Enhancing Access at the Tower of London

Historic Royal Palaces

WYATT BAHM, ANQI CAO, MARISSA LEONE, AND ANDREW MENDIZABAL

Presentation overview

- Background and significance of project
- Goal and objectives
- Conducting our research
- Recommendations and conclusions

Acknowledgements

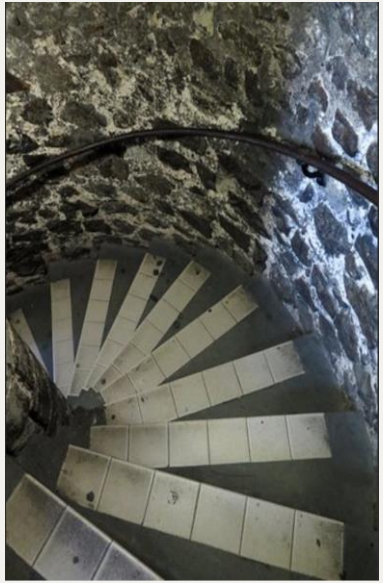
- Tim Powell and Polly Richards
- Professor Joel J. Brattin and Professor Zoe Reidinger
- Professor Dominic Golding
- Daryl Jackson
- Steve Gardam
- Natalia Hudelson, Elizabeth Porter, and Carlos Austin-Gonzalez
- Sue Whittaker
- Jodi Bickerton, Lizzy Leggat, and Richard Matthews
- Emma Morioka, James Murly-Gotto, Nicole Stockton-Davies, Debra Whittingham, Claire Ashford, and Nivek Amichund

The Tower of London

- Nearly 1000 years old
- Built as a fortress
- 3 million visitors per year
- Protected as a scheduled monument
- Current access at the Tower of London
  - Spiral staircases
  - Uneven surfaces
  - Narrow doorways

Demographics of disabilities in the U.K.

- 19% of the UK population identifies as disabled (Smith, 2013)
- 83% of disabled people chose service based on accessibility (Owen, 2017)
- 10 million people with a hearing impairment
- Approximately 140,000 blind people
- 57% of disabled people have some form of mobility impairment (Smith, 2017)



https://www.tripadvisor.co.uk/LocationPhotoDirectLink-g186338-d187547-i224303609-Tower_of_London-London_England.html

British Sign Language

- Recognized as an official minority language in 2003
- Independent syntax not closely related to English
- Not a universal language
  - Different countries use different sign languages
  - Regional variations even between cities in the U.K.
- People who sign identify it as their first language and may not understand written English as well

http://joanclevilledance.com/about/access/bsl-logo

Social model of disability

- A person is disabled by society, not by their impairment
- The medical model seeks to fix the individual rather than what is actually disabling them
- The social model developed by disabled people to help explain their life experiences and allow them develop more inclusive ways of living

Scope
About disability

https://www.scope.org.uk/about-us/our-brand/social-model-of-disability#body_inner

Project Goal

Evaluate digital technologies to help HRP increase accessibility for D/deaf and disabled visitors at the Tower of London.

Objectives

- Perform market research on current and emerging digital technologies
- Assess current state of accessibility at the Tower
- Assess stakeholder opinions about digital technologies
- Evaluate viability of implementation of technologies at the Tower
- Recommend how HRP could improve access

Our Observations

- Cobbles
- Step free route obstructed
- Towers inaccessible to wheelchair users
- Low lighting
- Background audio

Graeae Visit

- Social model
- Accessibility examples
  - Color coding
  - Flooring changes
  - Lighting
  - Acoustics
  - Counter height
- Distribution

http://hackneypost.co.uk/graeae-theatre-company-launches-new-writing-programme/

Survey Development

- Technology preferences
- Accessibility at the Tower
- BSL and text versions
- Distributed via social media and email

Survey results

- Access challenges at the Tower
- Accessibility of online information
- Assistive technologies

https://www.bemidjistate.edu/offices/its/knowledge-base/qualtrics-bsus-and-ntcs-survey-solution/

British Museum

- Has been working with organizations like VocalEyes to improve accessibility
- 40% increase in usage of the BSL/audio guide since they updated the audio tour
- Battery Life and storage are the major challenges for the audio tour

https://www.theguardian.com/culture/2017/sep/13/british-museum-says-too-many-asian-names-on-labels-can-be-confusing

The Roald Dahl Museum

- Original implementation of Signly
- Text transcriptions of all video and audio
- Wide doorways
- Accessible toilets
- Hearing loop and tactile maps

THE ROALD DAHL MUSEUM AND STORY CENTRE

http://www.roalddahl.com/museum

Hampton Court Palace

- One of the more accessible HRP properties
- BSL tours are usually very popular
- Wheelchair ramps and clear indication of level changes

https://www.uniquevenuesoflondon.co.uk/venue/hampton-court-palace

Accompanied tours

- We conducted 6 tours
- Visitors toured as if we were not present
- Visitors start with Crown Jewels
- Visitors explained access challenges while touring
- We conducted a short interview after

