

# Reimagining Sensory-Inclusive Learning Spaces: A Deaf-Centered Framework for Higher Education Campuses

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## ABSTRACT

Higher education institutions are increasingly challenged to create learning environments that are not only physically accessible but also sensory-inclusive for Deaf and hard-of-hearing students. While existing accessibility standards commonly emphasize mobility and physical access, limited attention has been given to visual communication, sensory accessibility, and communication-oriented spatial design that support Deaf learners within higher education campuses. This study explored the sensory and spatial experiences of Deaf students within the School of Deaf Education and Applied Studies (SDEAS) of De La Salle–College of Saint Benilde and developed a qualitative design-based framework for sensory-inclusive learning environments.

Grounded in DeafSpace Theory and Universal Design, the study employed a qualitative phenomenological and design-based research approach. Data were gathered through semi-structured interviews, focus group discussions, campus observations, spatial analyses, and participatory design workshops involving Deaf students, faculty members, interpreters, accessibility advocates, and campus stakeholders. Thematic analysis revealed major barriers related to obstructed visual communication, inadequate lighting conditions, inaccessible emergency systems, spatial congestion, limited wayfinding support, and insufficient collaborative environments that support Deaf culture and social interaction.

Based on the findings, the study proposed a sensory-accessibility framework emphasizing visual connectivity, adaptive lighting systems, visually accessible emergency technologies, flexible classroom layouts, sensory-responsive learning commons, and participatory campus planning strategies. The study contributes to the growing discourse on Deaf-centered architecture and sensory-inclusive campus planning by advancing practical and context-sensitive strategies for improving higher education learning environments within the Philippine context.

**Keywords:** Sensory Accessibility; DeafSpace Theory; Inclusive Campus Design; Universal Design; Deaf Students; Higher Education Campuses; Participatory Design; Inclusive Learning Environments.

## Introduction

Inclusive education has emerged as a significant goal for higher education institutions globally, as universities increasingly acknowledge the need to provide equitable and accessible learning environments for students with varied abilities, identities, and communication requirements. Although accessibility policies and building regulations have markedly enhanced physical access via ramps, elevators, and mobility-focused features, numerous educational institutions still neglect the more comprehensive notion

of sensory accessibility, especially for Deaf and hard-of-hearing students. Current accessibility frameworks primarily emphasize physical mobility and unobstructed movement, although they frequently neglect visual communication, environmental awareness, sensory comfort, and communication-centric spatial design, all of which are vital to the educational experiences of Deaf students.

In the Philippine context, accessibility legislation such as Batas Pambansa Blg. 344 primarily addresses physical access, mobility, and barrier-free movement. Deaf students have unique issues related to visual communication, spatial awareness, environmental legibility, lighting quality, visual connectedness, navigation systems, and inclusive social engagement. These obstacles directly affect classroom participation, academic engagement, communication accessibility, environmental comfort, safety, and students' general sense of inclusion in higher education institutions. Educational settings that lack purposeful design for visual contact and sensory response may hinder the academic engagement and social experiences of Deaf students.

Recent global research on DeafSpace Theory, Universal Design, sensory-responsive architecture, and inclusive educational settings highlights the increasing significance of communication-focused and visually accessible campus design. Research indicates that Deaf learners depend significantly on spatial openness, visual continuity, facial visibility, environmental legibility, and sensory-responsive settings to facilitate sign language communication, learning engagement, and social involvement. Modern literature emphasizes the significance of Deaf-centered educational environments that foster identity development, communication equality, social inclusion, and culturally attuned learning experiences.

Despite these developments, contemporary research predominantly concentrates on pedagogy, inclusive education policy, classroom engagement, or broad accessibility issues, with less focus on sensory accessibility in the planning and architectural design of higher education campuses. Moreover, a significant gap remains in studies focused on Deaf-centered spatial design in Southeast Asian and Philippine higher education settings, where accessibility regulations are primarily compliance-driven and mobility-focused. Current campus planning methodologies insufficiently include visual communication, sensory cognition, environmental comfort, and spatial experiences focused on communication, which are vital for Deaf learners. Furthermore, limited research has established a qualitative and design-oriented framework especially aimed at directing the development, improvement, and realignment of Deaf-centered university learning environments.

The School of Deaf Education and Applied Studies (SDEAS) at De La Salle–College of Saint Benilde is recognized as one of the leading schools in the Philippines promoting inclusive education for Deaf students. However, evolving educational requirements, technological innovations, shifting pedagogical approaches, and heightened awareness of sensory accessibility require the reevaluation and improvement of current campus learning settings. It is essential to assess if existing spatial arrangements effectively facilitate visual communication, cognitive comfort, environmental legibility, social inclusion, and sensory-responsive learning experiences for Deaf students.

This study aims to create a qualitative design-based framework for sensory accessibility in response to these concerns. This framework will serve as a guide for the realignment and improvement of SDEAS learning facilities. The study contributes to the fields of architecture, urban planning, inclusive education, and educational design by proposing practical, participatory, and context-sensitive strategies that prioritize the environmental needs, communication practices, and lived experiences of Deaf learners. This approach is rooted in DeafSpace Theory, Universal Design, and human-centered educational planning.

This study seeks to answer the following research questions:

1. What sensory and spatial challenges do Deaf students experience within the learning facilities and campus environments of SDEAS?
2. How do existing campus spaces affect communicative participation, learning engagement, mobility, safety, and social interaction among Deaf students?
3. What spatial and environmental design elements are perceived by Deaf students as supportive of sensory accessibility and inclusive learning environments?
4. How can a qualitative design-based framework for sensory-inclusive learning spaces be developed to improve SDEAS learning facilities?

### General Objective

To develop a qualitative design-based framework for sensory accessibility that may guide the enhancement and realignment of SDEAS learning facilities at De La Salle–College of Saint Benilde.

### Specific Objectives

1. To explore the lived spatial experiences of Deaf students within SDEAS learning environments.
2. To identify sensory and environmental barriers affecting communicative participation, safety, learning engagement, and social interaction.
3. To examine spatial and environmental design strategies preferred by Deaf students and campus stakeholders.
4. To formulate a sensory-accessibility framework for inclusive higher education learning environments.

This study enhances architecture, urban planning, educational design, disability studies, and inclusive education by offering a localized perspective on sensory accessibility within higher education campuses. The study promotes equitable educational environments for Deaf students, highlighting the significance of visual communication and sensory requirements in academic participation. The research provides architects and planners with design methodologies grounded in user experience and Deaf-centered spatial planning. The results may guide future campus building, accessibility improvements, and facility planning for educational institutions and administrators. The study advances the discourse on inclusive urbanization and sensory-responsive design by transitioning accessibility conversations from mere compliance to comprehensive environmental inclusion and educational equity.

### Scope and Delimitation

The study examines the sensory accessibility and spatial experiences of Deaf and hard-of-hearing students at the School of Deaf Education and Applied Studies (SDEAS) at De La Salle–College of Saint Benilde. The study specifically investigates educational facilities, circulation systems, classroom settings, collaboration areas, and campus accessibility issues.

