SEVEN REASONS AUDIO WILL SAVE MOBILE USER INTERFACE DESIGN

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As the mobile user base continues to grow, so do the expectations of mobile users for interactions that match their desktop counterparts. To meet the increasing demands of these users, GUI designers continue to push the limits of mobile display while hardware manufacturers continue to expand the size of their devices' screens. As hardware manufacturers reach the limits of what constitutes a mobile device, interaction designers need to start thinking outside the screen by exploring alternative sensory pathways.

Anyone who has experienced the intrusion of music or sound effects on a website understands the drawbacks of audio interface objects. From a user's perspective, sounds in websites and applications are an unexpected and unwelcomed intrusion that, in most cases, offer no additional information or value. For most UX designers, the emotional impact of audio makes the risk of turning away customers too high to justify wading into the highly complex and technical domain of audio design. Many have simply accepted the old adage 'silence is golden' and abandoned audio altogether.

This paper will present seven audio design recommendations that target the limitations of mobile GUI's. These recommendations will highlight the suitability of audio features on the mobile platform and illustrate how when the same user-centered design process traditionally applied to visual elements is applied to audio elements, the result is rich, immersive mobile experiences that can save your next mobile interface design.

SOUND WORKS BETTER ON MOBILE HARDWARE

In the early days of the internet, limitations in hardware made it impossible to depend on audio to deliver critical information. Many users' workstations did not have the capability to output high quality audio or the bandwidth required to download the content quickly enough to make it useful. Even today, audio hardware setups vary widely between web browsing platforms. This makes mastering audio levels to fit the context of the user's browsing experience a significant barrier.

Mastering is a processing technique applied to recorded audio material. It ensures the recording will be correctly reproduced when played on different sound systems, matching the volume of other media usually played on that hardware.

With mobile applications and websites, developers already know the hardware required for high quality audio output and input is available. They can also test their sounds on the exact hardware setups on which their user will experience them. This allows the audio content to be mastered to match the platform it will be experienced on and optimized to match the hardware. Perhaps even more importantly, testing provides insight into how loud an audio feature will sound on a device, which can mitigate the chance of disrupting a user's environment.

Audio UX Design Recommendation 1:

Ensure testing and mastering of sounds so they match the hardware on which your user will experience them.

SOUND CAN OVERCOME THE MOBILE CONTEXT

Even in desktop situations, predicting the context in which users will experience a website or application is extremely difficult. This can have a considerable impact on users' appraisals of the intrusiveness of audio content. If your user is in a public space when viewing your site and it starts reading the content of the page aloud without their initiation, the user will experience this as an intrusion and potentially a violation of their privacy. On the other hand, if users come to a text heavy page and have the option of clicking to have the text read aloud to them, they will have the opportunity to prepare by putting on headphones or adjusting their volume level. In this case, the audio feature will increase the likelihood of a user consuming the content on the page and avoid the possibility of them navigating away from the page due to the amount of text. Audio functionality works best as an on-demand feature that is initiated by users. Ideally, GUI features will sell users on the potential benefits of enabling audio without automatically playing them. This will give users the opportunity to experience audio features when they work for them and avoid annoying them when they do not. If users label the audio from your application as intrusive, they will immediately disable it and potentially stop using your product all together, resulting in a lost user or customer.

Ensuring audio is on-demand is even more important in a mobile context as the user's environment can be even more diverse than with desktop computers. Fortunately, most users are accustomed to managing the audio setting on their mobile device to suit their environment. Hands free systems, which are included with most mobile devices, help avoid many of these contextual issues by allowing a private listening environment. Stereo headphones or ear buds also give users access to rich spatial information.

Even in on-demand scenarios, allowing easily accessible and visible mute and volume controls is critical. It is important to remember to set default volume levels low and let users turn up the volume to match their environment and hardware setup. This will help avoid inappropriately loud audio features.

As distracted driving and walking laws continue to crack down on mobile phone multitasking, users will increase their reliance on audio interactions with their device. Many mobile devices commonly used while driving, including GPS navigation units, already rely heavily on audio feedback to communicate with their users. By providing interaction methods that are hands- and eyes-free, you increase the availability of your system and allow your users the opportunity to interact with your system in the situations that matter to them.

Audio UX Design Recommendation 2:

Always present audio features on an on-demand basis with easy access to volume and mute controls.

