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Developing Design Recommendations for Meditation Centres Through a Mixed-Method Study

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Abstract

Meditation is a practice used to cultivate focused attention, emotional stability, and self-awareness. Evidence of its psychological, physiological, and social benefits warrants greater accessibility and further research. This study evaluates meditation centre design by identifying recurring design practices, highlighting the importance of indoor environmental qualities (IEQs), and developing design recommendations for future use. A mixed-method, exploratory sequential design using a scoping case study review, expert interviews, and user surveys provides a holistic understanding of design practices, rationale behind decision-making, and user feedback. Quantitative and qualitative patterns were found across case studies, thematic analysis was conducted on interview transcripts, and user surveys were statistically analysed. The research concludes that effective meditation centre design integrates spatial, contextual, and community-driven practices while prioritising key IEQs to minimise sensory distractions and promote introspection. A hierarchy of IEQ importance was identified—(1) acoustic environment, (2) indoor air quality and thermal environment, (3) biophilic elements, and (4) lighting environment—alongside the influence of materials and colour. These findings were consolidated into comprehensive design recommendations addressing contextual, spatial, sensory, experiential, inclusive, and sustainable strategies. This study provides foundational recommendations and highlights future research opportunities, including direct engagement with meditation centres, longitudinal investigations, and psychophysiological studies.

Keywords: health and wellbeing; sustainability; acoustic environment; indoor air quality; thermal environment; biophilia; lighting; materials and colour

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1. Introduction

Urbanisation and technological development have enabled spatial and social transformations while simultaneously increasing financial insecurity, social pressures, political instability, environmental crises, and other inequalities [1,2] within urban populations. Against this backdrop, mental health has emerged as a priority and field of interdisciplinary research. Wellbeing practices warrant greater prominence and recognition as accessible, non-pharmacological interventions for mental health.

Meditation, a longstanding practice associated with psychological and emotional wellbeing [3], ought to gain renewed relevance in the context of contemporary stressors. It is a practice that spans diverse cultural lineages and methodological approaches, united

by the cultivation of focused attention, emotional stability, and self-awareness [4]. Traditionally, meditation has been associated with tranquil outdoor or rural settings that are isolated from the interruptions of daily life [5]. In contemporary society, we can see an increase in meditation practices in urban settings such as in multipurpose spaces, homes, or purpose-built centres. This shift renders indoor environmental qualities (IEQs) integral to the effectiveness of meditation. The architectural and sensory influence of meditation centres warrant systematic examination.

The link between the built environment and human wellbeing has been explored in environmental psychology [6], building science [7], and more recently, neuroarchitecture—an emerging field that studies how spatial experiences shape cognition, emotion, and physiology [8]. Neuroarchitecture suggests that architectural form, materiality, and environmental stimuli can modulate stress responses, attentional capacity, and emotional states, all of which are relevant to meditation philosophy.

Design practices such as daylighting, improved indoor air quality (IAQ), limited intrusive noise, thermal comfort, and natural elements, can greatly improve the health and wellbeing of a building's occupants [9]. While these principles are being increasingly applied to offices, healthcare facilities, and educational buildings, non-residential buildings such as meditation centres remain under-researched. Creating environments that are conducive to meditation would minimise distraction and facilitate deeper focus, which in turn would amplify the positive benefits of the practice.

The health benefits of meditation span various dimensions. Physiologically, sustained practice can shift autonomic regulation toward parasympathetic dominance, reducing cortisol levels, lowering blood pressure, and slowing heart rates, which improve cardiovascular health and stress resilience [10]. Psychologically, meditation supports emotional regulation, sustained attention, and cognitive flexibility [3,11,12]. Meditation also facilitates social connections regardless of its solitary nature. Group meditation, such as sessions held at meditation centres, can foster social cohesion, shared purpose, and a sense of accountability [13]. Spatial design for meditation ought to accommodate for both solitary introspection with privacy and collective practice with social connection.

Considering the significance of the impact meditation spaces have on the practice of meditation, further research must be conducted to examine effective IEQs in this context. Existing research on the impact of IEQs is extensive, but limited studies examine the environmental requirements of meditation centres. Existing design practices for wellbeing-oriented environments are typically broad, lacking the specificity required for meditation's sensory and attentional demands. Meditation is more than a wellbeing practice, as it delves into spirituality and can be used as mental health care; therefore, it should be researched in its own regard. The absence of targeted research leaves designers reliant on anecdotal or tradition-based principles, risking spaces that may hinder meditation practices.

Given meditation's documented capacity to enhance mental and physical health, there is a need to establish evidence-based design recommendations tailored to meditation centres, which can also benefit at-home spaces and adaptive re-use projects. Furthermore, design solutions must integrate environmental performance and sustainability, now an essential design imperative. This study seeks to bridge the knowledge gap in the field of meditation centre design by investigating how design practices influence meditation spaces and by developing design recommendations for healthy and sustainable meditation centres. Given the diversity of meditation traditions and cultural contexts, this study does not aim to generalise the findings and recommendations but rather create transferable knowledge in such an adolescent field of study [14].

The research questions are as follows:

Research question 1: Can recurring and successful design practices be identified in existing meditation centres and be adapted into a set of recommendations for healthy and sustainable meditation spaces?

Objectives for RQ1:

1. To identify recurring design practices in existing case studies;
2. To synthesise findings into a set of design recommendations.

Research question 2: Do indoor environmental qualities like indoor air quality, thermal environment, acoustic environment, lighting environment, materials and colour, and biophilic elements impact meditation experiences, and is there a hierarchy of impact?

Objectives for RQ2:

1. To evaluate how the various indoor environmental qualities can affect meditation experiences;
2. To establish a hierarchy of the various indoor environmental qualities based on their impact on meditation experiences.

The study is structured as follows: a review of relevant literature on meditation centres is presented, followed by a description of the mixed-method research design and data collection procedures. The subsequent sections present the findings from the scoping case study review, semi-structured interviews, and user surveys that were conducted, which inform the discussion of the results and design recommendations. The study concludes with a summary of findings and directions for future research.

2. Literature Review

The existing literature on meditation spaces is notably limited and scattered across fields such as architectural theory, environmental psychology, and cultural studies. This fragmentation reflects the complexity of understanding the link between meditation and the built environment. Many studies examine isolated environmental factors, but few explore them in the context of meditation spaces. Moreover, when multi-sensory approaches are acknowledged, practical design recommendations are rarely provided.

This literature review highlights the available literature in each of these domains and aims to identify and synthesise the design practices that underpin the creation of effective meditation spaces. The comparative analysis further positions the current research within the broader discourse of architectural design for wellbeing. For clarity and consistency of language, key definitions are included in Appendix A.

Meditation has an age-old and diverse history [15], with various traditions that teach techniques ranging from silent mindfulness to movement-based rituals. Some techniques include chants or visualisations, while others require minimal stimulation and focus on sitting in silence [10]. Despite their differences, these traditions share a concern with cultivating specific mental states, often influenced by the practitioner's surroundings.

Across Buddhist, Hindu, Christian, Jewish, Sufi, and secular traditions, meditation deploys overlapping cognitive and affective strategies, such as attention regulation, open monitoring, and compassion cultivation, that target common mechanisms of attention, emotional regulation, and self-representation, while differing in doctrines, ethical framing, and methods of transmission [10,16]. These shared mechanisms suggest that meditation may be supported or hindered by the environments in which it takes place.

Given that meditation involves sensory awareness and emotional regulation, the physical qualities of the space become crucial. The core IEQs that have been extensively studied as fundamental to an occupant's experience of the built environment [17,18] are thermal environment, lighting environment, acoustic environment, and IAQ. This study also recognises the importance of biophilic elements [19,20] and materials and colour

[21,22]. Each of these IEQs are explored further in the context of wellbeing or meditation spaces in Section 2.1.

2.1. Sensory and Environmental Conditions

Meditation is usually practiced with closed eyes, shifting the emphasis from visual to non-visual senses such as auditory, touch, and smell. In the book *The Sense of Place*, Steele (1981) [23] highlights the multi-sensory experience of spaces that contribute to one's sense of place. Features such as form, volume, proportion, lighting, materials, acoustics, and scents become central to the meditative experience [24]. As Guthrie et al. (2022) [25] observe, beginners are more susceptible to environmental and sensory distractions. Spatial strategies of using IEQs to create intersection, adjacency, and boundary can help redirect, weaken, or filter distractions [26].

While there is a growing body of research on IEQs, critical analysis reveals the following limitations:

- Thermal environment: Existing research acknowledges the role of thermal comfort on meditation and sustained stillness through physiological parameters, such as skin temperature [27], distraction, and physical strain [28]. However, interaction of thermal comfort with other IEQs is not explored and there is a limited focus on control over thermal environments in response to individual preferences and surrounding climates.
- Acoustic environment: Silence, or non-intrusive and continuous sound, supports focus during meditation [29]. Controlled soundscapes support peaceful socialisation and community building, which is examined through the design of sacred spaces by Medina (2013) [30]. However, there is little empirical evidence comparing sound design strategies across different meditation traditions, especially those that practice chanting in comparison to those that require silence.
- Lighting environment: Natural light is a key element linking meditative spaces to emotional wellbeing. The contrast between light and shadow can generate rhythmic and spiritual atmospheres [31]. Low lighting creates a sense of inward focus [32], and warm lighting promotes a sense of relaxation and social collaboration [33]. Interactions between lighting and other IEQs, such as materiality, colour, and thermal comfort, remain underexplored. Furthermore, the inverse relationship between natural light levels and distraction levels, and individual preferences of darkness are rarely acknowledged.
- Indoor Air Quality (IAQ): Ventilation and odour control for centres that often host large groups of people sitting for several hours are acknowledged as essential [9]. However, the connection between ventilation and fenestration operation could create counterproductive lighting and/or thermal environments, which is underexplored in the context of meditation spaces.
- Materials and Colour: Natural materials can promote warmth and grounding, while creating a connection to nature [28]. Material selection should consider weathering over time and lifecycle analysis for longevity and sustainability [34]. Dematerialisation of the architecture using fenestration can further enhance the connection to the outdoors and bring in daylight [29]. The existing literature suggests that green and blue tones correlate with calmness and have biophilic associations, with an emphasis on intentional hue and saturation selected to avoid overstimulation [31,35]. Such studies are not in the context of meditation centres but can be applied to this research.
- Biophilic elements: The connection to nature is widely recognised to reduce stress and improve immersion [24,36]. Strategies include fenestration for views to nature, landscaping, water bodies, outdoor paths, and natural materials and sounds [28,29].

