back button
  if(page.hasOwnProperty('back')){
    ui.qrBack.tapFunction(function(){a.stop();gotoPage(page.back);});
    ui.qrBack.hidden(false);
  }
  else ui.qrBack.hidden(true);

  //Go to the page
  navigate.to('QRPage');
}

//checks to see if the code is in the options
function checkCode(options, code){
  if(options.indexOf(code)>=0){//if the code is in the list
    handleQRCode(code);
  }
}

//takes a picture, then calls next, doesn't work on all platforms
function takePicture(next){
  navigator.camera.getPicture(next, next, {destinationType:Camera.DestinationType.FILE_URL});
}

function gotoError(){
  log("page error");
  return false;
}

```

```
//Audio handling functions

//plays sound, links the sound to a play pause button
function startAudio(sound, button){
    sound.play();
    button.text("Pause");
    button.tapFunction(function(){pause(sound, button);});
}

//pauses sound, links the sound to a play pause button
function pause(audio, button){
    audio.pause();
    button.text("Play");
    button.tapFunction(function(){unpause(audio, button);});
}

//restarts sound, links the sound to a play pause button
function unpause(audio, button){
    audio.play();
    button.text("Pause");
    button.tapFunction(function(){pause(audio, button);});
}
```

Appendix S: Preamble

We are students from Worcester Polytechnic Institute conducting research for the Historical Royal Palaces in order to create an application from the Palace Explorers program for use by families. Your responses are voluntary, and you may choose to end the survey at any time or to skip any specific questions. This survey is designed to be anonymous, meaning there should be no way to connect your responses to you. To help maintain your anonymity, please do not include any information in your responses that would make it easy to identify you. By answering the questions you are giving us permission to use your answers in our research.

Appendix T: Formative Family Interview Form

Formative Family Interview Form

Date of Visit:

On a scale of 1 (the worst) to 5 (the best) how was the

Response Time: __

Consistency: __

Ease of Use: __

Educational Value: __

Notes:

The bookkeeper video was too long and they wanted a back button.

Please Circle the response that matches best:

Was the game:

Too Short

Just Right

Too Long

Notes:

Only the video was too long

Was the storyline easy to follow?

Yes

No

Notes:

Would you recommend this game to other families?

Yes

No

Notes:

Definitely, it gives a lot of knowledge

Was the map easy to follow?

Never

Almost Never

Sometimes

Almost Always

Always

Notes:

It was difficult to get to the menagerie and they would prefer a GPS map of where they are and where they are going

Was there equal participation

Never Almost Never Sometimes Almost Always Always

Notes:

Were family members able to work together during this game?

Never Almost Never Sometimes Almost Always Always

Notes:

If there was collaboration among family members, please provide examples:

When they were answering the multiple choice and fill in the blank

How user-friendly was the “fill in the blank” section? (Was it suitable for the device?)

