

Sound advice

Sarah Angliss, Issue 31, p32-35, Autumn 2005

Don't let poor acoustics and dull soundtracks sell your gallery short. Sound designer Sarah Angliss shows how to make the most of sound in any gallery

If you want to know why sound design matters, let me tell you about a display in a small museum in Denmark. The museum is enchanting: a mini wildlife centre exploring the flora and fauna of the wetlands of Northern Europe. In the middle of it you can feast your eyes on a display that is big and blue. Its theme is crystal clear: the titles *The Polluted Lake* and *The Clean Lake* are emblazoned across two tall graphic panels. But anyone who encounters this display may be forgiven for thinking it is about the oddities of human sound perception, not the habitats of water mammals.

Each graphic panel has a narration, activated by a button, which obligingly tells you about the ecosystem in each habitat. The narrations are replayed by speakers mounted above each panel. I pressed a button to listen to the story of the polluted lake but, a few seconds later, a fellow visitor opted to call up the narrator who talks about the clean lake. The result was shared frustration as we both tried to listen to a curious, combative stereo.

To make matters worse, I could not see a way to turn off my soundtrack as a courtesy to my fellow visitor. So we both sidled away from the big blue exhibit, bewildered and mildly embarrassed, as the narrators' voices continued to reverberate through the gallery, polluting the rest of the space.

The story of the big blue exhibit is all too common in museums, as sound can be neglected in even the most well-appointed galleries. Fortunately, a big budget is not a prerequisite for good museum audio. There are, of course, some new solutions to age-old problems that come with a high price-tag. The hypersonic sound (HSS) speaker, for example, costs around £700 and can make enough sound to flood just one listening post. This luxury item is pushing the limits of creative sound design in the new Churchill Museum in London (see box below).

But if you employ a little common sense and thoughtful acoustic planning from the outset of your project, you do not have to rely on such high-tech offerings (see box below).

Acoustic attention

At the very least, creating good audio displays means getting the acoustics of your gallery right. As well as considering sound insulation - preventing too much sound travelling from one gallery to another - there is the issue of sound absorption. Hard concrete surfaces will enable sound to bounce around the room so much that you will end up with the acoustics of the local swimming baths. Visitors will find it hard to talk intelligibly to each other, let alone appreciate the sonic delights on offer in your gallery.

You can tackle excessive reverberance by lining the surfaces of your gallery with absorbent materials. While specialist acoustic materials may offer the best performance, a lot can be achieved through judicious use of soft furnishings, heavy wall coverings (backed by mineral wool) and carpeting.

The key is to cover as much of the available surface area as possible with absorbent material. It is now possible to buy panel absorbers that are transparent, so you can refine the acoustics of

your gallery without disrupting important sightlines.

You can have too much of a good thing. An acoustically dead gallery (one with very little reverberance) can be as uncomfortable as one that is too echoey. And much of the charm of a big museum comes from its moderately reverberant acoustic: the memorable sound of footsteps on marble.

Optimising acoustics is an art and a science, so if you are planning a new gallery, it is a good idea to call the experts: an acoustic consultant who has worked with galleries or big buildings before. In the UK, the Institute of Acoustics will be able to help (www.ioa.org.uk).

Trevor Cox, professor of audio engineering at the University of Salford, has often been called on to give remedial advice to museums. 'People start off with good plans,' he says, 'but when the money gets squeezed, the acoustic budget gets dropped.' But remedial action is very expensive - far more costly than getting the acoustics right in the first place.

'If you've ended up with a reverberant acoustic bunker, it's going to cost a lot to put that right,' warns Cox.

When we consider the way most gallery projects are planned, putting sound design at the forefront may require a certain degree of cultural shift. Invariably, new galleries are planned on paper and so decisions are made on the basis of words and pictures. The designers present the project team with a compelling visual impression of the way a new gallery might look - a sketch or computer-aided drawing populated with enthusiastic visitors. Problems like those in the big blue exhibit in the wetlands museum arise when everyone becomes committed to a design that cannot be realised acoustically.

Problems can be avoided if good acoustic principles are incorporated at the earliest stage of a design. Acousticians will help you deal with the technical side of an audio project. Some also class themselves as sound designers: people who can advise on content in collaboration with the curators. A sound designer should have all the necessary skills to create artful sounds, with the appropriate content and character, as well as providing advice on deploying them in your space.

Just as a skilful graphic designer can unify space visually, enabling visitors to navigate it easily and absorb text-based and graphic information, a good sound designer can give a venue sonic coherence and auditory intelligibility. Sound designers are not only interested in adding the push-buttons and other gadgets that enable you to access particular sounds.

They also exploit any sound's ability to permeate a space, imagining how it will mix with sounds from other exhibits and with the voices and footsteps of visitors. Arguably, the mix of sound at any point in a museum can have as much impact as the graphic information.

Up close and personal

The received wisdom is that you need to use audio guides or headphones if you want people to experience sound that is up close and personal. But these can create a rather isolated museum experience. Mounting the speakers very close to visitors' ear height can enable people to hear broadcast sounds focused clearly without resorting to headphones, as volumes can be kept moderately low. Acoustic hoods (or hemispheres) can help by focusing sound. It is worth experimenting with sizes and positions that achieve the best effect. 'Sound bugs' attached to glass can also be used at low volume to give localised sound on a modest budget.