It is important to support meditative practices by creating a meaningful space that understands and responds to the users. Spatial features that create 'ritualised engagement' support repetitive and meaningful behaviours such as walking meditation or pre-practice preparation [34]. For those who meditate at a centre dedicated to the purpose, a sense of journey is important. Sequencing spaces from public to private and energetic to contemplative enhances the users' psychological transition into meditation [28,29].

What distinguishes well-designed meditation spaces is the quality of experience they evoke. Such spaces reflect political, cultural, social, and technological contexts, shaping atmosphere as much as functionality [34]. In meditation centres, these atmospheres—subtle moods and resonant spatial qualities—support reflection and internal attunement. Gernot Bohme (1995) described such environments as "tuned spaces", emphasising that atmospheres are not merely subjective or objective aspects of our surroundings, but relational phenomena that emerge between people and space [37]. Similarly, James Gibsons's (1979) theory of affordance highlights how a space invites people to use it, and therefore how it becomes meaningful [38]. Spaces are created when they are used.

Atmosphere in architecture is also a tactile and sensory phenomenon, rooted in material presence, light, and spatial proportions. Such architectural elements "move" the users by evoking memories and presence [39]. This underscores how design practices can nurture meditative experiences. Michael Rotondi (2006) translates these theories of atmosphere into architecture that cultivates stillness and attentiveness, two key aspects of meditation [40]. His approach often integrates asymmetry, layered spatial sequences, and the interplay of light and shadow to guide occupants through shifting states of perception and often emphasises openness and adaptability.

This study examines the architecture of meditation centres to identify environmental features that support the meditative experience. Although meditation traditions differ in their cultural, doctrinal, and ritual contexts, they share certain psychophysiological aims—attentional stabilization, sensory quiet, and heightened bodily awareness. Consequently, spatial design variables such as light, enclosure, acoustics, and material tactility can be studied as cross-culturally recurrent affordances that facilitate these states [12,41]. The intention is not to claim a culturally universal form of meditation, but to derive design recommendations that respect cultural specificity while responding to human cognitive and sensory needs associated with contemplative practice.

2.2. Broader Contexts and Applications

Since meditation is a practice that improves mental wellbeing, there are many applications to its experience. Meditation and other calming, repetitive, and introspective practices can be seen through the lens of wellness and healing [42]. While traditionally understood as a personal or individual pursuit, meditation and mindfulness have also been integrated into unexpected settings. Courses for the Vipassana meditation tradition and other 'mindfulness interventions' have been conducted in prisons, which resulted in positive impacts on the rehabilitation of the inmate meditators [43,44]. Furthermore, mindfulness meditation can support rehabilitation treatment for military-related post-traumatic stress disorder [45] and improve emotional-coping, self-esteem, and self-regulation in students at educational facilities [46].

Due to meditation's broad applications, design practices used in meditation centres can be applied to a wide range of spaces such as religious buildings, wellness spas, elderly homes, schools, and healing spaces [24]. Strategies that are characterised by qualities of meditative spaces such as minimalism, sensory restraint, and calming atmospheres have often been applied to yoga studios. Both meditation and yoga occupy tangible and imagined realms that are practiced in spaces that facilitate deeper embodied awareness [47].

The context of any architectural project is a crucial consideration, and there is no difference for meditation centres. Not only does this include carrying out in-depth site analysis but also studying the context beyond just the physical. Cultural contexts need to be addressed to retain respect for the history of the meditation tradition in question while responding to the local community. Meditation has been practiced in Asian traditions for thousands of years [15] and is now spreading through the rest of the world [48]. New adaptations of meditation traditions will likely result in new building typologies to host them; therefore, thorough contextual analysis is important [28].

3. Methodology

3.1. Research Design

An exploratory sequential mixed-method design [49] was employed to investigate and quantify the factors influencing the design of meditation centres. This approach was particularly suitable given the emerging and under-researched nature of the topic, where limited empirical foundations exist to guide hypothesis testing. The exploratory design enabled an inductive identification of design practices used in meditation centres, while the sequential structure ensured that qualitative insights meaningfully informed subsequent quantitative development. This design was therefore essential for transforming conceptual findings into measurable constructs and for establishing a coherent link between discovery and verification.

The research was conducted in three phases:

1. Qualitative exploration: A scoping case study review of global meditation-based projects identified recurring spatial and environmental design practices, while semi-structured interviews with architects, lighting designers, and meditation instructors explored the rationale underpinning these approaches.
2. Quantitative assessment: Insights from the qualitative phase directly informed the development of a user survey designed to evaluate perceptions of key IEQs (IAQ, lighting environment, acoustic environment, thermal environment, and biophilia) in meditation centres.
3. Synthesis and recommendation formation: The qualitative and quantitative findings were integrated to generate evidence-based design recommendations that promote the creation of healthy, inclusive, and sustainable meditation centres.

The stepwise methodology, illustrated in Figure 1, facilitated the systematic translation of qualitative insights into quantitative measures, ensuring conceptual continuity across data collection phases. Furthermore, iterative reflection was implemented to reinforce the empirical grounding of the analysis. Similar applications of exploratory sequential mixed-methods have been demonstrated in the built environment [50] and in design-based research [51], affirming the rigour and adaptability of this approach for complex, multivariable investigations.

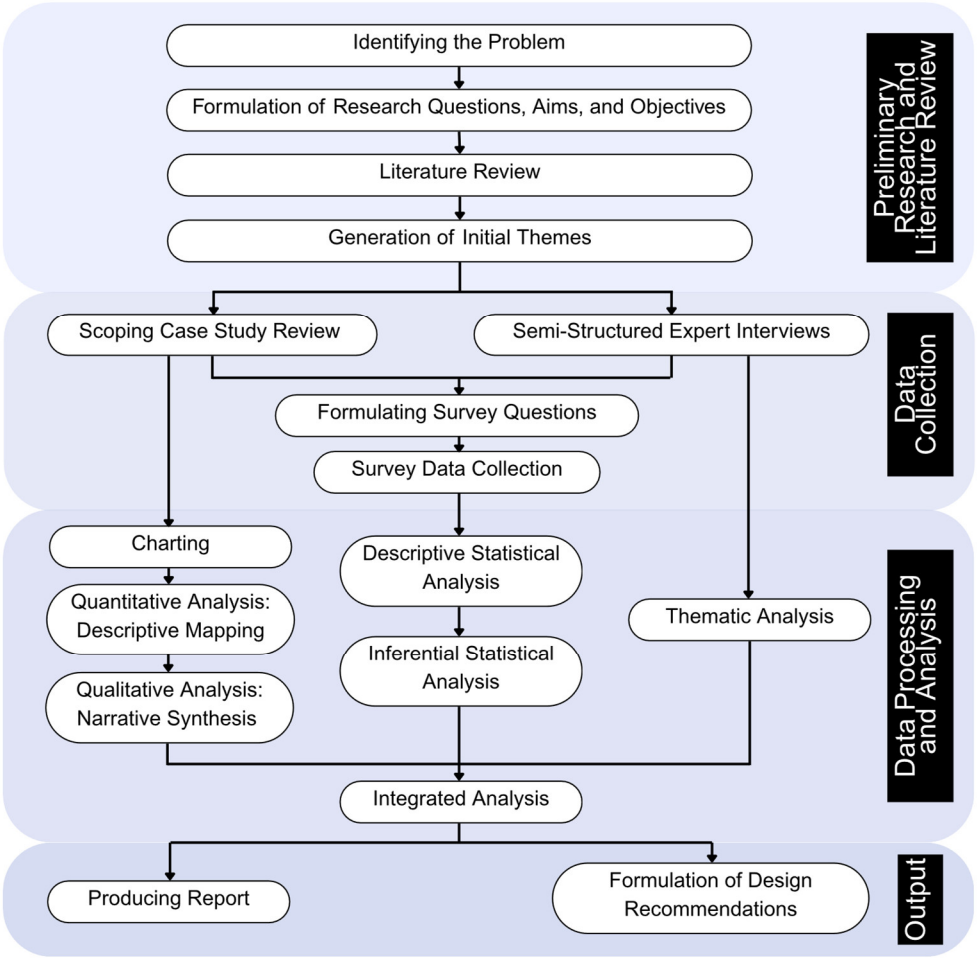

Figure 1. Methodology diagram created by the first author showing the mixed-method exploratory sequential design used for this study.

