Sourde

A performing arts centre for the hearing impaired and deaf community.

Darcy Davies

How can adaptive reuse and universal design principles help aid the design of a performing arts centre for the hearing impaired and deaf?

Submitted in fulfilment of a part of the requirement for the degree
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I declare that this report is my own work and has not previously been submitted for assessment.

Darcy Davies
April 2024

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Abstract

Deaf individuals struggle with many components in the build environment. There are few existing sympathetically designed structures in place to aid them. Alongside this, many deaf individuals struggle with self-confidence and reliance. This document aims to answer, 'How can adaptive reuse and universal design principles help aid the design of a performing arts centre for the hearing impaired and deaf?'. The document purpose is to analyse available knowledge about how deaf individuals interact within the built environment and to create a performing art that will aid their interaction and enhance their self-confidence and allow them to identify how they can start to express themselves.

A literature synthesis of existing available research will conclude that three main themes are identifiable when researching about deafhood. These include information about the deaf community, design strategies to benefit deaf people and deaf individuals' perception of music. The literature from these sources have guided my research and has made me sympathetic towards the lack of existing consideration there is for deaf individuals. It has made me aware of the struggles that the deaf community may safe, generally and with their mental well-being. Sourde aims to diminish these conceptions and create a welcoming environment where individuals can go to learn how to express themselves.

Research will be presented as to why a specific area in England was chosen for the project and an analysis on the building chosen will justify the base point to some of the needs of hearing-impaired individuals. An in-depth analysis on the users will help identify what the challenges they face are, their needs from the space and how this will be resolved. The document will investigate existing structures in the built environment and analyse key features and how users react with them to further aid the design and understanding needed. A final analysis will go into depth on the strategies that have been identified through the research, alongside the concept of the project which derives from the Fibonacci sequence. The document will identify these key design strategies such as wide circulation and transparency between floors and how they will be applied. The final chapter is a reflective chapter where I will reflect on key decisions and processes involved with the project and evaluate their significance proposing changes that could be made.

This exegesis highlights the issues the deaf community face within the built environment and discusses design strategies that can be implemented to lessen these issues. The study considers how the individual needs of potential users can be addressed and resolved, whether this relates to communication barriers, or feelings of isolation.

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1. Introduction

When considering the prevalence of deafness in the United Kingdom (UK), Hearing Link Services (2023) state that one in six of the population is affected by hearing loss. The National Deaf Children's Society (2021) report that out of 50,000 deaf children, more than 90% are born into hearing families. Although deafness is not recognised as a learning disability in the UK, it can have a serious impact on an individual's education and social development (National Deaf Children's Society, 2021). Teenagers who experience hearing loss of any kind will be significantly affected socially, emotionally, and educationally (Steele, 2016). Furthermore, even in later life, deafness can have a considerable effect on an individual. It is estimated that 1.2 million adults in the UK have a hearing loss severe enough that they are not able to hear most conversational speech (RNID, 2023a). Subsequently, this creates an isolated environment where people may struggle to connect with others and this isolation creates a negative effect on the individual's well-being.

Sourde aims to create an environment where deaf individuals cannot just come and learn new skills in the performing arts but are provided with an opportunity to enhance their communication, confidence, and mental well-being. Teenagers who experience hearing loss and cannot compensate for its effects, typically respond by losing self-reliance, becoming isolated, and losing their identity (Steele, 2016). *Sourde's* intentions are to diminish all these aspects. The centre will focus on teaching individuals kills in the performing arts as it is widely recognised as a way of reducing loneliness and social isolation (Fancourt and Finn, 2019).

2. Literature Review

2.1 Introduction

It is important to review current relevant literature before as it allows a person to gain familiarity with the present knowledge and see if there are any limitations or boundaries before proceeding. Found below is a literature review table which will go into dept in analysing related literature surround the deaf community and materials that may be useful. Under that table is a synthesis which will further analyse the literature and create connections found amongst them.

2.2 Literature Review Table:

Source	Dependant Variable	Results
National Deaf Children's Society (2021)	Statistics	The statistics show the number of deaf children and young people in the UK. It provides a detailed look into the types of hearing loss that affect these children and the technology available to support their hearing. The research explores the challenges faced by hearing impaired children as they progress through their education.
Bavelier, D., and J. Neville H. (2002)	Sensory Deprivation	Deaf people have enhanced peripheral vision and visual field compared to that of hearing people. This enables deaf people to process events in their periphery more accurately than that of hearing people. Bavelier and Neville (2002) discuss the science behind why this may be, such as, how the inferior colliculus connects the visual part of the brain to the auditory part in the thalamus section. If the auditory (the medial lateral geniculate body) does not work then it allows the auditory areas to be recruited for visual (the dorsal lateral geniculate body) processing; therefore, enhancing a deaf person's periphery.
Where is the North (2023)	Design Strategies	This informative web page discusses ten design strategies to create an inclusive architectural design for deaf people. The purpose of the article is to eradicate boundaries wherein deaf people are forced to adapt to a designed environment. One of the key aspects that is needed in all deaf designed spaces is to have a differentiating factor of deaf proxemics that allows two signing individuals to be able to share eye contact. The design strategies discussed in this article are Nodes, Eddies, Conversation Pedestals & Shelves, Entrance Locations, Transparency in Circulation Enclosures, Vibration Zones, Wider Circulation Spaces, Soft Intersections, Use of Colour for Navigation and Reducing Surface Glare.
Pallasmaa, J. (2012)	Materials	In this book, Pallasmaa takes the reader through a journey of how our senses relate to architecture and how features such as material language and furniture can play a vital role in these interpretations. Pallasmaa discusses this at length, discussing how natural materials such as stone and brick express the age and history of the building alongside its birth and human use, whereas modern materials such

		as synthetics and enamelled metals do not convey the same journey or age.
Edwards, C. and Harold, G. (2014)	DeafSpace and Universal Design Principles	Edwards and Harold discuss the emerging architectural paradigm of DeafSpace and how it distinguishes itself from universal design principles, however, the authors also address how these principles are not mutually exclusive. This journal goes into depth about what DeafSpace is and its effect on architecture; however, the concept is yet to become a mainstream practice to most architects.
Emmorey et al. (1993)	Mental Imagery	In this journal Emmorey et al., conduct a series of tasks that are completed by three categories of people: deaf signers, hearing signers who have deaf parents, and hearing non-signers. The study concluded that deaf signers and hearing signers have a greater ability to generate enhanced complex mental images.
Fahey, J. D. and Birkenshaw, L. (1972)	Deaf people's perception of music.	A deaf person's experience of music is primarily through the sense of touch whereby the individual feels vibrations rather than hearing the music. Similarly, to how a person's sense of smell and taste are closely related, a person's sense of hearing and sense of touch are also closely related. Sound in music is said to have both subjective and physical properties. The melody, harmony, rhythm, and volume are subjective properties, and the physical properties of the soundwaves can be measured. Deaf children can learn to recognised different tones in different areas of the body, such as low tones being felt in the stomach and legs, medium tones in the chest cavity, and high tones in the sinus cavities of the forehead.
Hanson, F. (2013)	The necessity for music for the deaf.	Hanson states that there is a need for more high-quality music opportunities and this report highlights the issues relating to music provision in the UK. A deaf child's experience of music can be stimulating and pleasurable. Hanson suggests that it is a powerful way for them to express their identity.

Table 1 - Literature review

2.3 Synthesis:

Three themes can be identified from this review of the literature. Information about the deaf community, design strategies to benefit deaf people and deaf people's perception of music.

The National Deaf Children's Society (2021), Bavilier and Neville (2002), and Emmorey et al., (1993) all discuss information about the deaf. The statistics provided by The National Deaf Children's Society (2021) give the reader an understanding of deaf issues within the UK. Bavilier and Neville (2002) provide a physiological overview of how a deaf person's brain can adapt in diverse ways to support interaction with their surroundings. Emmorey et al. consider the extent to which deaf people who sign have an enhanced ability to generate visual mental images. This is an important concept for design as it suggests playfulness could be incorporated into the project proposal.

The web page *Where is the North* (2023), Pallasmaa (2012), and Edwards and Harold (2014) all discuss varying design strategies that would aid the deaf community. The webpage presents the reader with ten design schemes that would create an ideal building for deaf people. The webpage itself does not go into too much depth about these strategies so further research would be required. Pallasmaa considers broader

design strategies but in more depth than the article produced by *Where is North*. Pallasmaa also discusses the benefits of these approaches. Edwards and Harold's *'DeafSpace and the principles of Universal Design'* is limited in its conclusions as it is not currently customary practice amongst most architects. Despite this, there is a lot of information in the main body of the journal about how DeafSpace can aid deaf people.

Fahey and Birkenshaw (1972), and Hanson (2013), both examine the relationship deaf people have with music. Farhey and Birkenshaw focus on how deaf people listen to music and how this can be taught from an early age. Hanson focuses on the need to provide musical opportunities for deaf people express themselves.

2.4 Conclusion

The literature from these sources have guided my research and has made me sympathetic towards the lack of existing consideration there is for deaf individuals. It has made me aware of the struggles that the deaf community may safe, generally and with their mental well-being. Sourde aims to diminish these conceptions and create a welcoming environment where individuals can go to learn how to express themselves.

3. Research Question and Design Problem

How can adaptive reuse and universal design principles help aid the design of a performing arts centre for the hearing impaired and deaf?

Sourde aims to resolve the widespread lack of performing arts centres for the hearing impaired and deaf community. This performing arts centre will provide a community for deaf children, teenagers, and adults to express themselves in a way they may not have been able to before, while discovering their identity and putting on performances for the local community. The performing arts centre will use adaptive reuse, universal design principles, and colour psychology to create a cohesive design tailored to the needs of the deaf community.

4. Contextual Analysis

4.1 Introduction

This chapter will discuss key factors to consider when designing for the deaf community such as the location of the site and all contextual factors surrounding them, site history, and the people who will use the centre.

4.2 Site Context and Analysis

When designing a public building for the deaf community factors such as transportation to the area, noise pollution, and the sun path are all important. A site analysis was conducted to ensure that the chosen building was idyllic for the purpose.

4.2.1 Site Location

Formally known as Littlemoor Chapel the site is in the historic textile trading town of Glossop in Derbyshire. The site is situated in an elevated position at the corner of Gladstone and Victoria Street. The image below (Figure 1) shows the ornately decorated façade of the building and Figure 2 shows the location of the building in relation to the wider town of Glossop.

Figure 1 – Image of proposed host building

Figure 2 – Site location
Not to Scale

4.2.2 Connectivity and Zoning

Glossop is an easily accessible town, whether it be by car, bus, or train. Figure 3 shows some of the accessible routes and Figure 4 demonstrates the zoning around the building relating to the connectivity. The orange line (Figure 3) shows the path from the nearest train station, a seven-minute walk away, and the pink line shows the path from the nearest bus stop, a 4-minute walk away. The site has more than twenty car parking spaces, making it accessible by car; parking spaces are marked in yellow, pink shows the vehicle entrance, orange shows the pedestrian entrance, and blue the entrance to the building (Figure 4).

Figure 3
Connectivity to site
Not to Scale

Figure 4
Zoning to site
Not to Scale

4.2.3 Noise Pollution

Noise pollution must be considered when designing for the hearing impaired. When teaching or demonstrating, additional background noise must be eliminated before giving instructions (National Deaf Children's Society, 2023); hearing aids amplify background noise indiscriminately and so this noise can be particularly problematic for users with hearing aids (University of Cambridge, 2023). Figure 5 indicates that most of the noise pollution around the site will be coming from the main road on the North-West side of the building. This will not affect the building too much and most of the noise pollution affecting the North-East side will be coming from minor roads, consequently, this will not be a major issue to address when designing.

Figure 5
Noise pollution of site
Not to Scale

4.2.4 Sun Analysis

The deaf community rely heavily on their vision, and this can often lead to their eyes becoming tired and makes it difficult for them to focus. Diffused daylight helps to reduce eye fatigue; therefore, it is important to design rooms and workspaces around angled windows and more natural sunlight (Amplifon, 2020). It is important to consider the path of the sun, as sufficient lighting is imperative for activities such as lip reading. However, the available light needs to be continuous and sudden changes in light intensity need to be avoided; the use of artificial lighting must be considered alongside natural light (Piñeiro, 2023). Figure 7 shows the sun's path around the building. The building is Northwest facing, this means that the Southwest side of the building will get most of the sun throughout the day. There are no buildings nearby in this area to block the sun, Figure 6 demonstrates the lighting the building may receive.

Figure 6
Concept of sun path

Figure 7
Sun path
Not to Scale

4.2.5 Site History

Glossop is an ancient settlement with evidence of its existance since the Bronze Age with a burial site at Shire Hill. When the Romans arrived and settled in Glossop in AD75, the area became a prominent territory. In the 13th Century, Glossop gained a market charter and became a successful centre for wool trading, which greatly expanded throughout the centuries. During the Industrial Revolution, Glossop became renowned as a producer of cotton. Glossop has a very damp environment and this alongside the plentiful water supply made it an ideal location for textile mills (Howards, 2023).

4.2.6 Building History

Formally known as Littlemoor Chapel, the building is Grade II listed and now houses a gymnasium called Bodycheck. The current car park was once a landscaped graveyard with a paved path through the centre leading to the chapel. This graveyard was exhumed and located elsewhere in 1976. In the latter part of the 20th century alterations removing most of the building's historic fabric and detailing took place, and a second floor was added (Henderson Heritage, 2023). The main materials used throughout the building are coarse millstone grit with ashlar dressings, and a Welsh slate roof. The exterior has a moulded cornice with the façade having three central round headed windows. The side elevations each have five windows to ground and gallery level (Historic England, 2023).

Figure 8 – History collage

4.2.7 Conclusion

This building is in an ideal location for the project in several ways. It is easily accessible with its connections via bus, train, and car routes; this is important as a 1.8% of the UKs hearing impaired population also suffer with difficulties with vision (University of Cambridge, 2023), therefore, having several methods of transportation to the building allows easy access for all. It is also in an area of low noise pollution; there will be limited noise transfer into the building and less confusion for users. The sun path shows that only one side of the building will have ample natural lighting, this suggests that artificial lighting will have to be carefully considered throughout the design.

4.3 User and Client

The town of Glossop in Derbyshire has one of the highest percentages of deaf people in relation to the total population at 19.2% (NHS England, 2017). Out of the school aged deaf children, 71% attend mainstream education as opposed to a specialist unit (UK Deaf Sport, 2012). On average, deaf children tend to achieve a grade less than their hearing classmates at GCSE (National Deaf Children's Society, 2020). This, alongside them not being in specialist education, can lead to deaf children facing communication barriers, social isolation, and poor mental health. As Hanson (2013) discusses, music is a powerful way for deaf individuals to express their identity (Table 1).

