Rethinking Audio Products: Designing Sound Experiences

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Abstract

Audio products as expressive and communicative tools have helped bridge the boundaries of understanding between humans and sound for centuries. These products are among the most important intermediaries for this relationship, merging users' personal and private space. From a combined systemic, strategic, and user-centered approach, this paper investigates the major issues involved with designing audio products. Initial findings are discussed and the process of on-going research is presented.

1. Introduction

The ability humans possess to produce and hear sound is a fundamental tool for sensing and displaying emotions. Voice lets us convey culture and social values within communities. Languages serve to differentiate between these many cultures, while showing a common bond through systems of communication.

Within language and culture there is still a more expressive communication type. Music is a culture-crossing art form, enabling feelings to be put across even a global stage in varying pitch, tone and tempo. Through countless genres, music can express the passions of composers, often stirring varying emotions from its listeners.

As music and culture has progressed through historical movements, so too have audio products developed to continually intermediate the close relation of people and their sound. As a concept, personal audio products have helped users to reclaim private space in the public realm, gifting not only physical, but also cognitive control of individual sound and thought.

Today's consumer generations are extremely comfortable choosing, editing, caring and multitasking with their sound. Social and demographic composition

has escalated to a globally networked scale, consequently enabling a high level of technology to be justified in modern audio products. The main risk in designing such products is to include functions not because the user needs, but because technology allows.

Fundamentally, sound can be described as a mechanical wave, which results from the longitudinal motion of particles in a certain medium (most often air) through which the sound wave is moving. From the moment a sound is heard, the human ear acts as a transducer, converting sound energy into a nerve impulse that is transmitted to the brain.

When people listen to sound through devices such as headphones or speakers, several significant processes occur subconsciously. As we hear, the intensity, orientation and distortion is translated to determine just how real the experience is that you are having. The scientific term for this ability to hear a sound and locate it in space is called 'psycho-acoustic localization'; using both ears to evaluate and compare sounds the brain is able to tell where a sound is coming from. This phenomenon is also determined by the angle of the head, and even wave reflection off the shoulders and torso. [1]

Despite some limitations of products to provide 'simulated live performance' audio, we are progressing toward more realistic solutions for sound reproduction. Quality of acoustic experience must hold precedent over any aesthetics or added features, preserving the fundamental human-sound relationship for future audio products.

This research is oriented to explore these issues and to map opportunities for innovation in the audio product market.

This market, as it exists today, lies steeped in complexity in even the smallest, seemingly unrelated areas. Influential forces of technology, social and cultural trends and the market must be broken down in context with the human-sound relationship. Investigation of these forces provides a window into

users and their context. A new methodology for continual innovation and redesign of products in this arena is urgently needed to cope with constantly changing global trends. This need applies not only to designers, but also more critically toward businesses within the market that have yet to integrate a central strategic design plan. Drawing away from traditional approaches of technology, market or designer focus, user-centered design must take a more prominent role in identifying directions for future audio products.

The approach for this research has been assembled from strategic, systemic, and user-centered methodologies. Innovative success in business comes from complete differentiation, delivering a unique mix of value to customers and users. Instead of a linear process to create this competitive distinction, a system of tools and activities has been chosen to form an explorative method. Based on the process model initially suggested by Charles Owen at the IIT's Institute of Design, this approach will support a co-evolution process between problem and its solution, with activities classified into iterative stages of research, analysis and synthesis [2].

Initial findings are based upon psychological profiles of audio product users. A previous ethnographic study published by Michael Bull in 2001 provided early user insights [3]. Behaviour analysis of this study has drawn several important findings. Perception of material cultures, socio-cultural differentiation and other impacts by the audio product market on users is also discussed.

2. Forces of Influence on Audio Products

For insights gained from users to be properly converted from observations into viable business opportunities, knowledge must first be gathered from the user environment. Contextual information compiled from the market in its current state can help remove the need to explore redundant areas of audio product development. Establishing profiles of user generations and how these people have influenced and reacted to today's market is also crucial. Patterns of behaviour and demographic trends can give useful insights into the needs of future populations. The most dynamic of forces is from the recent advances in technology.

2.1 Technology

A central driving force in the audio product market is the continual presence of new technologies. Overuse

of technology as a strategy to sell supersedes consideration for basic user needs. Designers must become responsible for constant revision of the relationship between users and their audio products.