3.2. Data Collection and Analysis

3.2.1. Scoping Case Study Review

Case studies of meditation centres from leading open-source architectural databases such as ArchDaily [52], Dezeen [53], DesignBoom [54], and Architizer [55] were selected for review. These platforms are internationally recognised and widely used by architects, researchers, and designers for their extensive, curated collections of architectural projects [56,57]. Open-access projects with adequate documentation, such as plans, descriptions, and photographs, were included in the process.

The aim was to identify recurring design practices in global meditation-based projects, so each selected case study was analysed using pattern analysis. This approach categorised various spatial and environmental qualities: location, year, site type, area, height, capacity, purpose, materials, lighting, ventilation, thermal comfort, acoustic strategy, and biophilic elements.

A total of 23 global projects were selected based on the following criteria to ensure relevant, diversity, and analytical depth of the sample:

1. Availability of sufficient architectural documentation, including drawings, photographs, and descriptive texts.
2. Representation of diverse geographical and cultural contexts, ensuring that various perspectives, climates, traditions, and cultural settings are considered.

3. Primary purpose of the project as a space to maintain a focus on spatial qualities rather than traditional or religious affiliations.
4. Range of project scales, to examine design practices across different spatial typologies.

The case studies analysed comprised of 23 meditation centres drawn from diverse climatic and cultural contexts. Each was selected for its alignment with the central aim of meditation—to provide environments that facilitate contemplative and restorative practice—ensuring a coherent analytical basis for comparison. The specific locations of each project are detailed in Appendix B, which also summarises their key characteristics. This diversity allowed the identification of core spatial and environmental principles that support contemplative and restorative experiences across settings, emphasising the transferability of design strategies that reflect shared values of meditative practice.

The scoping case study review was analysed using a charting and synthesis process guided by Arksey and O'Malley's (2005) scoping review framework [58]. Project data were consolidated into a table with the following categories, which were derived from literature review: project name, architect, location, year, use, site typology, area, height, materials, natural and electric lighting strategy, ventilation strategy, thermal comfort strategy, acoustic strategy, biophilic elements, and reference links. This framework enabled consistent documentation and comparison of heterogeneous cases.

Data analysis for the scoping case study review proceeded in two stages. First, a descriptive mapping was undertaken to identify quantitative patterns across the sample, including the frequency and distribution of specific categories (e.g., prevalence of natural ventilation, types of materials, or the average size of meditation centres). This provided an overview of dominant practices. This was followed by a narrative synthesis of qualitative insights, focusing on overarching concepts and recurring design practices. This stage involved comparing how strategies were implemented in different contexts and emphasised both commonalities and divergences across design practices and case studies.

By combining descriptive mapping with a narrative synthesis, a comprehensive overview of patterns was seen, while attending contextual nuances that shape the integration of design practices. This aligns with Arksey and O'Malley's scoping review methodology [58].

3.2.2. Semi-Structured Interviews

An expert interview method was conducted with professionals who have worked on the design of a meditation centre, an instructor of a meditation practice, and an owner and manager of a meditation centre. Expert interviews, given a relevant participant sample, can provide valid information [59]. Recent studies further highlight the methodological value of semi-structured interviews in qualitative and mixed-methods research, emphasising their flexibility, contextual adaptability, and capacity to generate comprehensive insights into participants' experiences [60,61]. Therefore, this method served as an exploratory tool to gain insights about the following:

1. Design decisions made during the project.
2. Outcomes and challenges related to IEQs such as acoustics, lighting, air quality, ventilation, thermal comfort, and biophilia.
3. Reflections on user feedback and post-occupancy evaluation.

A key stakeholder approach [62] was adopted to identify participants with direct experience in designing, managing, or teaching within meditation spaces. Experts were selected based on their professional relevance and verified through project portfolios, institutional affiliations, and public professional profiles, ensuring a minimum of five years' experience in their respective fields. Participants from diverse cultural backgrounds were

selected to help balance cultural differences and limit bias, such as spirituality- and religion-based practices common in Asia and more secular, stress-management-oriented approaches in Europe [15]. Initial contacts were identified through the scoping case study review and invited via email. Additional participants from diverse meditation traditions were recruited using snowball sampling to capture a broad range of perspectives. In total, seven participants were interviewed (Table 1).

Table 1. List of interview participants, their location and expertise.

Participant Code	Region	Expertise and Relevance	Years of Experience
P01	Portugal	Meditation instructor	15
P02	UK	Architect—design of meditation retreat centre and supporting research endeavors	30
P03	UK	Lighting designer—lighting design for the retreat centre designed by P02.	20
P04	India	Architect and urban planner	35
P05	India	Architect—completed nine spiritual and meditation-based projects.	20
P06	UK	Project management/Member of development committee for a meditation tradition	10/5
P07	UK	Owner and manager of a meditation centre	15

Findings from the literature and scoping case study review were used to develop guiding questions. The skeleton of the interview consisted of 12 questions (Appendix C), which were adapted based on the participants' expertise. The interview would begin with a background about the topic of research and the participant's experience in the field. The main body of the interview was focused on design practices such as IEQs and spatial conditions. The final section included design retrospection and post-occupancy evaluation.

The interviews lasted between 30–60 min and were recorded and transcribed using MS Teams, with consent. A thematic analysis was conducted to extract meaningful insights about design intentions and observed outcomes. The interview data was analysed using Braun and Clarke's (2006) six-phase framework for thematic analysis, applying a deductive, semantic approach [63].

3.2.3. User Surveys

Based on the findings from the qualitative phase of the study, survey questions were developed to assess how users of meditation spaces perceive environmental qualities such as lighting, air quality, thermal comfort, acoustics, and connection to nature. The survey included Likert-scale questions and an open-ended question for qualitative comments. See Appendix D for the complete survey.

The study sample was limited to users of meditation centres and aimed to include demographic diversity in terms of geographical location and meditation tradition. The results were anonymous and included consent and information before the survey questions. Paper copies and a Google Forms link were used to distribute the survey and collect data. The surveys were carried out over a period of 3 months in 2025, encompassing participants from several geographical regions including the United Kingdom, South Asia, Middle East, and parts of Europe.

Participants were recruited through the following:

- Collaboration with meditation centres.
- Meditation communities on social media platforms.
- Snowball sampling through survey respondents, with information to ensure only meditation centre users were participating.

The survey results were collated on an MS Excel spreadsheet and graphed on MS Power BI Desktop v2.142.928.0 since the responses were recorded using Likert-scales. The data cleaning process involved checking for incomplete responses and removing inconsistencies. Quantitative analysis was conducted in two stages: descriptive and inferential statistical analysis.

In the descriptive analysis, measures of central tendency (mean, median, and mode) and dispersion (standard deviation) were calculated to summarise participants' reported frequency of meditation and preferred meditation locations. For survey items related to IEQ, visual representations were produced in the form of bar charts to illustrate distributional patterns and compare selected variables across subgroups. These techniques provided an overview of trends and variability within the dataset.

Inferential analysis was undertaken to examine differences between groups of participants. Three two-sample *t*-tests assuming unequal variance were conducted to compare mean responses across distinct participant categories, and two one-way ANOVA tests were employed to test for statistically significant differences across multiple groups. These tests were selected to account for variance heterogeneity and to enable the exploration of group-level effects in the survey responses.

Together, the descriptive and inferential approaches allowed for both the identification of patterns and hierarchies, and the rigorous testing of hypotheses concerning group differences within the sample. Finally, the open-ended responses on the surveys were mapped as a word cloud to examine common feedback about various IEQs.

3.3. Ethical, Equity, Diversity, and Inclusion Considerations

Ethical approval was obtained from the UCL BSEER Local Research Ethics Committee. Informed consent was secured from participants, with assurances of anonymity, confidentiality, and the right to withdraw. Equity, diversity, and inclusion were addressed through diverse case study selection and participant recruitment. Interviews and surveys accommodated participants' timing, location, and sensitivity needs using mindful and accessible language. The review considered meditation traditions that are donation-based to promote affordability and developed design recommendations that aim to create inclusive meditation spaces.

4. Results

4.1. Scoping Case Study Results

A case study review of 23 global meditation-related projects varying in scale, use, typology, materials, and environmental strategies was conducted. This review provided an opportunity to identify patterns in IEQs and spatial designs of meditation centres.

4.1.1. Quantitative Patterns

Table 2 summarises the findings from the case study review. The projects are predominantly situated in rural contexts, with moderate floor areas and intimate spatial allocations for each meditator. A pattern of a connection to nature can be seen considering the most common material was timber, most projects employed natural lighting, and nearly half of the projects benefitted from inherent acoustic quietness. Furthermore, biophilic elements were a prominent feature in most projects. Percentages noted as 'not mentioned' refer to instances where available documentation did not specify particular design features; these were interpreted as gaps in reporting rather than as evidence of their absence and were considered in the synthesis of design recommendations.

Table 2. Quantitative patterns that emerged from the scoping case study review.

Category	Quantitative Pattern			
Mean area (m^2)	299			
Average space per meditator (m^2)	4.7			
Site typology	47.8% rural	Site typology	47.8% Rural	
Common materials	52.2% wood/timber	17.4% brick	17.4% concrete	13% others
Natural light	87% mention daylighting strategies		13% do not mention natural light strategies	
	34.8% glazing	30.4% skylights/roof openings	17.4% open facades	17.4% filtered light
Ventilation	34.8% mention natural ventilation		65.2% do not mention natural ventilation	
Acoustics	47.8% are quiet by nature of the site	21.7% implement acoustic strategies		30.5% do not mention acoustic strategies
Biophilic elements	78.2% mention biophilic elements such as connection to nature, natural materials, and landscaping		21.8% do not mention biophilic elements	

Collectively, these findings highlight a consistent emphasis on harmonising human comfort, sensory experience, and connection to nature, demonstrating how design strategies are tailored to support meditative practices within diverse environmental contexts.