4.3.1 Primary Users

User:
Deaf children aged between 5-12 (not exclusive)

Aims to:
Improves ways they can communicate with others through forms such as British Sign Language (BSL)

Needs from the space:
Easy wayfinding as may not be confident enough to ask for help
Fun and engaging sensory spaces

Challenges:
Communication skills
Understanding what is going on around them
Understanding spaces that are not designed with considerations for deaf individuals
Feeling disconnected

Shares aims to:
Feel more connected with society
Learn new skills
Gain confidence with who they are
Form new relationships
Develop connections within the deaf community
Ensure each user feels proud to be a part of the deaf community
Improve overall mental well-being

Shared needs from the space:
Circular design instead of linear for open communication
Colours that contrast skin colours for better perception of facial expressions
Nodes to encourage social iterations
Eddies to pause for socialising
Entrance locations to be seen from one communal area for better wayfinding
Transparency in circulation areas for better visual links between spaces
A café to unwind and socialise
Teaching spaces and studios to learn new skills
Theatre spaces to put on performances

User:
Deaf teenagers aged between 13-19 (not exclusive)

Aims to:
Improve their communication skills
Meet more people from the deaf community

Needs from the space:
An area to interact and form friendships
An area to relax and unwind
A quiet space to work

Challenges:
Communication skills
Low levels of self confidence
Low self esteem
Poor mental well-being
Struggle to make friends

User:
Deaf adults aged 20 and over (not exclusive)

Aims to:
Have experiences they have not been exposed to
Connect as a community
Form more relationships within the deaf community

Needs from the space:
Support to learn new skills

Challenges:
Confidence issues
May struggle to make friends
May struggle with communication with deaf individuals

Figure 9 – Primary users

4.3.2 Secondary Users

User:
Hearing parents with deaf children aged between 24-34
(not exclusive)

Aims to:
Connect with other hearing parents with deaf children
Gain support from other in similar situations
Learn new skills to be able to communicate such as British Sign Language (BSL)
Gain confidence
Improve mental well-being

Needs from the space:
An area to learn
Somewhere to unwind
A communal area to make new connections
Somewhere to bring their children

Challenges:
Confidence issues
Poor mental well-being
Confusion
Misinformation

User:
Support staff aged between 25-65
(not exclusive)

Aims to:
Encourage the users to learn
Learn new skills to apply to the role
Aid and support all primary and secondary users
Provide information for all users

Needs from the space:
An area where support staff can go on breaks
A learning area for theme to learn new skills
A teaching area for support staff to teach users new skills
A support system

Challenges:
Concerns over the development and skills needed to teach the deaf community
May not yet know how to communicate with deaf individuals
May not yet fully be aware of the challenges deaf individuals face

Figure 10 – Secondary users

4.3.3 Client

The client for this project will be *Signed Culture*, an organisation that supports and promotes British Sign Language (BSL) users' access to the arts across the UK. They work with arts organisations to ensure that the cultural sector is as open and welcoming to deaf individuals as it possibly can be (Signed Culture, 2018).

Figure 11 – Signed Culture logo

5. Precedent Studies

5.1 Introduction

When designing for the deaf community care for intricate details is imperative to discover how the individuals react to environments and the best ways to aid them in their experience with the centre. Research into existing buildings which follow similar design strategies that DeafSpace advocate is crucial in creating an effective design.

List of Precedent Studies:

4.2 BARLO MS Centre, St. Michael's Hospital

4.3 Collage of the Holy Cross Prior Performing Arts Centre

4.4 Tin Shui Wai Hospital

4.5 English National Ballet

4.6 Solomon R. Guggenheim Museum

4.7 Moritzburg Museum

4.8 Gallaudet University

5.2 BARLO MS Centre, St. Michael's Hospital

Location: Toronto, Canada
Year: Completed 2021
Architects: Hariri Pontarini

Figure 12 – BARLO MS Centre

5.2.1 Introduction

The *BARLO MS Centre* is on a mission to become the world's leading centre for the autoimmune disease, multiple sclerosis (MS) care. The centre was proposed as initially areas of the MS clinics were scattered across the hospital, posing a challenge for patients with mobility issues. Consequently, Hariri Pontarini Architects proposed an integrated space on the top two floors of part of the hospital.

The centre includes facilities such as well enhanced technology lecture spaces, a gymnasium, medical infusion zones, and private consulting rooms to name a few (Howarth, 2022).

5.2.2 Analysis

The clinic is fabricated using natural materials and curvilinear forms to establish an uplifting atmosphere for a patient's wellbeing in contrast to the rigidity of a traditional sterile-looking healthcare environment. This approach diminishes previous detrimental associations with such places and changes the ideals of what is required from a clinical space. The atrium is positioned in the heart of the facility and permeates the space with natural light, creating a welcoming and calming environment. The clinic's circulation follows a curved design, whether that be through the wavy panelled concealed rooms or through the primary circulation routes. This curved design softens the environment, detracting from a typical healthcare atmosphere.

Another key aspect in this design is the wider circulation areas. Circulation areas in hospitals are essential and critical components of a healthcare system and significantly impact a user's perception of an area. Having wide circulation areas supports wayfinding and creates a welcoming environment that does not cause a sense of confinement, moreover, it helps to reduce the risk of bottlenecks in high foot traffic areas (Hariri Pontarini Architects, 2023).

5.2.3 Evaluation

This project has been chosen as a precedent study as it follows design language such as wide circulation areas and curved design conveying the feelings associated with both the area and the function.

Figure 13 -BARLO MS Centre - Pods

Figure 14 – Consulting pods

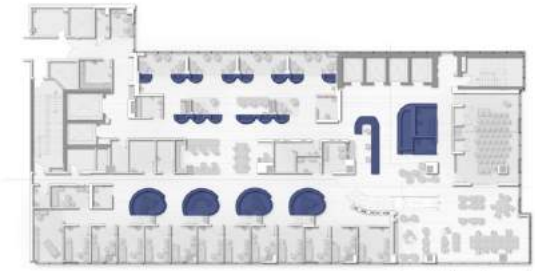


Figure 15 – Floorplan illustrating circular design

Figure 16 – Medical infusion pods

5.3 Collage of the Holy Cross Prior Performing Arts Centre

Location: Massachusetts, USA

Year: 2022

Architects: Diller Scofidio + Renfro

Figure 17 – Collage of the Holy Cross Prior Performing Arts Centre

5.3.1 Introduction

The *Prior Performing Arts Centre* was designed to incubate the multidisciplinary language of performing arts. One of the key areas in this performing arts centre is a space titled the *Beehive,* which is a central space from linking all other areas of the performing arts centre (Ott, 2022).

5.3.2 Analysis

The *Beehive* acts as the primary connective space between all the available programmes and acts as a creative playground for students to collaborate or display their talents to their peers. This sense of community is heightened by the viewing platforms; these are positioned in numerous places such as on the landing of the feature staircase and extruding from different floors. Through the viewing platforms students can observe the performances of others and learn what is possible for them in the future (Figure 19).

There is also a wide use of transparency through enclosures in this performing arts centre. This transparency is vital in design as it allows for the transmission of light and produces a visual connectivity between spaces, creating a sense of openness and possibility. Something that must be considered when designing transparency between spaces is the balance between open and private spaces. Areas that need privacy can maintain that quality without the language of spatial continuity being disrupted (Diller Scodifio and Rendro, 2022).

5.3.3 Evaluation

This project has been chosen as a precedent study because of the management of transparency between spaces while still having some sort of threshold. Additionally, the viewing platforms, and the performing area add versatility and interest to an otherwise unpopulated area.

Figure 18 – Transparency between spaces

Figure 19 –Viewing platform

5.4 Tin Shui Wai Hospital

Location: Hong Kong

Year: Completed 2016

Architects: Marc and Chantal

Figure 20 –Tin Shui Hospital

5.4.1 Introduction

The Tin Shiu Wai hospital provides the public with A&E, in-patients, ambulatory services, community care services, and diagnostic, and ancillary services. The hospital has a capacity of 300 in-patients and day beds so must be able to cater for every individual's needs while creating a caring environment. The primary objective for this project was to create a clear and accurate wayfinding strategy to enable the staff and patients to reach their destinations effortlessly (Hospital Authority, 2018).

5.4.2 Analysis

The wayfinding objective of this project was a key aspect and became a real feature for the hospital. The use of colour as a wayfinding strategy ensured that there was a significant reduction in the changes of users finding themselves lost amongst the many areas and corridors of this facility.

The bright colours coincide with the colours assigned to different departments on that floor/level. The colours were also used to disassociate with the sterile hues often used in
similar facilities, thus positively stimulating patients and improving their mood.

The bold tracts work alongside the distinct colours and clear signage to allow circulation around the hospital to be as efficient as possible. This ensures there are no bottlenecks and users can navigate themselves without having to interrupt staff to ask for directions. The tracks improve the fluidity of all aspects of the hospital (Marc and Chantal, 2017).

Figure 21 – Signage

5.4.3 Evaluation

This project has been chosen as a precedent study due to its impressive design features, which aid the circulation around the facility and positively affect not just a user's experience but also that of the staff.

Figure 22 –Wayfinding

5.5 English National Ballet

Location: London, England
Year: Completed 2019
Architects: Glenn Howells Architects

Figure 23 – English National Ballet

5.5.1 Introduction

The English National Ballet brings world class classical ballet to a wide audience. It is a universally recognised prestigious academy that trains students to become amazing performers. The centre is wrapped in a distinctive way with translucent glass cascading the length of the building. The building itself consists of world-class studios, medical, costume, and production facilities (Wilson, 2020).

5.5.2 Analysis

One of the key features for this building is the interesting way the architects have helped to blend the inside spaces with the outside areas. This transparency between spaces allows the outside world to get a taste for what is going on inside this building. A sense of intrigue is created, and people get a clear appreciation of the translucent cube.

The large windows and translucent white glass membrane create a striking separation between this building and its more colourful neighbours. This creates a sense of hierarchy between this building and the ones surrounding it. Unlike the upper floors, the ground floor is completely translucent with no sense of opacity. This area creates an openness to the building and guides passers-by into the café located on the ground floor (Arquitectura Viva, 2019).

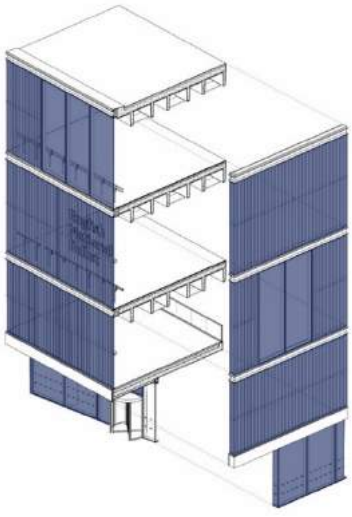


Figure 24 –Axonometric showing transparency between spaces

5.5.3 Evaluation

This project has been chosen as a precedent study due to its ability to create prestige from a translucent box. It shows how architecture can create an impressive sense of intrigue while allowing the outside world inside in such a dramatic manner.

5.6 Solomon R. Guggenheim Museum

Location: New York, United States

Year: Completed 1959

Architect: Frank Lloyd Wright

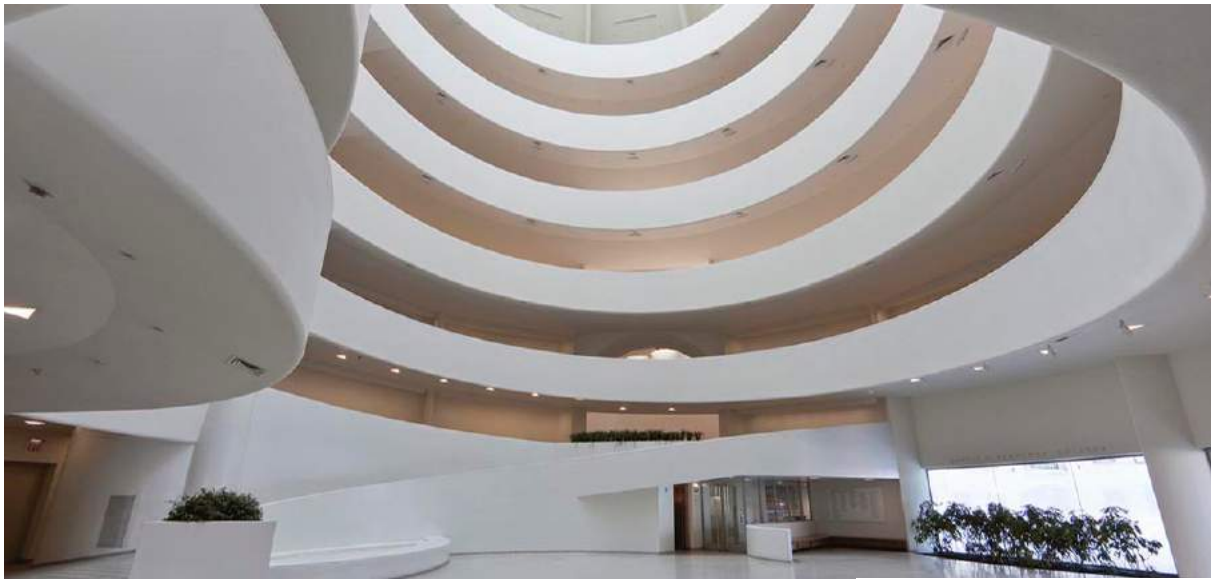


Figure 25 – Guggenheim Museum

5.6.1 Introduction

The Guggenheim Museum is one of the most well recognised museums in the world. The one requirement for the architectural design of the building was that it should be unlike any other museum in the world. That requirement was achieved when in 1990 it was designated as an official New York City landmark and the youngest building ever to receive this recognition (Guggenheim, 2023).

5.6.2 Analysis

From the exterior the building resembles stacked white cylinders, swirling towards the sky; however, despite the museum's dramatic exterior curves, the effect is even more stunning on the inside.

The original concept for this building was to have one spectacular space on a continuous floor. The atrium rises in height until it is capped by an expansive glass dome. Alongside the atrium is a continuous ramp uncoiling upward for six stories. This ramp was designed so the visitors could view art pieces in one continuous flow instead of wandering down corridors and into different rooms.

Not only does this ascending ramp overlook the open atrium creating a continuous flow rarely seen in many buildings, but it also offers interaction between people on different levels and enhances the transaction between how people can view each other (Perez, 2010).

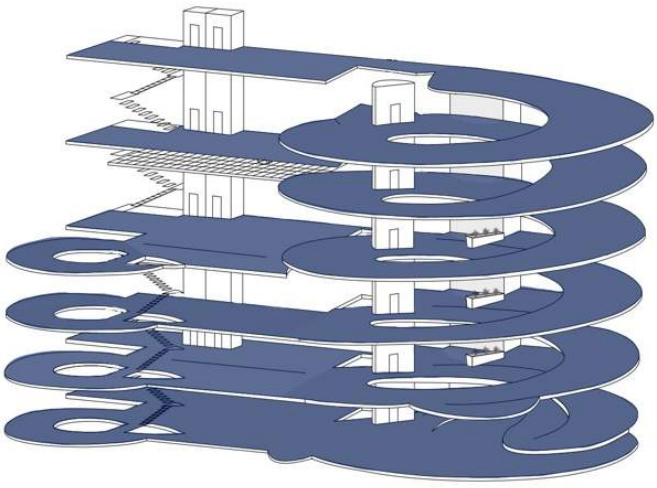


Figure 26 – Axonometric of the continuous flow

5.6.3 Evaluation

This project has been chosen as a precedent study because of its continuous flow, which optimises circulation and enhances a visitor's experience. It also offers aspects for visitors to be able to easily see what is happening on other floors and different areas.

5.7 Moritzburg Museum

Location: Halle, Germany

Year: Completed 2008

Architects: Nieto Sobejano Arquitectos

Figure 27 – Moritzburg Museum

5.7.1 Introduction

The Moritzburg Museum is an intervention hosted in the old Moritzburg Castle, which is an example of the religious and military architecture that was common in Germany in the latter part of the 15th century. The intervention encompasses a window structure that evokes the oeuvre of artwork that is displayed inside. Although the building has undergone many alterations, the original structure is still visible through main architectural features such as the surrounding walls, a few round towers, the corners of the structure, and the central courtyard (Arquitectura Viva, 2024).

5.7.2 Analysis

The alterations that took place during this construction involved a new roof, envisioned as a large, folded platform, which rises and opens to allow natural light to enter, thus illuminating the new exhibition areas. The project was designed to allow for the exhibition space to be expanded to give greater scope with regards to what can be presented in the space. The intervention allows the ruins to be repurposed, giving a contemporary feel whilst maintaining many of the historic fabrics and keeping alive the memories associated with the castle (Nieto Soberano, 2023).