Yes Somewhat No

Notes:

What did you like about the game?

What did you dislike about the game?

Is there anything specific you would like to add or see change in this application?

What did you learn?

What did you think the goal/objective was?

Do you have any additional comments?

Appendix U: Formative Evaluation Family 1

Formative Family Interview Form

Date of Visit: April 4, 2012

On a scale of 1 (the worst) to 5 (the best) how was the

Response Time: 5

Consistency: 4

Ease of Use: 4

Educational Value: 5

Notes:

The bookkeeper video was too long and they wanted a back button.

Please Circle the response that matches best:

Was the game:

Too Short

Just Right

Too Long

Notes:

Only the video was too long

Was the storyline easy to follow?

Yes

No

Notes:

Would you recommend this game to other families?

Yes

No

Notes:

Definitely, it gives a lot of knowledge

Was the map easy to follow?

Never Almost Never **Sometimes** Almost Always Always

Notes:

It was difficult to get to the menagerie and they would prefer a GPS map of where they are and where they are going

Was there equal participation

Never Almost Never Sometimes **Almost Always** Always

Notes:

Were family members able to work together during this game?

Never Almost Never Sometimes **Almost Always** Always

Notes:

If there was collaboration among family members, please provide examples:

When they were answering the multiple choice and fill in the blank

How user-friendly was the “fill in the blank” section? (Was it suitable for the device?)

Yes **Somewhat** No

Notes:

It would be beneficial to have spell check or a way to predict what the child is trying to say.

What did you like about the game?

The seven year old liked that he learned things through questions. The 17 year old liked the story at the end of the game. The parents liked that the questions involved them a lot.

What did you dislike about the game?

The sensitivity of the QR codes and the lack of back buttons.

Is there anything specific you would like to add or see change in this application?

Perhaps a map in the application, checkpoints, and spell check.

What did you learn?

The youngest liked learning about the ostrich eating nails and the other members liked knowing that there had been animals in the Tower.

What did you think the goal/objective was?

Gives something for children to do while being interactive. It provided good background knowledge while being fun.

Do you have any additional comments?

N/A

Appendix V: Formative Evaluation Family 2

Formative Family Interview Form

Date of Visit: April 14, 2012

On a scale of 1 (the worst) to 5 (the best) how was the

Response Time: 5

Consistency: 5

Ease of Use: 5

Educational Value: 5

Notes: NA

Please Circle the response that matches best:

Was the game:

Too Short

Just Right

Too Long

Notes: NA

Was the storyline easy to follow?

Yes

Somewhat

No

Notes: Forgot why he was trapped

Would you recommend this game to other families?

Yes

No

Notes: NA

Was the map easy to follow?

Never Almost Never Sometimes Almost Always Always

Notes: The beginning was a little confusing

Was there equal participation between family members