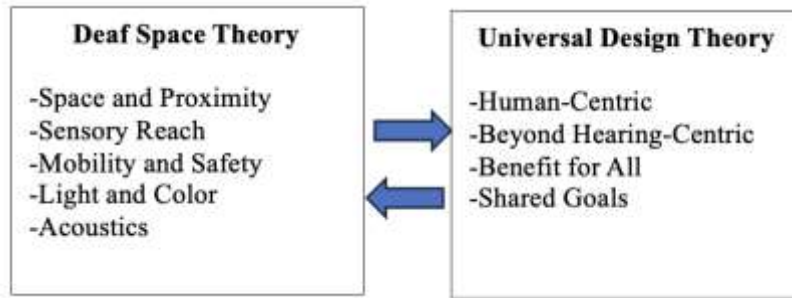
The study is confined to qualitative data obtained via interviews, observations, focus group discussions, and interactive workshops with chosen participants from SDEAS. The study does not include a quantitative evaluation of building performance or technical engineering analysis.

### Theoretical Framework

The study is anchored on Universal Design, DeafSpace Theory, inclusive pedagogy, and human-centered design principles. Universal Design emphasizes the creation of environments usable by all individuals regardless of age or ability. DeafSpace Theory highlights spatial principles specifically addressing the communication and sensory needs of Deaf individuals through visual accessibility, spatial awareness, and

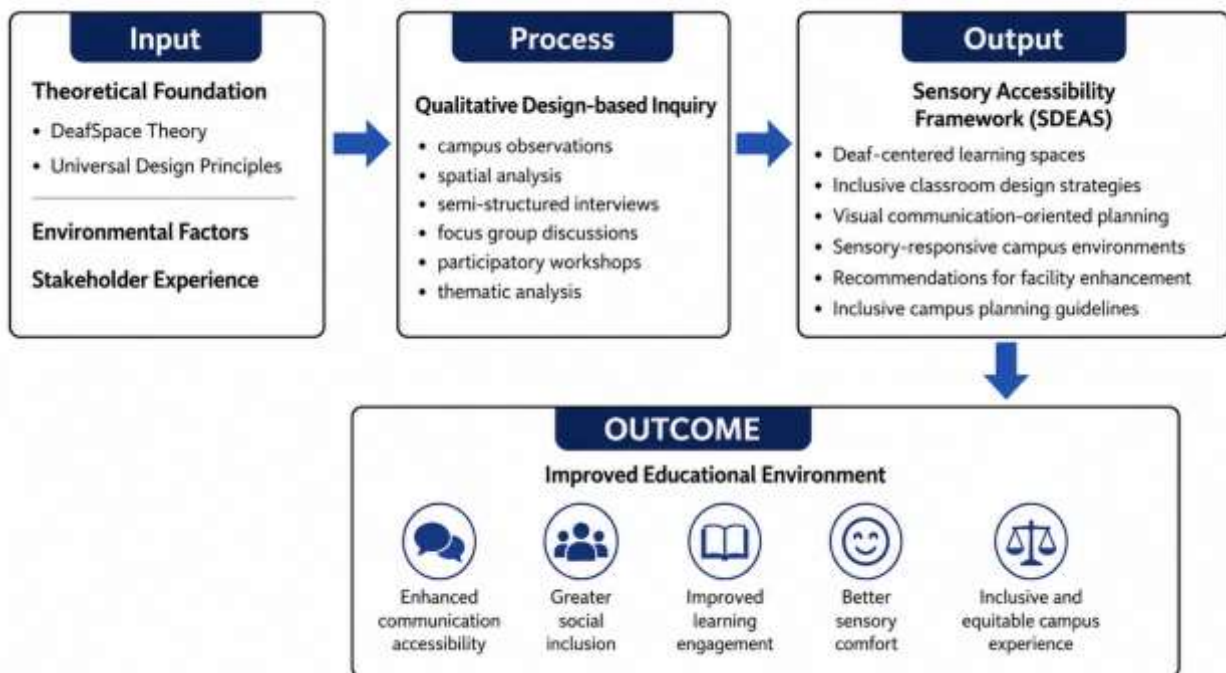
environmental comfort. Human-centered design further supports participatory and user-oriented planning processes that prioritize lived experiences and stakeholder engagement.

These frameworks collectively guide the analysis of sensory accessibility and the development of inclusive campus design strategies.



**Figure 1. Integrated Theoretical Framework Combining DeafSpace Theory and Universal Design for Sensory-Inclusive Learning Environments**

Figure 1 illustrates the comprehensive theoretical framework of the study, including DeafSpace Theory and Universal Design as the principal bases for analyzing sensory accessibility in higher education learning settings. DeafSpace Theory foregrounds spatial openness, visual legibility, sensory reach, and environments that support sign-language interaction, whereas Universal Design advocates for equitable, adaptable, and inclusive environments accessible to a variety of users (Edwards & Harold, 2014). The integration of these theories informs the creation of a sensory-accessibility framework aimed at enhancing the educational facilities of the School of Deaf Education and Applied Studies (SDEAS) at De La Salle–College of Saint Benilde.



**Figure 2. Input–Process–Output (IPO) Conceptual Framework for the Development of a Sensory Accessibility Framework for SDEAS Learning Facilities.**

### **Conceptual Framework of the Study**

The sensory accessibility of higher education learning environments is investigated through the integration of Universal Design and DeafSpace Theory in this study. The educational experiences, communication accessibility, social participation, and learning engagement of Deaf students in the School of Deaf Education and Applied Studies (SDEAS) of De La Salle–College of Saint Benilde are influenced by spatial and environmental design factors, as explained by the framework.

DeafSpace Theory underscores the significance of visual communication, spatial orientation, sensory awareness, mobility, and social interaction in the development of environments for Deaf individuals. It emphasizes the necessity of communication-centered environments that facilitate sign language interaction and environmental legibility, as well as of open visual corridors, appropriate illumination, visual connectivity, and flexible learning spaces.

Universal Design enhances this viewpoint by advocating for environments that are user-centered, accessible, and equitable, and that can be accessed by individuals with a variety of abilities without necessitating adaptation or specialized design. The development of inclusive educational environments that facilitate both accessibility and participation is guided by principles such as equitable use, flexibility, perceptible information, and low physical and cognitive effort.

The framework suggests that the incorporation of Deaf-centered spatial planning and inclusive accessibility principles enhances the quality of learning settings by augmenting visual accessibility, communication efficacy, environmental comfort, safety, social inclusion, and educational engagement. The study employs qualitative methods, including campus observations, interviews, focus group discussions, and participatory workshops, to identify sensory and spatial barriers faced by Deaf students and to develop a sensory-accessibility design framework for SDEAS learning facilities based on these findings.

Ultimately, the conceptual framework regards sensory-inclusive design as an essential element of educational justice, inclusive campus planning, and human-centered architectural practice.

### **Review of Related Literature**

#### **Sensory Accessibility and Deaf Learning Environments**

Recent literature emphasizes that accessibility in Deaf education extends beyond physical accommodation and should include sensory accessibility, visual communication, environmental awareness, and communication-oriented learning environments (Edwards & Harold, 2014; Partington et al., 2024). Contemporary studies argue that Deaf learners experience educational spaces differently due to their reliance on visual interaction, spatial awareness, and sensory cognition. Consequently, educational environments must be intentionally designed to support visual accessibility, communication continuity, and inclusive participation.

Research on classroom engagement demonstrates that Deaf and hard-of-hearing students encounter barriers when educational environments are not visually accessible or communication-oriented. Studies found that classroom participation is significantly influenced by obstructed sightlines, inflexible seating arrangements, and limited visibility of interpreters, instructors, and classmates (Todorov et al., 2022). Similarly, Partington et al. (2024) emphasized that educational environments directly affect the wellbeing, social-emotional development, and learning engagement of Deaf students. These findings suggest that sensory accessibility is closely linked to communication equity, educational participation, and emotional comfort within campus learning environments.