Wheelchair user-challenges

- Traversing cobbles
- Navigating crowds
- Navigating tight paths
- Using the access guide
- Encountering stairs
- Interpreting signs

http://theroadtripphotographer.blogspot.co.uk/2015/05/exploring-tower-of-london.html

Wheelchair user

- Liked Coins & Kings exhibition
  - Displays at a good height
  - Wheelchair can be rolled under displays

http://www.allcreativebranding.com/work-toweroflondon.html

Hard of hearing visitor

- Watching videos
- Hearing staff instructions
- Reading signs
- Using the maps
- Ended visit early
  - Poor lighting
  - Hearing aid interference
  - Lack of subtitles
- Would like a virtual BSL tour

http://www.signlanguage101.com/

Mobility impaired visitor

- Walking on cobbles
- Navigating moving walkway
- Walking long distances
- Being unable to take Warder tour
- Needed a variety of seating

https://josephsjourneyjournal.wordpress.com/tag/tower-of-london/

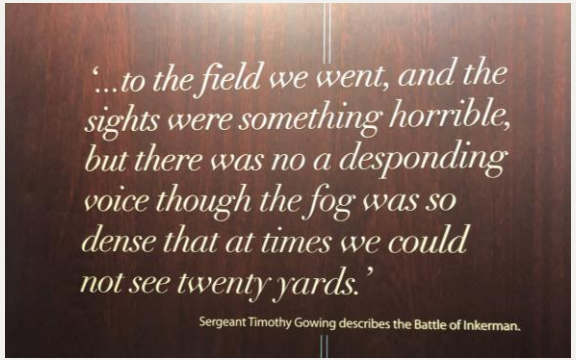
D/deaf visitor

- Cannot do Warder tour
- Cannot hear reenactments
- Cannot use audio guide
- Cannot see due to dim lighting
- No BSL translations
- No captions

https://www.youtube.com/watch?v=sG_zSmGAYoY

Legally blind visitor

- Lighting on displays
- Contrast on text displays
- Distance of text displays from glass
- Ideal contrast is dark background with off white text



Blind visitor

- Encountered challenges
  - Experiencing exhibitions
  - Wayfinding
  - Navigating stairs and level changes
  - Using the audio guide
- Recommended more detailed audio descriptions
- Recommended a variety of technologies be made available

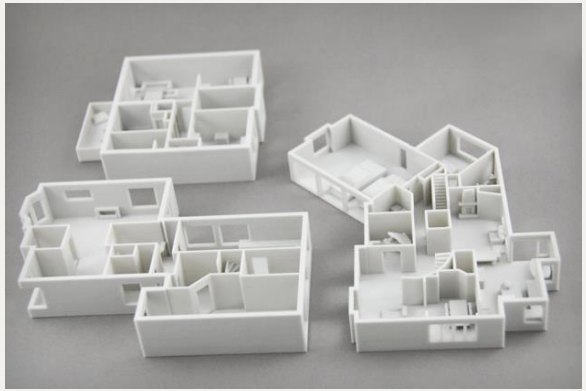
http://www.polin.pl/en/zaplanuj-wizyte-muzeum-dostepne/facilities-for-disabled-persons

Digital Recommendations

- Apps vs Tower devices
- Battery life
- Physical and data storage
- Cost

3D printed models

- Models help visually impaired people
- Models can be far from objects
- Models should be in rooms
- Braille descriptions should be nearby
- Costs will vary



https://i.materialise.com/blog/3d-printing-for-architects/

Augmented reality BSL interpretation

- Augmented reality can help D/deaf and BSL users
- Signly
  - Custom QR code reader
  - BSL, text, and audio versions
  - Personal and Tower devices
  - Numeric entry
  - Permanently printed placards

https://signly.co/

Virtual Reality

- Virtual reality can help mobility impaired individuals
- White Tower, Chapel of St Peter ad Vincula, and Battlements
- HTC Vive
- £499 per headset
- Google cardboard is a low cost alternative

https://www.amazon.ca/HTC-VIVE-Virtual-Reality-System/dp/B00VF5NT4I

Telepresence robots

- Telepresence robots offer an immersive remote viewing experience
- Beam Pro
- Retail prices are $13,950 with a $33 monthly fee per robot
- Challenges are battery life and WiFi strength