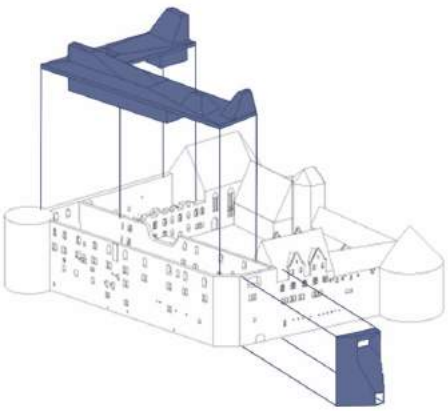


Figure 28 – Axonometric of the intervention

5.7.3 Evaluation

This project has been chosen as a precedent study because of the light structure. While designing for the deaf community it is imperative to allow natural light to transcend though the building to permit lip reading, signing and wayfinding.

Figure 29 – Intervention

Figure 30– Light structure

5.8 Gallaudet University

Location: Washington, United States

Year: 1856 – present

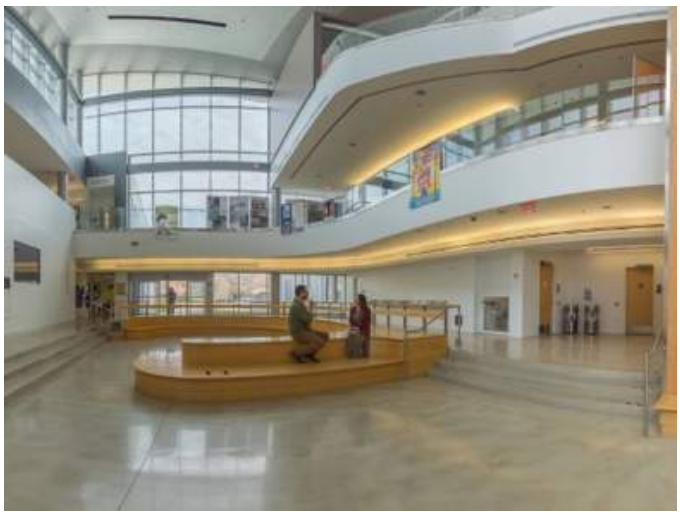


Figure 31 – Gallaudet University

5.8.1 Introduction

The Gallaudet University it known as the first fully fledged university incorporating DeafSpace design. The university encompasses many design features that aid how the deaf community engage with a space. It allows students to make their way through the premises without using their hands to open doors. Students are also able to move furniture to be able to sit opposite each other for easy communication (Gallaudet, 2023).

5.8.2 Analysis

Using an integrated approach, the building encompasses the best practices. These practices involve optimising space, providing sufficient lighting, using colours that contrast skin tones, ensuring good acoustics, and preventing glare from white walls.

One component of the building that practises *DeafSpace* is the seven-foot-wide ramp that descends onto the lowest tier. The width of this ramp is important as it allows for four people to pass alongside each other. This means there is a good amount of space and proximity for two groups of two to converse and sign without the conversation being interrupted.

At the heart of the building, there are several glass-walled lounges, these allow for the students to see what is happening and not being restrained by walls. This is similar with the extensive use of windows connecting the space to the outdoors. This expanse of glass contributes to sufficient lighting, reducing the likeliness of eyestrain.

People who cannot hear have a heightened need to see. Facial expressions and hand movements are vital for communications, so the colours of walls are often kept to a deep blue, bright green, and maple-leaf red. These colours were chosen to enhance the contrast between skin tones and the background (Dillon, 2019).

Figure 32 – Gallaudet University colours and ramp

5.8.3 Evaluation

This project has been chosen as a precedent study due to its high relation with the DeafSpace principles. Sourde incorporates as many of the DeafSpace ideologies as possible, so being able to see how it works in practice and what is more successful than other strategies is vital.

5.9 Analysis

	Strategy							
Precedent Study	1	2	3	4	5	6	7	8
BARLO MS Centre	●	●						
Collage of the Holy Cross Prior Performing Arts Centre			●			●	●	
Tin Shui Wai Hospital				●				
English National Ballet			●				●	
Solomon R. Guggenheim Museum		●			●			
Moritzburg Museum			●				●	
Gallaudet University	●	●	●	●	●	●	●	●

Table 2 – Precedent analysis

5.9.1 Key for Analysis Table

1	Wide Circulation
2	Curved Design
3	Transparency Between Spaces
4	Wayfinding
5	Continuous Flow
6	Viewing Platform
7	Sufficient Lighting
8	DeafSpace Principles

Table 3 – Key for analysis

5.10 Conclusion

The precedent studies that have been analysed in this chapter provided the components that began the meaningful, practical, and inclusive design that has been implemented into Sourde's design.

6. Design Strategy and Application

6.1 Introduction

Piñeiro (2023) states that hearing loss is not always congenital, it could happen to anyone; special demands of the deaf community are not always noticeable but despite this their needs are crucial. By creating spaces for the deaf community, designers can have a positive effect on the lives of these individuals by helping to reduce the social isolation many of them face (Cromwell, 2023). *DeafSpace* is a concept that enables a design to inhabit the rich sensory world of the deaf community. It supports individuals to experience the environment using vision and touch, thus meeting their needs, and facilitating enjoyment (Gallaudet University, 2023). Although *DeafSpace* is widely recognised, many architects remain unaware of the needs of the deaf community when designing spaces (Youde, 2017).

6.2 Working with the Existing Building

Through reviewing current literature, it was decided that due to the rich history of the formerly know Littlemoor Chapel and its relationship with Glossop as a town, that the building would be re-purposed through adaptive reuse. Fred Scott in his book *On Altering Architecture* states that "alteration is the mediation between preservation and demolition" (Scott, 2007). The use of alteration allows the building to be brought back to life without changing the historic fabrics, preserving the culture, heritage, and historical value of the building. Pallasmaa (2012) discusses how natural historic materials express the age and history of the building creating a journey (see Literature Review Table). Many of the existing windows and their fabrications have been kept, thus maintaining the historic value. Natural wooden acoustic panelling has also been used reinforcing the journey.

6.3 Conceptual Approach

The concept for this design is formed from the spiral aspect of the cochlear part of the ear (Figure 33) and the spiral part of the ear trumpet, a device that was used in the 1800s to help the hearing impaired hear better (Figure 34). The spiral seen in both objects is also known as the golden spiral or the eternal line (Cayenne, 2011). The golden spiral appears in many areas in the natural world and can be explained through the Fibonacci sequence. Leonardo Fibonacci discovered the Fibonacci sequence in the early 13th century, it is based around a sequence in which each number is the sum of the two preceding ones; it starts with one, then one plus one equals two, two plus one equals three, this then goes on to five, eight, thirteen and so forth (Swetz, 2013).

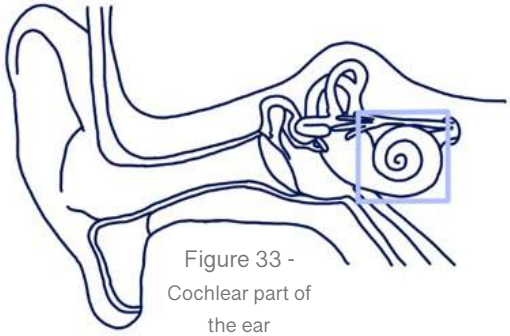


Figure 33 - Cochlear part of the ear

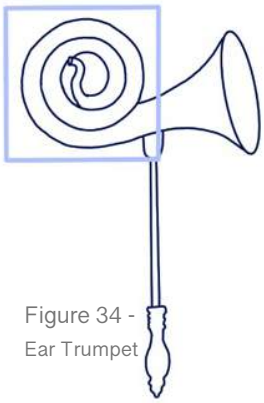


Figure 34 - Ear Trumpet

6.3.1 Conceptual Model

A model was created to display the concept in three-dimensional form (Figures 35 and 36) using blocks with areas following the Fibonacci sequence. These blocks represent how areas can be created with differentiating hierarchies while still coming together to form a holistic design. This concept is applied in the design through varying formats in the building. On the first floor of the building the walkway has varying sizes of viewing platforms and seating areas, these all follow this concept (Figure 27). The concept also helps to create a hierarchy of spaces seen throughout the varying floors.

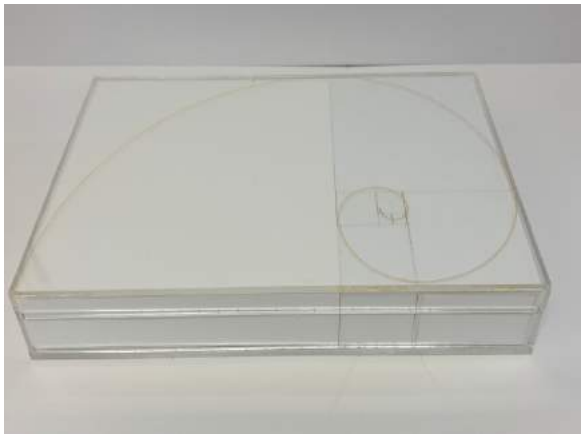


Figure 35 -
Concept model

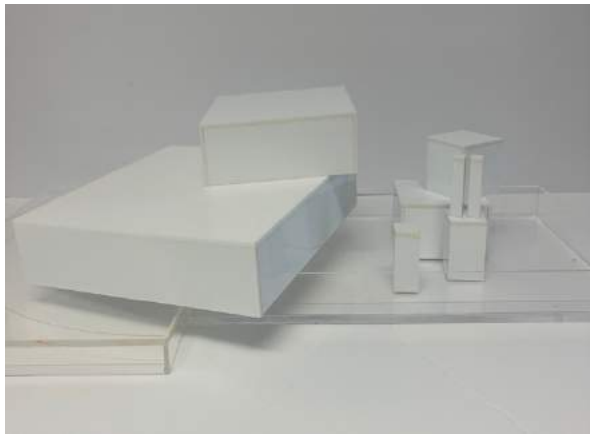
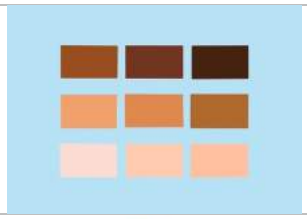


Figure 36 -
Exploded concept model

Figure 37 -
First floor showing concept through cut out pathway

6.4 Design Strategies

To successfully implement the concept into the design, a series of design strategies were researched through precedent studies and the literature review (Table 4). These strategies were successfully implemented in the project to create a design highly suited for the deaf community.

Strategy	Why	Diagram
Circular rather than linear design	To facilitate an open communication channel where each user can see one another. (Piñeiro, 2023)	
Automatic doors	Allow users to look at each other while walking with no interruptions for BSL. (Piñeiro, 2023)	
Colours that contrast skin tones	Helps user to perceive facial expressions and hand movements. (Piñeiro, 2023)	
Lighting	Both natural and artificial lighting needs to be sufficient and continuous. (Piñeiro, 2023)	
Multisensory	Facilitates the enjoyment of the spaces through all available senses. (Piñeiro, 2023)	
Nodes	Encourages social interaction. (Where is the North, 2023)	
Eddies	A place for users to pause for socialising during the transition between spaces. (Where is the North, 2023)	

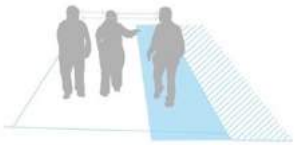
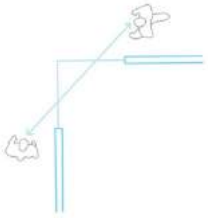
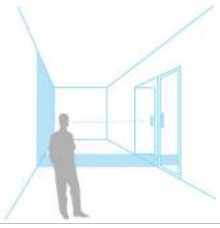
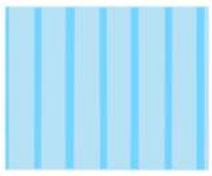
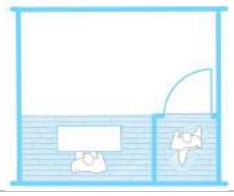
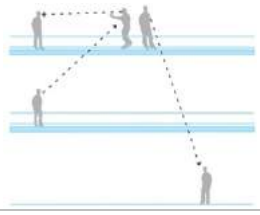
Entrance locations	Entrances should be clearly visible from major circulation spaces. (Where is the North, 2023)	
Wider circulation spaces	Should accommodate for two-way traffic signers in major circulation spaces. (Where is the North, 2023)	
Chamfered walls or glass corner junctions	Avoid collisions by allowing the user to see people approaching. (Where is the North, 2023)	
Colour for navigation	Acts as a form of wayfinding. (Where is the North, 2023)	
Consistent use of colour	Provides visual keys as to the principal areas of the building. (Where is the North, 2023)	
Soft furnishing, ceiling panels, and rubber feet on chairs and tables	Reduces the reverberation time of sounds. (RNID, 2023b)	
Vibration zones	Function as a tactile cue for the users to identify when someone is approaching. (Where is the North, 2023)	
Transition between floors	Transparency between spaces allows for a better visual link between floors, which aids wayfinding. (Where is the North, 2023)	

Table 4 – Design strategies

6.4.1 Spatial Configuration and Circulation

When designing for the deaf community it is vital to use visual cues to aid wayfinding and navigation. Similarly, it is important to allow for circulation through and around the building to be as comfortable as possible. Some of the design strategies that support this would be transition between floors, wider circulation spaces, automatic doors, and clear signage.

6.4.1.1 Transparency between Floors

As seen in the precedent studies above (5.2, 5.4, 5.6, and 5.7) transparency between floors allows for transmission of light through areas, which is fundamental for visual activities such as lip reading and signing. Furthermore, transparency between floors produces a visual connectivity. This strategy is heavily applied in the design (Figures 38 and 39) as the upper floors are mezzanine with voids both sides of the floors for viewing platforms and transparency.

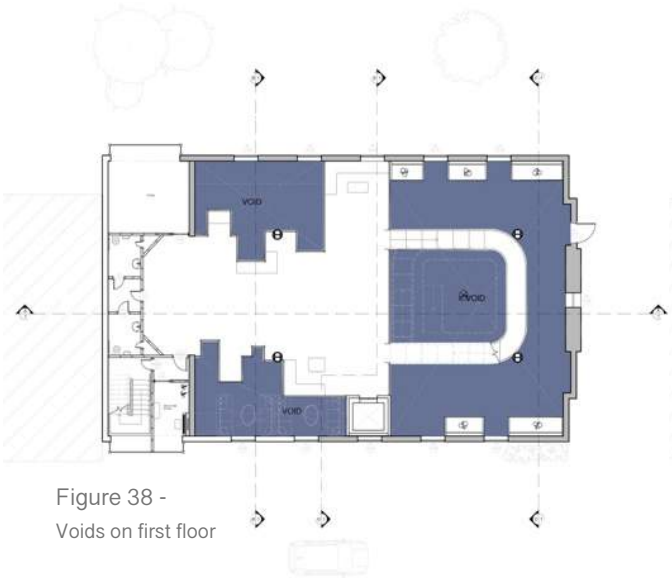


Figure 38 -
Voids on first floor

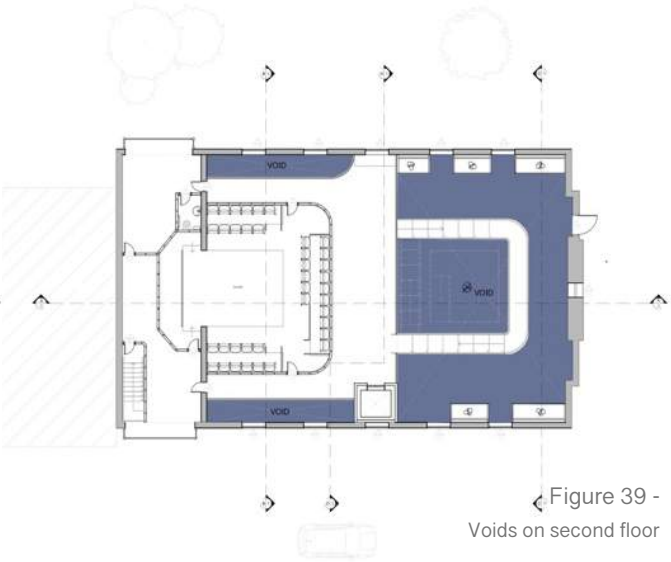


Figure 39 -
Voids on second floor

6.4.1.2 Wide Circulation Spaces

Wider circulation spaces are important when designing for the deaf as the act of signing must be done when the individuals can see each other. If two individuals are walking along signing in a narrow corridor that only allows for two people passing, they would have their conversation interrupted if they needed to pass another individual. This interruption could create an uncomfortable pause in conversation caused by a lack of space. Relatedly, in precedent study 5.1 Sourde incorporates wider circulation spaces through the design (Figure 40).