Environmental factors like lighting quality, visual continuity, spatial openness, and navigation systems are recognized as crucial elements of sensory-inclusive educational environments. Nózka (2023) contended that Deaf persons typically navigate situations using visual and environmental clues instead of aural information. Educational institutions should include visually accessible emergency systems, adaptive lighting, environmental clarity, and technology-enhanced communication systems to promote environmental awareness, safety, and accessibility. The evidence collectively indicates that learning settings lacking support for visual communication and sensory awareness may adversely impact the involvement, independence, and educational experiences of Deaf learners.

### **Deaf Identity and Spatial Experience**

Recent studies highlight that Deaf learners should be perceived not just through disability-focused lenses, but also via cultural, linguistic, and social frameworks that acknowledge Deaf identity, community, and collective lived experiences (Moriarty & Hou, 2023). Educational environments serve as both instructional spaces and socio-cultural contexts that affect belonging, participation, identity development, and interpersonal interactions among Deaf students. Research further emphasizes that Deaf communities are influenced by common communication methods, shared experiences, and visually focused interactions that enhance social connections and cultural identity (Moriarty & Hou, 2023). Supportive and visually accessible environments significantly contribute to social inclusion, emotional well-being, and academic engagement among Deaf learners. Smolen and Paul (2023) similarly discovered that accessible and inclusive educational environments enhance Deaf students' confidence, participation, and sense of belonging in higher education contexts.

The literature further indicates that social inclusion among Deaf learners is strongly connected to spatial experience and environmental design. Gentzke (2024) emphasized that school belonging and peer interaction contribute significantly to the educational experiences of Deaf students. Inclusive collaborative spaces, visually connected learning commons, and communication-centered social environments therefore play an important role in supporting Deaf identity, peer engagement, and community participation. These findings suggest that campus planning for Deaf learners should move beyond functional accessibility and incorporate culturally responsive and socially inclusive environments that strengthen communication accessibility and collective participation.

### **Communication-Centered Educational Design**

Modern literature increasingly emphasizes the significance of communication-focused and visually adaptive educational settings in aiding Deaf students (Edwards & Harold, 2014). Research indicates that educational accessibility must encompass not just physical accommodations but also communication-focused spatial design, adaptive technology, and sensory-responsive learning environments.

DeafSpace Theory emphasizes visual interaction, spatial orientation, sensory reach, environmental legibility, and communication-oriented design (Bauman & Murray, 2014). The approach acknowledges that Deaf persons depend significantly on visual interaction and environmental awareness to navigate educational and social contexts. Principles such as open sightlines, visual connectedness, adaptable classroom configurations, and dynamic lighting systems are crucial for facilitating communication accessibility and enhancing environmental awareness.

Research on Universal Design for Learning underscores the significance of adaptable and multimodal educational settings for Deaf students. Brandt and Szarkowski (2022) contended that communication accessibility must encompass visual learning aids, real-time captioning technologies, adaptive communication systems, and adaptable instructional configurations. Similarly, Modern (2025) highlighted

that visually interconnected and spatially expansive spaces enhance communication, environmental engagement, and social involvement among Deaf persons.

The literature emphasizes the increasing significance of technology-enhanced accessibility systems in educational settings. Digital navigation solutions, intelligent captioning technologies, visual emergency alerting systems, and adaptive communication platforms substantially enhance communicative participation, environmental safety, and autonomous engagement among Deaf learners (Watchorn et al., 2024). These findings endorse the creation of communication-focused and technology-enhanced learning settings that emphasize sensory accessibility and visual communication.

### **Universal Design and Participatory Planning**

Universal Design has become a significant paradigm for fostering inclusive and accessible workplaces for a variety of users. Universal Design, as conceived by Ronald Mace, promotes the development of surroundings accessible to all persons without requiring specialist modifications. Principles like equal usage, adaptability, perceptible information, and little physical and cognitive effort have become essential in inclusive educational and architectural design (Mace, 1998).

However, recent literature argues that Universal Design should move beyond compliance-based accessibility and adopt participatory and human-centered approaches (Watchorn et al., 2024). Participatory Universal Design frameworks recognize persons with disabilities as “user-experts” whose lived experiences provide critical insights into environmental accessibility and spatial barriers. This perspective strengthens the responsiveness, inclusivity, and effectiveness of educational environments.

Likewise, literature on Deaf pedagogy underscores that educational design must address the linguistic, cultural, and communicative realities of Deaf students. Potier and Givens (2023) contended that inclusive educational change must be based on the lived experiences, communication methods, and social involvement of Deaf learners. This underscores the necessity of including Deaf students, professors, interpreters, accessibility activists, and campus stakeholders in accessibility evaluations and planning efforts.

The integration of Universal Design and participatory planning fosters the creation of fair, communication-focused, and human-centric educational environments that address the genuine sensory and environmental requirements of Deaf learners.

### **Research Gap in Southeast Asian Higher Education**

While current research has greatly enhanced the comprehension of Deaf education, inclusive learning settings, Universal Design, and sensory accessibility, notable deficiencies persist concerning higher education campus planning and Deaf-centered architecture design. Contemporary research predominantly emphasizes pedagogy, communication obstacles, classroom engagement, or broad accessibility issues, with little focus on sensory accessibility in campus-scale educational environments (Partington et al., 2024; Watchorn et al., 2024).

Moreover, there is a paucity of research on Deaf-centered spatial design in the contexts of higher education in Southeast Asia and the Philippines, where accessibility norms primarily focus on mobility and compliance. Current educational infrastructure regulations frequently prioritize barrier-free movement, neglecting visual communication, contextual awareness, sensory comfort, and communication-focused spatial experiences vital for Deaf learners.

Furthermore, little research has established qualitative and design-oriented frameworks explicitly aimed at directing the development, improvement, and realignment of Deaf-centered university learning environ-

ments. Research incorporating DeafSpace Theory, Universal Design, participatory planning, and sensory-responsive architecture in the context of higher education campuses in the Philippines is very restricted. This study fills existing gaps by creating a qualitative design-based framework for sensory-inclusive learning settings based on DeafSpace Theory, Universal Design, and participatory planning principles. The study specifically enhances architecture, campus planning, inclusive education, and sensory-responsive design by suggesting practical and context-sensitive strategies to improve the learning facilities of the School of Deaf Education and Applied Studies (SDEAS) at De La Salle–College of Saint Benilde.

## Methods

### Research Design

This study utilized a qualitative phenomenology and design-based research methodology to investigate the sensory and spatial experiences of Deaf students in higher education settings. The phenomenological approach was employed to understand how participants experience, perceive, and interpret campus spaces, communication settings, and accessibility conditions. This methodology allowed the study to clarify the meanings, barriers, and contextual realities pertaining to sensory accessibility and communication-focused educational environments.

Concurrently, the study used a design-based inquiry framework to produce practical and context-sensitive design recommendations that were informed by participant experiences, environmental observations, and sensory-accessibility requirements. Phenomenology and design-based inquiry were integrated to enable the research to progress from descriptive analysis to the creation of a qualitative sensory-accessibility framework for the realignment and improvement of learning facilities at the School of Deaf Education and Applied Studies (SDEAS).

The study was grounded in DeafSpace Theory and Universal Design to examine how visual communication, spatial openness, environmental awareness, and sensory-responsive design influence environmental comfort, learning engagement, social interaction, and communication accessibility among Deaf students.