4.1.2. Qualitative Patterns

Through the case study review, the following key concepts were found:

- Geographic and Typological Diversity: Projects were spread across Asia, Europe, and North America, in urban (city-based), suburban (residential outskirts), and rural (countryside) settings. While focused on meditation, uses of the projects ranged from small, single-user pavilions to large, multi-functional retreat centres.
- Material Trends: Natural materials such as timber, bamboo, and stone were prioritised in rural contexts for their thermal and acoustic qualities, and biophilic appeal. Concrete is often used in urban or monumental contexts for durability and controlled acoustics.
- Natural Light: Skylights, roof openings, and glazing are the most common strategies for natural lighting. Rural projects favour open facades, while urban projects rely on controlled apertures for privacy and acoustic buffering. Dappled lighting that mimics a tree's light filtration is often used for its biophilic appeal and ability to bring in light but limit visual distractions.
- Ventilation and Thermal Environment: Passive strategies, such as open facades, cross ventilation, and shaded courtyards, are favoured in rural settings. Urban or large-scale projects incorporate mechanical systems for consistent comfort, but they need to ensure the systems are quiet.
- Acoustic Environment: Nature-based quietude is a recurring feature in rural settings. Urban projects employ material-based acoustic absorption, sound zoning of sociable and meditative spaces, and landscape buffers.
- Biophilic Integration: Almost all projects demonstrate biophilic principles. Strategies include visual or physical connection to nature, water elements, natural materials, natural soundscapes, or landscaping.

4.2. Interview Results

Interviews were conducted with seven experts in the field of meditation centre design. The 30–60-min interviews were semi-structured, allowing the participants to

contribute according to their expertise. A thematic analysis was conducted using the information gathered from the interviews. An overview of the themes can be seen in Figure 2.

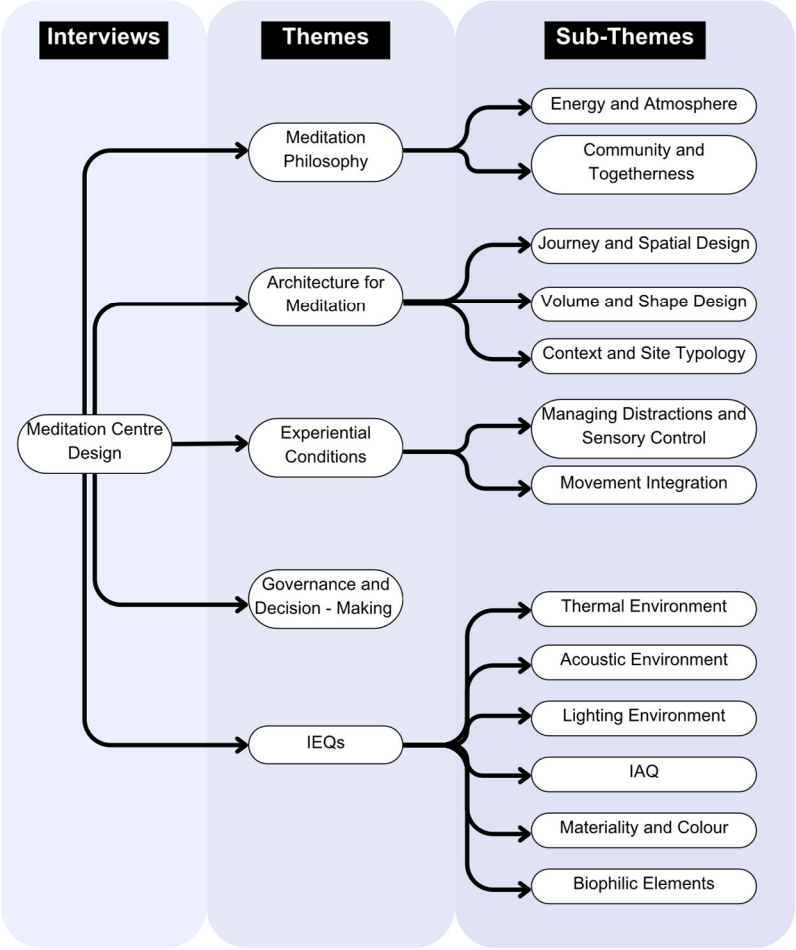

Figure 2. Summary of the themes and subthemes generated from the interview transcripts. Figure created by first author.

4.2.1. Theme 1: Meditation Philosophy

Key Codes: Impermanence, acceptance, community, togetherness, group sittings, solitude, intention, energy, atmosphere.

Across all interviews, meditation is framed as both a personal discipline and a collective experience. Meditation is an introspective experience that explores impermanence (P01, P05) and acceptance (P04). It is often linked to karma philosophy, suggesting that meditating can release the negative impressions caused by actions in the past (P01). Illustrative participant excerpts for Theme 1 are presented in Table 3.

Subtheme 1: Energy and Atmosphere

All interviewees refer to an intangible 'energy' shaped by space. Participant P01 emphasises group energy amplification. Participants P02 and P05 intentionally design for 'energy flow' using symmetry, volumes, and sensory balance. Participants P03 manipulates lighting to sustain atmosphere without distraction. Participant P06 links atmosphere to first-principal design, while Participant P04 notes environmental comfort as essential to sustaining meditative focus. While subjective, energy is grounded in environmental spatial qualities, such as light, air, volume, and material, that are carefully orchestrated

[39]. Sacred precedents, such as temples and monasteries, inspire design strategies to foster spiritual energy (P02, P05).

Subtheme 2: Community and Togetherness

Meditation centres foster accountability, belonging, and shared mission (P01, P02, P04, P06). The Vipassana meditation tradition's volunteer-led model (P04, P06) builds an egalitarian community. Participant P01 sees togetherness as amplifying mediative energy. P02 designs for both sociability and solitude, balancing communal needs with private retreat. A study by Thompson-Lastad et al. (2025) found that a 'community of practice' plays a central role in creating a sense of belonging, which in turn enhances meditation experiences [64].

Table 3. Interview excerpts for Theme 1.

Theme, Subtheme	Excerpt from Interviews	Source
T01, ST01	"Creating the right atmosphere is probably the most important part. When you walk in, you think, 'okay, I can be in this place for the next six hours...and it's going to support me in this practice.'"	P02
T01, ST02	"The moment you have a living guru and you're in that room, you close your eyes to meditate, and you feel his energy all around. Which is why when people say they meditate in groups, it's the group energy."	P01

4.2.2. Theme 2: Architecture for Meditation

Key Codes: Overdesigning, procession, transition, axis, separation, context, urban, rural, adaptive reuse, site, purpose, symmetry, volume, golden ratio, dome, ceiling.

Spaces or centres that support meditation are understood as 'processes' rather than 'products' akin to sacred (P02) and temple journeys (P05). Participants P02, P05, and P06 emphasise the importance of designing collaboratively with the clients and understanding their meditation objectives. Overdesigning can distract from the practice (P06). Illustrative participant excerpts for Theme 2 are presented in Table 4.

Subtheme 1: Journey and Spatial Transition

Entry-to-practice journeys prepare users mentally and physically. Participant P05 models design on temple processions with gradual sensory shifts. Participant P03 emphasises transitional lighting and Participant P02 emphasises transitional spaces, as well as the progression from communal to meditative spaces. Participant P04's plans reinforce functional and gender-segregated axes. These transitions operationalise philosophical principles into spatial experience [31].

Subtheme 2: Volume and Shape Design

Spatial volume and symmetrical geometry can influence meditative experiences. Symmetrical layouts (P01), domed forms (P01, P05), and high ceilings (P01, P02, P05) can concentrate 'energy flow' and create balance, which supports meditation [24]. Participant P04 describes how halls for the Vipassana meditation tradition are often proportioned based on the golden ratio, reinforcing harmony and circulation.

Subtheme 3: Context and Site Typology

Rural retreat centres (P02, P04, P05) enable purpose-built, climate-responsive designs with fresh, unpolluted air and nature immersion. Urban/adaptive-reuse contexts (P01, P02) require pragmatic adaptation to existing constraints. Participant P06 stresses maintaining the core function despite site limitations.

Table 4. Interview excerpts for Theme 2.

Theme, Subtheme	Excerpt from Interviews	Source

T02, ST01	Giving your eyes time to adapt to the lighting "helps create that setting and the anticipation of going into a room, allow you to slowly calm down before entering and when you're leaving."	P03
T02, ST01	"...the general signage around the centre and directional signage to get you from place to place. When you get those little details right, it just makes such a difference."	P02
T02, ST02	"I think you want to be in a space that has a bit of height so that you don't feel that there is an oppressively low ceiling... It's quite nice to have a bit of volume and feel that you are in a space that's got a bit of generosity."	P02
T02, ST03	"One solution is not possible everywhere. It can't be a prototype because every context is different."	P05

4.2.3. Theme 3: Experiential Considerations

Key Codes: Distraction, sensory hierarchy, control, adaptability, visual filtering, yoga, walking paths, circumambulation, acoustic control.

Illustrative participant excerpts for Theme 3 are presented in Table 5.

