LISTEN

A Sensory Experience

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LISTEN
A Sensory Experience

A Design Thesis Submitted to the Department of Architecture and Landscape Architecture of North Dakota State University

By
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In Partial Fulfillment of the Requirements for the Degree of Master of Architecture

Primary Thesis Advisor

Thesis Committee Chair

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Fargo, North Dakota
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This thesis project uses interpretive and evaluative research methods to examine how best to bring two social circles together through intentional design, education, and immersion. The project is a design proposal for a sensory museum for the hearing population located in San Francisco, California. This project is a combination of an immersive experience facility combined with a community theatre space to promote the exchange of information, culture, and education for all. Though architects follow guidelines for ADA requirement, in those codes there is nothing said about designing for the deaf. This museum is a place for the deaf and hearing communities to come together in an environment built to raise an awareness into a world without sound. The different spaces incorporated highlight innovative technologies, materials, and architectural design. With the help of the National Theatre for the Deaf and Gallaudet University, this project attempts to use history, experience, and architecture to bridge the gap between two social communities creating a better understanding and more opportunities for both. This project aims to create an immersive experience into a world without sound in order to bring to the forefront an awareness for the everyday challenges it brings. By focusing on spatial arrangement, materiality and the implementation of technology, I create spaces that promote the exchange of education, culture, and community between the Deaf and hearing populations.

“In a world without sound, everything still speaks; you simply have to change how you listen to it.”
the National Theatre for the Deaf, Gallaudet University, and a wealthy benefactor have come together with an idea for a new type of educational building that focuses on education for the deaf and community integration. The National Theatre for the Deaf has been looking to build a place for deaf theatre to come and educate and perform. This is a national movement to expand deaf theatre and bring it to deaf communities and universities throughout the country educating and performing both deaf individuals and members of the hearing community. The National Theatre for the Deaf’s goal is to unite communities through art and performances.

In conjunction with Gallaudet University, the building would be the new model for schools with a strong focus on innovation and intentional design within the deaf community. Gallaudet is the largest deaf college in the United States and they want to collaborate on an outreach program that focuses on community integration. The project's main emphasis is in trying to change how they go about their day-to-day life. Then, the public will be more able to understand the deaf world, but educating the hearing world about the potential and the capabilities of the deaf community.

This project proposes the design for a school that focuses on the deaf youth of America. They want to provide a place for the deaf community, allowing deaf individuals to assimilate into a hearing world, but educating the hearing world about the deaf. This project will look to remedy thisdivide.

The building will be designed as a school to educate deaf students; combined with a cultural space that facilitates in the education of the hearing population about the challenges, capabilities, and daily life of a person immersed in Deaf culture. Education and assembly, sensory museum, will be used by different social groups together into a public community that strives to bridge the gap between the deaf and hearing communities, bridges the social gap between different social groups, allowing them to come together and collaborate.

The project's main emphasis is in the development of new and innovative teaching practices. The project redefines the standard for universal design. The public spaces that will be used are educational spaces for the hearing population, such as the theatre and assembly. The public will be used by different social groups, allowing them to come together and collaborate. The project's main emphasis is in the development of new and innovative teaching practices.

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space is experienced. With this design emphasis, deaf individuals will be able to thrive in the built environment. Through the project’s design and implementation, one will reconsider the definition of universal design and adapt it to include more than just the architectural population.

The primary goals of this project are to unite, educate, and thrive. Through the combination of typologies, I hope to propose a way to bring together two social circles that only interact on a superficial level. While bringing people together and allowing for intentional built environment, the goals is to educate. Educate both the hearing population and the student to experience Deaf Space as well as Deaf Culture; and to educate the student enrolled at the school. Through exceptional education, both social circles and individuals will be able to thrive with maximum knowledge. Students will learn to thrive. Through the combination of education, both social circles and individuals will be able to thrive with maximum knowledge. Students will learn to thrive. Through the combination of education, both social circles and individuals will be able to thrive with maximum knowledge. Students will learn to thrive. Through the combination of education, both social circles and individuals will be able to thrive with maximum knowledge. Students will learn to thrive.