### Research Setting

The study was carried out at the School of Deaf Education and Applied Studies (SDEAS) at De La Salle–College of Saint Benilde. Designated classrooms, circulation pathways, collaborative learning environments, social interaction zones, and campus settings were analyzed to evaluate sensory accessibility, visual communication standards, and spatial inclusion within the school.

The location was chosen for its prominence as a premier higher education institution in the Philippines that champions inclusive education for Deaf students. The study concentrated on the extent to which current educational settings facilitate or obstruct communication accessibility, environmental awareness, social involvement, and sensory-responsive learning experiences.

### Participants of the Study

The participants of the study consisted of key stakeholders directly involved in Deaf education, inclusive learning environments, accessibility planning, and campus facility development within SDEAS. A total of 24 participants were involved in the study. These included six Deaf students, four faculty members, the SDEAS Dean, two institutional administrators, two campus planners/facility representatives, three consultants, three sign language interpreters, and three accessibility advocates.

A purposive sampling strategy was employed to select participants who possessed direct knowledge, lived experiences, and professional involvement related to Deaf-centered educational environments, sensory

accessibility, and inclusive campus planning. This approach allowed the study to gather diverse and experience-based qualitative data from academic, administrative, design, technical, and user-centered perspectives. The participants contributed insights on visual communication, classroom environments, campus navigation, social interaction, environmental comfort, safety, accessibility systems, and sensory-responsive campus planning.

## **Data Gathering Procedures**

### **Semi-Structured Interviews**

Semi-structured interviews were conducted to obtain comprehensive insights into participants' lived experiences with sensory accessibility, communication obstacles, and inclusive learning settings within SDEAS. The interviews examined topics including visual communication, classroom engagement, mobility, environmental comfort, spatial awareness, safety, social inclusion, and accessibility obstacles faced in campus environments.

The flexible interview format allowed participants to openly articulate their experiences, thoughts, and suggestions, while also enabling the researcher to explore developing themes and contextual matters pertinent to Deaf-centered educational settings. Communication methods aligned with participant preferences were employed during the interviews, including the use of sign language interpreters as required.

### **Focus Group Discussions**

Focus group discussions (FGDs) were primarily conducted with Deaf students to ascertain common experiences, collective concerns, and preferred spatial arrangements that facilitate communication accessibility, learning engagement, and social involvement.

The FGDs promoted cooperative discourse among participants concerning obstacles faced in classrooms, circulation areas, collaborative learning settings, and campus amenities. Discussions examined participants' views on optimal sensory-inclusive learning settings, visual accessibility, environmental comfort, and Deaf-centered campus design techniques. The group interaction allowed members to affirm shared experiences and collaboratively suggest enhancements for SDEAS learning facilities.

### **Campus Observation and Spatial Analysis**

Direct campus inspections and environmental assessments were conducted to evaluate the current spatial and sensory characteristics of designated learning settings and campus facilities within the School of Deaf Education and Applied Studies (SDEAS) at De La Salle–College of Saint Benilde. The observations concentrated on identifying architectural, environmental, and communicative aspects affecting visual accessibility, environmental awareness, mobility, social interaction, and sensory comfort among Deaf students.

Special emphasis was placed on assessing visual sightlines, spatial openness, lighting quality, visibility conditions, classroom designs, seating arrangements, circulation systems, transition areas, and the accessibility of collaborative and social-learning settings. The evaluation also analyzed navigation systems, visual signs, emergency communication infrastructure, and the incorporation of visually visible safety elements inside school structures. This study sought to assess how current spatial arrangements facilitate or obstruct visual communication, sign language interaction, environmental legibility, and inclusive engagement among Deaf learners.

### **Participatory Design Workshops**

Participatory design workshops were held to engage participants in the collaborative development of sensory-inclusive learning environments and spatial enhancement strategies. Participants were urged to conceptualize and suggest desired environmental alterations informed by their own experiences, communication requirements, and accessibility issues.

The workshops included sketching activities, spatial annotations, environmental mapping exercises, visual preference discussions, and collaborative design dialogues centered on classroom layouts, circulation systems, collaborative spaces, lighting conditions, emergency systems, and communication-focused environments.

This interactive method enhanced the human-centered and Deaf-centered focus of the study by acknowledging participants as active contributors rather than simply responders in the development of inclusive spatial design and sensory-accessibility suggestions for SDEAS learning facilities.

### **Data Analysis**

The research utilized thematic analysis based on the qualitative analytical framework established by Braun and Clarke (2006, 2022) to systematically analyze data collected from interviews, focus group discussions, campus observations, spatial analyses, and participatory workshop outputs. Thematic analysis was chosen for its adaptability and efficacy in detecting, evaluating, and interpreting patterns of meaning within qualitative datasets concerning sensory accessibility and inclusive educational settings.

The analysis began with data familiarization, involving the iterative evaluation of interview transcripts, observation notes, workshop outputs, and visual documentation to gain a thorough understanding of participant experiences and contextual conditions. Preliminary codes were produced to highlight significant statements, recurrent themes, environmental difficulties, and communication-related challenges pertaining to the educational experiences of Deaf students.

Subsequent to this, related codes were systematically categorized into overarching thematic groups that included recurring patterns and common participant experiences. Themes were systematically examined, refined, interpreted, and synthesized to yield profound insights into visual communication accessibility, environmental comfort, sensory-responsive design, social inclusion, visual connectivity, and participatory campus planning.

The identified themes formed the foundation for the creation of the proposed sensory-accessibility framework and inclusive design suggestions for SDEAS learning environments.

### **Trustworthiness and Research Rigor**

To ensure qualitative rigor and trustworthiness, the study adhered to the criteria of credibility, transferability, dependability, and confirmability. Credibility was strengthened through methodological triangulation involving interviews, focus group discussions, observations, spatial analyses, and participatory workshops. Member checking was also conducted by presenting preliminary thematic interpretations to selected participants to validate the accuracy of findings and interpretations.

Transferability was addressed through rich and detailed descriptions of the research setting, participant experiences, environmental conditions, and sensory-accessibility contexts within SDEAS. Dependability was reinforced through the systematic documentation of research procedures, coding processes, thematic development, and analytical decisions through an audit trail. Peer consultation and review with experts in architecture, inclusive education, and qualitative research were likewise conducted to strengthen methodological consistency and analytical rigor.

Confirmability was established by grounding interpretations in participant narratives, field observations, workshop outputs, and documented evidence rather than researcher assumptions. Reflexive note-taking and analytical memos were maintained throughout the research process to promote transparency and minimize researcher bias.

### **Ethical Considerations**

The study complied with ethical research guidelines by ensuring informed consent, voluntary participation, confidentiality safeguards, and respect for Deaf culture and communication choices. Participants were informed of the study's aims, procedures, and voluntary nature prior to their involvement.

Necessary communication accommodations, including sign language interpretation, were given to facilitate accessibility and meaningful participation during the data collection procedure. Participant names and personal information were treated with strict confidentiality, and all collected data were used exclusively for academic and research purposes.

### **Results**

#### **Theme 1: Visual Communication Barriers in Learning Spaces**

Participants consistently emphasized that visual communication is fundamental to the educational experience, social interaction, and classroom participation of Deaf learners. Findings revealed that several learning spaces within the School of Deaf Education and Applied Studies (SDEAS) presented spatial and environmental conditions that hindered effective sign language communication and visual engagement. Classroom observations identified obstructed sightlines, rigid seating arrangements, spatial congestion, and inadequate lighting conditions that limited students' ability to maintain continuous visual contact during discussions and collaborative activities. Participants explained that narrow classroom layouts and poorly positioned furniture disrupted visual connectivity, making it difficult to simultaneously observe interpreters, instructors, classmates, and presentation materials. These limitations affected communication flow, classroom participation, concentration, and peer interaction.

