Issues and recommendations for the design of audio handsets at the V&A

Version

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1. Introduction

A number of problems exist with the current design of the audio handsets located in the British Gallery and Architecture Gallery. It is planned that any new development of the handset addresses these problems and provides an improved experience both for those visiting the museum and for those maintaining the handsets.

This document describes all the main issues identified with the design, use, function and maintenance of the handsets, and provides a set of recommendations relating to the design of the handset that should be considered as part of any further development.

2. Approach

Views, issues and future requirements relating to the use, design, implementation and maintenance of the audio handsets were identified and collected. Discussions were held with those involved in the existing and planned implementations. This was supplemented by a high-level review of the ergonomics and usability of each type of handset located in the British Gallery and Architecture Gallery, including free-standing, in-bench and in-display.

A meeting, workshop and series of telephone interviews were held with:

- Dinah Casson (Casson Mann)
- Juliette Fritsch (Head of Gallery Interpretation, Evaluation & Resources, V&A)
- David Judd (ex-Gallery Educator, British Gallery, V&A)
- Gwyn Miles (Director of Projects & Estates, V&A)
- Colin Mulberg (Gallery Educator, British Gallery and Architecture, V&A)

- Paul Nolan (Integrated Circles)
- Steve Patching (Hands-on Invention)
- Nighat Yousuf (Gallery Educator, Islamic Gallery, V&A)

The high-level review focused on the physical design of the handset, its mount and its location, together with the use of the handset and its associated experience. Only one person was observed using a handset at the time of the review. As a result visitor observation and feedback was very limited.

3. Issues and recommendations

Recommendations are highlighted in italics within each section below.

Aesthetics & awareness

i. In the British Gallery, all the units are very discreet and integrated with the colour scheme adopted in the gallery.

   Whilst it is possible that visitors will not notice the units at all during their visit, the freestanding units are potentially more likely to be discovered than the bench units.

   The freestanding units are clearly associated with a particular display and located right next to it. As a result, the visitor should notice the handset.

   However, the bench units are less associated with a particular object on display and also possibly regarded simply as general seating. As a result, the visitor has to be close to the bench in order to discover the handset.

ii. One freestanding unit was positioned in a very dark corner of a room which had low light levels. As such, it was invisible to visitors.

iii. In the Architecture Gallery, the handsets form part of the display construction and are again very discreet and in keeping with the gallery. Where provided, individual handsets sit directly in front of the associated object. Again they may be missed by passing visitors, although those stopping to look and read about an object will almost certainly immediately discover the handset.

Recommendations:

It would appear to remain a trade-off between fitting the handsets into the overall style of a gallery and wanting the handsets to be noticed and used. Without further research into people's awareness of the handset and their decision to use it or not, it is hard to provide a definitive conclusion.

However, whilst the British Gallery free-standing and Architecture Gallery implementation appear satisfactory to a degree, the success of the bench may need to be more fully assessed, especially when the majority of existing and planned content is limited to a single presentation and short running time.

Certainly as a minimum, all handsets need to be visible within all various lighting conditions. In addition, continued promotion of the various interactive experiences available within the museum and particular galleries remain an important factor and ought to be explored further.

Using the handsets

General

i. In the British Gallery, the majority of the handsets are provided in pairs and allow two people to listen to the same selection at the same time. It is understood that this was a design decision taken at the time to reflect the museum's goal of encouraging a shared experience between two people who have visited the gallery together.

   Based on this study, it is not clear whether this shared experience does take place as often as the museum would like, and also whether it is fully expected or desired by the visitor.

   Two strangers are unlikely to be attracted to use the handsets as they would have to stand relatively close to each other and share control of the start and type of content (when more than one option is available). As a result, as soon as one person starts to use one handset, the other handset may well become redundant.

   Even for two people who know each other, they might well expect a bit more flexibility in terms of when the commentary starts and what they listen to (when options exist).

   Recommendation:

It would make sense to review the need to have paired handsets and confirm how important it is to promote a shared experience. Single handsets may well provide the better solution and continue to meet the needs of the visitor, simplifying the implementation, usability and potential cost. Further research into the value of paired handsets would help qualify further.

ii. In the British Gallery, the general design, controls and instructions all look simple and easy to use.

However there is likely to be an expectation that the commentary will finish when you replace the handset. The fact that it continues to play may well confuse the visitor who may think there is something wrong with the handset.

In addition, as the sound remains audible (especially when at loudest volume), it may distract other visitors and create a negative impression.

Individual volume controls are provided, although during the period of the review, several controls failed to work, which may well prove an irritating experience and create a negative perception of the handset. Appropriate signage was only provided when the whole unit was out of order.

Recommendation:

It is recommended that as a minimum the audio shuts off when the handset is replaced. Whilst a 'start' button does provide a degree of control, users are unlikely to miss its absence in those cases where the audio starts automatically. The solution in the Architecture Gallery provides a good blueprint.