In addition I plan to use modeling as a way to develop the development of space as well as Deaf Culture. Modeling will be started. Following that, material choices will be made based on research. This research will include case studies and case analysis. In the following weeks the structure of the building will be used to look back at historical projects similar in design and function, then provided for reference where appropriate. Sources will be left out and credited or information gathered at the time the research is completed as to not reveal and issues that need to be resolved. As the spaces develop, modeling will be completed to evaluate the quality of the spaces being designed. Next, research will be done pertaining to passive and active technologies and how to implement them to create a net zero design. This research will include case studies and case analysis. In the following weeks the structure of the building will be completed first. This will provide a basis for which the project will be built and develop. Project Schedule

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Hearing school with and interpret that deaf students in a mainstream learning environments. They found an environment designed specifically for Deaf students have been shown to a positive learning experience. An environment that is conducive to spatial details that aid in communication and the implementation of sign and toward a more intentional design. Specific considerations need to be made in regards to spatial design in deaf schools. In addition to improving learning, the school would provide a place for young deaf students to interact and be a part of their peers' best interests. It's a network of people because it represents a strong support mechanism within a hearing society, which isn't the only factor that needs to be considered when addressing materiality within a deaf school. Materiality and spatial design in deaf schools due to the absence of a lack the sense of sound, colors are important. Our brains are hardwired to notice differences in color. The colors we perceive change depending on the light and materiality. We can actually stimulate a distinct part of our brain that can be measured by functional magnetic resonance imaging (Meacham, 2015). Each color elicits its own specific response and can be both positive and negative. When implementing these colors in a school, intentional design is critical. The Office of Campus Design and Planning at Gallaudet University, bri...
For example, people take for granted. For example, there are many sounds that hearing people hear that are not audible to people who are deaf or hard of hearing. Communication is the key to understanding our environment through sound. For some people, the sounds that they hear are more important. They preserve the history of communication. An example of this can be seen in the use of translucent or even opaque glass in large spaces like libraries. These spaces are designed to provide a place for individuals to communicate with one another while reducing the amount of visual distractions that can occur within the space. Communication design is as important as visual design in terms of spatial development. The spaces and materials that are used in the design of a building can affect the way that it is perceived by users. The materials and design of the space can influence the way that users communicate with one another. This can be seen in the use of technology, which can be altered to provide a space for communication. For example, the technology used in smart glasses can be altered to provide a visual representation of the sounds that are being played. With smart glasses, individuals can see the sounds that are being played in real-time, allowing them to communicate more effectively with one another. These technologies can be used in a variety of settings, from classrooms to meeting rooms. They can be tailored to meet the needs of different users, allowing for a more inclusive and effective communication environment. In conclusion, the design of spaces must take into account the needs of all users, including those who are deaf or hard of hearing. By incorporating technology and other considerations into the design process, we can create a more inclusive and effective communication environment for everyone.


The National Theatre of the Deaf was established in the 1960s and has been the longest standing theatre company in the United States. They go on tours producing original shows for their deaf audiences. Founded by Dr. Edna Simon Levine. All of the shows incorporated American Sign Language with vocal interpretets. They encourage young deaf individuals to pursue their dream in a big way.


Electrochromic devices change light transmission properties in response to voltage and allow control over the amount of light and heat passing through. Electrochromic windows change the color in response to voltage and allow control over the amount of light and heat passing through. Smart glass. (2016, September 4). In Wikipedia, the free encyclopedia. Retrieved from https://en.wikipedia.org/w/index.php?title=Smart_glass&oldid=737633587


The absorption is the absorbed energy is transformed into heat and the rest is transmitted through the absorbing body. The energy transmitted into the material is said to be ‘lost’. When sound collides with a material, part is reflected, transmitted, and absorbed. The absorption is a factor in soundproofing, which aims to absorb as much energy as possible. Soft furnishings are good insulators. Dense, heavy materials reflect the most sound.


This study examined whether full access to ASL as a medium for instruction could influence performance. Three groups of children ages 6-14 were placed in different learning environments; two groups of deaf children participated. One group was placed in a mainstream school with a single interpreter, the other in a bilingual-bicultural school. The bilingual-bicultural group performed significantly better on lexical comprehension and theory of mind tasks.


Color is processed in multiple parts of the brain. Recognizing color has specific neurological patterns. Color also aids in pattern recognition. Research has shown that subjects performed five to ten percent higher on pattern recognition texts given in color rather than black and white. Color stimulates specific brain functions. This study showed how the brain reacts when exposed to different colors.

Color is an essential part of the brain. It is processed in multiple parts of the brain. Color also aids in pattern recognition. It has specific neurological patterns. Color also affects the brain in multiple ways. A study shows how the brain reacts when exposed to different colors.