One participant shared:

“When the classroom is too crowded or poorly arranged, it becomes difficult to see everyone signing, especially during discussions.”

Another participant explained:

“Sometimes I need to move my chair just to clearly see the interpreter, teacher, and my classmates at the same time.”

A Deaf student also emphasized the importance of visibility within classroom interaction:

“Visual access is very important for us because communication depends on seeing facial expressions, gestures, and body language clearly.”

Similarly, another participant stated:

“If someone blocks the view, even for a few seconds, you can already miss important parts of the discussion.”

The findings further indicate that visual accessibility extends beyond simple visibility and directly influences students' sense of inclusion, engagement, and communication confidence within the learning environment. Participants expressed a preference for open classroom configurations, flexible seating arrangements, and spatial layouts that support uninterrupted visual communication and collective interaction.

These results reinforce the importance of integrating Deaf-centered spatial planning principles into educational facility design. The study highlights that visual accessibility should be treated as a primary consideration in campus and classroom planning, particularly in institutions serving Deaf and hard-of-hearing learners.

### **Theme 2: Environmental and Sensory Challenges**

Participants identified several environmental and sensory barriers that adversely impacted communicative participation, environmental legibility, safety, and cognitive comfort inside the SDEAS learning environment. Key issues were insufficient illumination, visually inaccessible emergency systems, spatial overcrowding, poor navigation assistance, and the lack of sensory-responsive technology in school buildings.

Deaf students primarily depend on visual communication; however, participants indicated that excessive environmental noise, visual distractions, overcrowded environments, and disorganized circulation systems led to mental fatigue, diminished concentration, and communication challenges during classroom discussions and collaborative tasks. Participants highlighted that environmental comfort encompasses not just acoustics but also visual clarity, spatial openness, and unobstructed sightlines that facilitate ongoing visual contact and situational awareness.

Campus observations further revealed the limited presence of visual emergency notification systems capable of effectively communicating urgent situations such as fire incidents, earthquakes, evacuations, or other campus emergencies. Participants highlighted the need for technology-enhanced emergency communication systems utilizing colored signal lights, flashing visual alarms, digital notification displays, and synchronized smart-alert technologies strategically integrated throughout classrooms, hallways, collaborative spaces, and circulation areas. These systems were perceived as essential in ensuring immediate awareness, safety, and independent response during emergencies.

One participant explained:

“Sometimes we do not immediately know if there is an emergency because alarms are mostly sound-based. Visual signals and colored emergency lights would help us respond faster and feel safer.”

Another participant emphasized the importance of lighting quality:

“Good lighting is very important because we rely on facial expressions and hand movements during communication.”

A participant also described the effects of overcrowded environments:

“When hallways and classrooms become crowded, it becomes stressful because it is harder to move, communicate, and stay visually aware of people around us.”

Similarly, another student shared:

“Clear signage and digital alerts improve environmental legibility, supporting independent navigation and spatial confidence among Deaf learners.”

Participants also emphasized the importance of environmental features that promote sensory accessibility, visual comfort, and communication efficiency within the campus environment. They highlighted the need for adequate natural and adaptive lighting systems that enhance facial visibility and support sign language interaction, as well as visually open and unobstructed learning spaces that allow continuous visual communication and environmental awareness. Participants likewise stressed the importance of reducing spatial congestion and overcrowding to minimize distractions and improve mobility and concentration during academic activities.

In addition, participants identified the need for intuitive and clearly defined circulation systems that support independent navigation and spatial orientation within campus facilities. Visually accessible and technology-supported signage systems were also viewed as essential in improving wayfinding and environmental awareness among Deaf learners. Furthermore, participants emphasized the importance of integrating visual communication technologies, including digital displays, visual emergency alerts, and technology-enhanced navigation systems, to support both emergency response and daily campus interaction.

The findings suggest that sensory accessibility within Deaf-centered educational environments requires responsive environmental systems that support visual awareness, communication continuity, environmental safety, and inclusive participation. These results reinforce the importance of incorporating technology-enhanced sensory-responsive design strategies into future campus planning and facility development initiatives within SDEAS.

### **Theme 3: Social Inclusion and Spatial Belonging**

Participants underscored the significance of learning settings that promote social inclusion, communicative participation, and a sense of belonging within the SDEAS community. Research indicated that spatial surroundings significantly influence academic engagement and facilitate Deaf culture, peer contact, collaborative learning, and emotional connections among students.

Numerous participants explained the necessity for inclusive, communication-focused social environments where Deaf students may connect, cooperate, and partake in both formal and informal learning activities with ease. Current campus settings are regarded as inadequate in offering designated spaces that promote visual communication, group interaction, and community-building activities. Participants emphasized that socially inclusive environments must facilitate ongoing visual interaction, unimpeded mobility, and adaptable interaction modalities that promote sign language communication and communal engagement.

One participant shared:

“We need spaces where we can easily communicate with each other, move freely, and feel connected as a community, not just classrooms for studying.”

Another student explained:

“Open spaces where we can gather and see everyone clearly make communication more natural and comfortable.”

A participant also highlighted the emotional value of inclusive environments:

“When the environment supports our communication, we feel more included and more confident participating in school activities.”

Similarly, another participant stated:

“Social spaces are important because they help strengthen friendships, collaboration, and our Deaf identity within the campus.”

The results indicate that spatial belonging and social inclusion are intricately linked to the physical and sensory attributes of educational settings. In addition to academic utility, Deaf-centered campus planning must emphasize the development of visually accessible, socially responsive, and community-focused environments that facilitate engagement, inclusion, and cultural identity in higher education contexts.

### **Theme 4: Preferred Sensory-Inclusive Design Strategies**

Participants consistently identified several spatial and technological interventions that they considered would markedly enhance communicative participation, environmental awareness, learning engagement, and overall inclusion within SDEAS learning settings. These recommendations reflected the participants’

preference for campus environments purposefully built to facilitate visual communication, sensory response, social engagement, and Deaf-centered educational experiences.

The most commonly suggested techniques were the creation of open visual corridors and unimpeded circulation areas that facilitate continuous sightlines and enhance sign language communication throughout classrooms, halls, and collaboration spaces. Participants highlighted that visually interconnected environments improve communication, environmental awareness, and social engagement among Deaf students. Flexible classroom layouts were highly favored, especially seating arrangements that enable students to sustain direct visual engagement with instructors, interpreters, and peers throughout discussions and collaborative endeavors.

One participant explained:

“Spaces should be designed so communication happens naturally. We need to see people clearly, move comfortably, and immediately understand what is happening around us.”

Another participant highlighted the importance of adaptive technologies:

“Real-time captioning and visual technologies would make learning more accessible and reduce communication barriers inside classrooms.”

A student also emphasized the importance of emergency communication systems:

“Visual emergency systems with flashing lights and digital alerts are necessary because we cannot depend only on sound-based alarms.”

Similarly, another participant recommended more visually connected environments:

“Transparent spaces and open layouts help us feel more aware, included, and connected to what is happening around the campus.”

The results indicate that Deaf-centered spatial planning transcends mere adherence to physical accessibility criteria. Participants underscored the necessity for surroundings purposefully crafted to facilitate visual communication, sensory awareness, cognitive ease, environmental safety, and inclusive social engagement. These findings underscore the importance of incorporating sensory-responsive and technology-enhanced design concepts into future campus planning and facility development initiatives for SDEAS.