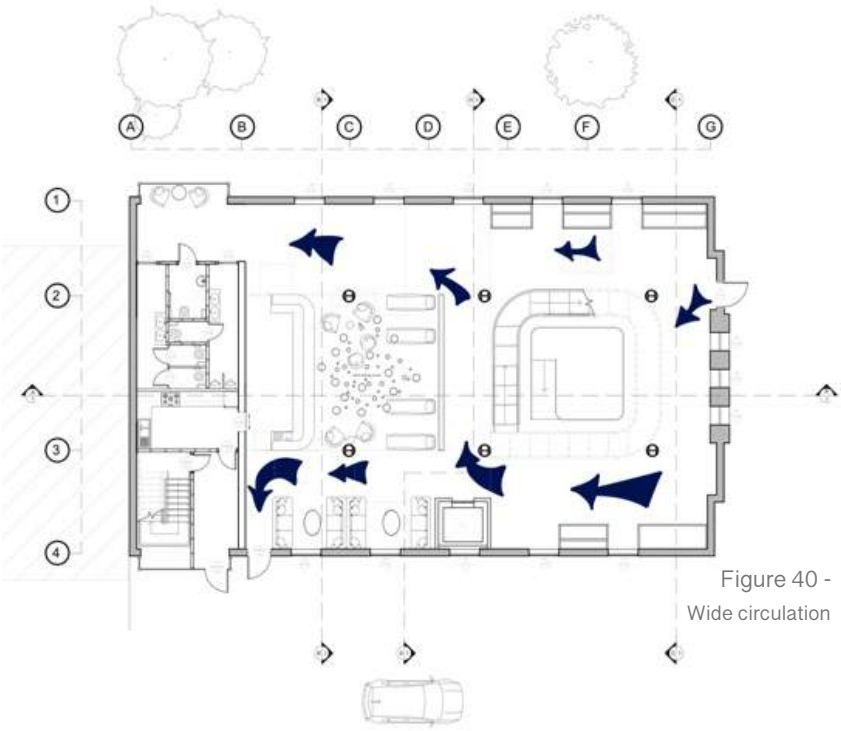


Figure 40 -
Wide circulation

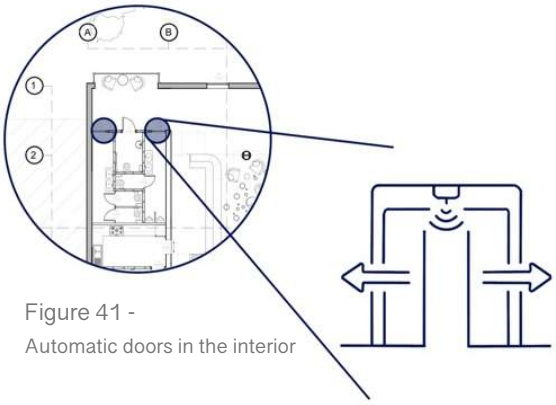


Figure 41 -
Automatic doors in the interior

6.4.1.3 Automatic Doors

Similarly to the theory behind how wider circulation aids the deaf community, so do automatic doors. Automatic doors are seen in several locations in Sourde's design (Figure 41). This helps with communication for signers as they do not have to use their hands to open doors, thus the flow of their conversation is not interrupted.

6.4.1.4 Signage

Clear signage helps deaf individuals' ability to navigate around the building without having to ask a member of staff or other individuals, which they may not have the confidence to do. Clear universal signage has been used throughout Sourde's interiors to aid this wayfinding (Figure 42).

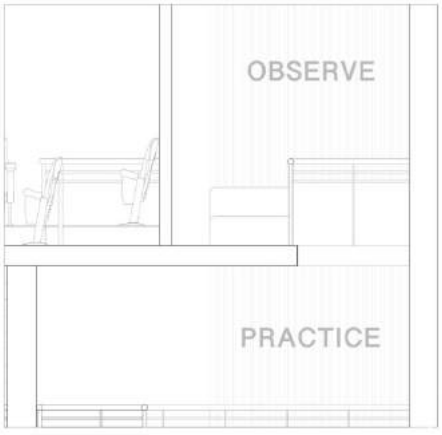


Figure 42 -
Signage in the interior

6.4.2 Colour Psychology

Deaf individuals can be easily distracted by what is going on around them, so a neutral colour pallet has been used throughout the design to minimise this. Dark blue has been used alongside the colour pallet to enhance points of interest. Dark blue was chosen as the World Federation of the Deaf and deaf associations around the world chose it to represent deafhood (Irish Deaf Society, 2023).

6.4.3 Noise Control and Reverberation

Fahey and Birkenshaw (1972) explain how deaf individuals experience music through learning to recognise different tones in different areas of the body (Table 1). Due to this noise and reverberation control it is imperative to avoid disruption of this experience. Low pile carpet has been used in areas of the design to help with sound reverberation. On all floors acoustic timber cladding has been used on walls and ceilings to buffer sound through floors. The theatre and main studio have had a soundproofing mat behind the finishing on the walls to help with the transfer of noise between spaces. Plastic buffers have been fixed to chairs and tables to reduce the scraping noise of furniture.

6.5 Conclusion

Through expansive research, a review of precedent studies, and the literature review a solid foundation has been created to resolve how best to design for the deaf community. The strategies have been researched and embedded into the design of Sourde in conjunction with the concept.

7. Reflective Practice

7.1 Introduction

For an individual's personal and professional growth, it is important to engage in reflection. Reflection enables individuals to identify their skills and limitations so they can form a better self-knowledge and develop their abilities (Jasper, 2003). This reflection will explore my progress through the year and discuss how I have developed my skills and understanding while acknowledging and creating an action plan for my weaknesses. Costa and Kallick (2008) in their book entitled *Learning and Leading with Habits of Mind* discuss the significance of self-reflection for a person's success, stating that "to be reflective means to mentally wander through where we have been and to try to make some sense out of it… [the authors considers how during reflection]… we must act upon and process the information, synthesizing and evaluating the data". I will use Gibbs 1988 model to provide a clear and effective approach to reflection. Gibbs model (Figure 43) uses six clear stages, the first three of which are concerned with what happened, and the final three sections relate to making sense of the experience and how the individual can improve.

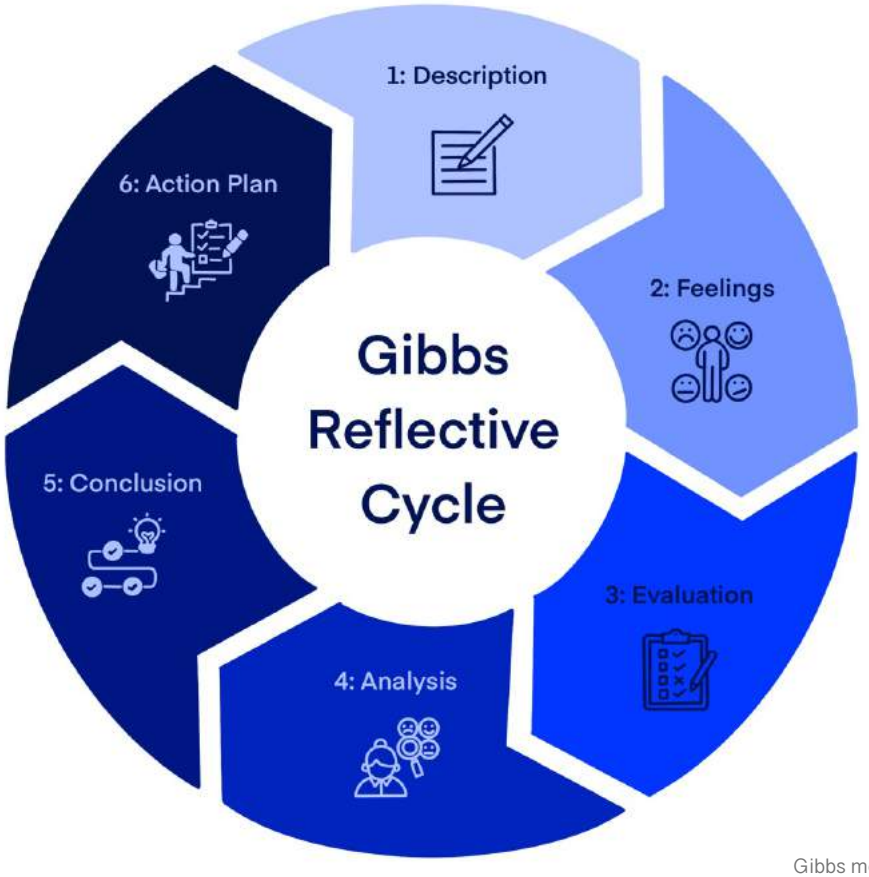


Figure 43 - Gibbs model of reflection

This chapter will discuss and critique my design decisions and the design itself. This will allow me to reflect upon myself as a designer and enhance how I view my decisions in future projects. GANTT charts, time plans, and peer review notes support this reflection (appendix B).

7.2 Reflection

As this was the biggest project I was yet to face, interest in the chosen subject was imperative. Through my initial research at the start of the Summer 2023, I came across a documentary on deaf individuals and the struggles they face. This sparked my interest, and I wondered if there was anything that already exists in the built environment to aid them. I was saddened by my findings, as suitable existing structures were very limited; however, there was plenty of research regarding what can be achieved to create appropriate spaces for the deaf community. When evaluating this, although daunting at the start, the lack of existing structures for deaf individuals produced a positive outcome. It allowed me to design freely with no preconceived ideas as to what should be in the space, or what it should look like. While analysing this, it became apparent that much more was designed for visible disabilities in the built environment than for non-visible disabilities. Having this keen interest in the topic motivated me to research more, which allowed me to gain a thorough understanding of what was needed from the space. Moving forward from this project it is important for me to find projects about which I am passionate as this will ensure a high level of motivation.

Following my initial research, I tried to find a building that would house my intervention. The host building I decided on was in an ideal location that was easily accessible with good connections to major cities. The building was also in a low noise pollution area, thus making it suitable for users who have a range of hearing loss. At the beginning of the project, I considered this building ideal. However, when evaluating the building further along in the project I decided it could have been bigger as it ultimately needed to accommodate a theatre, and I ended up having to design something smaller than I originally planned. Analysis of the situation has demonstrated that planning spatially, while simultaneously deciding on a suitable host building would have allowed me to achieve a better understanding as to what was needed from the space. In conclusion, this building is suitable for my project as it is in an ideal location and is a respectable size; however, I would have benefitted from a slightly bigger building. My action plan moving forward from this would be to not rush into finding a property but to carefully consider the requirements before deciding on the host building.

Reflecting upon the precedent studies I chose, I think although they all presented aspects ideal for deaf individuals, I would have benefitted from looking into how people react within those spaces. In hindsight it would have been valuable to look at a wider range of studies. When evaluating the project, further exploration of spaces specifically designed for deaf individuals would expand my knowledge of the subject and subsequently enhance the project design. However, given the time constraints of an undergraduate project a considerable amount of useful knowledge was gained from the studies researched. In conclusion, the process was advantageous to my project as I gained valuable insight. I appreciate that time for deeper research would have benefited the project and enabled me to collect a greater variety of precedents to choose from to enrich the design.

An aspect I have struggled with throughout the year has been my self-belief and confidence. Although I worked incredibly hard and thought everything through carefully, I had doubt and developed a sense of imposter syndrome. This was more prominent around the times when we received our grades and feedback. This left me with a feeling that I did not deserve the grades I had received and put me off doing my work. On reflection I now understand this lack of confidence stems from my experience with dyslexia throughout my educational journey. I also often compared myself with my peers, which I should not have done as we all have different strengths and weaknesses, and our projects differ. When analysing this I understand that many people may suffer with similar feelings of imposter syndrome and loosing self-confidence, so I knew it was not an uncommon feeling and I needed to figure out how to move past it. These feeling would happen in waves

throughout the project but, they had always been a fog around me in terms of confidence. At my lowest points this year I found it useful to use positive affirmations believe in myself. I read existing literature on the subject to help me better understand my feelings and I spoke to peers and family members who would remind me how hard I work, that I did deserve it, and my work is good. Going forward I will be mindful of the need to revisit these positive affirmation strategies.

At the start of the year, I recognised this period of study was going to be intense academically, and that I needed to be able to efficiently manage my time alongside training, competing for the University's Hockey Club's Women's First Team and socialising. To ensure a good work-life balance, effective time management and organisation was imperative. I am very proud of how I managed my time this year. I always finished my assignments before deadlines, and I never had to rush. As a result of this, I was able to achieve good grades as I was always able to submit work that was completed to a respectable standard. I was able to act on feedback, while allowing myself downtime for exercising and socialising. Reflecting on this positive experience gives me confidence in my ability to manage similar experiences in the future and have the confidence to take on more responsibility.

7.3 Project Delimitations

The main aim of the project is to be a performing arts centre for the hearing impaired, but also act to improve individuals' mental health and wellbeing. While the centre does not provide a course of therapy for poor mental health, it can act as a support for individual wellbeing.

As individuals within the deaf community face different challenges, it could be difficult to cater for each specific need. These differing needs may cause issues with the core strategies becoming lost. While designing, it was important to find a compromise so that people were not hindered in any way.

Although the building has been modified in the past, it is Grade II listed and this may cause issues with planning permission. Certain elements may need to be revised to comply with these.

7.4 Conclusion

This chapter has allowed me to reflect on some of the trials and tribulations I encountered during the implementation of the proposed project. It has allowed me to progress not only as a designer but also on a personal level. Identifying and understanding things that did not go the way I wanted or expected has been an important part of the experience, helping me to grow as a designer, understanding my strengths, weaknesses, and motivations. This new found confidence and self-assurance will hopefully lead on to further creativity and distinctiveness in my work.

8. Conclusion

In conclusion, this exegesis has highlighted the issues the deaf community face within the built environment and has discussed design strategies that could be implemented to lessen these issues. The study has sought to consider how the individual needs of potential users can be addressed and resolved, whether this relates to communication barriers, or feelings of isolation. The design question and a proposal for the design intentions outline the intentions of the project. A comprehensive literature review has explored current available findings and knowledge to show how this will inform the design and further research. Extensive research has ensured that everything from lighting fixture to floor finishes had been thought out to create a sympathetic design with the users' needs at the heart.

9. Reference List

Amplifon. (2020) *Designing Spaces for Hearing Impaired.* Available from https://www.amplifon.com/au/blog/designing-spaces-for-hearing-impaired [accessed 17 November].

Arquitectura Viva. (2024) *Moritzburg Museum: Paintings of an Exhibition, Halle.*

Arquitectura Viva. (2019) *Dance school for the English National Ballet in London.*

Bavelier, D., and Neville, H. J. (2002) Cross-model plasticity: Where and how? *Nature Reviews Neuroscience,* 3(6) 443-452.

Cayenne, O. (2011) A note on generalised Fibonacci sequences. *Applied Mathematics and Computation,* 217(12).

Costa, A. and Kallick, B. (2008) *Learning and Leading with Habits of Mind.* ASCD.

Cromwell. (2023) *DeafSpace: Design for the Deaf and Hard of Hearing.* Available from https://cromwell.com/2023/03/23/deafspace-design/#:~:text=By%20designing%20spaces%20that%20consider,isolation%20many%20of%20them%20face [accessed 17 November].