Electrochromic devices change light transmission properties in response to voltage and allow control over the amount of light and heat passing through. Electrochromic glass changes color in response to voltage and allows control over the amount of light and heat passing through.

Electrochromic devices change light transmission properties in response to voltage and allow control over the amount of light and heat passing through. Electrochromic glass changes color in response to voltage and allows control over the amount of light and heat passing through.
These case studies look into different aspects of Deaf Space. Each project sheds light on a slightly different typology and analyzes the space created through intentional design. The following projects emphasize that intentional design for a community without sound can create a beneficial architectural experience that can enhance their world. Using specific materials and innovative technologies, paying attention to lighting and spatial development, and making small yet intentional adjustments, can result in spaces that contribute to the well-being and functionality of deaf students and individuals within their built environment. All of these lead to a positive learning space for students to create a community and grow with all of the potential possible.
The Living and Learning Residence Hall at Gallaudet University takes a new look at the development of “deaf space.” LTL and Quinn Evans Architects paired with Gallaudet’s ASL and Deaf Studies Department to create an exemplary building tailored to deaf, cognitive, linguistic, and cultural ways-of-being. The program was expanded to include public gathering spaces, student residence, classrooms, offices, and collaboration studios. Gallaudet wanted to challenge the way in which residential and academic components of campus interact by changing the current separation between them and reactivating the mall as the center of university life.

The designers were extremely careful to make sure that communication between the spaces was possible. This was accomplished by using transparent materials, open spaces separated by partitions, and vertical voids in space. Movement through the spaces was addressed by using sloped walkways and by extending the tread in the stairs. Communication was also facilitated by the use of specific colors; muted blues and greens that contrast with most skin tones. The classrooms were integrated near group spaces encouraging collaboration among the students. This also brought life back to the main mall, revitalizing it and creating a center for community and activity. The spaces move vertically from public to private; multi-purpose and larger class rooms on the main floor, then dorms on the upper floors.
Spatial development can revitalize and create community among deaf students. By combining residential and public learning spaces within the same building, Gallaudet University was able to bring new life back to this part of campus. Communication is key throughout this process and can be aided by the use of specific colors and materials, as well as the way in which the students move about a space. The designers did a great deal of consulting with the users of the space which benefited in the development of a space that people wanted to be in. Though pairing my project with residential wasn’t in the initial plan, it may be something to consider moving forward.
Skådalen Skole

Skådalen Skole by Sverre Fehn is a school for the deaf built in the early 70s on the Holmenkol-lenåsen on the outskirts of Oslo, Norway. The school is a small campus surrounded by nature. Located on the hillside, the campus incorporates several dormitories, a sports and swimming hall, pre-school, cafeteria, and kitchen. The intention was to create an appropriate surrounding for the deaf children. Fehn designed the buildings carefully as he considered the visual connections among windows and light-flooded rooms. The main material used in the design was concrete. This was an intentional design decision to prevent distraction within the learning environment.

Fehn designed the spaces to grow as the age of the students increased. He even designed specific furniture that varied in height to accommodate all ages. The campus was initially designed as a boarding school and was envisioned to be a home away from home for these young students. However the entire project was rejected by many of the parents as the initial plans were released to the public. The press called it “Concrete hell for deaf children.”

The design was an experimental exploration into materials. Concrete was used to prevent distractions. The concrete was paired with simple red brick to create some variation among the textures and large windows to let in ample diffused lighting. A few years later the school staff painted all of the exposed concrete white and installed false ceilings to improve the acoustics and cover the concrete. Many years later the concrete was re-evaluated and found to be an effective warming material.
Drawing Conclusions

Even though this project was rejected at the time, the material exploration adds to the campus. The large atrium and windows allow for plenty of diffused light. However, lowering the ceilings in the hallways creates a cave-like feel that isn’t as conducive to a beneficial learning environment. Concrete can still be used in the construction, especially in a climate that changes with the seasons as it’s a wonderful thermal barrier. The pairing of simple textures is a good way to prevent over-stimulation for deaf students, however pure white or concrete walls create a potentially oppressive environment. Again pairing the school with residential wasn’t something initially considered, but will be something to consider.
Roomroom

Roomroom is a single family residence designed by Takeshi Hosaka built in Tokyo, Japan. The home was designed for a family with two deaf parents and their unimpaired young children. The house is a simple box comprised of two stories and an accessible roof. The unique aspect of the dwelling is that there are a multitude of small windows, openings, and well holes placed throughout the house. The openings in the facades function as the bridge between the first and second floor to enhance communication. Some of the punctures function as conduits for plants and the incorporation of a rooftop garden.