**Table 1. Coding Matrix and Thematic Development of Sensory Accessibility Experiences among Deaf Learners**

Initial Codes	Categories	Emergent Themes
Obstructed sightlines; blocked views of interpreters; difficulty seeing classmates; poor visual access to presentations	Visual communication barriers	Theme 1: Visual Communication Barriers in Learning Spaces
Fixed seating; narrow classroom layouts; poorly arranged furniture; limited face-to-face interaction	Classroom spatial limitations	Theme 1: Visual Communication Barriers in Learning Spaces
Poor lighting; glare; shadows on faces and hands; difficulty reading facial expressions	Lighting and visual comfort concerns	Theme 2: Environmental and Sensory Challenges
Sound-based alarms; lack of flashing lights; absence of digital emergency alerts; delayed emergency awareness	Emergency communication barriers	Theme 2: Environmental and Sensory Challenges
Crowded hallways; spatial congestion; visual distractions; difficulty moving and communicating	Sensory stress and circulation challenges	Theme 2: Environmental and Sensory Challenges

Lack of gathering spaces; limited informal interaction areas; weak peer connection	Social space limitations	Theme 3: Social Inclusion and Spatial Belonging
Need for learning commons; preference for open social spaces; desire for community areas	Deaf-centered social participation	Theme 3: Social Inclusion and Spatial Belonging
Open corridors; transparent partitions; circular seating; flexible classrooms	Visual connectivity strategies	Theme 4: Preferred Sensory-Inclusive Design Strategies
Real-time captioning; digital wayfinding; smart signage; visual alert systems	Technology-supported accessibility	Theme 4: Preferred Sensory-Inclusive Design Strategies
Participation in planning; user feedback; co-design workshops; accessibility consultation	Participatory design and user involvement	Proposed Sensory Accessibility Framework

To translate the qualitative findings into practical design directions, a design strategy matrix was developed. The matrix connects the barriers identified in the thematic analysis with corresponding spatial issues, DeafSpace principles, design responses, and facility implications. This provides a clearer link between participant experiences and the proposed sensory-accessibility framework for SDEAS learning facilities.

**Table 2. Design Strategy Matrix for Sensory-Inclusive SDEAS Learning Facilities**

No.	Barrier	Spatial Issue	DeafSpace Principle	Design Response	Facility Implication
1	Obstructed sightlines	Limited visual access	Space and Proximity; Sensory Reach	Use circular seating and clear sightlines	Improve visual contact among students, faculty, and interpreters
2	Poor lighting and glare	Reduced facial visibility	Light and Color	Provide even, glare-controlled lighting	Support sign-language visibility and visual comfort
3	Crowded rooms and corridors	Restricted movement	Mobility and Proximity	Clear obstructions and improve circulation	Enable safe movement and visual awareness
4	Sound-based alarms	Limited emergency awareness	Sensory Reach; Mobility and Safety	Add flashing lights and digital alerts	Provide visual and multi-sensory warning systems
5	Weak wayfinding	Poor spatial legibility	Sensory Reach; Mobility and Safety	Use visual signage and color-coded cues	Support independent navigation
6	Lack of social-learning spaces	Limited peer interaction	Space and Proximity; Sensory Reach	Create open commons and gathering areas	Strengthen Deaf identity and community belonging
7	Limited visual connection	Weak spatial continuity	Sensory Reach; Space and Proximity	Use transparent partitions and open views	Improve visual continuity across learning areas
8	Limited captioning support	Reduced information access	Sensory Reach; Universal Design	Integrate captioning and smart displays	Enhance classroom communication access
9	Limited Deaf participation	User needs underrepresented	Participatory Universal Design	Include Deaf users in design reviews	Institutionalize participatory planning
10	Compliance-based approach	Accessibility limited to physical access	DeafSpace and Universal Design	Include sensory and communication criteria	Move beyond BP 344 toward sensory-inclusive planning

The matrix demonstrates that the improvement of SDEAS learning facilities does not necessarily require major reconstruction alone, but may begin with targeted spatial, environmental, technological, and

participatory interventions. These strategies support a transition from compliance-based accessibility toward Deaf-centered, visually legible, and sensory-inclusive campus planning.

### **Proposed Sensory Accessibility Framework**

The study proposes a qualitative design-based framework for sensory-inclusive higher education environments to enhance and realign learning facilities within the School of Deaf Education and Applied Studies (SDEAS) at De La Salle–College of Saint Benilde. The framework incorporates elements from DeafSpace Theory and Universal Design to enhance communicative participation, sensory responsiveness, environmental comfort, and inclusive engagement in higher education settings (Edwards & Harold, 2014; Watchorn et al., 2024).

### **The proposed framework consists of five interrelated components:**

**Visual interaction and Spatial Connectivity.** Visual interaction emerged as a key element of Deaf-centered educational settings. Participants highlighted that unobstructed sightlines, visually integrated spaces, and communication-focused spatial configurations are vital for facilitating ongoing sign language contact, environmental awareness, and inclusive engagement within campus learning environments. The results demonstrate that visually accessible environments improve communication efficiency and foster students' confidence, engagement, social interaction, and sense of belonging in the academic community. The proposed framework recommends the establishment of open visual corridors and unimpeded circulation systems to enhance continuous visual contact and spatial navigation for Deaf learners. The framework also advocates for adaptable and circular seating configurations in classrooms that facilitate direct visual engagement among students, instructors, and interpreters during discussions, collaborative tasks, and learning exchanges.

The framework emphasizes the significance of transparent walls, visually interconnected interiors, and architectural configurations that promote seamless visual connection among classrooms, collaborative learning environments, and social areas. These design solutions seek to enhance communicative participation, visual awareness, environmental comfort, and social inclusion, while addressing the sensory and communication requirements of Deaf students in higher education settings. The findings align with DeafSpace principles, which prioritize visibility, spatial orientation, and communication-focused architectural design (Edwards & Harold, 2014).

**Environmental Comfort and Sensory Responsiveness.** The results emphasized the significance of environmental factors that reduce sensory stress and improve cognitive comfort for Deaf learners. Participants recognized lighting quality, spatial openness, visual clarity, and environmental organization as critical elements affecting focus, communicative participation, and learning engagement in educational environments. Inadequate illumination, overcrowded settings, and excessive visual distractions were believed to adversely impact students' capacity to sustain attention and engage successfully in classroom discussions and collaborative endeavors.

The proposed framework advocates for the use of adaptive and glare-reducing lighting technologies to enhance facial visibility and facilitate sign language communication. The framework prioritizes the enhancement of natural illumination and visual comfort, the alleviation of spatial overcrowding and environmental distractions, and the establishment of sensory-responsive learning settings that foster cognitive concentration, environmental consciousness, and communicative efficacy. These strategies

facilitate the creation of inclusive educational settings that acknowledge and address the sensory experiences and communication requirements of Deaf students (Partington et al., 2024).

**Inclusive Communication and Safety Systems.** Participants emphasized the need to integrate visually accessible communication and emergency systems into campus facilities to enhance the safety, communication accessibility, and environmental awareness of Deaf learners. The results indicated that conventional sound-based emergency systems and communication methods are insufficient to meet the requirements of Deaf students in both academic activities and emergency situations. The significance of incorporating visual emergency notification systems that employ flashing colored lights, digital alerts, and synchronized smart-warning technologies to immediately communicate critical information during fire incidents, earthquakes, evacuations, and other emergencies was emphasized by the participants.