SOUND TELLS YOU IT IS WORKING

As digital tools replace many of the mechanical devices people use on a regular basis, natural audio feedback is becoming a thing of the past. The ticking of clocks, clicking of typewriters and the rumble of internal combustion engines are all being phased out in favour of newer, quieter technology. Even the reassuring hum of the computer fan and clicking of a physical keyboard are not present in touch-based mobile devices. Although these sounds can annoy users, they can also be reassuring and let them know their device is working properly. Moving forward, these sounds can be replaced with features that are intentionally designed and can be disabled when users need silent functionality.

Applying metaphors that simulate real world sounds can add depth and user feedback to interactions. This concept has clearly been applied in the development of the sounds for the iPhone and iPad. Both the satisfying click of a lock being opened when the device is unlocked and the ticking sound when letters are typed on the virtual keyboard are excellent examples of metaphors being applied to UX sound design. These features augment the user experience and add depth to the interaction. By incorporating sounds that mimic digital products' analog predecessors, users get useful feedback that their device is working properly while the immersion of the interaction is enhanced. When done correctly, users should barely even notice the sounds at all.

When applying audio metaphors, it is important to remember that real sound feedback is never exactly the same every time. Each time you press a key on a keyboard, the volume and tone differ slightly depending on how the key is pressed. When sound effects in UX design do not vary in this way, they can become very annoying. In music production, sound engineers incorporate subtle changes in timing and texture to repetitive computer generated sounds, like drums. This method, called humanizing, simulates reality where each time a drummer hits a drum; the volume and tone differs slightly. If this is not done, the drums will sound mechanical and grating. This same practise can be applied in audio interface design. Replacing a single sound with a cache of subtly different sounds that are rotated can avoid wearing out peoples' ears, while still maintaining continuity. Although the rotation can be random, the slightly varying sounds can also represent the subtle differences in the presses, with longer contact or larger contact points resulting in louder, more intense sounds. This will further deepen the realism and immersion of the user experience.

Humanizing is a type of processing that incorporates subtle changes in the timing, velocity (volume) and pitch of computer sequenced music. This technique is applied by sound engineers to make computer sequenced music sound more natural and less robotic.

Audio UX Design Recommendation 3:

Applying sound metaphors can enhance the depth of the user experience while giving useful feedback.

SOUND HAS EMOTIONAL IMPACT

Human hearing is an extremely well tuned sensory tool that is closely linked to emotions. Our hearing allows us to determine the location of a sound, recognize individuals' voices, and pick up on subtle emotional cues in speech patterns. You only need to listen to a sad song to understand the impact sounds can have on our emotional state. Unlike our eyes, we cannot easily close our ears. If a sound is adverse, people will hear it whether they choose to or not. As human perception of sound is directly linked to emotion, choosing sounds that are pleasant to the ear can be critical in instilling the perception of quality of a product. Ensure your audio features are designed by professional audio designers who understand the emotional impact of the sounds they are building.

Unfortunately, people lacking expertise in sound design have been responsible for developing many of the audio interface features we are accustomed to hearing. Without proper mastering and sound selection, sounds can become grating and overwhelming. If you have ever experienced overbearing music paired with inaudible dialogue while watching a movie, you understand the negative impact of poorly balanced sound levels. Proper mastering of audio features in your interface will ensure a consistent listening experience.

Audio UX Design Recommendation 4:

When designing audio UX features, be cognisant of the dramatic impact they can have on the emotional state of your user and utilize this impact to instil the perception of quality and feelings of well being in your users.

SOUND CAN DEFINE YOUR BRAND

When choosing audio for a user interface, designers should make their selections the same way a visual designer would select a colour pallet. If sounds are selected from a large stock of sound effects and have no continuous theme, users will perceive them as out of place. By selecting sounds that complement each other and the GUI elements, designers can create lush soundscapes that can contribute to the brand identity of the product.

Sound Branding, the art of developing brand identity through the use of sounds and music, is an important way to make your products stand out. By hearing sounds that follow a similar theme or incorporate similar musical features, users will come to associate those sounds with your products. By conditioning an association between a sound and a positive event (for example receiving an email), you consequently establish an association between your brand and that emotion.

This concept is best illustrated by the start up sounds of operating systems (for example Windows and Mac start up sounds) and message indicators (for example the ringtone for Skype). These examples apply spatial depth by using digital reverb and apply musical features to help reinforce their brand and instill the perception of quality. They also serve a functional purpose by telling users their computer is done booting or that they are receiving a call. Fortunately, the development of digital audio editing software has made the production of premium, immersive soundscapes faster and cheaper than ever.