Audio products now have cross-platform ability, performing any number of additional tasks; scheduler, clock, file storage, cellular phone, camera and so on. Widely available 'Wi-Fi' (Wireless Fidelity) technology is approaching faster. Consumer electronics connect via a wireless 'hub', integrating products in any location; home, office or through mobile capabilities. Companies such as Microsoft, Hewlett Packard and Apple are developing devices for the home, and even motor vehicles, that allow many products to seamlessly talk to one-another. A number of automakers are already producing cars with iPod adapters controlled by buttons on their steering wheels.

Intuitive systems of interface are changing the face of audio products. There is however a problem that these new navigation concepts will have to overcome. Traditional interface metaphors have been so long established that new concepts for intuitive navigation are few and mostly undeveloped. Apple iPod, with their click-wheel innovation, could be only the beginning. Browsing your own music can be an enjoyable passtime if doing it is easy. More perceptive tools for understanding levels of navigation are needed. Enabling both wide and detailed views of products capabilities can limit confusion. Complexity must be kept to a minimum with users in mind.

The audio products of today and the media for these products continue to vanish into their environments of most use. Recording sales continue to decline annually as more music is purchased online. Remote technology and pre-programmed functions reduces physical product interaction. Voice recognition development is slowly crossing over to audio products; for more personalized user commands and one-step interaction.

The audio product user is set to have endless choice for service, functionality and style. Knowing the ideal combination of these benefits for users is crucial.

2.1 Social and Cultural Trends

The world we live seems smaller because of modern communication possibilities; what was dreamed five years ago is now commonplace. Users exchange voice, data and image across cities and continents effortlessly. Many cultures and human values have progressed from traditional channels to co-exist in a complex global network. A universal material culture is now recognized in consumer electronics,

where having access to communication networks through audio products is highly valued. The lifestyle of the audio product user is one of action and multitasking; staying connected and available keeps this user at ease with their environment [4]. Workplaces in particular are reflecting this lifestyle. Leisure and recreation now bear similar importance as a user's occupation. With generation Y set to replenish the workplace from the retiring boomers and aging generation Xers, values in this area are already changing. Flatter hierarchies in business structure reflect the significance of constructive communication at work, pointing in part to the social stability that audio products provide for users. An intimate relationship with sound holds pleasure in both contexts; professional and recreational.

Preparation for the newer technically savvy generation Y (born after 1980) will be needed if the purchasing power these people will hold is to be utilized. This generation is embracing technologies that allow unprecedented consumer choice. To provide this type of choice in the audio product market is to align with the needs of a generally demanding, brand sensitive, self-satisfying generation. Software functions, on-line ordering, accessories and user-defined playlists provide differentiation; customized benefits for customized demands.

2.2 The Market

Upscale design is the current solution for simplifying technology to an understandable level for the user. Retail channels are flooded with new concepts, popular through their innovative and simple interface technology. One resulting problem is that emulation as a competitive strategy is crowding the marketplace, further confusing consumers on which product will perform best for them. Choice is good to have, but too much choice can bewilder even the technically literate buyer. Price rises in standard audio products such as cellular phones and MP3 players signal the advent of higher technology driving this market more than basic cost reduction. Users are assimilating this complex technology willingly on the premise of accepting the basic concept of a product. Understanding brings confidence and trust in capabilities; audio product retailers have become the educators [5].

The product itself is not the end to the process of truly innovative audio design. Connection is not only to a design philosophy held by companies and shown through their products, but a product lifetime service provider. Warranties, software updates, repair

assistance and product tips are valued as part in parcel with what is 'in the box'. Even recycling of product parts has become a concern of companies and users alike; accepting responsibility for the continuance of an environmentally friendly market.

3. Designing Sound Experiences

The people concerned in this relationship have been split into generations; mature, boomers, X and Y. Boomers represent births from 1946 to 1965, and well known for encouraging innovation, humanizing the workplace, individuality and confidence in prosperity. Generation X, although very entrepreneurial, are labeled as slackers and cynics. Born from 1966 and 1977 they have strong belief in equality and idealism.

Probably the most influential group for the audio product market is those born between 1978 and 1995. Generation Y characterize a global perspective and desire for automation in every aspect of the environment. Products have in past demonstrated their worth by aligning with driving behaviors of these generations.

'Sound' has been separated into physical and cognitive aspects. Wave physics deals with mechanical properties of sound; knowing how products reproduce sound and in turn impact our bodies. Communication by users with products or other users needs to be comprehended; how people acquire and use knowledge, deal with barriers of interaction and so on.

'Audio products' and 'designers' are displayed for simplicity outside the context of the market in the concept map (Figure 1). In the approach to information gathering, products are best viewed from a developed view of how they fit into 'market' sections of suppliers, competition (opponents) and complementors (allies).