Davies, R. (2023, 1). *Image of the proposed host building.*

Davies, D. (2023)

Diller Scodifio + Rendro. (2022) *Prior Performing Arts Centre Collage of the Holy Cross.*

Dillon, I. (2019) *Gallaudet University Designs for the Deaf Community, but Everyone Benefits.*

Edwards, C.a.H., G. (2014). (2014) DeafSpace and the Principles of Universal Design. 36(16) 1350-1359.

Emmorey, K., Kosslyn, S. M., and Bellugi, U. (1993) Visual imagery and visual — spatial language: Enhanced imagery abilities in deaf and hearing ASL signers. *Cognition,* 46(2) 139-181.

Fahey, J.D. and Birkenshaw, L. (1972) Educations of the deaf: Bypassing the ear - the perception of music by feeling and touch. *Music Educators Journal,* 58(8) 44-128. Available from https://journals.sagepub.com/doi/pdf/10.2307/3394046?casa_token=HOfP2s6pvAUAAAAA:_XU38N3HWutyq7GCKZWHTFBzHSfymkvT35Eu9ZCiM_PLC1zvw6YMOI6DHno3ra-qbZ2yFfz1Vww.

Fancourt, D. and Finn, S. (2019) What is the evidence on the role of the arts in improving health and well-being? *Nordic Journal of Arts Culture and Health,.*

Frearson, A. (2011) *Moritzburg Museum Extension by Nieto Sobejano Arquitectos.* Available from https://www.dezeen.com/2011/06/17/moritzburg-museum-extension-by-niento-sobejano-arquitectos/.

Gallaudet. (2023) *What is the Gallaudet Promise?.*

Gallaudet University. (2023) *DeafSpace.* Available from https://gallaudet.edu/campus-design-facilities/campus-design-and-planning/deafspace/ [accessed 17 November].

Guggenheim. (2023) *Form Follows Function.*

Hanson, F. (2013) Music to young ears. Engaging deaf children with music. Available from https://network.youthmusic.org.uk/sites/default/files/uploads/research/Music4U%20Music%20to%20Young%20Ears%20Report_1.pdf.

Hariri Pontarini Architects. (2023) *BARLO MS Centre.* Available from https://hariripontarini.com/projects/barlo-ms-centre/.

Hearing Link Services. (2023) *Deafness and Hearing loss facts.* Available from https://www.hearinglink.org/your-hearing/about-hearing/facts-about-deafness-hearing-loss/ [accessed 02 October].

Henderson Heritage. (2023) Heritage Impact Assessment Former Littlemoor Independent Chapel, Victoria Street, Glossop.

Historic England. *Bodycheck official list entry.* Available from https://historicengland.org.uk/listing/the-list/list-entry/1384303?section=official-list-entry [accessed 16 October].

Hospital Authority. (2018) *Tin Shui Wai Hospital.*

Howards, S. (2023) *Glossop.* Available from https://letsgopeakdistrict.co.uk/glossop-2/ [accessed 16 October].

Howarth, D. (2022) *Hariri Pontarini rethinks cold medical interiors at Barlo MS Centre.* Available from https://www.dezeen.com/2022/09/18/barlo-ms-centre-toronto-hariri-pontarini-architects/ [accessed 08 March,].

Irish Deaf Society. (2023) *Colour Blue and the Deaf Community.* Available from https://www.irishdeafsociety.ie/about/blue/#:~:text=The%20concept%20of%20Deafhood%20was,communities%20cherish%20their%20own%20language. [accessed October].

Jasper, M. (2003) *Beginning Reflective Practice.*

Marc and Chantal. (2017) *Tin Shui Wai Hospital - Beyond Wayfinding.*

National Deaf Children's Society. (2023) *Making arts and drama inclusive: Teaching arts to deaf children (2023) National Deaf Children's Society. .* Available from https://www.ndcs.org.uk/information-and-support/professionals/activities/arts/#:~:text=Give%20verbal%20instructions%20first%2C%20without,you%20in%20the%20mirror%20too. [accessed 08 October].

National Deaf Children's Society. (2021) *Information about deaf children and young people in the UK.* Available from https://www.ndcs.org.uk/media/6809/dcyp-in-the-uk-info-sheet.pdf.

National Deaf Children's Society. (2020) *Deaf pupils failed by education system for fifth consecutive year.* Available from https://www.ndcs.org.uk/about-us/news-and-media/latest-news/deaf-pupils-failed-by-education-system-for-fifth-consecutive-year/ [accessed November 3,].

NHS England. (2017) *Prevalence of hearing loss by Local Authority area (2014 ONS estimates).* Available from https://www.england.nhs.uk/publication/prevalence-of-hearing-loss-by-local-authority-area-2014-ons-estimates/ [accessed November 2,].

Nieto Soberano. (2023) *Moritzburg Museum.*

Ott, C. (2022) *College of the Holy Cross Prior Performing Arts Center / Diller Scofidio + Renfro.*

Pallasmaa, J. (2012) *An Architecture of the Seven Senses.* Princeton Architectural Press.

Perez, A. (2010) *AD Classics: Solomon R. Guggenheim Museum/ Frank Lloyd Wright.*

Piñeiro, A. (2023) *Architecture for People with Hearing Loss: 6 Design Tip.* Available from https://www.archdaily.com/936397/architecture-for-people-with-hearing-loss-6-design-tips#:~:text=Brightness%2C%20light%20and%20reflections&text=Colors%20that%20contrast%20with%20skin,atmosphere%20that%20can%20be%20disturbing [accessed 17 November,].

Pintos, P. (2024) *English National Ballet / Glenn Howells Architects.* Available from https://www.archdaily.com/936089/english-national-ballet-glenn-howells-architects.

RNID. (2023a) *How to make your venue more accessible.* Available from https://rnid.org.uk/information-and-support/deaf-awareness/how-to-make-your-venue-more-accessible/ [accessed 10 November].

RNID. (2023b) *Prevalence of deafness and hearing loss.* Available from https://rnid.org.uk/get-involved/research-and-policy/facts-and-figures/prevalence-of-deafness-and-hearing-loss/ [accessed October 2,].

Scott, F. (2007) *On Altering Architecture.* Taylor & Francis.

Signed Culture. (2018) *About Signed Culture.* Available from https://www.signedculture.org.uk/about-signed-culture/ [accessed 02 October].

Steele, A. (2016) *Psychology effects of hearing loss in teens.* Available from https://hearinghealthfoundation.org/blogs/psychology-effects-of-hearing-loss-in-teens#:~:text=Emotional%2C%20social%20and%20educational%20results%20of%20hearing%20loss&text=Teens%20who%20experience%20hearing%20loss,isolated%20and%20losing%20their%20identity. [accessed 02 October].

Swetz., F. (2013) *The European Mathematical Awakening.* Dover Publications.

UK Deaf Sport. (2012) *UK Deaf Sport has produced this factsheet to provide partners with a brief outline of the number of deaf and hard of hearing people within the East Midlands, and how it all compares to the country as a whole.* Available from https://ukdeafsport.org.uk/wp-content/uploads/2015/05/UK-Deaf-Sport-A4-East-Midlands_Layout-1.pdf [accessed November 3,].

University of Cambridge. (2023) *Inclusive Design Toolkit.* Available from https://www.inclusivedesigntoolkit.com/UChearing/hearing.html [accessed 17 November].

Where is north. (2023) *10 Strategies to design for the deaf - inclusive design in architecture.*

Wilson, R. (2020) *Dance moves: Glenn Howells' new home for English National Ballet.*

Youde, K. (2017) *News Feature: Put design for the deaf on the agenda.* Available from https://www.architectsjournal.co.uk/news/news-feature-put-design-for-the-deaf-on-the-agenda [accessed 10 November].

10. Bibliography

Anonymous (2023) *Signs for Change.* BBC.

Audicus and Mittnacht, V. (2021) *Do hearing impaired people use other senses better?* Available from https://www.audicus.com/do-hearing-impaired-people-use-other-senses-better/ [accessed 15 October].

Burgstahler, S. (2009) Universal Design: Process, Principles, and Applications. Available from https://files.eric.ed.gov/fulltext/ED506550.pdf.

C&G Partners. (2018) *Designs for Deaf Eyes at Gallaudet University.*

Casiez, L. (2019) *Deafness and Architecture.*

Cayenne, O. (2011) A note on generalised Fibonacci sequences. *Applied Mathematics and Computation,* 217(12) Available from https://www.sciencedirect.com/science/article/pii/S0096300310012403?casa_token=B9VfHg6qJzsAAAAA:jlulKKmkxYnJokIQKCjn-oOm5UGG7DOGbUjN7xJNHB7a643vkOzy_Z9QW85jEzDkryagA0Ap.

Cooper, R. (2007) Can it be a good thing to be deaf? Journal of medicine and philosophy. 32(6) 563-583.

Cromwell. (2023) *DeafSpace: Design for the Deaf and Hard of Hearing.*

Crook, L. (2023) *DAF launches to "ensure Deaf people have a stake in architecture".*

Darrow, A.A. (1993) The role of music in deaf culture: implications for music educators. 41(2) 93-110. Available from https://journals.sagepub.com/doi/pdf/10.2307/3345402?casa_token=xrZGnCPDoVAAAAAA:s7DnM2YPZ990k7EOyFI6phgpsFvYbgA2wJfKazstxavlgmHAfg_-9WqzqhipGXyn4RUc5o_KRRc.

Darrow, A.A. (1985) Music for the deaf. 33-35. Available from https://journals.sagepub.com/doi/pdf/10.2307/3396472?casa_token=fSuVoYp7T4UAAAAA:MXv1Y9V9HEL5zqBx6hfMPESqWeZBcspKuM6CD_V9oBsYoE5Xc5d0pcggtMRBvt07-w6Mivfq5v0.

Davis, M. (2019) *The Rise of Deaf Architecture.*

Disability Arts International. (2020) *International sign - connecting deaf performing arts.* Available from https://www.disabilityartsinternational.org/collaborations/international-sign-connecting-deaf-performing-arts/ [accessed 15 October].

Edwards, C. (2011) Interior Design. A Critical Introduction.

Edwards, C. and Harold, G. (2013) DeafSpace and the principles of universal design. 36(16).

Fancourt, D. and Finn, S. (2019) What is the evidence on the role of the arts in improving health and well-being? *Nordic Journal of Arts Culture and Health,.*

Goldsmith, S. (2007) Universal Design.

Harris, J. and Barton, G. (2016) *How architecture changes for the deaf.*

Highfield, A. (2023) *Architectural antagonist: Deaf Architecture Front.*

Klimova, B. (2013) Self-reflection in the Course Evaluation. *Procedia Social and Behavioural Sciences,* 141

National Deaf Children's Society. (2024) *Creating good listening conditions.*

Null, R. (2014) *Universal Design.* CRC Press.

Philip, L. (2015) Encouraging reflective practice amongst students: a direct assessment approach. *Examples of practice and pedagogic research,* 17(1).

Prospect. (2023) *Designing content for users who are deaf or hard of hearing.*

Proximity of Care. (2022) *Designing inclusive public spaces for the deaf community.*

Scott, F. (2008) *On Altering Architecture.* London: Routledge.

Shalev, T., Schwartz, S., Miller, P. and Hadad, B.S. (2020) Do deaf individuals have better visual skills in the periphery? Evidence from processing facial attributes. . *Visual Cognition,* 28(3) 205-217.

Steinfeld, E. and Maisel, J. (2012) *Universal Design: Creating Inclusive Environments.* Canada.

Turner, W.W. (1848) Music among the deaf and dumb. 2(1) 1-6. Available from https://www.jstor.org/stable/44401116.

University of Buffalo. (2023) *Universal Design Principles.*

Wake, L. (2020) *Designing for users who are deaf or heard of hearing.*

Washington Do It. (2022) *What is universal design?*

Williams, O. (2017) *Kolb and Gibbs Reflective Cycle.*

11. Definition of Terms

Sourde	French for ‘Deaf’.
Deaf (upper case ‘D’)	Refers to people who are members of the deaf community and who exclusively communicate with sign language.
deaf (lower case ‘d’)	People who have hearing loss, born, or developed.
Hard of hearing	People who have lost some but not all their hearing.
Hearing impaired	Anyone with any level of hearing loss.
Congenital hearing loss	Born with hearing loss which may become progressively worse.
Acquired hearing loss	People who were born hearing but have lost some/ all their hearing.
Hyperacusis	Sensitivity to certain frequencies.
Tinnitus	A ringing or hissing noise that can be permanent.
DeafSpace	An approach to architecture where it is primarily informed by the way deaf individuals live and inhabit a space.
Deafhood	A process in which the deaf community come to actualise their identity as deaf individuals.

12. Appendix A

Application Details

Ethics Reference:

Title of Project: Sourde

Lead Researcher: Darcy Davies

Academic Supervisor (if applicable):

Date of Letter: 14 November 2023

FAVOURABLE OPINION

Thank you for the submission of your Project Registration Form (PRF), on behalf of the committee and I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form and supporting documentation.

The favourable ethical opinion provided is conditional to the following requirements:

1. Commencement of the research

1.1 Governance Audit: Your application may be subject to audit, should any issues your application be identified, your application may be returned to you for modification and a full ethics application *may* be required.

1.2 Risk Assessment: In accordance with H&S policy and guidance, a risk assessment must be completed, or existing risk assessment reviewed/updated before any data collection commences. A copy of the risk assessment should be retained with your research data.

1.3 It is assumed that the research will commence within 12 months of the date of the favourable ethical opinion.

1.4 If the research does not commence within 12 months of the favourable opinion being issued, the lead applicant (or academic supervisor for student research) should send a written explanation for the delay. A further written explanation should be sent after 24 months if the research has still not commenced.

1.5 If the research does not commence within 24 months, the REC may review its opinion.

2. Duration of favourable opinion

2.1 The favourable ethical opinion of the Research Ethics Committee (REC) for a specific research study applies for the duration of the study, as detailed in your application (or any subsequent amendments).

3. Amendments

3.1 If it is proposed to make an amendment to the research, the lead applicant (authorised by the academic supervisor for student research) should submit an amendment to the REC by accessing the original application form on LEAS and creating an amendment form.

4. Monitoring

4.1 A REC may review a favourable opinion in the light of progress reports and any developments relevant to the study. The lead applicant and academic supervisor (for student research) is responsible for ensuring the research remains scientifically sound, safe, ethical, legal, and feasible throughout its duration. The lead applicant and academic supervisor (for student research) should submit a progress report to the REC 13 months after the date on which the favourable opinion was given. Annual progress reports should be submitted thereafter.

4.2 Progress reports should be completed and submitted using the forms in LEAS.

5. Conclusion or early termination of the research

5.1 The Lead Applicant should complete the End of Study Form in LEAS once the study has completed. It is also their responsibility to inform the REC of early termination of the project or if the work is not completed.

6. Long Term Studies

6.1 The lead applicant and academic supervisor (for student research) is responsible for ensuring that the study procedures and documentation are updated in light of legislative or policy changes and also for reasons of good practice (e.g. standards for supporting documentation). This should be documented in the progress report to the REC (see above) and, where necessary, an amendment (see above) should be submitted to the REC. The REC may review its opinion in light of legislative changes or other relevant developments.

Additional guidance may be found at here

Statement of Compliance

The Committee is constituted in accordance with the University Research Ethics policy and E-QMS SOP E-01 Ethics Committee Operations.

Yours Sincerely

Approved list of documents (if applicable)**:**

13. Appendix B

Learning Agreement

This document records the details of the project to be undertaken. This agreement must be negotiated and submitted during Term 1 and is based on the outputs produced for the final studio research project. Any amendments during the project must be negotiated and a new learning agreement signed. Students are responsible for the safe keeping of a copy of the agreement.