The design features small openings that really bring the space to life. The openings allow for light, air, and life to circulate through interior and exterior spaces. Plants are also allowed to bridge the floors and flourish from the lower floor into the open upper space. The rooftop cut outs also flood the space with natural, diffused light and ventilation.

Communication is a key aspect to any family dynamic and this design embraces the unique way in which this family communicates. Sometimes, the children drop small toys to alert their parents. The small well holes also facilitate the communication between floors, they allow the parents to sign to each other through sign language.
Communication between people and the environment is a key aspect in the development of space. The innovative way to embrace the bridge between the upper floor and lower floor was a strong design decision on the part of the architect. The small spaces used in the house translate to larger atrium spaces within public buildings where the same line of sight for communication is still needed. Aside from the communication aspect, the space is simple and free of visual distraction, a common theme found throughout my research.
Dialog Im Dunkeln or “Dialog in the Dark” is an immersive experience into a world of a blind individual. This experience is lead by blind guides that bring small groups of people through a day in the life of a blind person. Through this experience they hope to “open your eyes” to a new world and the different challenges it brings with it. Each group is taken through the exhibition and their view of daily life tasks are met with a new perception. Blind guides lead the group providing a sense of security, while the participants experience the world through only sound, smell, and touch.

Blind guides lead tours of no more than eight people through the exhibition. During which participants are brought through a grocery store, crossing a street, a short boat ride, and into a coffee bar. The idea is that each of these tasks is simple but gives the sighted person a new perspective on daily life activities. The tours lasts about 90 minutes and goes through a course that is approximately 500 sq meters.

In 2014 this company successfully transferred this idea into a deaf experience. Deaf guides will lead groups of no more than twelve participants through soundproof rooms where they learn about the challenges of non-verbal communication. Participants are shown how to communicate with their expressions and gestures as well as listen with their eyes instead of their ears. Some of the challenges include: The Dance of the Hands, Gallery of Faces, Forms and Figures, and The Game of Signs.
An immersive experience like these are really interesting for those who are not hindered by an absence of a single sense. In both the blind and deaf exhibitions, participants have an opportunity to broaden their horizons and change their perception of the world and how to interact with it. I believe this knowledge is imperative because it allows for understanding and eliminates fear of the unknown interactions. I want to implement some of these aspects as I draw people into a world without sound. My goal is to bring to light the day to day challenges as well as open eyes to new ways of communication and a better understanding of deaf culture.
The primary function of this building is to create a place where the deaf and hearing communities can come together to share information, culture, and experiences. The spaces within the building accommodate the deaf community while creating an immersive experience for hearing individuals. As you progress through the building, you encounter different aspects of deaf life. The spaces progress and lead a hearing individual through a day in the life of a deaf individual, bringing to attention the differences in everyday challenges the deaf community faces.

The architecture, materials, and technology aim to exemplify deaf space and create spaces that highlight the non-auditory senses in hearing individuals. The main goal is to bring to a forefront an awareness of deaf culture and change give a new perspective on spatial navigation and communication. Additionally, the program includes spaces that bring together both communities to facilitate interaction and the exchange of information, experience, and culture.
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### Qualitative Comments

The footprint of the building takes up only a small portion of the site. This allows for less disruption of the land and more access to outdoor elements for activities. The track and field do take up a chunk of the land area, however, potentially partnering with the middle school across the street would be an option to promote collaboration.

The classroom set up is divided so that the upper floor’s primary use is for the younger students. The older students who have to move between classes are on the middle floor allowing them more convenient access to the community spaces such as the library, computer labs, gym, and theatre.

Floor one houses many of the community spaces. The spaces become more private as you ascend in elevation. The second floor is comprised of mainly class rooms, however the community library and computer labs are also housed on the floor. Lastly, the third floor is made up of more class rooms and faculty offices. If I were to incorporate housing into the project, that would be the upper most floors ensuring the most amount of privacy.
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**Qualitative Comments**

Through further research, the program of the building shifted from an educational facility to a sensory museum. The footprint of the building takes up only a small portion of the site. This allows for less disruption of the land and more access to outdoor elements for activities. The theatre does take up a chunk of the land area, however it still leaves enough room for parking to be implemented or for additional use of the site by a separate contractor.