Subtheme 1: Managing Distractions and Sensory Control

Suppressing distractions is valued (P01, P02, P03, P04) [25], though Participants P01 and P05 recognise that some meditation traditions embrace the challenge of discipline regardless of environmental distractions. Participant P02's shrine room redesign reduced visual distractions using perforated walls. Participant P04's window design avoids direct light and views while maintaining ventilation. Participant P03 conceals light sources to avoid peripheral distraction and manages brightness transitions. Participant P05 prioritises non-visual senses to avoid visual dominance. All interviewees mention adaptable control over sensory and environmental conditions. Participant P07 mentions meaningful noises, such as discernible music and conversation, are more distracting than natural, ambient, or consistent sounds, such as birdsong or white noise [31]. Certain meditation traditions mention the benefits of meditating in solitary cells or isolation from others to deepen practice (P02, P07).

Subtheme 2: Movement Integration

Some meditation traditions such as Art of Living (P01) and the Triratna Buddhist Community (P02) integrate yoga or walking meditation, influencing layout and outdoor connections. Participants P04 and P05 include outdoor paths in their designs for walking breaks between meditation sessions. Movement-based elements blur physical and contemplative boundaries [34].

Table 5. Interview excerpts for Theme 3.

Theme, Subtheme	Excerpt from Interviews	Source
T03, ST01	"Overdesigning is actually frowned upon a little bit... It's distracted. This is quite an austere practice."	P06
T03, ST01	"Your memory and senses are an important part when you close your eyes."	P05
T03, ST01	"Any noise that has direct meaning, like music or talking, is more distracting than something like traffic noise."	P07
T03, ST02	"The shrine room has a huge set of double doors that open to the courtyard and that courtyard's got a stupa in it. You can circumambulate, as they call it, the stupa in a puja ceremony or in a walking meditation. So, the idea of being able to go from a seated, still form of practice to a walking, a moving kind of practice, whether it is yoga or walking, is important as well."	P02

4.2.4. Theme 4: Governance, Decision Making, and Funding

Key Codes: Trust, donation, volunteer led, pragmatism, decision making.

Vipassana meditation traditions centres use consensus-based decision-making, slowing projects but ensuring tradition alignment (P04, P06). Donor-led or privately commissioned centres allow more design autonomy. All note that trustees, volunteers, and teachers shape priorities, with pragmatic compromises common in donation-funded projects. It is vital to understand the client's and meditation tradition's needs. Illustrative participant excerpts for Theme 4 are presented in Table 6.

Table 6. Interview excerpts for Theme 4.

Theme, Subtheme	Excerpt from Interviews	Source
T04	"I believe that the reason it was a success is that it was a real collaboration, a really true collaboration between us and them."	P02
T04	"We don't have that much funding so the materials choices we make is the biggest thing, and how you exhaust your buildings."	P04
T04	"So, we make decisions on the bases of the [development] committee, and we take it to the trust, and they make the fundamental decision."	P06

4.2.5. Theme 5: Indoor Environmental Qualities

Key Codes: Temperature, passive strategies, ventilation, comfort, noise, quiet, ambient sounds, daylight, concealed lighting, glare, dim, darkness, air freshness, nature, plants, local materials, warm tones, tactile.

Illustrative participant excerpts for Theme 5 are presented in Table 7.

Subtheme 1: Thermal Environment

Stability is critical—sudden temperature changes disrupt focus. Participant P04 designs with insulation, passive cooling, and careful orientation, which keep interiors 10 °C cooler than the exterior in Indian summers. Participant P02 adds underfloor heating for floor-based practice. Participant P03 ensures HVAC noise is minimal. Participant P01 links comfort to sustaining longer sessions.

Subtheme 2: Acoustic Environment

Quiet is essential for deep practice (P02, P03, P05). Strategies include material thickness, ceiling treatments, and spatial separation between communal and meditative spaces. Participant P07 considers 'active' sounds (e.g., water) to create perceived silence. Participant P06 notes some traditions embrace ambient noise to build resilience. A study by Zhang and Chen (2023) demonstrated that natural sounds such as birdsong can 'mask' noise and thereby enhance psychological wellbeing [65].

Subtheme 3: Lighting Environment

Participant P03 alters lighting to tradition and programme according to the client's requirements and preferences and emphasises avoidance of glare and concealing sources to minimise distraction. Participant P03 manages circadian effects where relevant. Participant P02 balances natural light and artificial light for day/night use and uses perforated walls to mimic light conditions created by trees [31]. Participant P01 prefers softer, warmer tones for calmness [33]. Participant P04's angled windows bring in sunlight while eliminating distracting views.

Subtheme 4: Indoor Air Quality

All interviewees stress clean air and ventilation. Participants P02 and P06 prioritise fresh air for concentration in group settings [9]. Participant P01 links air freshness to biophilic wellbeing. Participant P07 speaks on the updates he plans to do on his centre to improve cross ventilation and combat increasingly warm summers in London.

Subtheme 5: Materials and Colour

There is a preference for local, tactile materials such as stone and wood, which are tied to sustainability and cultural relevance (P02, P04, P05) [28]. Participant P04 experiments with rammed earth, ACC blocks, and expanded clay but emphasises the use of local

materials for ideal thermal performance. Participant P03 now considers luminaire life cycles for sustainability consideration. Participant P05 values weathering for connecting users to time and impermanence.

Subtheme 5: Biophilic Elements

Natural elements reduce anxiety, deepen the sense of belonging, and align with impermanence philosophy (P01, P02, P05) [26]. Participant P02's courtyards offer sheltered outdoor meditation. Participant P04 integrates landscapes into site plans, and Participant P05 stresses sensory engagement with nature's dynamism. Participant P07 emphasises the importance of staying connected to the rest of the world and nature and avoiding artificial sensory deprivation. Even though some meditation traditions support meditation in solitary cells, they only suppress sensory exposure to a certain extent.

Table 7. Interview excerpts for Theme 5.

Theme, Subtheme	Excerpt from Interviews	Source
T05, ST01	"Being distracted by things like being too cold or too hot or having air blowing on you are unnecessary...Being in a neutral environment that is where you are not overstimulated."	P02
T05, ST02	When experiencing a space "you feel that there is a silence even though there is chaos or something is happening. That quality is very important."	P05
T05, ST02, ST03	"...keeping [the light source] very concealed. So, there's nothing in your peripheral vision...and as quiet as possible in terms of the lighting equipment."	P03
T05, ST03	"Quite often, some people prefer not very much light at all..."	P03
T05, ST03, ST06	"A meditation centre needs to manage that access to sunlight and daylight aspects to...minimise the harshness of having solar gain from it."	P03
T05, ST04	"Volumetrically, if you design and provide different levels of openings, for circulation, it gives you a benefit. When we are always sitting on the floor, if you can provide an opening 6–9 inches from the ground and at the same time, if you can provide ventilation openings in the upper level, it can be an exhaust."	P04
T05, ST04	"We've had a lot of conversations about air quality and how fast air needs to be transmitted. It's a very important factor when you put a large amount of people in a place."	P06
T05, ST01, ST05	"What's on the floor? Because you spend a lot of time on the floor, so we had a timber floor with underfloor heating."	P02
T05, ST05	"I personally feel that if you can use locally available materials, it has more benefits and more thermal properties than [imported] materials."	P04
T05, ST06	"We should design our indoor space to have the quality of the forest, of riverbanks, or outdoor feelings. All things, all senses are required more than just making it calm physically."	P05
T05, ST06	"You want as little distraction as possible, in the case of noises… but you don't want it to be any more artificial than it has to be… we want to be connected, not disconnected."	P07

4.3. Survey Results

A total of one hundred survey responses were recorded, out of which four were removed due to missing data. Data from Questions one to nine were coded and analysed. Question ten was omitted since it was about the meditation centre that the participant was referring to, which was not trackable for the online responses.

4.3.1. Descriptive Analysis

Question one asked how frequently the participant meditates, and the following was reported (Table 8):

Table 8. Percentage of responses to survey question one.

Frequency of Meditation	% of Responses
Daily	47.9%
A few times a week	32.2%
Weekly	8.3%
Monthly	3.1%
Rarely or first time	8.3%

Question two asked if the participant preferred to meditate at a centre or at home, and the following was reported (Table 9):

Table 9. Percentage of responses to survey question two.

Preference of Meditation Space	% of Responses
Meditation Centre/Space	57.3%
Home	42.7%

Question three asked the impact that the room in which one meditate has on their experience. With one being 'Strongly Agree' and five being 'Strongly Disagree', the average response was 1.76. This suggests that most people agree that the room impacts their meditation experience.

Questions four to eight asked if various IEQs impact the participant's meditation experience. Considering ideal or better conditions (i.e., natural light, better indoor air quality, thermally comfortable temperatures, quietness, and the presence of plants), the participants responded on a scale where one was 'Strongly Agree' and five was 'Strongly Disagree'. The following was reported (Table 10):

Table 10. *p* values from descriptive analysis of responses to survey questions four to eight.

	Natural Light	IAQ	Thermal Comfort	Noise	Plants
Mean	2.24	1.79	1.79	1.42	2.17
Media	2	2	2	1	2
Mode	2	1	1	1	2
Standard Deviation	1.01	0.83	0.81	0.68	0.65

The results for questions four to eight indicate that noise, indoor air quality (IAQ), and thermal comfort are the most influential environmental factors affecting meditation, as seen in the bar chart (Figure 3). Natural light and plants had comparatively weaker impacts. This is supported by the descriptive analysis as well (Table 10). Noise has the lowest mean score (1.42), a low median and mode (1), suggesting higher agreement on its impact. It was followed by IAQ and thermal comfort, which have low mean scores (1.79), suggesting high agreement on their importance as well. Plants (2.30) and natural light (2.24) had higher means, indicating weaker importance. Moreover, the lower standard deviations for noise (0.68) and plants (0.65) suggest greater consistency in responses compared to natural light (1.01).