The proposed framework also suggests the integration of technology-enhanced classroom communication tools, real-time captioning systems, and smart communication technologies to facilitate accessible learning interaction and communication participation. Furthermore, the framework underscores the significance of digital wayfinding technologies and visually accessible signage systems that improve environmental awareness, spatial orientation, and independent navigation in campus environments. Collectively, these interventions enhance safety, communication equity, accessibility, and independent participation, while simultaneously fostering more inclusive and sensory-responsive higher education environments for Deaf learners.

**Social Inclusion and Collaborative Learning Environments.** The findings indicated that inclusive educational environments must transcend conventional classroom settings to encompass collaborative and social spaces that promote Deaf culture, peer interaction, communication accessibility, and a sense of community belonging. Participants underscored the significance of spaces that facilitate Deaf students' comfortable engagement in both formal and informal interactions through visually accessible and communication-focused spatial configurations. These areas were regarded as vital for enhancing social engagement, emotional comfort, collaborative learning, and a feeling of identity within the school community.

The proposed framework advocates for the establishment of sensory-responsive learning commons, collaborative hubs, inclusive public interaction spaces, and adaptable collaborative learning zones that facilitate communication accessibility and collective engagement among Deaf learners. The framework emphasizes the significance of Deaf-centered social environments that promote visual connection, peer involvement, and inclusive social experiences in college settings. These spatial interventions enhance social inclusion, emotional well-being, community involvement, and a heightened sense of belonging among Deaf students (Gentzke, 2024).

**Participatory and Human-Centered Campus Planning.** The proposed approach, aligned with human-centered and participatory design principles, acknowledges Deaf students and other stakeholders as active participants in campus planning, accessibility evaluation, and educational facility construction. The framework prioritizes the active participation of Deaf learners in decision-making regarding spatial planning, environmental assessment, and inclusive campus development, rather than viewing them just as receivers of accessibility measures. The framework promotes participatory design and co-creation methodologies that include Deaf users, professors, accessibility activists, planners, and institutional stakeholders in recognizing accessibility obstacles and suggesting sensory-inclusive design solutions. It underscores the need for ongoing sensory-accessibility assessments, environmental evaluations, and the incorporation of inclusive campus design strategies in future development projects. Collaborative

stakeholder engagement is crucial for maintaining campus environments that adapt to the changing communication, sensory, and social requirements of Deaf learners.

This method corresponds with participatory Universal Design frameworks that acknowledge persons with disabilities as "user-experts," whose lived experiences offer essential insights for developing inclusive and accessible spaces (Watchorn et al., 2024). The proposed framework illustrates that sensory accessibility in higher education extends beyond adherence to physical accessibility standards. It necessitates deliberately crafted spaces that facilitate visual communication, sensory awareness, environmental safety, social inclusion, and educational equity for Deaf students.

## Discussion

The findings of the study demonstrate that accessibility within higher education environments should not be understood solely as physical access, but as a broader spatial, sensory, and communication-centered condition. Conventional accessibility standards commonly prioritize ramps, elevators, and barrier-free circulation systems; however, the experiences of Deaf students within the School of Deaf Education and Applied Studies (SDEAS) reveal that inclusive campus environments must also support visual interaction, environmental legibility, communication continuity, social participation, and psychological comfort. Accessibility for Deaf learners therefore extends beyond mobility and includes the ability to communicate, navigate independently, participate actively, and experience a sense of belonging within educational spaces.

The findings strongly support the principles of DeafSpace Theory, which emphasize that Deaf individuals experience and interpret space primarily through visual and sensory interaction. Participants consistently highlighted the importance of open sightlines, spatial openness, adaptive lighting, visual connectivity, and unobstructed circulation systems in supporting communication and learning engagement. These findings suggest that communication accessibility among Deaf learners is spatially produced and architecturally mediated. When classrooms are overcrowded, visually obstructed, or poorly illuminated, students may lose access to facial expressions, gestures, signs, and contextual cues necessary for meaningful interaction. In this regard, spatial configuration directly shapes communication dynamics, participation, and collaborative learning within educational environments.

The study further demonstrates that DeafSpace Theory extends the principles of Universal Design by moving beyond generalized accessibility toward communication-centered and culturally responsive spatial planning. While Universal Design promotes equitable and flexible environments for diverse users, DeafSpace specifically addresses the visual, sensory, and social experiences unique to Deaf individuals. The findings indicate that conventional accessibility frameworks often remain mobility-oriented and insufficient in addressing the communication realities of Deaf learners. As a result, educational accessibility should not be limited to physical entry and circulation but should also include visual orientation, environmental legibility, communication continuity, and sensory responsiveness within learning spaces.

The findings also reveal that visual interaction reframes the concept of inclusion within higher education environments. Participants associated visually open and communication-oriented spaces with confidence, independence, emotional comfort, and social belonging. This suggests that inclusive educational design should not merely eliminate physical barriers but should actively create environments that support communication equity, cultural identity, and meaningful participation. Collaborative learning commons, visually connected social spaces, and flexible interaction environments therefore function not only as

physical settings but also as socio-cultural spaces that reinforce Deaf identity, peer engagement, and collective participation within the campus community.

The study additionally highlights how spatial exclusion may contribute to educational inequity among Deaf students. Environments that obstruct visual communication, limit environmental awareness, or depend heavily on sound-based systems may unintentionally marginalize Deaf learners within academic and social settings. Restricted visual access can reduce classroom engagement, delay emergency response, weaken social participation, and create communication dependency. These findings suggest that spatial environments are not neutral conditions but structures that influence participation, inclusion, autonomy, and educational opportunity. Consequently, campus planning and architectural design play a significant role in either reinforcing or reducing educational inequities experienced by Deaf learners.

The findings also expose how architecture shapes communication power dynamics within educational institutions. Hearing-centered campus infrastructure, including sound-dependent emergency systems, inaccessible classroom arrangements, and limited visual communication technologies, often privileges auditory modes of interaction while restricting non-auditory communication practices. Participants emphasized the importance of visual emergency alerts, real-time captioning systems, digital wayfinding technologies, and adaptive communication infrastructure in promoting equitable access to information and participation. These findings indicate that architecture and spatial planning are not merely technical processes but social and communicative systems that influence who can participate, interact, and engage within educational environments.

Grounded in Universal Design and DeafSpace Theory, the proposed framework advocates a transition from compliance-based accessibility toward participatory and human-centered campus planning. The study emphasizes that Deaf students should not merely be consulted after facilities are constructed but should actively participate in planning, assessment, and design decision-making processes. Their lived experiences provide critical insights into how educational environments function within everyday academic life. Participatory planning therefore becomes essential in creating responsive, culturally appropriate, and communication-oriented learning environments that reflect the actual sensory and spatial needs of Deaf learners.

Within the Philippine context, the study underscores the need to revisit existing accessibility practices that remain largely focused on mobility-oriented standards such as BP 344. While these policies provide an important foundation for physical accessibility, they do not sufficiently address sensory inclusion, visual communication, Deaf culture, and communication-centered spatial planning. The findings therefore suggest that higher education institutions should broaden accessibility standards to include visual sightlines, adaptive lighting systems, sensory-responsive social spaces, visually accessible emergency infrastructure, and technology-enhanced communication systems that support communication equity and inclusive participation.

The primary contribution of this study is the development of a Deaf-centered sensory-accessibility framework that translates lived spatial experiences into actionable campus planning strategies. Unlike conventional accessibility approaches that emphasize physical mobility, the proposed framework positions visual connectivity, spatial legibility, communication equity, and participatory planning as core architectural conditions for inclusive higher education environments.