Name	Student ID	Course
Darcy Davies	[redacted]	Interior Architecture and Design
Module Research Process 3: Design Exegesis, 2324	**Module Code** [redacted]	**Project Tutors** [redacted]
Start date 25/09/23	**Final Submission** 16/04/24	

Nature of the brief

The student who is assigned this brief will be answering the design question *'How can adaptive reuse and universal design principles help aid the design of a performing arts centre for the hearing impaired and deaf?'*

The students should learn to understand the nature of deaf individuals and how they react with the built environment. The individual should recognise the constraints the deaf community faces within everyday life and design a proposal which aids them. The student should understand the benefits of the performing arts and learn how it can be integrated within the deaf community.

Aims of the project

Researching the way that deaf individuals react with the built environment and how they would benefit from a performing arts centre will impact the design. The aim of the project is allowing deaf individuals to learn new skills within the performing arts while learning how to express themselves in ways they may not have been aware of; it will hopefully allow the individuals to gain confidence in their identity.

Personal learning objectives

To be able to…

- Develop an understanding of how to produce a successful design solution through thorough research
- Appreciate how research informs and impacts the design process
- Start to identify the characteristics of myself as a designer and grow confidence in my abilities while recognising my strengths and weaknesses.

Student Signature	Date
	06/01/24

14. Appendix C

GANTT Charts and Time Plans

Goal						
Benchmarks for success						
Evaluation Plan: Action from Interim Crit						
Action	**Date to Begin**	**Date Due**	**Resources Required**	**Potential Hazards**	**Desired Outcome**	**Done**
Move Lift	23/01/2024	24/02/2024	CAD/ Revit	Cannot get it to blend into design	Seamless design so everyone can have the same experience	
Reflect on the geometry of concept model	23/01/2024	24/02/2024	CAD/ Revit/ Paper	Does not create a seamless design	To blend the concept into the design without just placing it	
Make the theatre and insertion	23/01/2024	24/02/2024	CAD/ Revit/ Paper	There is not currently enough room to fit it and backstage and a WC	It becomes part of the performance	
Look into Studio Weave – The Lullaby Factory	23/01/2024	24/02/2024	Computer	It does not fit with the rest of the design	Gain inspiration	
Look into Neon – Kinaesthetic Installations	23/01/2024	24/02/2024	Computer	It does not fit with the rest of the design	Gain inspiration	
Check Ceiling Hights	23/01/2024	24/02/2024	CAD/ Revit	I have not allowed for enough head height	All the floors and stairs work	
Make a New GANNT Chart	23/01/2024	24/02/2024	Computer	N/A	N/A	

Diagram

Dogma:

Introduction

Literature Review

Design Problem

Design Question

Design Intentions

Project Delimitations

Precedent Studies

Techne:

Precedent Studies

Introduction

DeafSpace

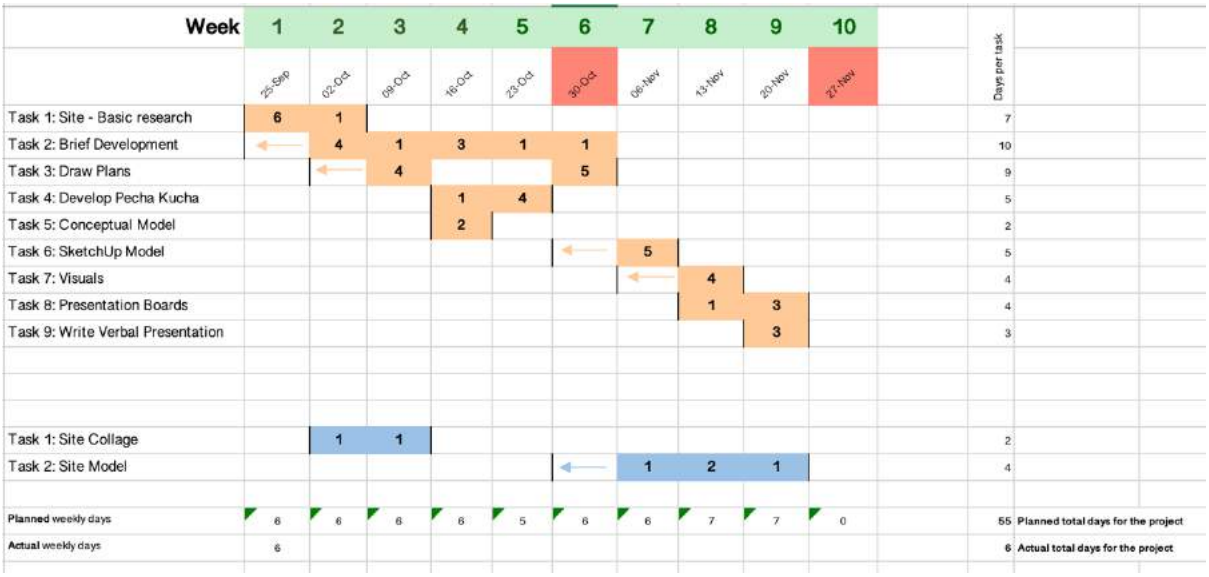
Initial Layouts

Praxie:

Reflective Practices

Addendum

Appendix



Week	1	2	3	4	5	6	7	8	9	10	Days per task	
	25-Sep	02-Oct	09-Oct	16-Oct	23-Oct	30-Oct	06-Nov	13-Nov	20-Nov	27-Nov		
Task 1: Site - Basic research	6	1									7	
Task 2: Brief Development		4	1	3	1	1					10	
Task 3: Draw Plans			4			5					9	
Task 4: Develop Pecha Kucha				1	4						5	
Task 5: Conceptual Model				2							2	
Task 6: SketchUp Model							5				5	
Task 7: Visuals								4			4	
Task 8: Presentation Boards								1	3		4	
Task 9: Write Verbal Presentation									3		3	
Task 1: Site Collage		1	1								2	
Task 2: Site Model							1	2	1		4	
Planned weekly days	6	6	6	6	5	6	6	7	7	0	55	Planned total days for the project
Actual weekly days	6										6	Actual total days for the project

15. Appendix D

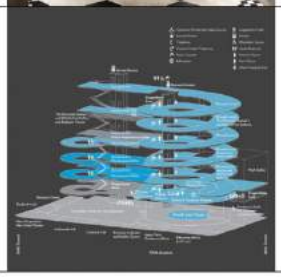
Existing plans, sections, elevations, and site of the site (not to scale) drawn by myself.

(Images have been removed/ redacted to be in compliance with Interior Educators)

Photos of Building

Precedent Studies

Project	Image	Similarity	Question	Category	Source
Clinic in Toronto Hariri Pontarini		**Form** Wide circulation areas and circular design	How does this inform wayfinding?	Contemporary	https://www.dezeen.com/2022/09/18/barlo-ms-centre-toronto-hariri-pontarini-architects/
Tin Shui Wai Hospital		**Form** Using colour for wayfinding	Could it become confusing if over used?	Contemporary	https://www.marc-chantal.com/news/tin-shui-wai-hospital-beyond-wayfinding/
Gallaudet University		**Use** Architectures first full-fledged DeafSpace Design	Is it inclusive? Is it too catered towards the deaf community?	Contemporary	https://www.archdaily.com/406845/architecture-s-first-full-fledged-experiment-in-deafspace-design?ad_source=search&ad_medium=projects_tab&ad_source=search&ad_medium=search_result_all
Performing Arts Centre on Massachusetts Campus		**Form** Transparency through enclosures	Is there then enough privacy in the	Contemporary	https://www.archdaily.com/989817/college-of-the-holy-cross-prior-performing-arts-center-diller-scofidio-plus-renfro
			spaces that need it? Materials - vibrations		
National Ballet School		**Use** Performing arts **Form** Transparency through enclosures	Is there enough privacy?	Can be visited	https://www.enbschool.org.uk
Bibliotheca Alexandrina		**Form** Different levels	Is it inclusive for all?	Contemporary	https://archello.com/project/bibliotheca-alexandrina
Bun in Milan, Italy		**Form** Colours that contrast skin colours	Does it become too much of a distraction?	Contemporary	https://www.archdaily.com/958820/bun-milan-restaurant-masquespacio

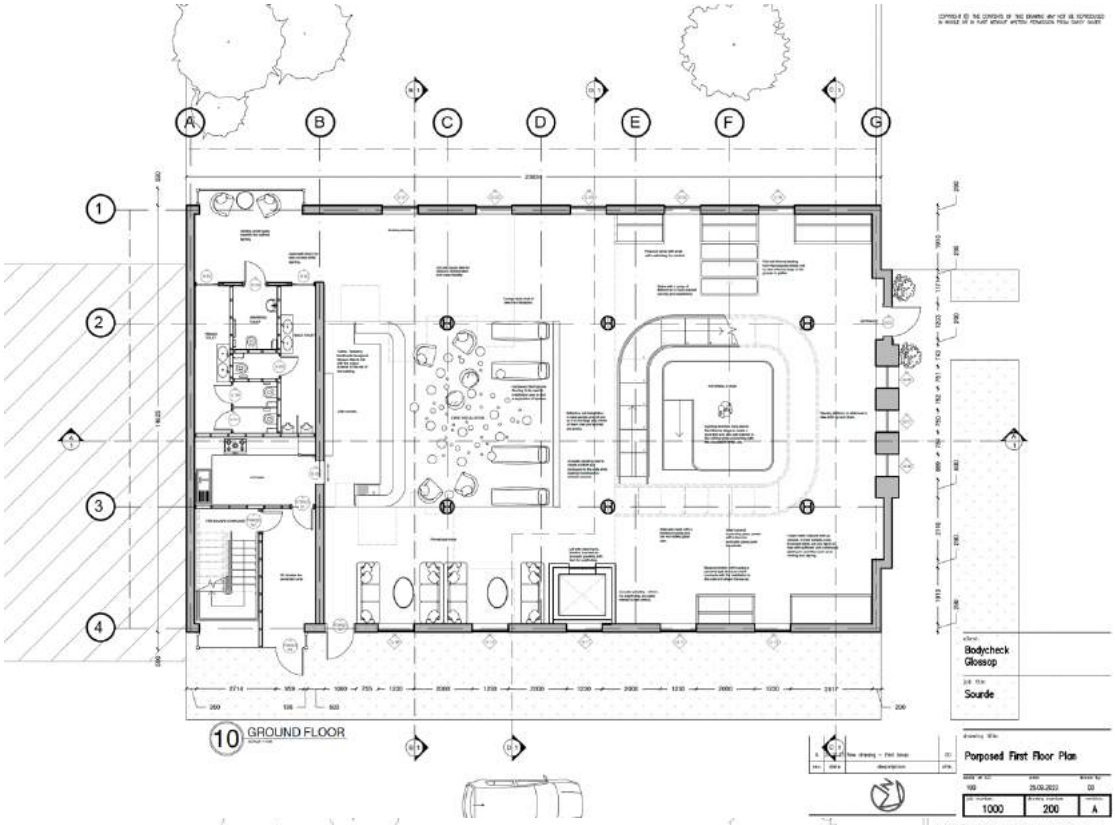
Masato Sekiya, Japan		**Form** Glass corridor and corner junctions	Does it provide internal v external privacy?	Contemporary	https://www.dezeen.com/tag/masato-sekiya/
House of Vans London		**Form** Use of materiality for wayfinding	Are the spaces too small? Do they allow for much to happen?	Adaptive re-use	https://www.archdaily.com/585818/house-of-vans-london-tim-greatrex
Guggenheim		**Form** Circulation	Does it allow for enough private/ individual rooms?	Contemporary	https://www.guggenheim.org/teaching-materials/the-architecture-of-the-solomon-r-guggenheim-museum/form-follows-function

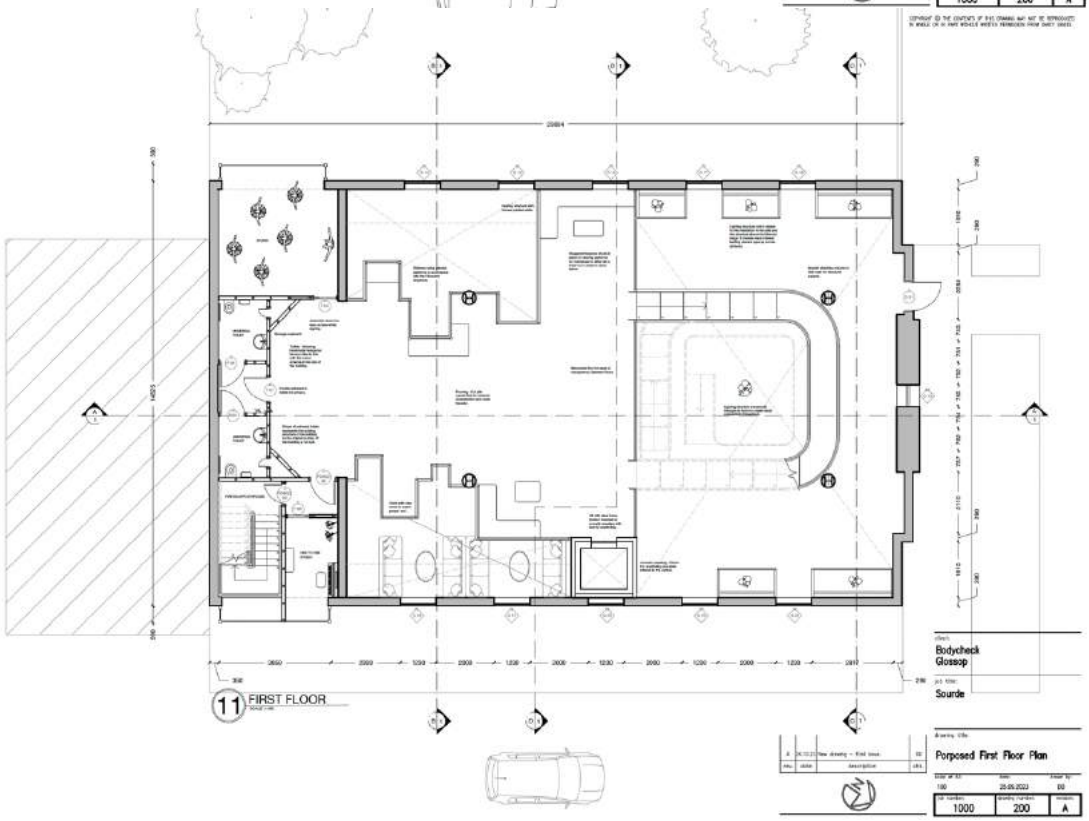
The Green Building		**Form** The new protruding from the old	Does it take away from the form of the older building?	Adaptive re-use	https://www.archdaily.com/118709/the-green-building-fer-studio
The High Line		**Form** Created a journey	Is it maintainable?	Contemporary	https://www.archdaily.com/24362/the-new-york-high-line-officially-open
The Dancing House		**From** The mixing of worlds/ styles	Is it too literal?	Contemporary	https://architectuul.com/architecture/the-dancing-house

