A quick history lesson: Lean UX research at Hampton Court Palace

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Abstract. This paper describes the Lean UX research approach used to evaluate the Digital Visitors Guide (DVG) developed for use at Hampton Court Palace. The DVG was tested onsite at the palace over several rounds of research. The DVG was liked by participants, who felt that it was easy to use, engaging, modern and improved their learning experience. Taking a Lean UX approach worked well as insights were delivered, and design recommendations prioritised, efficiently in a collaborative environment.

Keywords. Usability, Lean UX, context of use, field-based research

1. Introduction

Historic Royal Palaces (HRP) are responsible for managing six palaces in the UK, including Hampton Court Palace (HCP). Visitors come from around the world to visit HCP and learn about the people and the events that took place there over the last five centuries. HRP face strict limitations on the amount and type of signage/information that can be placed around the palace, due to the historical significance of the site.

The consequence is that visitors need to be provided with additional forms of information that they can, ideally, carry in order to better learn the history of the palace. A key form of 'portable information' comes in the form of the Audio Visitors Guide (AVG) – a handheld device which gives guided audio tours of the buildings. Up to 900 AVGs are used each day, thereby forming an important part of HRP's strategy for enhancing visitors' learning experiences.

1.1 The Audio Visitors Guide

The AVG's audio tours provide information about the palace's historical figures, events and locations. Up to three types of tours are available for a given part of the palace, which provide factual, dramatised or family-orientated information. The AVG device works by entering a number which corresponds to a given tour location and type in the palace. The user then hears (and can control the playback of) the tour's audio tracks, with the AVG prompting them to move to the next area/room of the tour as necessary. Visitors collect AVGs from a specific room in the palace, at which point they are given verbal usage instructions and provided with a printed map which has the locations and the corresponding numbers of the available tours indicated.

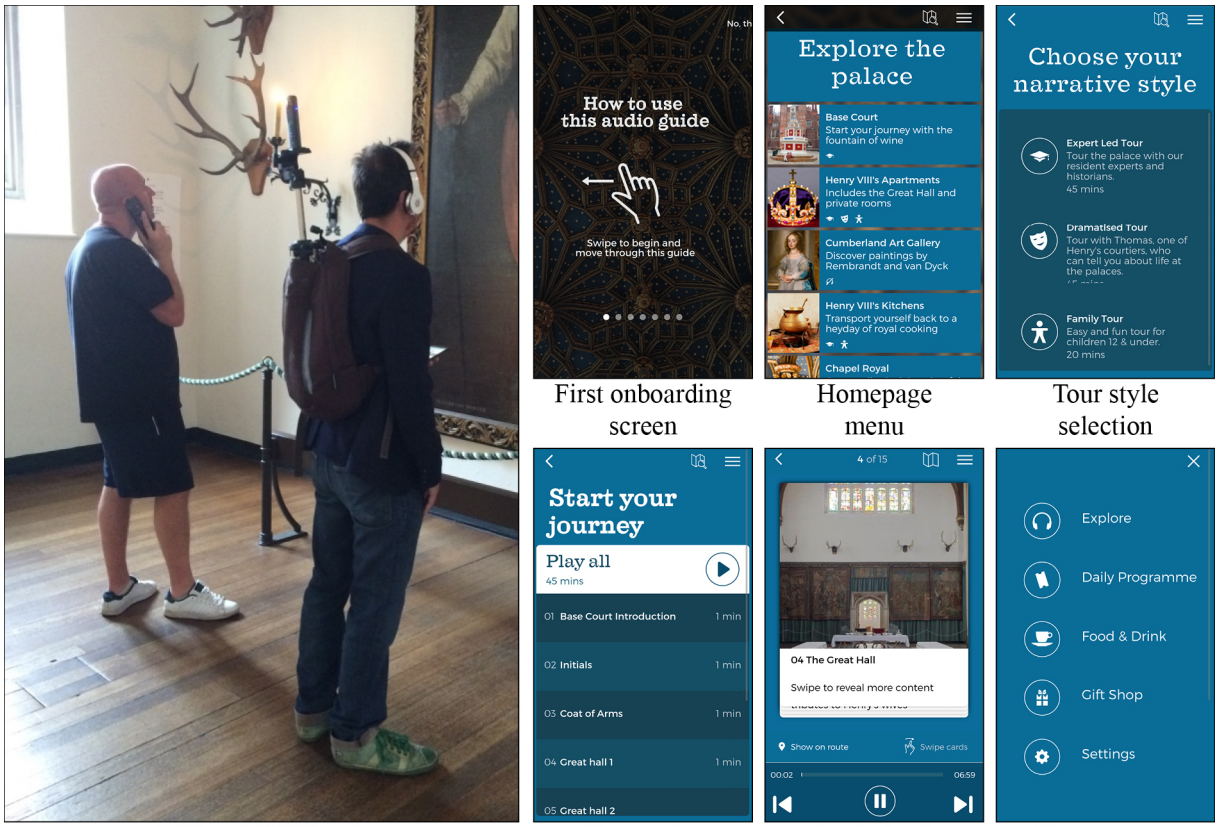
1.2 Creation of the Digital Visitors Guide