Overall, the study contributes to architecture, campus planning, and inclusive education by demonstrating that sensory accessibility is both a spatial design issue and an educational equity issue. The proposed framework positions Deaf-centered campus planning as a practical strategy for improving communication

access, environmental safety, social inclusion, learning engagement, and participatory educational experiences within higher education institutions. By integrating Universal Design and DeafSpace Theory, the study advances a more comprehensive approach to inclusive campus development, one that recognizes Deaf learners not as passive recipients of accessibility interventions, but as active participants in shaping equitable, communication-centered, and sensory-responsive educational environments.

## **Practical Implications**

The findings offer practical implications for higher education institutions, campus planners, architects, and policymakers seeking to develop sensory-responsive and inclusive learning environments for Deaf learners. The proposed sensory-accessibility framework has the potential to be a valuable resource for the evaluation, improvement, and future development of educational facilities that prioritize visual communication, environmental awareness, communication equity, and student engagement.

Higher education institutions can adopt the framework by integrating Deaf-centered and sensory-responsive strategies into classroom layouts, circulation systems, collaborative learning spaces, emergency infrastructure, and campus communication systems. Practical interventions may include reconfiguring classroom layouts, installing adaptive lighting systems, integrating visually accessible emergency technologies, improving wayfinding systems, and creating sensory-responsive collaborative spaces that promote Deaf culture and social inclusion.

The study also emphasizes the relevance of institutional policies that acknowledge visual communication as a critical component of inclusive education. Accessibility policies and campus development guidelines should transcend compliance-based standards and integrate communication-oriented and sensory-inclusive planning approaches that are consistent with Universal Design principles and DeafSpace Theory. Institutions may also implement participatory planning mechanisms and regular sensory-accessibility assessments that involve Deaf students, faculty members, interpreters, and accessibility stakeholders in campus development initiatives.

From an architectural and planning perspective, the framework may be integrated into campus master planning, facility retrofitting, and future infrastructure development projects within higher education institutions. The findings support the incorporation of sensory accessibility considerations within educational building standards, learning space design, smart campus technologies, and inclusive urban campus planning. Ultimately, the study contributes to the development of more equitable, communication-centered, and human-centered educational environments that support the academic participation, wellbeing, and social inclusion of Deaf learners.

## **Limitations of the Study**

This study is confined to qualitative data collected from the School of Deaf Education and Applied Studies (SDEAS) at De La Salle–College of Saint Benilde. The results represent the experiences and perspectives of specific individuals and may not be applicable to other higher education institutions or Deaf educational settings. The study primarily focused on sensory and spatial experiences, excluding quantitative environmental assessments such as lighting intensity, acoustic analysis, or post-occupancy evaluation. Future research may use mixed-methods methodologies and comparative institutional evaluations to enhance the generalizability and technical evaluation of sensory-inclusive educational settings.

Since the proposed framework has not yet been implemented or evaluated through post-occupancy assessment, future studies may test its effectiveness through pilot spatial interventions, user satisfaction surveys, and environmental performance measurements.

## Conclusion

This study examined the sensory and spatial experiences of Deaf students in the learning environments of the School of Deaf Education and Applied Studies (SDEAS) at De La Salle–College of Saint Benilde, utilizing a qualitative and design-based inquiry informed by DeafSpace Theory and Universal Design. The results indicated that current educational settings still pose considerable obstacles concerning visual communication, environmental comfort, circulation systems, emergency accessibility, social inclusion, and sensory-responsive learning circumstances. These obstacles significantly influence communication accessibility, classroom engagement, environmental consciousness, emotional well-being, and the overall educational experience of Deaf students.

The research asserts that sensory accessibility is a crucial element of inclusive education and must be acknowledged as a vital factor in the planning of higher education campuses, architectural design, and institutional growth. The findings indicate that Deaf-centered educational settings necessitate visually responsive, communication-focused, and human-centered spatial methods that surpass traditional mobility-oriented accessibility norms. Inclusive learning settings must provide physical access as well as visual connectedness, equitable communication, sensory awareness, social involvement, and cultural belonging for Deaf students.

The study emphasizes the necessity of including sensory-responsive technology, visually accessible emergency systems, adaptable learning environments, and participatory planning methods in campus construction projects. The proposed sensory-accessibility framework offers a pragmatic and contextually attuned model for enhancing SDEAS learning environments by incorporating open visual corridors, adaptable classroom configurations, dynamic lighting systems, inclusive communication technologies, and sensory-responsive collaborative areas.

The study ultimately enhances the discourse on inclusive urbanism, sensory-responsive architecture, and educational equity by promoting a transition from compliance-based accessibility to comprehensive, participatory, and Deaf-centered campus planning in higher education institutions.

## Recommendations

Based on the findings of the study, the following recommendations are proposed to strengthen sensory accessibility, communication equity, and inclusive learning environments within the School of Deaf Education and Applied Studies (SDEAS) of De La Salle–College of Saint Benilde. These recommendations are aligned with DeafSpace Theory and Universal Design principles.

1. **Conduct Sensory-Accessibility Audits** Regular accessibility assessments should be conducted to identify barriers related to visual communication, environmental comfort, circulation systems, and emergency accessibility within SDEAS facilities.
2. **Integrate DeafSpace and Universal Design Principles** Future campus planning, renovations, and architectural projects should incorporate Deaf-centered and sensory-responsive design strategies that promote visual accessibility, spatial openness, and inclusive participation.
3. **Improve Classroom and Learning Environments** Classrooms should adopt flexible and visually connected layouts, including circular or semi-circular seating arrangements, open sightlines, and

collaborative learning configurations that support sign language communication and student interaction.

4. **Install Adaptive Lighting and Visual Emergency Systems** Educational facilities should integrate adaptive lighting systems and visually accessible emergency technologies such as flashing colored lights, digital alerts, and smart-warning systems to improve safety, communication, and environmental awareness among Deaf learners.
5. **Develop Inclusive Collaborative and Social Spaces** Institutions should establish sensory-responsive learning commons, collaborative hubs, and Deaf-centered social spaces that promote communication accessibility, peer interaction, and community belonging.
6. **Enhance Wayfinding and Communication Technologies** Campus environments should incorporate tactile, digital, and visually accessible wayfinding systems, interactive signage, smart captioning technologies, and communication-enhancing tools that support independent navigation and information accessibility.
7. **Promote Participatory and Inclusive Planning** Deaf students, faculty members, interpreters, and accessibility stakeholders should be actively involved in campus planning and facility development initiatives to ensure that educational environments reflect the lived experiences and communication needs of Deaf learners.
8. **Strengthen Institutional Policies and Future Research** Higher education institutions should institutionalize policies on sensory accessibility and inclusive design while encouraging further research on Deaf-centered educational environments, inclusive campus planning, and sensory-responsive architecture within the Philippine context.

### Future Research Directions

Future research may investigate comparative analyses across various institutions and inclusive learning environments to enhance the understanding of sensory accessibility in diverse educational settings. Quantitative environmental assessments, including lighting, acoustics, circulation efficiency, and spatial performance analysis, can be used to enhance the evaluation of sensory-responsive educational settings. Subsequent research may include mixed-methods methodologies and post-occupancy assessments to evaluate the enduring efficacy of Deaf-centered design initiatives and inclusive campus planning strategies. Research on intelligent accessibility systems, AI-driven communication tools, real-time captioning technologies, and digital navigation systems is also recommended to improve communication accessibility and sensory-inclusive educational settings for Deaf students.

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