Audio UX Design Recommendation 5:

Generating a theme that ties sound features together can help establish brand identity and develop positive emotional associations with your product.

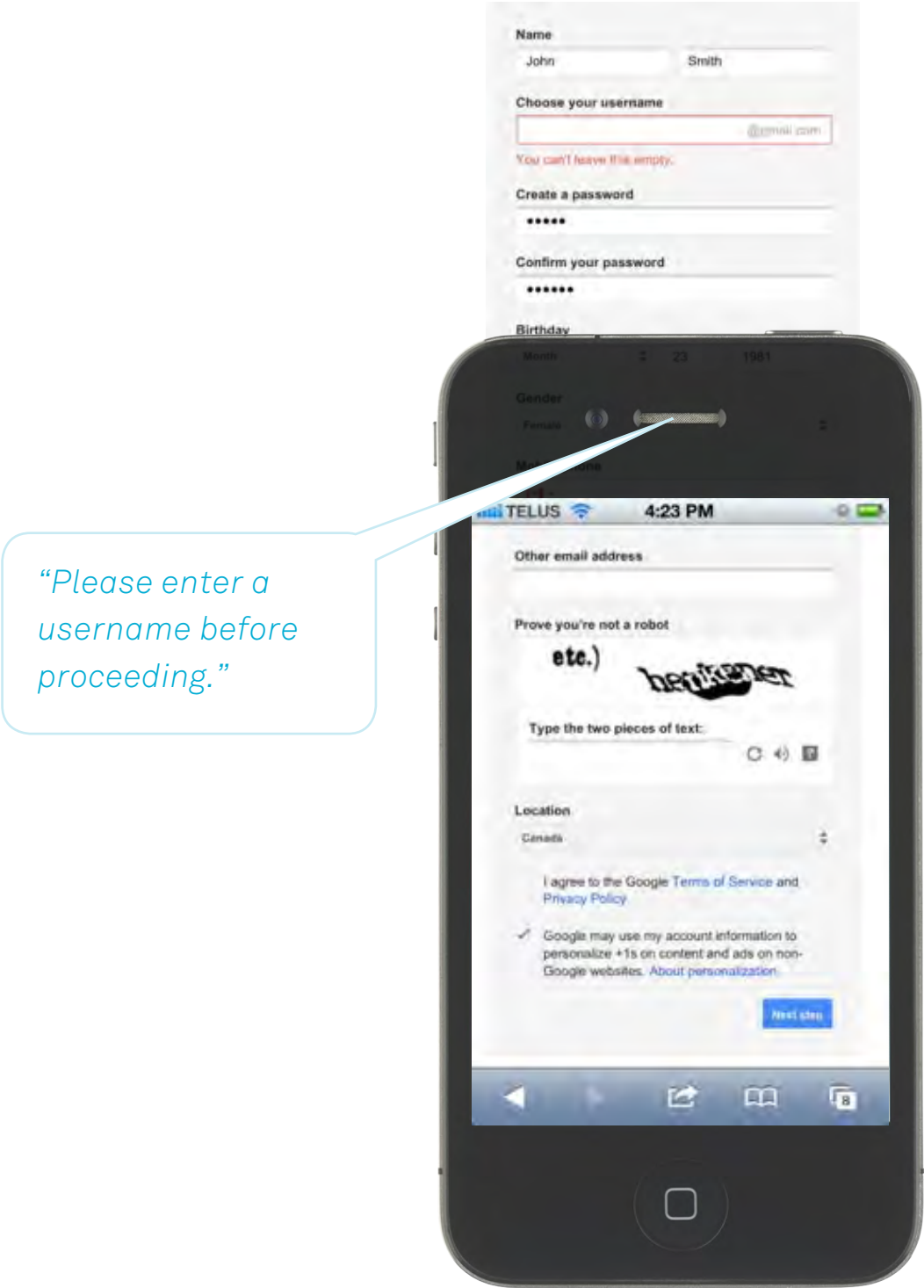## SOUND CAN EXPAND MOBILE REAL ESTATE

Condensing all the content from a desktop GUI into screen context leads to huge challenges in allotting screen space. Utilizing audio content can effectually expand the boundaries of the mobile screen. This can provide users with information about navigation, content and provide alerts without occupying any valuable screen space.