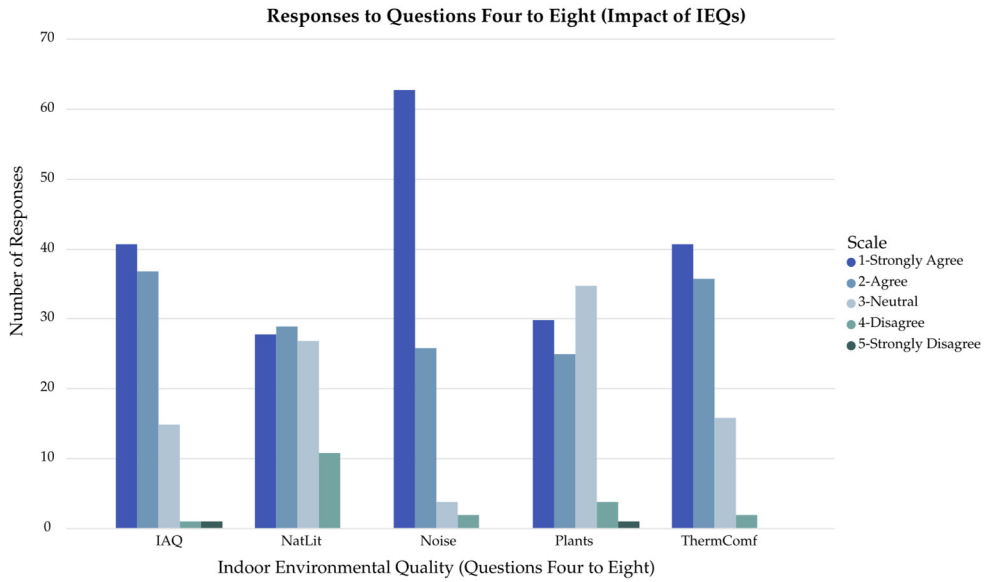

Figure 3. Distribution of responses to survey questions four to eight assessing the perceived influence of indoor environmental quality factors—indoor air quality, natural light, noise, plants, and thermal comfort—on meditation. Responses are shown on a five-point Likert scale (one = Strongly Agree to five = Strongly Disagree).

Overall, the hierarchy of impact of the various indoor environmental conditions based on the survey results is as follows:

1. Acoustic environment
2. Indoor air quality and thermal environment
3. Biophilic elements
4. Lighting environment

A comparison of responses between two groups—those who prefer to meditate in a meditation centre and those who prefer to meditate at home—was conducted.

Figure 4 shows the two groups' responses to Question three: The room in which I meditate impacts my experience.

- Meditation Centre group: Most participants strongly agreed, and a smaller proportion agreed that the room impacts their meditation experience. Few participants selected 'neutral' or 'disagree', and none selected 'strongly disagree'.
- Home group: Even though they were slightly more spread, the responses were still dominated by 'strongly agree' and 'agree'. Fewer participants responded 'strongly agree' in comparison to the Meditation Centre group. Slightly more participants responded 'disagree' in comparison to the Meditation Centre group. No participant responded 'strongly disagree'.

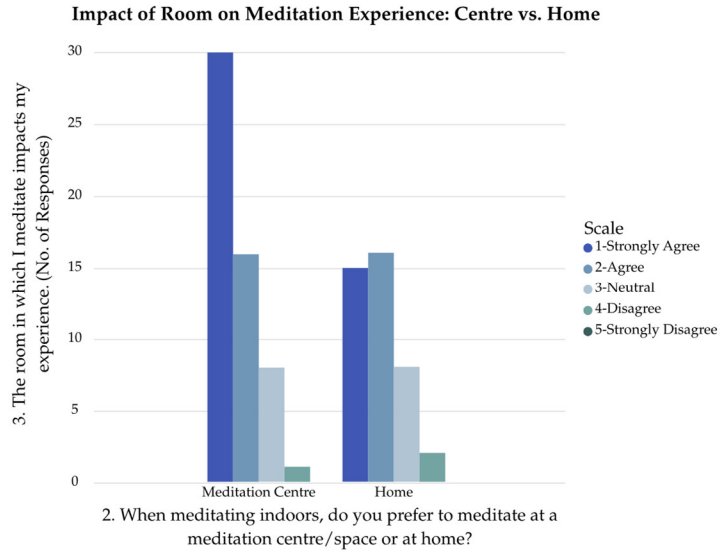

Figure 4. Distribution of responses comparing perceptions of the room's impact on meditation experience at a meditation centre versus at home. Responses are shown on a five-point Likert scale (one = Strongly Agree to five = Strongly Disagree).

This suggests that while both groups generally acknowledge the room's influence, those who meditate in centres tend to feel more strongly about its impact on their experience compared to those who prefer to meditate at home.

Figure 5 shows the two groups' responses to Question nine: How distracting do you find indoor environmental conditions (e.g., noise, lighting, temperature) during meditation?

- Meditation Centre group: The largest share rated IEQ as 'neutral', followed closely by 'very distracting', with a small number of participants finding it 'not distracting'.
- Home group: A similar pattern appears but with lower counts for both 'neutral' and 'very distracting'. Few participants find it 'not distracting'.

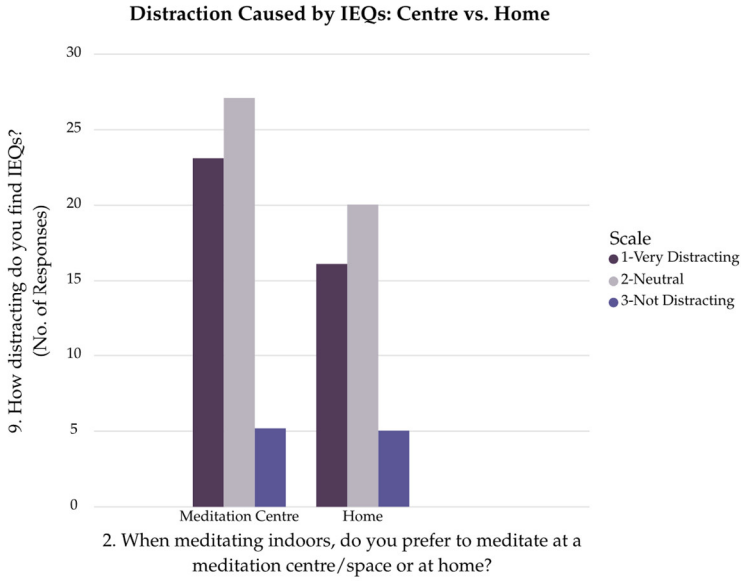

Figure 5. Distribution of responses comparing perceived distraction from indoor environmental qualities (IEQ) during meditation at a meditation centre versus at home. Responses are shown on a three-point Likert scale (one = Very Distracting to five = Not Distracting).

Overall, both groups tend to report either neutral or high distraction from IEQs, but participants who prefer to meditate at a centre have slightly higher counts than those who prefer to meditate at home. This may suggest that while environmental distractions are a concern for both settings, they may be more pronounced or more frequently noticed at meditation centres, or that participants who are more susceptible to distractions prefer to meditate at more purpose-driven spaces.

A comparison of responses between groups of participants who meditate daily, a few times a week, weekly, monthly, and rarely was conducted.

Figure 6 shows the responses of the different groups to Question three: The room in which I meditate impacts my experience.

- Daily: Most participants 'strongly agree', followed by 'agree'. Responses for 'neutral' and 'disagree' are minimal.
- Few times a week: Participants also show high agreement with the most responding 'strongly agree', followed by 'agree'. No one disagreed.
- Weekly: Fewer responses were recorded but they were more evenly split between 'agree', 'neutral', and 'disagree'. Fewer people 'strongly agreed', which contrasts the results from more frequent meditators.
- Monthly: Meditators are minimal in number. Responses only in 'strongly agree' and 'neutral'.
- Rarely: Meditators lean towards 'strongly agree', with smaller numbers in 'neutral' and 'agree'.

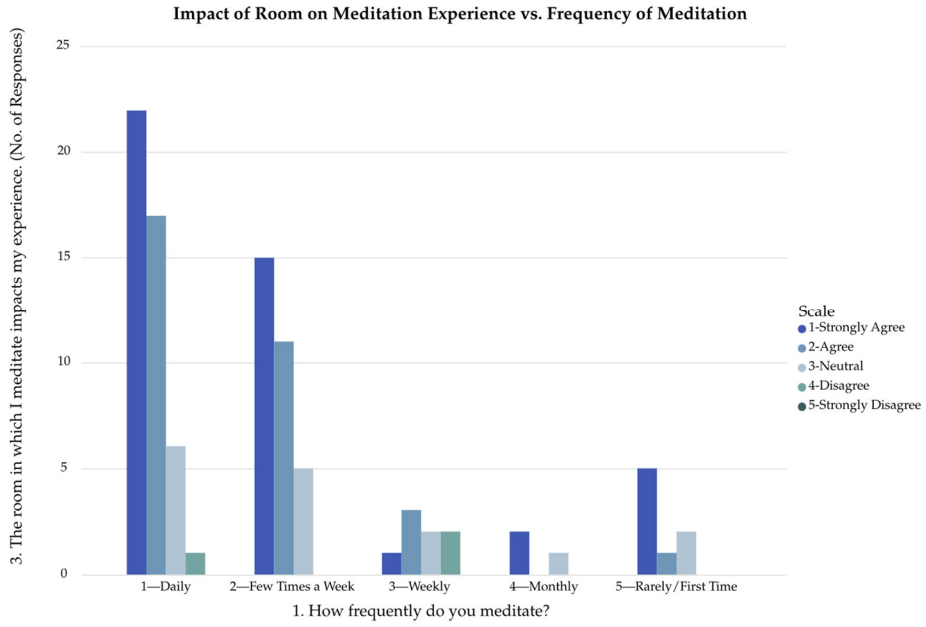

Figure 6. Distribution of responses comparing perceptions of the room's impact on meditation experience, shown by frequency of meditation. Responses are shown on a five-point Likert scale (one = Strongly Agree to five = Strongly Disagree); no participant responded "Strongly disagree".