The layout is set up so that most of the elements are on the first floor. The few elements that are underground are also connected through sky-lights to the plaza above, utilizing the space in multiple ways. The theatre entrance is elevated slightly to create a grander approach.

The spaces are mainly organized along a linear path. This alignment provides a clear walk through of each space. The spaces progress from open to isolated then back to full integration within the theatre. There is external access to only one of the spaces from the exterior and that is the dance studio because it has a dual purpose and needs to be accessible from both the experience space and the general public.
Function
Since the state of California has the second highest deaf population and tourism, the introduction of a building of this nature will be located in a place where it can act as a link between the deaf and hearing communities.

Since sustainability is an important aspect to good architecture, this building will aim to be at least LEED Platinum with goals during design to be a Net Zero facility while promoting sustainability to the community that will occupy this building.

Form
Since line of sight is important among deaf individuals for communication, this building will have an “open” feel throughout in order to facilitate productive communication between students and faculty.

Since acoustical properties will be important in creating a “world without sound”, the building will incorporate innovative ways to use form, materials, and technology to insulate the building from unwanted noise.

Since a prominent aspect of this building is to connect two communities, the building will be designed to accommodate both.

Economy
Since the design has a high emphasis on sustainability, there will be a higher initial cost to develop and incorporate innovative technology and design.

Time
Since the area is rapidly growing, the timeline for the completion of this building should follow suit.
San Francisco is a growing metropolitan area that has a large deaf population and high tourism traffic. These aspects of the place are ideal when attempting to connect the deaf and hearing communities within a single space. The city is not too busy as to have too many attractions, however it does have an appeal that brings people in and lets them explore.

This site brings the project to a growing part of the city. There are connection to many different elements such as medical facilities, parks, restaurants, bars, educational establishments, and community gathering spaces. Introducing a building of this typology so close to downtown and the embarcadero, expands the tourism area and draws people into a wider range of the city. Currently the site is the temporary home of the trans-bay terminal, however after the new hub is built this site will maintain its close connection and be easily accessible from anywhere in the city.
San Francisco, California is the location picked for the site of the project. California has the second largest deaf population and an immense tourism industry making it a wonderful location for a sensory museum and theatre. The specific site is located in the SOMA district which is an up and coming part of the city with fast growing population and development.

The site has connection to many different amenities such as green spaces, medical facilities, educational institutions, and plenty of restaurants and bars. It is also located near the embarcadero, a major through way for the coast. There are plenty of public transit access points that connect to the rest of the city.
As seen in these site pictures, this part of town is growing quickly. It is connected to downtown and the financial district. There is quite a bit of new construction surrounding the site. The lot at this time is the temporary home to the trans-bay terminal. This provides connections to most places in the city as well as brings lots of traffic to the site. The Northern corner of the site is the most populated while the Southern corner is surrounded by mostly residential highrise apartments.
Through climate analysis these charts show that San Francisco is a relatively dry environment with moderately high temperatures that don’t have a large swing due to the proximity to the ocean. The rainy season spans most of the winter, resulting in hot and dry summers. There are more sunny days providing ample natural lighting opportunities. The wind comes mainly out of the southwest between 3 and 20 miles an hour, with the windy season being the beginning of the year.

This site map shows the amount of city noise, measured in decibels, that influences the site. The sound within a city, taking into account buildings, traffic, and human interaction, ascend about 1/4 of a mile from a single point. Any sound emitted beyond this distance doesn’t have much influence on the area. Measurements are shown based on activity within the building, traffic, and density of people.
This project combines two main building types. This represents both aspects of the project: education and community. With primarily steel construction, both portions of the project have the capabilities to be much larger than needed. This is beneficial because it allows for expansion as the school, community, and city grows. With such a large occupancy load, egress is always the main issue. The site has access on all four sides to facilitate in any emergency.
A - 1 [Assembly]

6,000 people

E (Education)

3,525 people

Occupancy Type


a + b = c

Construction Type

III A

Steel Construction

Occupancy Load = 1,000 people

42,000 Total
10,500 per Floor

70,500 Total
17,625 per Floor

(6,000 x 0.3) / 12 = 150 Ft. Total
50 Doors / 4 Floors = 12 Doors per Floor
(3 means of egress with 2 double doors)

(3,525 x 0.3) / 12 = 88 Ft. Total
88 / 3 = 30 Doors
30 Doors / 4 Floors = 8 Doors per Floor
(2 means of egress with 2 double doors)

Maximum Height

85'

Maximum Square Footage

Maximum Exit Width = 36’
Research Direction

Research will be completed by reviewing and analyzing articles and case studies pertaining to the deaf community. Research will be completed on the topics of light, sound, materials, schools, theaters, housing, and any other pertinent topic relating to the unifying premise.