It is important that visitors avoid having a negative or frustrating experience. As such the need to identify faulty parts and remove/replace them on a daily basis is critical.

iii. In the Architecture Gallery, the overall ease of operation (start and end triggered when handset is picked up and replaced respectively) and lack of

controls result in a very simple and intuitive interface. However the volume was set and users could not adjust the level. This may put some visitors off using the handset especially if they view the sound as being too loud or too quiet.

Recommendation:

Finding the right default volume control is difficult, as sound levels are very personal. The provision of volume controls does provide a suitable level of flexibility that will be appreciated by the user.

Benches (British Gallery)

i. It is not possible for two people to listen to both handsets at the same time comfortably, when seated on the bench together. The cable would have to be pulled right across the person sitting nearest to the handsets.

   The position of the handsets on the end of the bench support one user sitting on the bench together with another either standing or in a wheelchair. Whilst accessibility is a key requirement, the position of the handsets does not cater well for what is likely to be a very typical scenario (two people wanting to sit next to each other).

   Recommendation:

   Again paired handsets exacerbate this problem. It is important that any implementation works for all typical scenarios. To maintain accessibility, consider providing a single handset at each end of the bench.

ii. When holding the handset to the ear, the bench experience felt less comfortable than the freestanding.

   Whilst stationary, the user has to maintain a hold on the cable to stop it retracting which, although manageable, is likely to affect the perceived comfort.

If moving/standing whilst listening, the user will need to adjust the length of cable and the mechanism involved can make this action awkward.

In addition, the amount of 'hold' and pull required varied between benches.

Recommendation:

See section on Cable & retraction mechanism.

iii. In most cases, it was quite noisy when the cable was pulled out and retracted. This is likely to draw unnecessary attention and potentially cause embarrassment to users.

Recommendation:

Where possible, noise needs to be kept to an absolute minimum within the gallery. Whilst it will not be noticed so much in busy periods, those looking to avoid the crowds (and a quieter experience) are likely to be more sensitive.

Freestanding (British Gallery)

i. The handsets on the paired, freestanding units are not securely mounted. It is very easy to accidentally knock them off which causes them to hit the floor, potentially damaging the unit as well as producing an unwanted noise (again attracting undesirable attention and causing potential embarrassment).

In addition, it requires an unnecessary amount of concentration from the user when replacing the handset, as it feels like a balancing act. The cables exacerbate this problem especially when twisted, taking on a life of their own, and by 'pulling' the handset down off the mount when replaced.

Recommendation:

It is very important to ensure that the handset can be picked up and replaced with ease and complete confidence. The user should not have to be faced with anything else to think about. In addition, the handsets, when in place, should be secure and ideally placed out of the way of the walkway.

Provide a suitable means of cable management to prevent twisting and prevent one cable invading another.

ii. The design of the mount on the single, freestanding handset unit does not allow the bottom of the handset to be completely pushed down (being obstructed by the cable). As a result, whilst better than the paired unit, the handset does not feel totally secure and there is likely to be a sense of uncertainty as to how much force the user should apply to push the handset down (without damaging the cable).

Recommendation:

Ensure the mount is designed to fit the part of the handset it receives and ensure the user is not left with any uncertainty.

Cable & retraction mechanism

There were a number of issues highlighted specifically with the cable and retraction mechanism housed in the bench units (British Gallery):

i. The retraction system cannot be fine-tuned, resulting in it being either too stiff or too loose.

ii. The cable can fail to retract, resulting in the cable left hanging over the seat. Whilst a low retraction tension was set on the cable to ensure it was easy to pull, the downside was that there was not enough tension set to ensure the reliability of the mechanism to retract every time.

iii. The benches themselves were not designed properly to house all the cable and retraction mechanism. The space available was not adequate. Additional cable had to be housed to cater for those wanting to stand and each handset had to be positioned at right angles to the mechanism (as opposed to in line). The cables are also prone to cross each other.

These factors have all resulted in unnecessary strain on the mechanism, problems affecting the amount of cable that can be pulled out (certainly affecting tall people standing), reduced reliability and a less than perfect experience for the user.

iv. Wires coming out of the cable (at the other end) that are normally fixed in place can sometimes come loose and be pulled out with the entire cable through the retraction hole.

v. The cable has been known to snap at the point of connection to the handset, underlining a weakness in how the cable and handset are joined together.

vi. The cable casing, whilst hard wearing, does 'cut' into the side of the retraction hole, leaving a visible mark.

In the Architecture Gallery, the cable length did appear to vary between handsets and in one case seemed to require a bit more effort to pull out

Recommendations:

As a minimum, ensure the unit which surrounds the retraction mechanism is designed to fully take account of the retraction mechanism requirements (both in terms of construction, operation and maintenance). The Architecture Gallery would appear to be a vast improvement on the British Gallery and the same principles should be incorporated.

However, there are still general issues relating to use of a retraction mechanism and further thought should be given to potential alternatives, even considering wireless options.