Overall, the vast majority of the participants believe the room influences their meditation experience. The strongest conviction is seen among daily meditators where 'strongly agree' dominates. This may be due to heightened sensitivity, established routines, or longer cumulative exposure. No participant responded 'strongly disagree'.

Figure 7 shows the responses of the different groups to Question nine: How distracting do you find indoor environmental conditions (e.g., noise, lighting, temperature) during meditation?

- Daily: Most meditators rated IEQs as 'neutral', with a smaller share finding them 'very distracting', and very few saying 'not distracting'.
- Few times a week: Meditators have a more even split between 'neutral' and 'very distracting', though the latter is slightly higher. Comparatively fewer responses saying IEQs are 'not distracting'.
- Weekly: There are few but balanced counts across all categories as seen through the more even distribution.
- Monthly: Minimal participants meditate monthly. More responded 'neutral' and none responded 'not distracting'.
- Rarely: Meditators mostly rated IEQs as 'very distracting', followed by 'neutral'. No one responded 'not distracting'.

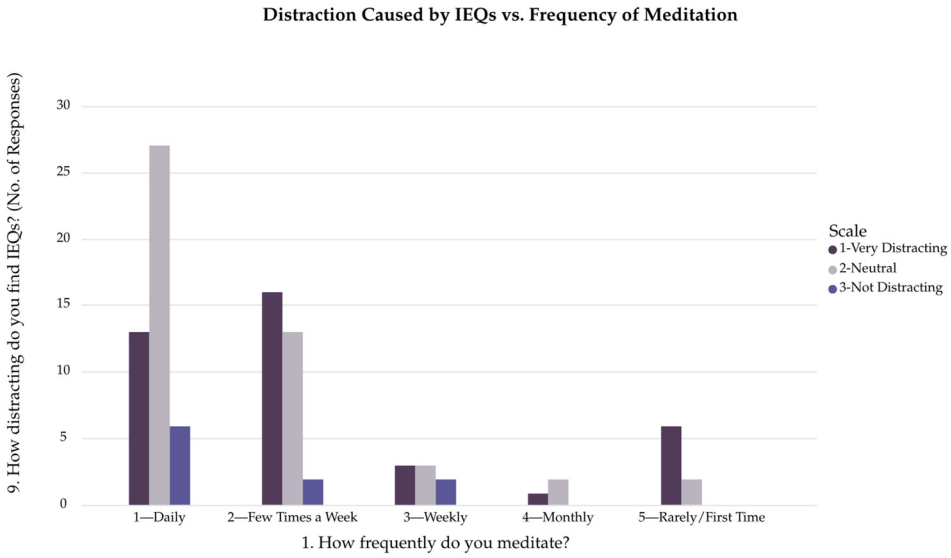

Figure 7. Distribution of responses comparing perceived distraction from indoor environmental qualities (IEQ) during meditation, shown by frequency of meditation. Responses are shown on a five-point Likert scale (one = Strongly Agree to five = Strongly Disagree).

Overall, frequency meditators tend to perceive the environment as 'neutral' and some even perceive it as 'not distracting'. Meditators practicing less frequency report more even splits between 'neutral' and 'very distracting', with no one responding 'not distracting'. This suggests that regular practice may foster greater tolerance or adaptability to varying environmental conditions. This means that creating supportive environments for meditation can be beneficial for beginners.

Linking findings from the two charts (Figures 6 and 7) shows the following patterns:

- In response to the impact of the room on meditation, daily meditators show the strongest conviction as most responses 'strongly agree'.
- In response to the distraction caused by IEQs, daily meditators report more 'neutral' feelings than responding 'very distracting'.

This suggests that daily meditators seem more aware of the importance of the room as a supportive element to meditation, but they are less likely to be distracted by the

environment. They value good meditation centre design, but their regular practice helps them build resilience to maintain focus even when conditions are not perfect.

4.3.2. Inferential Analysis

Three two-sample assuming unequal variance *t*-tests and two one-way ANOVA tests were conducted (Table 11).

Table 11. Results to *t*-tests and ANOVA tests used for inferential data analysis.

Test	Variable (Survey Q)	Variable (Group)	Result
t-test 1	Q3—Room impact	Q2—Meditation centre vs. Home	$p = 0.99$
ANOVA test 1	Q9—IEQ distraction	Q1—Frequency of meditation	$F(4,91) = 2.23$, $p = 0.072$
t-test 2	Q9—IEQ distraction	Q1—Frequency of meditation	$p = 0.008$
ANOVA test 2	Q3—Room impact	Q1—Frequency of meditation	$F(4,91) = 2.45$, $p = 0.052$
t-test 3	Q3—Room impact	Q1—Frequency of meditation	$p = 0.841$

Room Impact and Meditation Location:

A two-sample assuming unequal variance *t*-test (*t*-test 1) was conducted to see the statistical significance of the responses to Question three: 'The room in which I meditate impacts my experience' between participants who prefer to meditate at a centre and who prefer to meditate at home (Question two).

The mean responses from those who meditate at a centre was 1.636 and at home was 1.927, suggesting that those who prefer to meditate at a centre have a stronger agreement about the impact of the room. However, the *t*-test (*t*-test 1) result was $p = 0.99$, which is above the 0.05 significance threshold, indicating no statistical significance between the two groups in their perception of the room's impact on meditation experience.

IEQ Distraction and Frequency of Meditation:

A comparison between the responses to Question nine: 'How distracting do you find indoor environmental conditions (e.g., noise, lighting, temperature) during meditation?' from groups based on their frequency of meditation was conducted (Question one).

A one-way ANOVA test (ANOVA one) was conducted.

The ANOVA test (ANOVA one) resulted in $p = 0.072$. This suggests that overall, there is no statistically significant difference in how distracting participants find their environment based on how often they meditate. However, there was a hint of a trend that was seen in Section 4.3.1., which suggested that rarely or monthly meditators tend to report IEQs as less of a distraction than daily/weekly meditators. Further data collection and analysis is needed to investigate this.

A two-sample assuming unequal variance *t*-test (*t*-test two) was conducted to examine whether there is a statistically significant difference in responses to Question nine between participants who meditate daily and those who meditate rarely (Question one).

The *t*-test (*t*-test two) result was $p = 0.008$, which is below the 0.05 significance threshold, indicating a statistically significant difference in distraction from IEQs between daily and rare meditators. Daily meditators reported significantly stronger agreement (mean = 2.15) than those who meditate rarely (mean = 2.75) that IEQs are distracting. This may be because meditating rarely is less demanding or conducted in shorter sessions, making distractions more noticeable.

Room Impact and Frequency of Meditation:

A comparison between the responses to Question three: 'The room in which I meditate impacts my experience' from groups based on their frequency of meditation was conducted (Question one).

A one-way ANOVA test (ANOVA two) was conducted.

The ANOVA test (ANOVA two) resulted in $p = 0.052$, which is slightly above the 0.05 significance threshold, indicating no statistically significant difference in perceived room impact between meditation frequency groups. Although, the result is close to the significance level and may suggest a possible trend worth further investigation.

A two-sample assuming unequal variance *t*-test (*t*-test three) was conducted to examine differences in responses to Question three between participants who meditate daily and those who meditate rarely (Question one).

The mean response for daily meditators was 1.7 and rare meditators was 1.63, both indicating strong agreement. The *t*-test (*t*-test three) result was $p = 0.841$, which is above the 0.05 significance threshold, indicating no statistically significant difference in perceived room impact between daily and rare meditators.

4.3.3. Survey Word Mapping

The additional comments from the survey results were mapped to infer recurring feedback, issues, and preferences from the users. The results were consolidated into a word cloud (Figure 8), in which font size corresponds to the frequency of each word mentioned by participants.

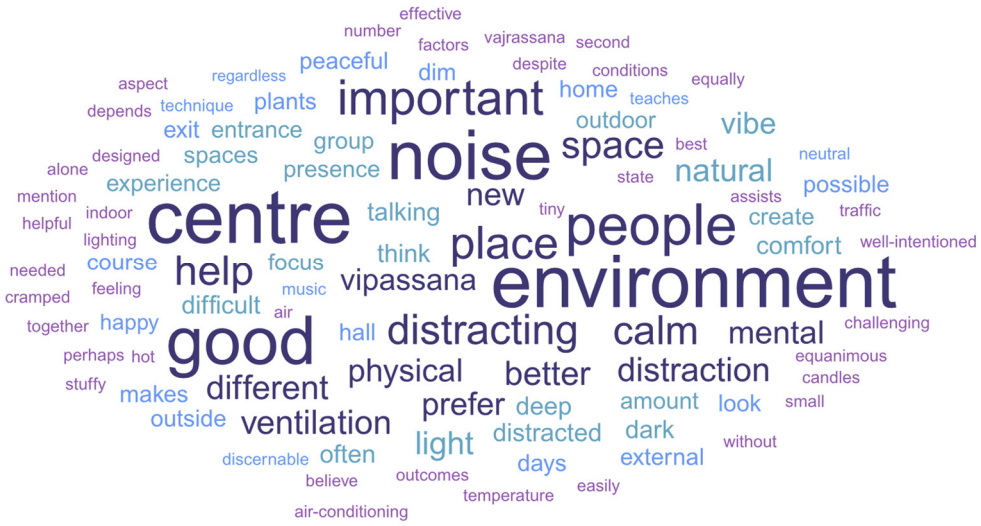

Figure 8. Word cloud generated from responses to the open-ended survey question.