http://www.telepresenceoptions.com/robotic-telepresence/

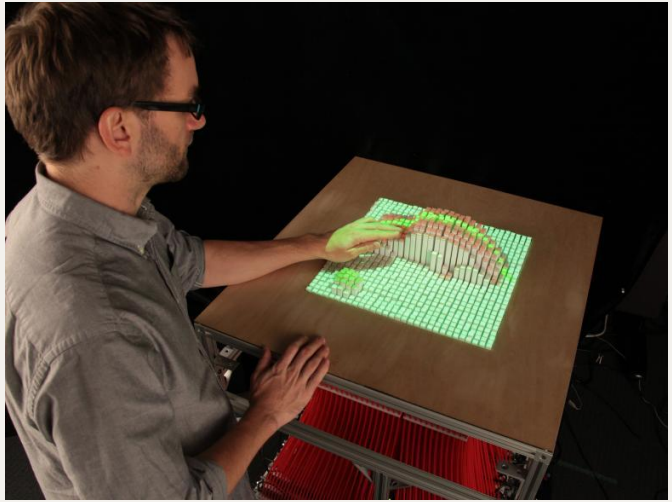
Bluetooth Beacons

- Bluetooth beacon system used to help blind or visually impaired individuals
- Bluetooth beacons will prompt information to be played on the phone without user input
- Battery life should be considered

https://www.israel21c.org/app-orients-visually-impaired-in-malls-schools-hospitals/

inFORM

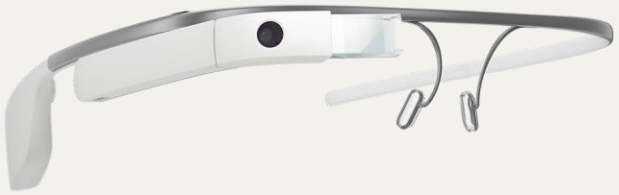
- 3D models made from stored data
- Same scans as 3D printing are used
- Display cases with multiple objects inside could benefit from inFORM
- inFORM is still in the early stages of development



https://tangible.media.mit.edu/project/inform/

Other considered technologies

- 3DS virtual walkthrough
- Explorer app
- Additional touchscreen displays
- Google glass
- Key fobs to control captioning
- Tablets
- TTS devices



https://www.techtrends.co.zm/tag/google-glass/

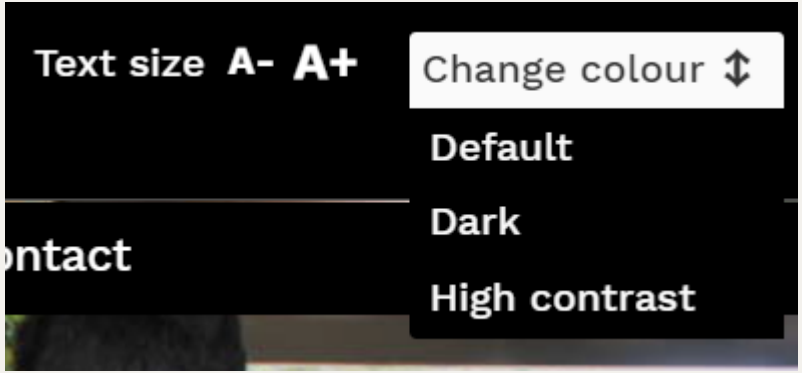
Non-digital recommendations

- Consider D/deaf tour guides
- Conduct additional disability awareness training
- Clear smooth pathways
- Install a variety of seating
- Consider high contrast text
- Evaluate lighting on displays
- Consider a lift entry intercom

http://www.peticleanair.com/gownroom-accessory/intercom-system/intercom-system.html

Website Improvements

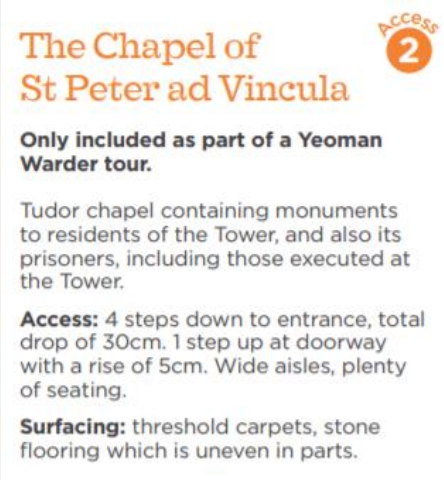
- Quick access should be added to Tower homepage
- BSL information should be moved to top of access page
- Text resizing and contrast options could be added



graeae.org

Access guide improvements

- Visitors found guide inaccurate
- Visitors should be asked if they need access information
- Staff prefer not to use guide
- Ratings should be offered for different access challenges



The Chapel of St Peter ad Vincula

Access 2

Only included as part of a Yeoman Warder tour.

Tudor chapel containing monuments to residents of the Tower, and also its prisoners, including those executed at the Tower.

Access: 4 steps down to entrance, total drop of 30cm. 1 step up at doorway with a rise of 5cm. Wide aisles, plenty of seating.

Surfacing: threshold carpets, stone flooring which is uneven in parts.

https://www.hrp.org.uk/tower-of-london/visit/accessibility/

Captions on videos

- Hard for D/deaf people to understand videos
- Descriptive text of what is being said
- “[Music]”
- “[No sound]”

Conclusions

- Over the course of our project we have conducted extensive research into digital technologies that can be used for access
- We have conducted accompanied tours and a survey to understand the current state of accessibility at the Tower and how open visitors are to new assistive technologies
- We feel that 3D printed models, Signly, and virtual reality best fit the access needs at the Tower