Through extensive visitor research, HRP identified an opportunity to update the AVG. Issues with the current guide included:

- The need to improve visitors' learning experiences via enhanced/additional content
- Its visual and interaction design were considered old fashioned
- Controlling audio tour playback was sub-optimal, making it hard for visitors to control their tour experiences.

A requirements analysis study was conducted by HRP, which generated detailed user and technical requirements. A digital solution was subsequently proposed, in which the current audio content would be repurposed and augmented to provide visitors with a more flexible and personalised experience. In particular, the Digital Visitors Guide's (DVG) objectives were:

- Help visitors explore the palace's spaces and stories in their own way
- Provide information about 'what's on' to help visitors plan their day
- Provide intuitive wayfinding and general information about HCP's services and facilities
- Enable visitors to engage with other group members and HCP staff while using the DVG
- Be easy for all members of a family to use, regardless of age or accessibility need
- Provide multi-lingual access to all content, as currently offered by the AVG.



AVG and DVG users (left and right visitor respectively)

First onboarding screen

Homepage menu

Tour style selection

Tour audio track list

Audio track playback screen

Burger menu options

Figure 1 – DVG screenshots and AVG and DVG users

The DVG was developed as a native app designed to work on a smartphone handset, thereby facilitating a modernised visual and interaction experience. The various tours available at the palace are immediately accessible via the home screen, with a map and three-line 'burger' menu (provided as global navigation links) offering quick access to additional information about the palace, e.g. the location of amenities and lists of recommended tours and live shows to see. Unlike the AVG, which is held up the visitor's ear, the DVG is supplied with headphones so that users can interact with its screen while listening to audio content or have a

hands-free listening experience, as the DVG will eventually be provided on a lanyard. A sample of screenshots from a mid-development phase DVG prototype and a comparison of AVG and DVG usage are provided in Figure 1 for reference.

HRP engaged a third party digital agency to design and develop the DVG using an Agile approach. Bunnyfoot was subsequently employed to conduct independent user testing research, in line with the key development milestones and sprint schedule. This case study details the research that was undertaken by Bunnyfoot.

1.3 Aims and objectives

Ultimately, the long term aim of the research was to provide evidence to inform the design of the DVG, including its structure, language, and visual and interaction design. To meet this aim, the following objectives were set:

- Evaluate the DVG prototype with representative users to fit in with, and inform, the DVG development plan
- Understand the impact of the DVG's design on its usability, visitors' social interactions and their learning experiences
- Feedback insights and design recommendations to the HRP and digital agency stakeholders in a collaborative way, in order to support the Agile development process.