When designing sound features that augment GUIs it is important to balance redundancy and criticality. Including a "beep" every time a user selects a button will only annoy them without providing any added information. Conversely, delivering critical information through audio alone could result in users who have audio disabled missing that information. Instead, audio features should be used to enhance and deepen information that is already represented visually or highlight information that is present but not within the currently displayed visual field. If we use the example of a web form, playing an alert sound when a user tries to submit a form that is missing a required field will not provide any additional information and risks increasing user frustration. Playing a sound that says the name of the required field the user failed to complete, on the other hand, will help users quickly navigate to the required field, even if it is not in the user's display area (see Figure 1). This can greatly increase the efficiency of the process and avoid user confusion and frustration.

Audio UX Design Recommendation 6:

To overcome the challenges of mobile screen real estate, designers must balance the redundancy and criticality of sound features and deliver information that is unavailable on screen.

Figure 1:

"Please enter a username before proceeding."

SOUND MAKES IT EASY

As devices become smaller, presenting dense text material becomes more difficult. Text-to-speech readers offer a solution and some mobile devices and websites are starting to incorporate these solutions. Although the quality of these systems has improved considerably, the speech still does not sound natural and can be grating or difficult to understand in prolonged listening applications. When possible, using a recording of an actual person reading the text can increase user comprehension and the quality of the user experience, offering a competitive edge to your product. Providing easily accessible controls and highlighting the text that is currently being read will help users consume the information and review text they may have missed.

As an added bonus, text-to-speech solutions enhance accessibility for users with any sort of visual disability or limited literacy. With an aging user-base and an increasing number of mobile device users in developing countries, this accounts for a growing number of users. Providing superior solutions to meet these user groups' needs is a great way to make your product stand out.

Audio UX Design Recommendation 7:

Providing text-to-speech is a great way to enhance the usability and accessibility of your product. Using a recording of a real person reading the text and having text highlighted will enhance the usefulness of these solutions and increase the quality of the interaction.

LOOKING AHEAD

When screen space is completely unavailable, strictly audio-based interfaces have been applied. This type of application has been proven in telephone-based systems like those used in customer service and support lines. As customers' desire for smaller mobile devices continues to grow, more of these devices will need to rely on sounds to provide user feedback (the new iPod Nano for example). The release of Apple's Siri, a two-way natural language interaction tool, shows how two-way audio interaction could be used to augment GUIs on mobile devices. Although this is not the first attempt to implement this technology on a mobile device, the freedom of input and casual discourse captured the public's attention.

Exclusively audio-based interfaces are not appropriate for most situations; however, they demonstrate the value of further development of this technology. As with multi-touch, the mobile platform is becoming the most effective route to introduce new interaction methods. Once the value of audio interface features has been proven on mobile devices, users will come to expect a similar interaction from desktop applications.

The marginalized role of audio in mobile interface design is only exceeded by the current utilization of tactile feedback. The vibration functionality of most mobile devices is analogous to using a single beep in an audio interface. For a detailed exploration of strategies for applying tactile feedback in your interface design, check out our whitepaper on tactile UX design for mobile.

THE 7 REASONS

Sound Works Better on Mobile Hardware

Ensure testing and mastering of sounds so they match the device on which your user will experience them.

Sound Can Overcome the Mobile Context

Always present audio features on an on-demand basis with easy access to volume and mute controls.

Sound Tells You it is Working

Applying sound metaphors can enhance the depth of the user experience while giving useful feedback.

Sound has Emotional Impact

When designing audio UX features, be cognisant of the dramatic impact they can have on the emotional state of your user and utilize this impact to instil the perception of quality and feelings of well being in your users.

Sound Can Define Your Brand

Generating a theme that ties sound features together can help establish brand identity and develop positive emotional associations with your product.

Sound Can Expand Mobile Real Estate

To overcome the challenges of mobile screen real estate, designers must balance the redundancy and criticality of sound features and deliver information that is unavailable on screen.

Sound Makes it Easy

Providing text-to-speech is a great way to enhance the usability and accessibility of your product. Using a recording of a real person reading the text and having text highlighted will enhance the usefulness of these solutions and increase the ease of the interaction.

ABOUT AKENDI

Akendi is a human experience design firm, leveraging equal parts user experience research and creative design excellence. We are passionate about the creation of intentional experiences, whether those involve digital products, physical products, mobile, web or bricks-and-mortar interactions.

We provide strategic insights and analysis about customer and user behaviour, combine this knowledge with inspired design, and architect the user experience to meet organization goals. The result is intentional products and services that enable organizations to improve effectiveness, engage users and provide remarkable customer experiences.

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