Design of handset

i. The overall comfort of the handset is affected by the narrow and angular design of the handset body, as well as the speaker casing which protrudes out from the body and does not rest well on the ear.

Recommendation:

The design should adopt a more ergonomic style which integrates the speaker. This will improve the comfort.

iii. Perceived cleanliness is an important factor in the desire to use these sorts of devices. Whilst the handsets look relatively clean, the 'rubber' material used did feel sticky on some of the handsets. It is certainly a positive that the handset does not include a microphone (as in traditional phones), as these can be off-putting.

Recommendation:

Potentially, other materials could be investigated which meet the need for warmth, durability and moisture resistance, but which can provide a perceptibly cleaner feel.

iv. The speaker casing is not an integral part of the body of the handset and, as such, sticks out. Its use, particularly on the freestanding units, to locate and mount the handset on the unit opens it up to potential damage. It can be pulled off inadvertently when picking up or replacing the handset, the mount acting like a bottle top opener.

Recommendation:

Ensure the handset is more effectively supported and cannot be damaged through normal use. Avoid any undue strain on more sensitive parts of the handset.

v. Whilst the small size of the speaker was determined and limited by the size of the handset, it can easily become damaged despite the protective surround. In addition, when knocked, it can become loose within the casing (causing a rattle). It also has less life expectancy than bigger speakers.

Repeated impact of the handset on the ground can also fracture the cable as well as break the speaker (although the handset itself will continue to survive, being made of very durable material).

Recommendations:

Make use of bigger speakers to ensure greater durability. The design of the handset will need to be revised accordingly.

Look to prevent the handset from reaching the ground, thus minimising any impact on the handset.

Maintenance

i. Ongoing maintenance is not straightforward, as most repairs require the whole handset and cable to be removed, with multiple suppliers involved. It is not generally possible to simply replace individual elements 'in situ' due to the lack of standard fixings and connections (seen at the time to detract from design); for example, the cable and speaker casing are glued into handset.

ii. Some repairs involving the sound box require floor tiles to be raised which adds to the time and disruption.

Recommendations:

Where possible the design should make use of industry standard parts and off-the-shelf elements to keep costs to a minimum, ensure availability, ease maintenance and ease replacement.

Consider keeping all parts local and easily accessible to reduce effort and disruption to the surrounding areas.

In addition, it is critical that all the requirements for operation and maintenance are factored into the design of the gallery and the displays as early as possible.

4. Summary of design drivers

The following summarise the key design drivers based on the issues and recommendations identified:

- Design should be elegant and discreet, yet not invisible
- Design should fit in with the style of the gallery
- Design should attract and entice to encourage use
- Design should enhance the visitors' perception of the gallery and museum
- Visitors should be encouraged to use the handset
- Users should be encouraged to listen and move on (not linger)
- A range of options should be provided based around the same design principles to cater for varying needs of galleries (incl. freestanding and in-display as well as handset-only and handset-with-video)
- The design of the display and gallery infrastructure should address audio and handset requirements upfront (including operation and maintenance)
- A unit should be clearly associated with the object to which it refers
- 100% accessibility should be maintained and take account of both able and disabled users of all ages
- Seated implementations should be avoided
- Shared control of more than one handset should be avoided
- Design should support typical 'standing' scenarios and single/individual use

- Enough distance should be provided between any two handsets relating to the same object, to encourage individual use of both at the same time
- Interface should be instantly recognisable and not need any instruction
- Operation (pick up, start, end, replace) should be simple and straightforward
- User controls should be kept to an absolute minimum
- Audio should stop when handset is replaced
- Operation should not distract users from the object being viewed
- Volume should be adjustable
- Handset should be securely mounted when not in use
- Design should prevent the handset from hitting the floor
- User operation of the unit should not be noisy
- Operation (including bringing handset up to ear, holding it in place and replacing handset) should not put any physical strain on the user
- Speakers should not bleed and should direct the sound accordingly
- Handset (incl. speaker) should be comfortable to hold
- Any form of cabling or tether should be of an appropriate length to cater for the range of physical characteristics of both able and disabled users of all ages
- Handset should be tethered in some way to prevent theft, vandalism and accidental damage
- Sound should be of a good quality

- Content should be restricted to a single, short presentation per audio point and multiple choices should be avoided
- Maximum reliability and longevity of parts should be guaranteed
- Number of industry standard parts used should be increased
- The whole unit should be durable and able to withstand degree of mis-use
- The handset should feel comfortable to hold and operate, both in the hand and against the ear
- Design and material used should be easy to maintain and clean
- Material used on the handset should be protective and not feel cold to the touch
- Cables should be prevented from twisting
- Parts should be contained and constructed in a single, local, accessible space to support maintenance and repair
- Other ambient sound / sound booth alternatives should be avoided

5. Next steps

Continued observation and research with visitors would enable the issues and recommendations described to be qualified further. In addition, whilst this document reflects the individual views of the author and those interviewed, further discussion would help to verify the criteria defined and their feasibility.