2. Methods

2.1 Research approach

A Lean UX approach was taken in order to deliver research insights that would align with the DVG's agile development process. Lean UX, advocated by Gothelf (2013), Klein (2013) and Levy (2015), for example, is gaining traction in the software development domain. Based on Lean Startup principles (see Ries, 2011), it promotes: (1) efficiency, by moving away from heavily documented deliverables; (2) harmonisation, by creating cross-functional design teams; (3) faster learning, through rapid experimentation; (4) design thinking; (5) Agile development philosophies.

Essentially, Lean UX strikes a balance between the speed of Agile development and the need for UX design in the product-development lifecycle (Gothelf, 2013). Consequently, Bunnyfoot's activities were based on delivering solution-focused insights in an efficient, flexible and collaborative way.

Four rounds of testing were planned (three have been completed at the time of writing). The testing schedule was mapped to the sprint plan to coincide with development milestones, i.e. when key features and functionality had been built into the DVG prototype. The final round of testing was reserved for evaluating the minimum viable product version (MVP) of the DVG.

2.2 Test preparation

Immediately prior to each round of testing, a briefing took place with HRP and Bunnyfoot stakeholders in order to agree the research objectives and onsite testing logistics. The short timescales between briefing and testing were designed to maintain an efficient approach to the research, i.e. being able to adapt the testing to the fidelity of the DVG prototype without having to duplicate preparation activities (e.g. re-writing the test protocol). The lead consultant (author of the paper) and a support consultant then spent a day onsite at HCP preparing the testing material (protocol paperwork, surveys etc.), running a pilot study and making amendments to the protocol.

2.3 Participant recruitment

The recruitment for each round of testing was based on three visitor personas that had been developed for HRP in previous research by Bunnyfoot. The personas focused on the goals, behaviours and motivations of different visitor types and can be summarised as:

- A young London-based couple, who seek spontaneous cultural activities to fill their day and have little existing knowledge about HCP
- A mother bringing her young children to the palace to share a fun learning experience which provides good value for money
- A retired couple from the US, history enthusiasts on a once-in-a-lifetime trip to HCP who want to understand what life was like at the palace.

Participants were recruited so that each persona was represented twice in the sample. Half of the participants were recruited onsite on testing days, as they came to collect an AVG, in order to test the DVG with palace visitors. The remaining participants were pre-recruited to mitigate the risk of insufficient numbers of relevant people visiting the palace on the testing days.

2.4 Testing schedule

Testing for each round of research took one day, with both Bunnyfoot consultants working onsite at HCP. The 2-3 participants that represented a given persona took part in the same 60-minute test session, which involved:

- A briefing session and pre-task interview about their previous audio guide experiences
- Participants using the DVG to take a tour of the palace's main courtyard (the first tour AVG users are advised to take) and then choose, navigate to and start a second tour (which was cut short once sufficient observational data had been captured)
- A post-task interview about the participants' experiences of using the DVG
- Completion of a Look and Feel survey, which asks participants to select from a range of 48 adjectives the words that best describe the look and feel of the DVG
- Complete the System Usability Scale (SUS) and Net Promoter Score (NPS) surveys to provide quantitative measures of the DVG experience

In the third round of testing participants were also asked to use the DVG to choose and locate one of the palace's cafés. Examples of participants using the DVG and being interviewed about their experiences are provided in Figure 2.

Figure 2 – Participants using the DVG, a post-task interview and an affinity mapping output

2.5 Data analysis and reporting

The analysis and reporting of the test data took place on the day after testing. The first half of the day was dedicated to analysis, which began with an affinity mapping exercise (see Figure 2) to identify themes in the three areas of interest: DVG usability, social interactions, the learning experience. This analysis was followed by the generation of design recommendations (either written or sketched) and processing the Look and Feel, SUS and NPS data.