All research completed on light and sound will pertain to the theoretical premise/unifying idea. Analysis will be completed on the effects that light and sound have on space as it pertains to deaf individuals. Conclusions will be made as to the most beneficial ways in which to implement and enhance the built environment.

Historical documentation will be analyzed to determine best how architecture has adapted to the needs of deaf individuals. Conclusions will be made in terms of programmatic requirements within the selected typology based on historical success of existing pertinent projects.

Research completed through the analysis of relevant typologies to determine their success in integrating one or more social groups. These studies will be evaluated and methodologies integrated into the final design.

Plan for Design Methodology

I will use a combination of methodologies to ensure a successful design solution. These methodologies include but are not limited to modeling, evaluative research, and logical systems research.

Modeling will be used to evaluate the quality of space being created. This will be achieved through both digital and physical models. Light, sound, material, and energy modeling will be the main aspects this type of research will help to address.

I will use evaluative research to analyze completed projects and evaluate their success with regards to the unifying idea. This will allow me to continually analyze my own design decisions as guided by the unifying theoretical premise.

Logical systems research will provide new insights as I attempt to combine typologies and create new interactions between uncommon aspects. This allows me to continually transform the relationships between design practices and social values as it pertains to the collaboration of the deaf and hearing cultures.

Plan for Documenting the Design Process

All physical deliverables related to this thesis project will be collected and compiled into a digital document. That document will then be submitted to the thesis advisor.

All images will be taken at 16 megapixels or higher to ensure good printing and viewing quality as to highlight the work as well as possible.

All digital files will be saved on an external hard drive to ensure safe keeping. They will then be uploaded to the North Dakota State University Architectural Repository and available online for future students, accreditation, and research.

All non-digital documents will be scanned in on a weekly basis then saved to the same external drive. Then they will be compiled into a digital file and submitted as process work.
This project leads the participants along a specific path throughout the building. Within each new space the attention is drawn to a different element or sense to be experienced. The transitions between the spaces are also important as they work to show change, create an experience in themselves, and alert you to the new experience to come.
The entrance of the thesis project aims to draw attention to the noise level within the volume of the space and transition the person from noisy to quiet. The space achieves this goal by using the architectural shape; transitioning from a tall ceiling height to a lower one. Additionally, the walls are lined with acoustical tiles that become thicker and are arranged in a more dense pattern as you progress through the space. To accentuate the transition from the noisy exterior space to the quiet interior, drop ceilings are used; more reflective materials closer to the entrance, then changing to a more absorbent material as you reach the interior door.

Smaller and tighter spaces elicit a sense of comfort and coziness. The confined space prevents excess movement and lowers the amount of ambient noise present within a space. These spaces are easily constructed with wood or softer materials that will absorb more sound waves than some of the harder materials required for larger construction. However, this doesn’t mean small spaces can’t and aren’t constructed out of concrete or similar materials. In spaces made of highly resonant materials, acoustical wall tiles are a solution to reducing the noise within a space. Due to the ceiling restriction, the panels can be mounted to the walls and vary in thickness.

Spatial volume plays a large role in the acoustical properties of a space. Larger spaces are generally louder and filled with more energy than that of a smaller space. Large volumes allow for more occupants and movement of both sound waves and people. This movement contributes to louder interior spaces. These spaces also require a more substantial structural system, lending to the use of harder materials that reflect sound, bouncing it all throughout the space. This reflection and reverberation of the sound waves causes echoes and more ambient noise. To compensate for the additional noise factor, implementing drop ceilings with acoustical tiles can reduce some of this reverberation, thus quieting the space and creating a more comfortable environment.
In the early 19th century, deaf education was largely inspired by the desire to save deaf people's souls. A form of visual communication was developed to help convey God's word as written and preached from the Bible. In 1817, a deaf teacher from France, named Laurent Clerc (left) partnered with American educational philanthropist Thomas Hopkins Gallaudet (right) to establish the first American School for the Deaf. The school was located in West Hartford, Connecticut. This was first school for the deaf in the western hemisphere. Clerc went on to teach at the school for 41 years, using his knowledge of French Sign Language, to influence the development of what we know today as American Sign Language (ASL).