The design processes are structured only to understand how a user-centered approach is superlative in comparison to technology, market and designer centered methods.

From within the market, innovation is the competitive position that best supports this new hybrid form of approach. Systemic differentiation discourages emulators, with platform extension of new opportunities able to be held by the business holding intellectual property; a further advantage.

3.1 Methods: Gather, Assimilate, Propose

The approach for a conjectural/evaluative process model is utilized in this research. Developed by

Charles Owen, it includes three phases; research, analysis, and synthesis.

This will be combined with a strategic design process developed by Charles Bezerra [6]. Strategic design is utilized in the planning phase of the design process; methods and techniques developed to bridge the gap between need and offer.

Systemic design principles oversee the entire methodology, dealing with the complexity and interconnected, dynamic agents within audio product design. This will help in decomposing the complexity of the market, allowing broad and detailed perspectives of this design system.

Human-centered design features in the first phase of this methodology, with user observations from within the environment conducted after the environment is understood. Knowing the users context, routines and behaviors is crucial. Video/photo ethnography, studies of the material culture surrounding observed users, and inventories of personal spaces are the main tools here.

The research phase aims to gather information from audio product technology, the market and social/cultural trends. Innovative design begins here, with an 'active sensing mode' used to generate initial innovation intent [7]. Analysis of this data is conducted with the information being assimilated into knowledge. Profiles of audio product users are assembled and clustered according to derived needs established from ethnographic studies. Activity networks for these clusters are then established; how the user operates in differing locations every day.

SWOT analysis is drawn from the market, along with audio product benchmarking, technology and macro-trends forecasting. Designers must have comprehensive views of trends. Synthesis from this organized knowledge progresses from mapping actual opportunities for the market, defining possible strategies for new concepts, to full prototyping and planning of implementation with user-experience scenarios.

3.2 Processes and Goals

The strength in the combined approach process is that it can be adapted into any consumer market or business. It is one goal of this research to identify an innovative outcome for the audio product market, but a new process for design in business has evolved alongside this project also. Evaluative processes on the effectiveness of this approach will provide performance feedback and the possibility of further development.

Figure 1. Concept Map

This research in particular contains a user-centered element directed at a goal to understand the needs of audio product users. Passive engaging studies are the key to gathering insights to begin and motivate an entire design process. Practices and assumptions that users engage in with current products available help us to ascertain limitations, providing gaps and opportunities to innovate. The observer benefits from not engaging users directly, avoiding any personal bias during information gathering. Immersion in context helps the designer gain perception at an individual user level.

Although initial insights are derived from users, the final outcome of this research is aimed to benefit those business within the audio product market that regard innovation as a dominant competitive strategy. User-centered design within a business context identifies patterns of unmet needs and, based on strategic and systemic activities, determines principles and practices on which will increase the probability of bringing successful innovations.

Figure 2. Methodological framework

4. Opportunities

The process outlined in this paper is an effective approach to address today's main issues on audio products. Being such a vast system of influential forces, the approach shown (figure 2) allows comprehension through differing complex elements.

A steady move away from traditional and public

modes of entertainment has already begun. The new stage for communication and networking is the Internet; a vessel for product services, software and media downloads. The possibilities for extended access for users and business are a definite advantage to new audio product innovations.

Wireless 'hub' technology development is on the verge of larger user availability and practicality. The possibilities for 'Wi-Fi' capability are yet to be explored in the personal audio market.

Personal audio products offer more intimate interaction with sound. Users hold the power of disengagement, prioritizing their degree of social interaction. New products need to consider audio products as communication demarcators, for social and physical safety reasons especially.

The audio product market is moving upscale in price and quality of design. Higher technology requires further education provided to consumers. Retailers have to be brought into the design process as product educators.

Interface design can progress further toward a more intuitive structure, such as using simplistic 'one-button' navigation. As technology advances, the benchmark audio products demanded by younger generations will require a more systemic approach to operate in increasing complexity. The audio product market is currently crowded with emulated designs. Innovative concepts and processes will stand-alone in new markets if users needs are addressed exclusively.

5. Conclusion

This paper has discussed some issues related to the audio product market, and presented the methodological approach of an on-going research on the topic. The audio product market is extremely competitive, and therefore, very demanding for innovations. Innovative concepts involve novelty, feasibility and acceptance. A very difficult task for those responsible for design interventions.

This research is oriented to two goals: first, to develop a map of the opportunities for innovation in the audio product market, and second, to identify the elements of a planning methodology for designing audio products.

Audio product designers have a continual responsibility toward their users and consumers. It is important that the next progression of audio products remains focused on how people derive pleasure from their sound.

6. References

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