The second part of day involved presenting the analysis findings and recommendations to key project team members from HRP and the digital agency developing the DVG. The feedback session was run flexibly so findings could be explored and recommendations discussed and prioritised for development.

3. Results

This section details the key findings under the main research themes: DVG usability, social interactions and the learning experience

3.1 DVG usability

Overall, using the DVG was a positive experience with most participants commenting that it was much more visually engaging, easy to use and modern than the AVG (and similar audio guides). The majority of the participants quickly learnt the interactions required to use the DVG, as standard touchscreen interaction patterns had been used for most of the design.

However, participants representing the retired couple persona generally found the DVG harder to use. Their comments revealed that their learning curve was steeper due to the lack of familiarity with touchscreen mobile devices. While these participants mentioned that using the DVG would be more straightforward for smartphone users, this issue revealed the need for a better onboarding process. It was recommended that extra usage guidance be provided in at least one of two ways:

- Provide a more engaging and interactive onboarding experience, e.g. prompting users to interact with the essential features of the DVG before it allows them to use it unaided (while allowing users to easily exit and relaunch the process, if preferred)
- Staff members can give verbal usage instructions when the DVG is collected by visitors, if required/time permits.

Improving the onboarding process was also considered a solution for several other issues,

e.g.:

- Most of the participants ignored the onboarding screens or tried to complete the interaction described on the screen, e.g. tapping on the instruction 'tap to select', which did not progress them to the next screen
- Some users did not know how to adjust the volume using the device's hard keys, as they were unfamiliar with the handset
- Increasing participants' usage of the digital map at an early stage in their visit to help them navigate to their desired tour/amenity.

The participants were observed using the DVG for three forms of navigation: moving around the whole site, within the area of a tour and within a specific room in a tour. The DVG's map was used successfully to locate, and navigate to, a given tour/amenity despite GPS-based wayfinding not being available on the device (for practical/logistical reasons). The digital map was used in combination with existing physical signage and landmarks to locate destinations. However, due the limitations on signage around the palace (as mentioned in Section 1), relevant signage was not often immediately visible: this highlighted the importance of being provided with a site-wide map, whether on the DVG or in paper form.

However, several usability issues were observed when using the map, for example, the interactive icons which provided additional information about a given tour/amenity were small and abstract, making them hard to see, understand and tap. Recommendations to improve the map's usage were discussed, e.g. improve the icons' size, labelling and touch zones, with the changes being made for the (as yet) untested MVP.

More localised wayfinding (i.e. between and within rooms on a tour) was achieved by matching the images provided by the DVG (of certain features within a room) to the participants' immediate surroundings. This is not easy to do with the AVG and, therefore, the DVG improves the exploration of the palace and the tours within it. Being able to match images on the DVG to the features in the participants' immediate vicinity became particularly useful when moving to the next room on a tour, as the audible instructions were not always remembered.

3.2 Social interactions

Every participant/couple/family group was observed helping each other to use the DVG so that each member of the couple/group could be synchronised on the tour they were taking and therefore have a shared learning experience. Given that the DVG provides much more visual feedback about its content and functionality, this synchronisation was considered to be notably easier with the DVG when compared with the AVG.

Participants within a couple/group mostly chose the same type of tour as each other in order to facilitate the shared learning experience. The majority of participants stayed within close proximity of each other as they tended to take the tour at the same pace. However, the participants in two of the retired couples went their separate ways due to preferring a different pace of tour, i.e. one of each couple skipped past the tracks they weren't interested in. These behaviours were considered unlikely to change if the participants had been using AVGs and, therefore, the use of the DVG was not believed to negatively impact on the social interaction of a group, with one exception.

Several participants felt that the headphones used in testing slightly isolated them from their group and the ambient sound (i.e. the ambience) of the palace, e.g. they had to remove their headphones to talk with each other. However, as many people said that they liked being in 'a bubble' which allowed them to focus on the audio tours. The possibility of providing single-ear headphones with the DVG is currently being considered by HRP.