In 1857, postmaster general Amos Kendall donated two acres of land in northeast Washington, D.C. to establish a school and housing for 12 deaf and 6 blind students. A year later he appointed Thomas Gallaudet’s son Edward Miner Gallaudet to the first superintendent. In 1864 the U.S. Congress authorized the Columbia Institution for the Instruction of the Deaf and Dumb and the Blind to confer college degrees; President Lincoln signed the bill into law himself. Edward Gallaudet became the president of the first deaf college in the world where he presided over the first commencement giving 3 deaf individuals their college diplomas. Each of their diplomas were signed by President Grant, and to this day all of the diplomas of Gallaudet graduates are signed by the presiding U.S. president. The school's name was officially changed to Gallaudet College in 1954 as an honor and tribute to Thomas Hopkins Gallaudet.

In the year 1872, Alexander Graham Bell promoted deaf education by opening a school that focused on the idea of Oralism. This teaching style is now regarded as very controversial and focused on teaching deaf students how to speak and communicate audibly instead of using visual means of communication. This lead to the 1880 meeting of The World Congress of the Educators of the Deaf where they passed a resolution to promote Oralism in deaf education all over the world. In turn this dismissed most of the deaf teachers from the schools.

In the early 20th century, deaf individuals saw the continual suppression of sign language in schools and the increasing importance and involvement of students in clubs and sports. With the goal of healthy competition and cultural and linguistic interaction, the International Committee of Sports for the Deaf was founded in 1924. That year they established the first World Games of the Deaf, or Deaflympics which took place in Paris, France. The Deaflympics now host over 4,000 deaf athletes every four years and host more than 200 sports.

1988 brought forth a major political movement within the deaf community called the Deaf President Now student demonstration. This was a student protest at Gallaudet University that aimed to overturn the decision to appoint a hearing individual as the seventh president of the university instead of one of the highly qualified Deaf candidates. The protest began on March 6, 1988 when the students, backed by many of the alumni, staff, and current faculty, shut down the campus. The protest ended on March 13 when all of the demands of the students were met and I. King Jordan became the first Deaf president in the history of Gallaudet University.
Every sound wave will reflect off of a surface and they can reflect with almost the same amount of intensity as the initial wave. This is how we get echoes and reverberation within space. The more surface area a sound wave can interact with, the more diffusion will occur, dampening the sound. Every sound wave will reflect off of a surface, and they can reflect with almost the same amount of intensity as the initial wave. This is how we get echoes and reverberation within space. The more surface area a sound wave can interact with, the more diffusion will occur, dampening the sound.

As sound encounters a surface, depending on the specific material, some of that sound will be absorbed. Softer and less dense materials have a higher absorption coefficient, making them ideal for soundproofing and acoustical design. These materials include fabrics, curtains, and foam. As the thickness of the material increases, so do the acoustical properties. When sound waves strike a flat surface, the wave reflects at an angle equal to that of the incident angle. However, when sound waves strike a jagged or uneven surface, they diffuse in many different directions, decreasing the volume as the sound is dispersed throughout the space. Acoustical tiles are designed with this in mind, as to diffuse the sound as much as possible. Therefore, the shape of the sound-proofing material also plays a factor in its effectiveness.

As shown in this graph, the shape of a material’s surface has an effect on the sound that is reflected back into the space. The more surface area a sound wave can interact with, the more diffusion will occur, dampening the sound.

As sound encounters a surface, depending on the specific material, some of that sound will be absorbed. Softer and less dense materials have a higher absorption coefficient, making them ideal for soundproofing and acoustical design. These materials include fabrics, curtains, and foam. As the thickness of the material increases, so do the acoustical properties. When sound waves strike a flat surface, the wave reflects at an angle equal to that of the incident angle. However, when sound waves strike a jagged or uneven surface, they diffuse in many different directions, decreasing the volume as the sound is dispersed throughout the space. Acoustical tiles are designed with this in mind, as to diffuse the sound as much as possible. Therefore, the shape of the sound-proofing material also plays a factor in its effectiveness.
The interior “exterior” space aims to create both isolation and interaction. Cameras mounted on the exterior face of the building record the outside world. Then projectors connected to the cameras display that life feed on the interior face of the wall. People on the outside cannot see what’s happening on the interior of the building, however they are interacting with the barrier as they become part of the interactive media installation on the exterior face of the building. People on the interior of the wall can see the interaction. Still completely silent, the person inside feels a sense of isolation due to the lack of ability to communicate with the interaction before them. Additionally, this space attempts to stimulate the other senses by incorporating vibrating strips on the floor that send a very small vibration when triggered by the cars driving over the sensors on the street. This is to bring into play more than just visual awareness of a space by incorporating other senses.
The experience of the dance studio is an important one because it incorporates an aspect of life that most people don’t consider when thinking about a world without sound. How does one enjoy or experience music without being able to hear the beat, listen to the melody, or sing the lyrics?