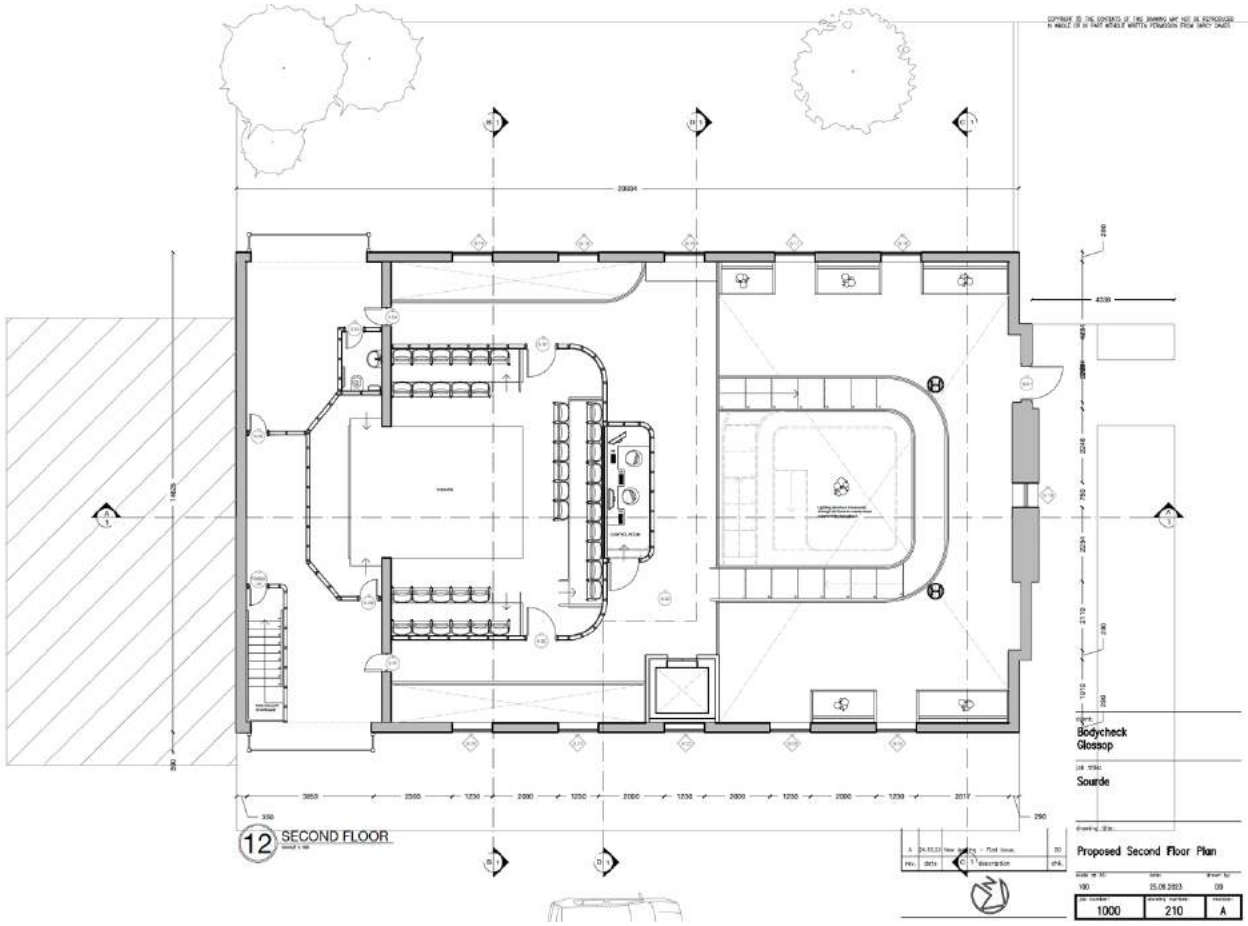
Blue and Glue		**Form** The use of level changes to separate spaces		Contemporary	https://www.archdaily.com/785473/blue-and-glue-hao-design?ad_source=myarchdaily&ad_medium=bookmark-show&ad_content=current-user

Proposed Plans

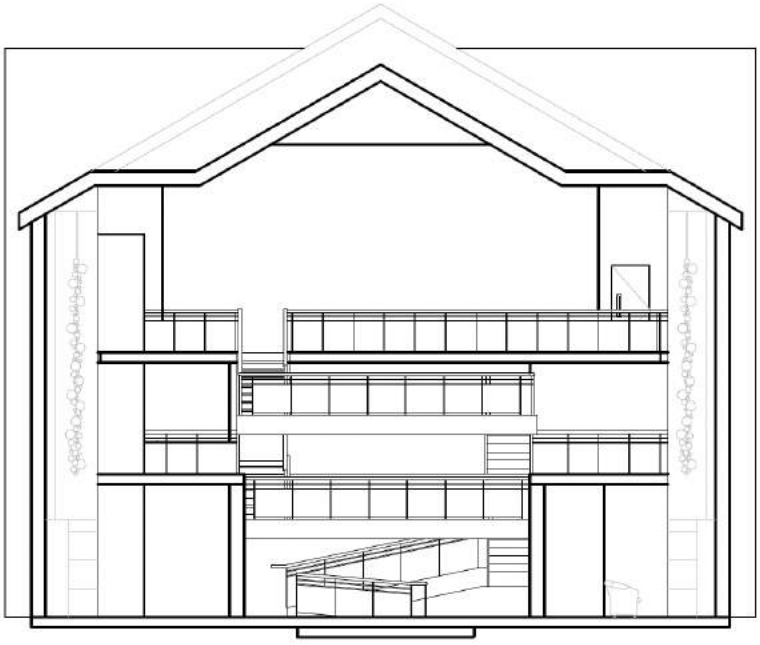
Proposed plans, sections, and elevations (not to scale) drawn by myself.





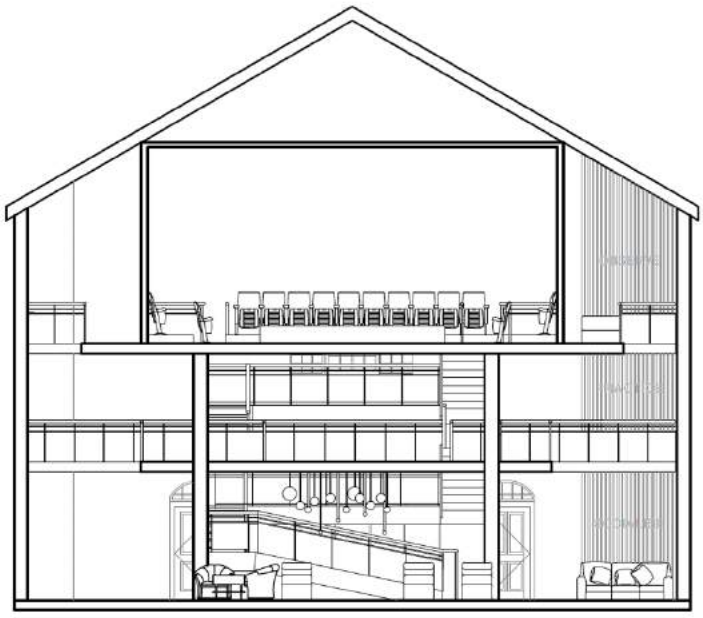

12 SECOND FLOOR
Bodycheck
Glossop
Sourde
Proposed Second Floor Plan
25.08.2023
1000
210
A


13 LONG SECTION A-A
Bodycheck



15 SHORT SECTION C-C

client:
Bodycheck



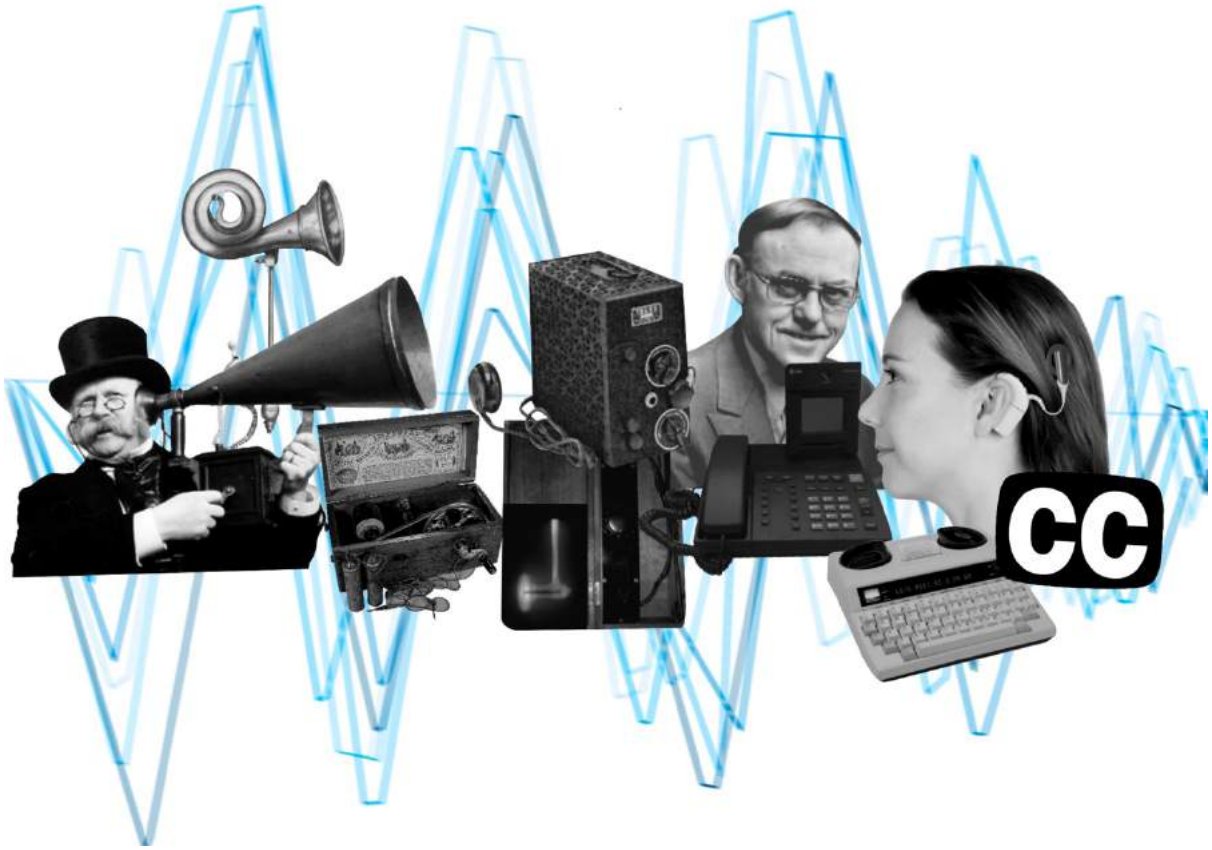
14 SHORT SECTION D-D

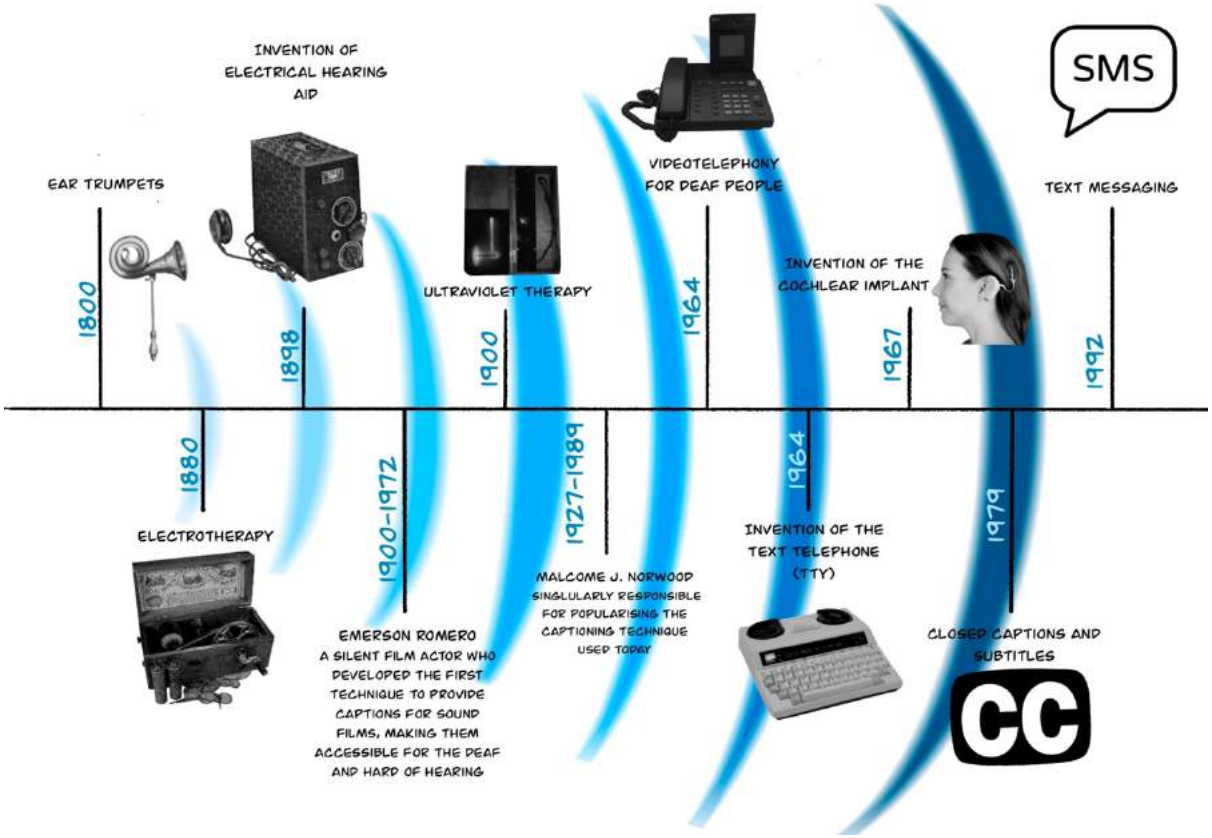
Peer Review Notes

Notes from Ellanor Brown (Peer) 13/03/2024:

- Good coherent essay.
- Excellent use of precedent studies.
- I really like the table at the end of your precedents as it makes it clear why you have used those studies.
- Could possibly make site figures like wind noise etc bigger as not very clear.
- Make sure to finish your reflection using the gibs reflection.
- Your design strategy clear.
- Add bibliography.

Selection of Development Work





DEAF HISTORY - A TIMELINE OF THE TECHNOLOGY

1800 – EAR TRUMPETS
THE EAR TRUMPET WAS FIRST COMMISSIONED BY FREDERICK. C. REIN IN LONDON. OTHER SIMILAR PRODUCTS WERE ALSO PRODUCED BUT THEY WERE GENERALLY TOO BULKY AND HAD TO BE SUPPORTED.

1880 – ELECTROTHERAPY
IT WAS BELIEVED THAT ELECTRICITY COULD CORRECT DEAFNESS CAUSED BY PARALYSIS OF THE AUDITORY NERVES.

1898 – INVENTION OF ELECTRICAL HEARING AID
THEY WERE CONSTRUCTED AFTER THE INVENTION OF THE MICROPHONE AND TELEPHONE. THE FIRST ELECTRICAL HEARING AID WAS CREATED IN 1898 BY MILLER REESE HUTCHINSON AND WAS CALLED ***AKOUPHONE.***

1900-1972 – EMERSON ROMERO
A SILENT FILM ACTOR WHO DEVELOPED THE FIRST TECHNIQUE TO PROVIDE CAPTIONS FOR SOUND FILMS, MAKING THEM ACCESSIBLE FOR THE DEAF AND HARD OF HEARING

1900 – ULTRAVIOLET THERAPY
USED TO COMPLIMENT THE GROWING USE OF ELECTROTHERAPY BY USING HIGH-FREQUENCY ELECTRICAL CURRENTS, IN ATTEMPTS TO CURE DEAFNESS

1927-1989 – MALCOME J. NORWOOD
KNOWN AS THE FATHER OF CLOSED CAPTIONING AS HE WAS THE LEADING ADVOCATE IN THE DEVELOPMENT ON CLOSED CAPTIONING ON TELEVISION AND WAS SINGLULARLY RESPONSIBLE FOR POPULARISING THE CAPTIONING TECHNIQUE USED TODAY

1964 – VIDEOTELEPHONY FOR DEAF PEOPLE
AT&T RELEASED A VIDEOPHONE CALLED THE PICTUREPHONE WHICH ALLOWED DEAF USERS TO COMMUNICATE FREELY

1971 – INVENTION OF THE TEXT TELEPHONE (TTY)
ROBERT WEITBRECHT INVENTED THIS PRODUCT WHICH ALSO ALLOWED DEAF OR PEOPLE HARD OF HEARING TO COMMUNICATE USING A PHONE

1967 – INVENTION OF THE COCHLEAR IMPLANT
AN INVENTION BY GRAEME CLARK WHICH ALLOWED DEAF PEOPLE TO RECIEVE A HEARING SENSATION THROUGH ELECTRICAL STIMULATION.

