



Design Brief

Major Project Preparation

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Dominic Ley



Context

An estimated **11 million** people in the UK are deaf or hard of hearing, that's **1 in 6 adults**, making it the second most common disability in the country. **42%** of people over the age of 50 have some form of hearing loss, this increases with age, leading to to **71%** of those over 70 affected. Unassisted, hearing loss has a significant impact on older people leading to reduced quality of life, and loss of independence.[1]

The good news is auditory technology has progressed greatly in recent years, and advances in digital hearing aids has made it easier than ever to improve patients hearing. But not all of those affected with hearing loss take advantage of this technology or are even aware that it exists. A study led by University of Manchester researchers has revealed showed that approximately **20%** of adults currently do not use their hearing aids at all, **30%** use them some of the time and the remaining **50%** most of the time [2]

Why is this the case?

There is no sole reason for this lack of hearing aid use, instead there are many varying reasons that contribute to the disregard of this technology:

They aren't comfortable.

Hearing technology has advanced greatly even within the last 5 years, but many users still find models uncomfortable over large periods of time and require professionals to fit them.

Hearing aids don't meet sound expectations.

Often users need additional calibration on their hearing aids which requires professional help and careful tuning.

Background noise is too often too much.

Particularly in public settings, where many conversations are taking place.

Cleanliness.

Hearing aids can get dust and bacteria locked inside, particularly if the aids are only used occasionally and remain in storage most of the time.

Power Shortages.

The batteries are often too expensive and not easily replaced in many models, particularly for those who have limited dexterity.

Resistance to new technologies.

Elderly users have been reported to refuse technologies due to fear of getting it wrong or fear of being even more of a burden due to needing help with complex systems.

Forgotten Hearing Aids.

Users have reported forgetting to wear their hearing aids or falling out of the routine of wearing them because it's not convenient. Early onset hearing loss has strong links to dementia and wearing hearing aids daily has been shown to increase memory and cognitive ability for wearers.

[3][4]



Encouraging Daily Use

Sufferers of hearing loss have reported a decrease in social activity, contributing to the ever growing epidemic of loneliness that is prevalent in the elderly demographic of the UK. In general, those who are hard of hearing have a less active lifestyle compared to those who have good hearing of the same age, and in turn, this inactive lifestyle can lead to even more health problems later on in life. [5]

These issues can be reduced by encouraging the routine use of assistive auditory technology. With improved hearing ability, social interaction is increased, as well as improved memory levels and cognitive ability. All in all leading to a higher quality of life and lower stress levels.

In the same way that glasses are not for blind people, hearing aids are not for deaf people alone. The main aim of this project is to encourage day to day use of hearing aids but simultaneously, there is opportunity to take inspiration from and replicate the revolution that has been seen in the eyewear market into the earwear market. Its clear that development within the every growing auditory technology sector can help to reduce the stigma attached to wearing a hearing aid, ideally through the same intuitive design and normalisation seen with glasses.



The Task

Design a multifunctional bedside docking station and accompanying hearing aids, with automatic servicing to encourage habitual wearing and to reduce dismissal of the technology.

The dock itself must connect to AC mains electricity source, be a suitable size for a bedside table, and should charge the users hearing aid daily. It must have accessories and functions, each with a specific purpose to enhance user experience for the wearer and service the aid, promoting hearing aid usage **specifically for day to day use.**

Some additional accessories and functions may include but are not limited to the following:

- Directional microphone technology for intentional conversations in public.
- A Digital clock with vibrational alarm features.
- Bluetooth technology.
- Self-cleaning and self-charging systems.
- Detachable case for on the go use.
- An accompanying app to adjust settings and increase communication with audiologists.
- Self-calibrating technology for starting users – saving money and time for patients and audiologists.

Each of the chosen accessories should serve the function of addressing one or more reasons why users avoid wearing their hearing aids.

The wearable models must be Behind-the-Ear hearing aids and must contain Bluetooth technology, being fully functioning to improve hearing for early onset hearing loss. One reason for the lack of hearing aid use is limited aesthetics and form in existing products. The aesthetics and form of the wearable models should follow modern trends, taking inspiration from the eyewear market where necessary, avoiding any medical characteristics.

The accompanying case must charge the hearing aid pieces through conduction and should be designed to be housed and charged within the dock, keeping in mind the issues addressed previously. The case should be small enough to be taken on the go.

Continuity between the dock, case and aids is important, acting as a family of products. The collection should be beautiful and blend in with existing furniture, it should not draw attention as a medical unit but instead complement the surroundings, further normalising the disability and not leaving those labelled with loss of hearing feeling different.

All products should be simple and intuitive, enabling those who are resistant to or unable to use new technologies feeling like the unit is familiar and easy to use.



Details

2 million people in the UK currently own a hearing aid, and of those 20% use private hearing services. Because of this the initial production quantity will be **20,000 units**, aiming for 5% of the private market.

The expected price point depends greatly on the user, their choice of one or two hearing aids as well as advanced the functionality and technology is within the design. But considering existing products and the scope of technology involved, the expected price point will range somewhere between **£1,500 and £2,500**.

The docking station must connect to **AC mains supply** for UK households and charge the portable case.

The Hearing Aids must cater for early onset hearing loss and function accordingly for up to **30 hours**.

Earpieces must be a digital **BTE – Behind the Ear Model**.

The wearable parts should be designed so that they do not have any sharp edges and must be constructed from durable and **hypoallergenic materials**.

The design must conform to the following British Standards:

- **BS 2813:1981** Specification for dimensions of plugs for hearing aids [6]
- **BS 6083-5:1984** Hearing aids. Specification for dimensions of the nipple and sealing device for inset earphones - Part 5 [7]
- **BS 6083-8:1985** Hearing aids. Methods for measurement of the performance characteristics of hearing aids under simulated in situ working conditions. - Part 8 [8]
- **BS 6083-11:1984** Hearing aids. Specification for symbols and other markings on hearing aids and related equipment [9].

References

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