Never Almost Never Sometimes Almost Always Always

Notes: NA

Were family members able to work together during this game?

Never Almost Never Sometimes Almost Always Always

Notes: NA

If there was collaboration among family members, please provide examples:

- There was collaboration on every question
- French Prayer

How user-friendly was the “fill in the blank” section? (Was it suitable for the device?)

Yes Somewhat No

Notes: NA

Did your family specially enjoy the game?

Yes Somewhat No

Notes: NA

What did you like about the game?

- That you could write things
- The animal section
- Learn without reading too much
- The drawings

What did you dislike about the game?

N/A

Is there anything specific you would like to add or see change in this application?

Make a bit louder

What did you learn?

- **White Tower- King Henry III white washed the Tower**
- **Bookkeeper went to jail**
- **How the Yeoman warder got his job**

What did you think the goal/objective was?

- **To get families engaged while teaching them with technology**
- **So children can listen and do activities while learning**

Do you have any additional comments?

- **The learning was ahead of what the kids would be learning in the US but not too advanced.**

This is great since it can teach them more.

- **Menu for navigation**

Appendix W: App Creation Platform Comparison Form

	AppFurnace	Demibook	Sencha Touch	Runrev	PhoneGap	RhoStudio
Apple iOS developer account required to publish	N (more expensive without though)	Y	Y	Y	Y	Y
Supports iPad development	Y (limited)	Y	Y	Y	Y	Y
Supports iPhone development	Y	N	Y	Y	Y	Y
Requires apple developer account to test on iOS devices	N	N	Y	Y	Y	Y
Supports iOS development from Windows computers	Y	N (Ipad only)	N	N	N	N
Supports Android development	Y	N	Y	Y	Y	Y
Development Environment Cost	0	0	\$279	\$798 (commercial version) \$198 (free apps only)	\$0 (open source)	\$0 (open source)
Cost self publish	£500 (£750 for both platforms)	\$499-699	0	0	0 \$0 (open source)	\$0 (open source)
Coding Support	Y	N (minimal)	Y	Y	Y	Y
Programming Language	javascript	N/A	HTML5 (javascript)	LiveCode (custom language)	HTML5 (javascript)	HTML5 and Ruby
Video Support	Y	Y	y	Y	Y	Y
QR Code support	Y	N	N	N	Y (third party)	Y
Interactive element support	Y	Y (limited)	Y	Y	Y	Y
Dynamic Content	Y	N	Y	Y	Y	Y
Saving user data	Y(space limited)	Y	Y	Y	Y	Y
WYSIWYG Editor	Y	Y	Y	Y	N (can use Dreamweaver)	N
Camera use support	N	N	Y	Y	Y	Y
Audio Recording	N	N	Y	Y	Y	Y

Appendix X: Application Map

Royal Menagerie



Pig Faced Baboons



Thomas Abel



Alfred Cops





Beauchamp Tower



Earl of Arundel



Thomas Abel

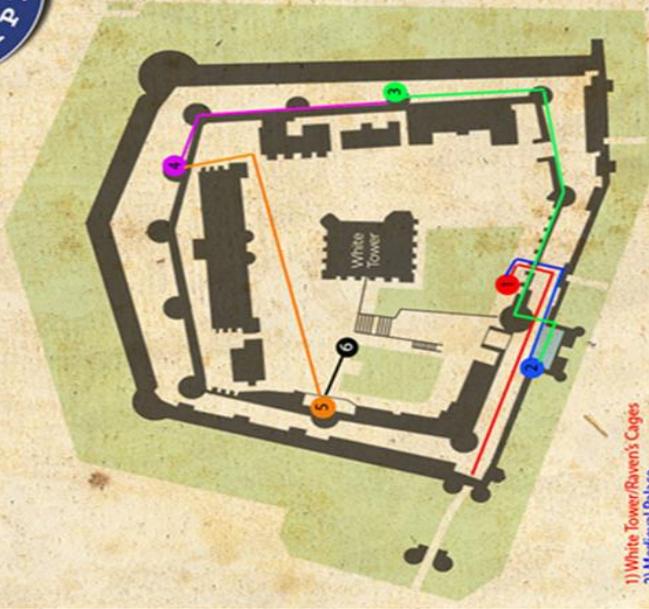


Lady Jane Grey




Historic Royal PALACES





1) White Tower/Raven's Cages
 2) Medieval Palace
 3) Broad Arrow Tower
 4) Royal Menagerie
 5) Beauchamp Tower
 6) Queen's House

White Tower



Legend of Bran

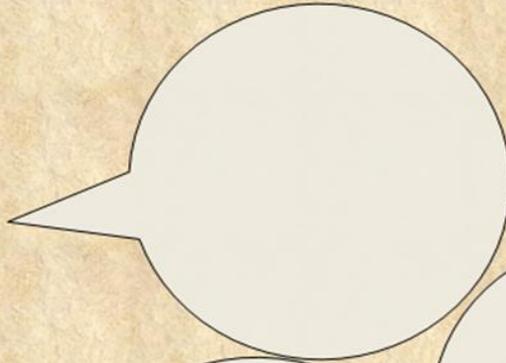


Ravens

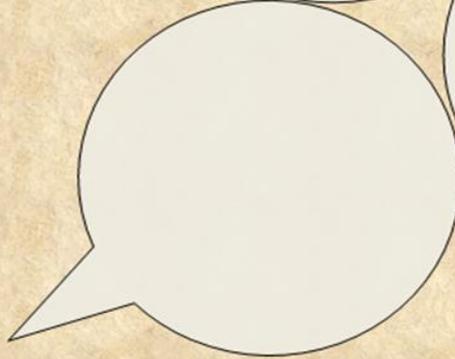


Ranulf Flambard

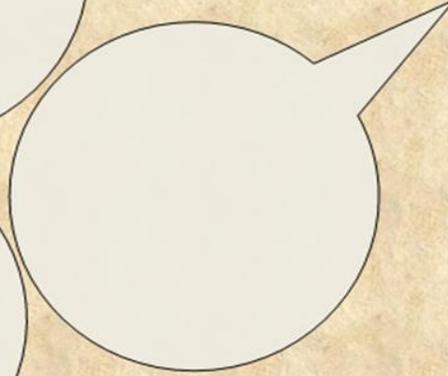
Draw your Coat of Arms



Draw your Fantasy Fortress



Draw your Graffiti



Medieval Palace



King Edward's Bed



French Prayer



Coat of Arms