1979 – CLOSED CAPTIONS AND SUBTITLES
THE BBC WAS THE FIRST BROADCASTER TO INCLUDE CLOSED CAPTIONS BASED ON THE TELETEXT FRAMEWORK FOR PRE-RECORDED PROGRAMMING.

1992 – TEXT MESSAGING
GIVES DEAF PEOPLE INDEPENDENCE ACCESS TO LONG DISTANCE COMMUNICATION WITH BOTH HEARING PEOPLE AND DEAF PEOPLE

History of Hearing Aids (The history of hearing aids)

1634	In 1634, the Ear Trumpet was invented. These devices worked by collecting sounds and funneling them into the ear
1790	The Ear Trumpet becomes more common, and is seen in every-day-use
1800	The first company to begin commercial production of the ear trumpet was established by Frederick C. Rein in London in 1800
1812	The first bone conduction hearing aid is invented. Sound was conducted by a wooden rod placed against the teeth of the speaker and listener. Vocal vibrations were passed down the rod and picked up by the cochlea of the listener
1853	A London surgeon develops the first implantable artificial eardrum
1879	One of the first patient testing audiometers is developed by David Hughes
1885	Alternative conversational tools are developed with the Duplex Conversational Tube being a popular product. The device allows the hearing impaired listener to hear their partner, as well as their own voice
1892	The first electrical hearing aid is developed. The Akouphone was the first device to utilise electricity to convert a weak signal into a stronger signal
1904	Oticon is established in Denmark as a hearing aid distributor by Hans Demant
1910	Siemens begin manufacturing hearing aids
1912	The first volume control is introduced into an electrical hearing aid
1920	The first hearing aid to use vacuum tubes is invented. The Vactuphone was battery-powered and employed a single triode. A large hearing aid, this device was bigger than a box camera, therefore not particularly portable
1923	The first electrical bone conductor is invented and quickly implemented into audiometers for better diagnostic testing
1926	Halsey A. Frederick receives the first US patent for custom made earpieces
1930	An early, pre-war, crystal microphone hearing aid
1932	The first wearable bone conduction hearing aid is introduced by Sonotone
1934	Vacuum tubes are successfully miniaturised allowing for smaller wearable vacuum tube hearing aids
1938	Telex release a small werable vacuum tube hearing aid
1944	Ardente bone conduction body worn hearing aid is invented
1946	Samuel Ruben developed a balanced mercury cell which was useful for military applications, such as metal detectors, munitions and walkie-talkies. After the WWII, the battery system was adopted to small electronic devices, such as hearing aids

1947	Beltone announce the launch of the "audio-selectometer" - the first electronic master hearing aid for hearing aid programming
1950	The revolutionary transistor technology is employed by hearing aid manufacturers. Transistor devices have lesser voltage requirements, and are much smaller than vacuum tubes. This allows for significant miniaturisation of hearing devices. This technology paves the way for behind-the-ear and spectacle worn devices
1954	The first commercial spectacle hearing aids are launched
1955	The first so-called "in-the-ear" hearing aid, the D-10 Magic Ear is released – it concealed all electronic components in a shell snapped onto an earmould
1961	Amplivox Secret BTE hearing aid is launched
1969	The first hearing aid to utilise directional microphones is introduced
1970	Qualitone release their new Spectacle Hearing Aids
1975	Invention of the Phonic Ear HC527 Rechargeable Body Aid
1977	The Zinc-Air battery is invented. This battery is smaller and has a greater capacity than mercury batteries. This allows for further miniaturisation of hearing aids and allows for manufacturing of ITE hearing aids
1978	Launch of the Super Front, Phonak's first superpower BTE hearing aid
1982	Widex Audilens ITE modular aid, originally designed for German market, is released
1982	American Resound company produced the first pre-digital remote control for their BTE and ITE instruments
1984	Craigwell released the first fully automatic twin-channel BTE hearing aid
1986	Phonak launch a remote control for the 1st twin microphone BTE/ITE hearing aids
1987	The first models of digitally programmable hearing devices are introduced by Bernafon/Maico (1987) and Widex (1988). Using conventional analogue circuitry, they can be programmed electronically from a specially designed computer and software. The Widex Quattro system features a user-operated remote control which can also be used to program the instrument
1988	The launch of Solar Ear's first solar-powered rechargeable pack, with conductive charging or cells within the hearing aids
1990	GN Resound manufactures a dynamic range, multi-band, compression system. This allows for separation and different amplification for soft and loud sound inputs
1991	Oticon release the first fully automated hearing aid. The "Multifocus" had no volume control or program button, and was the first hearing aid that required no input from the wearer

1992	Danavox release the first hearing aid to use digital feedback suppression
1993	Phonak PICS - first twin microphone hearing aid
1994	The first programmable CIC with volume control and program button is released by Maico Electronics
1996	Widex Senso is the first fully programmable digital hearing aid to be successfully commercialised
1996	Widex Senso Programming Unit is launched for the first digital signal processing hearing aids
1997	Siemens release the first digital hearing aid to utilise dual-microphone technology
1998	The first Phonak digital BTE, the Claro emerged on to the market, with a remote control
1998	Hansaton produced a built-in rechargeable cell hearing system for both BTE and ITE hearing aids, using induction charging
2000	Sonic Innovations were among the first to manufacture standard CIC digital instruments
2001	Oticon develop an innovative speech focused algorithm called "Voice-Finder". This processing allows full prescription amplification when speech is present, but reduced comfortable volume when speech is absent. The Oticon Adapto was the first to utilise this technology
2003	The first RIC/RITE is invented
2005	90% of hearing aids provided in the UK are now digital
2006	Oticon launch their first RIC hearing aid the Delta
2011	Siemens launch the Aquaris, the first waterproof hearing aid
2014	GN Resound launches the Linx "the world's smartest hearing aid" which enables users to control and stream media to their hearing aids from their smartphone.
2016	Oticon presents the OPN, the world's first hearing aid to communicate with the internet

Deaf History – Technology

1800: Eartrumpets	The first firm to begin commercial production of the ear trumpet was established by Frederick C. Rein in London in 1800.
1880: Electrotherapy	As electricity became a part of everyday lives in the nineteenth-century, practitioners became excited about its applications for deafness and other ailments.
1898: Invention of electrical hearing aid	The first electronic hearing aids were constructed after the invention of the telephone and microphone in the 1870s and 1880s. The technology within the telephone increased how acoustic signal could be altered. Telephones were able to control the loudness, frequency, and distortion of sounds. These abilities were used in the creation of the hearing aid.
1900 – 1972: Emersion Romero	Emerson Romero was a Cuban-American silent film actor who worked under the screen name Tommy Albert. Romero developed the first technique to provide captions for sound films, making them accessible for the deaf and hard of hearing; his efforts inspired the invention of the captioning technique in use in films and movies today.
1900: Ultraviolet Therapy	Ultraviolet therapy arose during the late nineteenth-century and early twentieth century to compliment the growing use of electrotherapy by using high-frequency electric current, in attempts to cure deafness.
1927 – 1989: Malcolm J. Norwood – The Father of Closed Captioning	As television developed in the 1950s and 1960s the deaf were virtually left out. As the head of DCMP, Norwood became a leading advocate for the development of closed captioning on television and was singularly responsible for popularizing the captioning technique now used in television.
1964: Videotelephony for deaf people	One of the first demonstrations of the ability for telecommunications to help sign language users communicate with each other occurred when AT&T's videophone (trademarked as the 'Picturephone') was introduced to the public at the 1964 New York World's Fair –two deaf users were able to freely communicate with each other between the fair and another city.
1964: Invention of the Text Telephone (TTY)	The TTY came into being because of a deaf man named Robert Weitbrecht, the device's inventor. Weitbrecht was born in 1920 and died in 1983. Born deaf, he had difficulty learning to talk and was teased for his disability. He

	grew up to become an astronomer, physicist, and a licensed ham radio operator. Many people don't know that he also worked on the Manhattan project and invented the Geiger counter to measure radioactivity. However, it was his experience as a ham radio operator that led to the development of the TTY. In the late 1970's and through the 1980's, much smaller and compact versions of the TTY were manufactured, marketed, and made available through state TTY equipment distribution programs.
1967: Invention of the Cochlear Implant by Graeme Clark	In the mid-1960s, while working as an ear surgeon in Melbourne, Australia, Professor Clark came upon a scientific paper by Blair Simmons in the US. It described how a profoundly deaf person received hearing sensations through electrical stimulation, but no speech understanding. The seed was planted, and in 1967 he began researching the possibility of an electronic, implantable hearing device: a cochlear implant. In 1978, the first cochlear implant surgery took place. And he and his dedicated team discovered in 1978 how speech could be coded with multi-channel electrical stimulation. Professor Clark's determination had paid off. From his success, Cochlear Limited was born. Its purpose: to make Professor Clark's innovative multi-channel cochlear implant commercially available all over the world. Today, hundreds of thousands of severely or profoundly deaf children and adults worldwide have received a cochlear implant from Cochlear.
1979: Closed Captions and Subtitles for hard-of-hearing and deaf	The British Broadcasting Corporation (BBC) in the UK was the first broadcaster to include closed captions (subtitles in the UK) in 1979 based on the Teletext framework for pre-recorded programming. It now offers a 100% broadcast captioning service across all 7 of its main broadcast channels.
1992: Text messaging	SMS (short message service) is the text messaging service component of most telephone, Internet, and mobile device systems. Since it is used by most hearing people, it gives deaf people direct abd independent access to long distance communication with both hearing and deaf people.

Making the Arts Deaf Friendly (National Deaf Children's Society)

Taking part in art activities can help deaf children and young people to:

- ⇒ Feel more confident.
- ⇒ Learn new skills.
- ⇒ Improve their communication.
- ⇒ Explore and understand their emotions, identify and the world around them.
- ⇒ Be creative and imaginative.
- ⇒ Broaden their horizons.
- ⇒ Have fun!

Consider:

- ⇒ Staff training (arts practitioners) and awareness.
- ⇒ Important that everyone can adapt activities so deaf children and young people are included in all aspects of the organisation, including at break times and social events.

Design Strategies:

- ⇒ Arrange the room so its circular rather than linear.
- ⇒ Well-lit for lip reading.
- ⇒ Clear signage.

One of the main challenges is missing information or instructions:

- ⇒ Well-lit for lip reading and reading body language.
- ⇒ Visual cues such as pointing at what you're talking about.
- ⇒ Demonstrate a movement but don't speak at the same time.
- ⇒ Use images and a variety of mixed media.
- ⇒ Use soundproof/ quieter room if struggling or missing info.

Circus Skills:

- ⇒ May not be possible to give instructions once they're in air.
- ⇒ Give instructions at ground level and check if understood.
- ⇒ Use pre-arranged signs or gently tug/ waggle silk to get attention.
- ⇒ Do not demonstrate and speak at the same time.

Balance:

- ⇒ Be aware deaf children and young people may find balancing activities difficult.

⇒ Balance can additionally affect when hearing aids or cochlear implants aren't being worn.

Acting:

⇒ Working from a script:
- Sit in circle when reading in groups.
- Be aware may look down to read script and miss something.
- Use interpreter.
- Visual symbols can be used to support learning skills.

⇒ Script writing and devising:
- Devising drama may be more accessible than working from a script.
- Use visual approaches to develop the script, like creating a storyboard or table aux or using mime.

Performances:

⇒ Managing cues:
- Maximises use of visual cues.
- Where auditory cues are needed, have someone on the opposite side of the stage/ venue to signed when to go on stage.

⇒ Managing calls:
- If use tannoy system to call performers to the stage, you could consider:
  - Buddy a deaf child.
  - Designate a staff member.

⇒ Blackouts:
- Give directions before any blackout.
- Tell deaf people if a blackout is happening and how long it was.
- Have a small lamp backstage.
- Make sure they're with someone when it happens.

Photography:

⇒ Teaching:
- After giving instructions allow time for a child to look at camera before talking again.

⇒ Darkrooms:
- Light will be very low so make sure they are prepared.
- Go through instructions before going into darkrooms, provide written instructions they can take in with them.

Dance:

- ⇒ Position yourself so they can read your lips and see gestures.
- ⇒ Verbal instructions first without movement, followed by a practical demonstration.
- ⇒ Practice routine facing the class or Infront of mirror.
- ⇒ Eliminate additional background noise before giving instructions.
- ⇒ If using unfamiliar terminology to deaf children – provide written as well.

Music and Dance:

- ⇒ If a person is able to hear music or feel the bass/ beat. Using live drum/ instrument can be more effective than a recorded track.
- ⇒ Teach them to understand the beat/ rhythm visually then introduce them to music.
- ⇒ Use visual clues, such as hand movement or dap to signal beat.

When sound is part of dance:

- ⇒ If tap dance or Irish dancing – students may not be able to hear sound of shoes.
- ⇒ Need to teach them to understand how their feet feels when the correct sound is produced, therefore linking the association between foot movements/ positioning and sound.
- ⇒ Try to teach how to count the beats.
- ⇒ Learning to count can be taught using simple clapping exercise, distinguished between whole notes, half notes, quarter notes, eighth notes, sixteenth notes and accented notes with and without syncopation.

Prevalence of hearing loss around the UK

"Prevalence of hearing loss by Local Authority area (2014 ONS estimates)"

Area	Total population	Estimated number with hearing loss (rounded to the nearest 500)	%
England	54,316,618	9,235,000	17
North East	2,618,710	471,500	18
North West	7,132,991	1,233,000	17.3
Yorkshire and the Humber	5,360,027	921,500	17.2
East Midlands	**4,637,413**	**821,000**	**17.7**
Derbyshire	**779,804**	**149,500**	**19.2**
West Midlands	5,713,284	985,500	17.2
East	6,018,383	1,083,500	18
London	8,538,689	1,081,000	12.7
South East	8,873,8181	1,578,500	17.8
South West	5,423,303	1,060,500	19.6

Signs for Change

Documentary by Rose Ayling-Ellis

BSL is starting to be recognised as a language.

Struggle with their identity – performing arts are a way of expressing themselves.

A profound moment w Rose finding her identity was when she was 15 and her mum found her a weekend workshop for deaf teenagers – they once wrote a little play and made a movie.

Chris – words at leading architecture firm. 1 of 5 in the country.

- ⇒ Lighting, circular seating – communication relies on eye contact, not listening. Transparent screens between rooms so know what's going on.
- ⇒ He has to make new BSL signs up for words like masterplan and gentrification.
- ⇒ He wish's more people could sign instead of him being able to talk.

Most deaf people leave school with a reading age between 9 – 11.

Rose reading scores:

- ⇒ Reading age of 13 (she's 28)
- ⇒ BSL (most native speakers score between 24-29/ 40) Rose scored 28/40

Cochlear implant which connects to the auditory nerve in the brain – available on the NHS for over 30 years.

We listen by our brain – our ears are just a way in.

Today, 48% profoundly deaf children have a cochlear implant.

Creative sign – a new way of acting.

Parents have to pay to learn sign language – it's a second option.

Silence has beauty in it.

Don't overcome, embrace it.

Sourde

André Djourno and Charles Eyriès are widely recognized as the first to implant an electrical auditory prosthesis, stimulating the development of the modern cochlear implant. Djourno had developed a device for remote stimulation of motor nerves in the early 1950s. In 1957, Eyriès implanted this device in a deaf human subject and successfully stimulated the auditory nerve. Roger Maspétiol implanted a second patient in 1958. Based on these experiments, Djourno anticipated many features that have since been incorporated into modern cochlear implant design. Despite a promising start, the work was complicated by interpersonal and ethical conflicts and abandoned in 1959.

https://pubmed.ncbi.nlm.nih.gov/18792116/