To cut down on ambient noise, these can be activated by proximity detectors. Sound designer Luc Martinez has used sound bugs successfully in many installations including, for example, at the Musée de la Musique in Paris.

Spoken words

It is worth remembering that the spoken word is different to the written word. Just as curators have learned to avoid the phenomenon of the book on the wall, maybe it is time to reconsider sound as more than a talking label. Good sound designers can work with the limitations of sound, mixing appropriate foreground sounds, such as vocals, with background sounds, such as music or sounds from nature.

They can capitalise on sound spill, using the mix of sounds that inevitably result in a gallery to create an appropriate, evocative sonic environment.

If you are interested in interactive sound, there is scope to take that interactivity far beyond a simple push-button. Interactive sound can respond dynamically to the actions of the visitors. At the recent Ecoute exhibition at the Centre Pompidou in Paris, for example, visitors were able to interact with light-sensitive sound sculptures to magical effect.

Computers are becoming reliable enough to be deployed in exhibits, making new forms of interactivity feasible. And the old days of recorded tape and CDs are now long gone. Solid-state recorders can replay sounds reliably for many years, as they have no moving parts. If you are working on a tight budget, a portable mp3 player can give you solid-state sound in your gallery.

Traditionally, sound has been regarded as a problem in museums - something that needs to be played through earphones or shut away in booths where it will not disturb the rest of the gallery. Increasingly, though, design teams are realising that sound spill can be a good thing when used thoughtfully.

Sound can add immensely to a museum experience when it diffuses through a gallery - but skill is needed to engineer the acoustics and create the right sonic mix.

Anyone who wants to make a more engaging and evocative museum experience will find it is worth spending time to consider sound design. These days it is rare to find a major gallery project without a lighting designer involved. If, in the future, museums learn to think the same way about sound, displays such as the big blue exhibit may become problems of the past.

Sarah Angliss is an acoustic engineer and sonic artist (www.spacedog.biz)

Improving acoustics

- location is everything. Place noisy exhibits as far as you can from noise-sensitive ones - in a separate room if possible. In an open-plan space, use quieter exhibits as buffer zones

- deal with noise at its source whenever possible. If your visitors are dropping boulders into a metal skip, line it with rubber, for example

- place loudspeakers close to the visitors' ear level and you will get audio that seems loud and intelligible even when played at low volume

- add a PIR (passive infra-red) detector with a ten-minute timer relay to a noisy exhibit. Coupled to a relay, the PIR detector is a cheap way to cut down on ambient sound. It allows you to trigger the exhibit's audio only when someone moves towards it

- consider how sound travels through floors, walls, doors and other paths that connect separate spaces. Sound travels most readily through air paths, so it will travel through the ventilation system

- cover floors, walls, ceilings, furniture, exhibit housings and other surfaces with acoustically-absorbent material. These materials cut down on the sound that bounces off the surfaces and reverberates around the space. Mineral wool makes a cheap, excellent sound absorber.

How sound takes centre stage at the Churchill Museum

The Churchill Museum is deep under the streets of Westminster, in an annex to the Cabinet War Rooms, the government's wartime bunker. Wandering through the War Rooms, you can almost sense the intense conversation, ringing of telephones and clatter of typewriters that must have filled these corridors of power, now eerily quiet. But today's visitors are reduced to near silence by the audio guides that provide what are in fact talking labels.

By contrast, the new Churchill Museum is flooded with many layers of evocative sounds: wartime sirens, music, and excerpts from Churchill's most famous speeches. The sonic layers are dense and the overall effect is compelling, creating a sonic tapestry rather than an expositional audio track.

Combining sound effects with archive recordings can sometimes be frustrating for visitors, as it can be difficult to hear the original material. But that is where the Churchill Museum has pulled off an interesting trick. Electrosonic, the sound design company, has used a new hypersonic sound (HSS) loudspeaker, made by ATC, that beams recordings into an audio spotlight around the visitor.

HSS speakers use interference between two ultrasonic beams to create its sonic 'spotlight' effect.

Electrosonic placed an HSS speaker over each point in the gallery where it wanted visitors to hear a spotlight of sound. There are a lot of loudspeakers in the museum, which are close together and all playing commentaries at the same time. The designers had to set the right volume in each spotlight while avoiding too much spill, in order to make each soundtrack intelligible.

To my ears the results were pretty impressive. I visited with a mild hearing impairment but I could hear the words in the commentaries above all the din. Considering that 65 per cent of the population has less than perfect hearing, it would be better to increase the volume or place the speakers nearer the visitors' heads.

I suspect that visual design considerations won over the acoustics - the speakers were neatly tucked away in the ceiling of the gallery. I would also have preferred an activation switch that did not restart the commentary every time I wobbled a little on the spot marked on the floor.

Despite these minor reservations, the Churchill Museum shows the potential of this new system. It is bold attempt to put broadcast sound centre stage.