3.3 Learning experience

All the participants reported that the DVG provided interesting audio content which brought the history of the palace to life. The participants were seen to be visually engaged with the palace's buildings and artefacts, rather than having their attention dominated by the DVG (the concern being that having a touchscreen device might prompt the frequent interactions that people are seen to have with their smartphones). In addition to the engaging content, the ease in which the participants could fully control the playback and ordering of tracks was liked by all, as it allowed them to customise a tour to their individual/group needs. However, most of the older participants commented that their learning experience had been hampered because of the additional time taken to learn how to use the device. Again, this issue could be (at least in part) mitigated by an improved onboarding process.

4. Discussion and Conclusion

4.1 Comparison of the DVG and AVG

Although the participants were not asked to use the AVG and, therefore, no control stimulus was provided, the findings of the research clearly suggest that the DVG will improve the learning experience of visitors. Choosing, finding and controlling playback of tours were all facilitated by the DVG in ways not possible with the AVG. Furthermore, having access to additional content (e.g. lists of curated tours, details of amenities) in a device that permits a hands-free guided tour is not an experience that the AVG can provide. The positive comments given by the participants suggest that, with an improved onboarding experience, the DVG would be preferred over the AVG by the vast majority of visitors.

4.2 Benefits and challenges of using a Lean UX approach

Various benefits were gained by taking a Lean UX approach to the research. For example, the necessary efficiency required to deliver useful insights and recommendations within short timescales was achieved by not providing formal documentation. Also, by getting the relevant stakeholders together to examine the findings and recommendations, design decisions could be considered and prioritised immediately. This way of working helped keep the development schedule on track and facilitated the build-measure-learn ethos of the Lean approach. All stakeholders were committed to working flexibly to achieve an MVP within the required timescales, creating a strong sense of collaboration amongst the project team. This was helped by maintaining a consistent core group of stakeholders throughout the rounds of testing.

Given the project's timescales, understanding the more nuanced aspects of the participants' DVG experiences was challenging, with some having to be ignored in order to focus on the main findings of the testing. However, the recommendations provided were considered to have the most impact on improving the user experience of the device.

4.3 Benefits and challenges of researching onsite

It was clear that the context of use played a crucial role in the participants' experiences of the DVG in a number of ways, e.g.: wayfinding using the combination of the DVG and the palace's signage and landmarks, manoeuvring through crowds and physical spaces while using the device, and searching for particular artefacts described in the audio tracks. Testing onsite allowed the consultants to directly observe the influence of the palace environment on the DVG's usage and account for this in their design recommendations. This project also provided the Bunnyfoot consultants with a rare and exciting opportunity to conduct field-based user testing.

There were also some challenges that arose when testing at the palace. For example, the testing took place on sunny days, which meant that any glare from the DVG's screen made it harder to see which elements of the user interface were being touched. To facilitate natural behaviours, the Bunnyfoot consultants observed the participants from a distance. However, this also meant that device interactions were occasionally hard to observe and required the researchers to quickly move closer while remaining unobtrusive. Also, testing with multiple participants at the same time meant that a consultant had to divide their attention between the participants and could not always see how each of them was interacting with the device. This was particularly challenging if the participants walked apart from each other. Finding a quiet place to conduct post-task interviews was also problematic, as large tour groups could unexpectedly arrive during the interviews. This issue was, however, partly mitigated by the researchers walking through the tour routes during the preparation day to identify suitably quiet locations.

4.4 Conclusion

In summary, a Lean UX research approach worked well to deliver useful insights and recommendations in an efficient manner throughout the course of the DVG's development. Working collaboratively with key project stakeholders helped to quickly prioritise design decisions and keep the MVP delivery on track, thereby facilitating the build-measure-learn cycle. Testing onsite at Hampton Court Palace proved essential in understanding the participants' DVG usage and learning experiences.

5. References

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