During the guided experience, you will be attending a dance class where you must learn a choreographed dance. However, you must do so without being able to hear any sound. This poses an interesting challenge and highlights the importance of visual and tactile cues. Dancing without sound challenges us as hearing individuals to rely on our internal beat instead of being influenced by our surroundings.
Additionally, this space acts as a community concert space focusing on creating a similar musical experience for both hearing and deaf individuals. The space is equipped with speaker cone walls that can amplify the vibrations of the music, vibrating platforms that pulse to the beat so that it’s not only heard but felt, and light and water elements that mimic the appearance of sound converting the three dimensional sound waves into a visual element.
The underground “emergency” space provides an experience that isn’t a common daily occurrence. By bringing you down and underground, limiting the lighting, and decreasing the volume of the space, a sense of intensity builds. This amplifies the tactile senses in the way that as you walk down the ramp you can feel the other people as they walk behind you. The vibrations can be felt from any place on the ramp surface and vibrates up through the handrails. The way, if you can’t see around the corner you can feel if someone is coming before you see or hear them.

The tunnel to that brings you underground from the dance studio to the “emergency situation” is an important transition. The ramp creates and isolation by bringing you underground, lowering the light levels, compressing the space, and isolating you from the outside world. The vibrations can be felt from any place on the ramp surface and vibrates up through the handrails. This way, if you can’t see or hear the person coming before you see or hear them.
The bubble is the last step in the experience before you are introduced back into the world of sound. This element is the reprieve after a stressful and high intensity experience underground. The bubble keeps the sound isolation, however it allows for visual interaction with the world outside of the building. A sense of calm and relaxation is achieved as you are lifted up into the plaza in front of the theatre.

The National Theatre of the Deaf was founded by Dr. Edna Simon Levine, a psychologist working in audiology. She formed the concept of a professional company of deaf performers and presented it to David Hays, Broadway set and lighting designer, who fell in love with the strength and beauty of Sign Language on stage. He persisted in his vision and helped Levine bring the expressive art to the main stage.

In 1965 a grant was given from the U.S. Department of Health, Education and Welfare that provided the funds for planning. Two years later, a national television program was aired exploring the newfangled idea of Deaf Theatre. They then held their first live performance at Wesleyan University in Middletown, Connecticut. The following year, The Little Theatre of the Deaf was founded; they still tour the country today.

In 1994, the National and Worldwide Deaf Theatre Conference came together in session to facilitate communication, develop techniques, and encourage young deaf actors to pursue their acting careers all around the world. The National Theatre of the Deaf has toured in all 50 states and 32 countries around the world.

The National Theatre of the Deaf provides an opportunity for the hearing community to come and experience the artistry of Deaf Theatre. The theatre allows for the stereotypes to be broken regarding the "disabilities" of deaf individuals.
Reference List


5th Year

Fall 2016
Malini Stravasta
Speculative Design

Spring 2016
Paul Gleye
Brussels Urban Design

Fall 2015
Boaz Al Arnad
High Rise

Spring 2015
Mark Barnhouse
Community Center
Fire Station

Fall 2014
Steve Martins
Community Center

Spring 2014
Cindy Ummez
Dance Studio
Bird House
Dwelling

Fall 2013
Darryl Booker
Tea House

Spring 2013

2nd Year

Fall 2013
Darryl Booker
Tea House

Spring 2013
Cindy Ummez
Dance Studio
Bird House
Dwelling

3rd Year

Fall 2014
Steve Martins
Community Center

Spring 2014
Mark Barnhouse
Community Center

Fall 2013
Darryl Booker
Tea House

Spring 2013
Cindy Ummez
Dance Studio
Bird House
Dwelling

“Since some reason no one from South Dakota wants to come up to North Dakota... I truly wonder why.”

Originally from Sioux Falls, SD

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