The mapping and analysis of the open-ended responses in the surveys gave the following key insights from the users' perspectives:

- Noise is a dominant distraction.
- Meditating in a 'good' environment is important.
- Thermal comfort and IAQ are critical for crowded centres.
- Lighting needs to be adaptable.
- A natural and muted material and colour palette is preferred.
- Biophilia is most effective when implemented outside the meditation hall, while retaining connection.
- Atmosphere and social dynamics are important.

5. Discussion

5.1. Key Findings and Design Recommendations

The research carried out about meditation centre design sought to investigate how design practices can create healthy and sustainable spaces that support meditation. More than half of the meditators that were surveyed reported a preference for meditating at a

centre rather than at home, which emphasises the relevance of dedicated, purpose-built spaces. Furthermore, user surveys suggested that the environmental conditions of the meditation space had a notable influence on the meditation experience. This highlights the need for evidence-based, thoughtful, and well-intentioned design practices. Through integrating global case studies, thematic expert interviews, and a quantitative survey of meditators, several recurring and successful design practices and nuanced understandings were found. The results from the mixed-methodology exploratory study were consolidated into key concepts and themes (Figure 9).

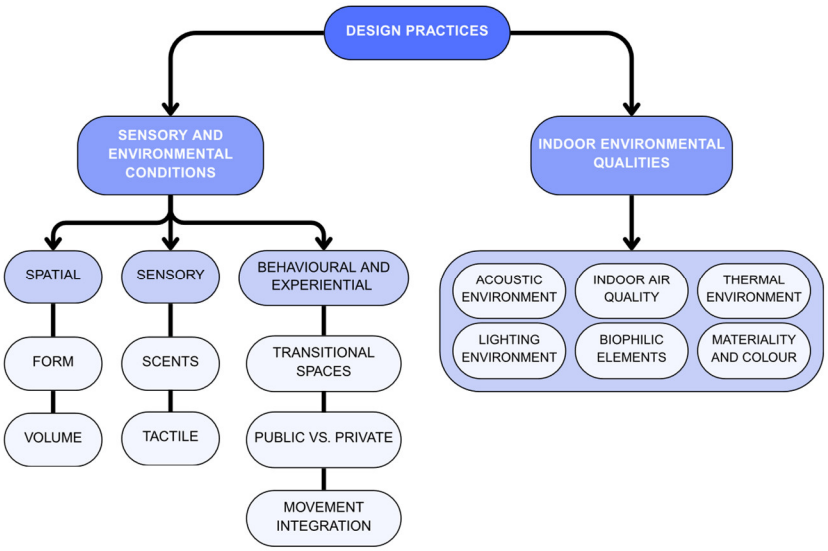

Figure 9. Summary of key findings that were consolidated into design practices. Note: Colours are used only to visually group related categories. Figure created by first author.

Each concept and theme was analysed in depth based on the evidence collected from the scoping case study review, semi-structured expert interviews, and user surveys. The findings were used to develop a set of design recommendations, which can be applied to meditation centre design, as well as similar calming and restorative spaces (Table 12). These recommendations serve as the final output, a summary and an application of this study's key findings.

Table 12. Design recommendations for meditation centres.

Design Practice	Strategy	Description
Site-specific environmental strategies	Contextual adaptation	Tailor design to urban, suburban, or rural settings. Rural sites should exploit open facades, landscape immersion, and passive environmental strategies, such as cross ventilation and shaded courtyards, to connect users with nature and maintain thermal comfort. Urban centres require controlled apertures, landscape buffers, and acoustic treatments to ensure privacy and manage external noise.
	Environmental zoning	Separate sociable and meditative zones, using strategic placement, material buffers, and transitional spaces to modulate sound and energy.
Journey and Spatial Transitions	Gradual sensory preparation	Model entry sequences on sacred or spiritual journey traditions, using gradual changes in lighting, acoustics, and volumes to prime users' bodies and minds for meditation.
	Transitional spaces	Incorporate thresholds, vestibules, or intermediate spaces that help occupants shift from communal to introspective modes.

	Public vs. private	Create a journey from public and social spaces to private and meditative spaces.
Flexibility and Movement	Walkways	Accommodate for walking during or between meditation sessions by providing outdoor, contemplative pathways. Facilitate movement breaks to blur boundaries between contemplative and physical activity.
	Accommodating for movement-based meditation	For those traditions that inherently require physical movement, such as yoga or walking meditation, as a part of the meditation tradition, provide open plan layouts and circulation routes. Space per meditator for such traditions should be generous enough to fit a yoga mat.
Sensory Adaptability	User control	Provide mechanisms for occupants to adjust lighting, noise cancelling, airflow, temperature, and privacy according to their needs and preferences. Adaptability is especially important for beginners, who may be more sensitive to environmental distractions.
	Managed distractions	Suppress visual and auditory distractions through careful placement of windows, perforated walls, and concealed fixtures. Design flexibility ensures comfort for diverse traditions and individual requirements.
	Provision for solitary meditation	Provide spaces for isolated, solitary meditation, such as dedicated cells or adaptable rooms. The emphasis on seclusion is inherent in certain meditation traditions, where isolation is regarded as integral to deepening practice.
Community and Governance	Stakeholder engagement	Involve users, teachers, volunteers, community leaders, and donors early in the design process. The ideal design practice involves a deep understanding of the meditation tradition and its specific requirements. Align spatial solutions with tradition-specific goals, operational resources, and community aspirations.
	Pragmatism	Recognise that consensus-based and donation-funded centres may require phased construction, flexible material selection, and strategic priorities to ensure completion and adaptability.
Inclusivity and Tradition Alignment	Respond to tradition	Understand and respect the unique requirements of each meditation philosophy practiced in the centre. Adaptive design is critical for sustaining authenticity and supporting evolving needs.
	Accessible design	Build to, or beyond, local inclusive design standards for a centre that is accessible by individuals of all abilities.
Lighting Environment	Natural light emphasis	Incorporate strategies such as skylights, roof openings, and facades that maximise daylight. Ensure that these openings can be closed according to user preference and to limit solar heat gain when necessary.
	Filtered and dappled light	Use perforated walls, angled windows, and landscaping to diffuse light, mimicking the biophilic filtration found in trees while minimising distractions.
	Artificial lighting	Supplement with dimmable, warm-toned fixtures for evening use. Conceal light sources to reduce glare and refocus attention inward. Adjust lighting to support circadian health and specific requirements. Provide intuitive and sufficient controls for flexibility in lighting scenes.
Indoor Air Quality	Passive ventilation	Prioritise open facades, cross-ventilated plans, and shaded courtyards in suitable, non-polluted climates.
	Air freshness	Ensure air freshness through filtration or direct connection to outdoor air depending on pollution levels, which is critical to accommodate for the multitude of users sitting in meditation sessions for extended periods of time.
	Mechanical systems	Where mechanical ventilation is required, select quiet systems and insulate against unwanted noise.
Thermal Environment	Passive systems	Passive cooling is preferred for its quiet operation and energy efficiency. Passive heating through insulation and thermal mass can reduce energy consumption in the winter.
	Mechanical systems	Where mechanical heating or cooling is required, select quiet systems and insulate against unwanted noise.
	Design at the floor level	Unlike most buildings, users of meditation centres spend a lot of time sitting on the floor. Underfloor heating/cooling systems can provide more direct effects for this purpose.

	Constant temperatures	Avoid sudden changes in temperature, which can cause distractions in meditative focus. For centres where sitting meditation takes place, design for thermally comfortable and constant temperatures at the floor level.
Acoustic Environment	Sound management	Foster nature-based quietude in rural settings. In urban sites or large centres, deploy material-based acoustic absorption in walls and ceilings, and landscape buffers to insulate from external disturbances.
	Sound zoning	Spatially separate communal and meditative spaces and buffer zones to minimise the transmission of noise.
	Positive acoustics	Where appropriate, introduce non-intrusive and constant 'active sounds', such as water features and white noise, to mask intermittent disturbances, creating a perceived silence.
Materials and Colour	Natural materials	Prioritise locally sourced natural materials, such as timber, stone, bamboo, brick, or context-specific materials, for their biophilic appeal, acoustic properties, thermal performance, and low embodied carbon. This supports both sustainability and cultural resonance.
	Adaptive reuse	In urban sites, employ durable materials such as concrete for longevity and efficient sound absorption. Layer with tactile surfaces such as wood panels or soft flooring to retain warmth and character.
	Impermanence philosophy	Consider the life cycle of the chosen materials. Experiment with materials that weather and evolve, grounding the space in contemplative themes of change and time.
	Subtle colour palette	Implement a subtle and calming colour palette for materials and finishes.
Biophilic Elements	Connection to nature	Ensure visual, auditory, or physical connection to planted landscapes, water features, or outdoor courtyards. Use natural materials or anecdotal lighting qualities to reinforce a subtle connection to nature.
	Indoor planting	Use live plants in transitional spaces or provide visual access to them to soften environments, reduce anxiety, and promote restoration.
	Sensory connection to nature	Natural scents and sounds can promote a calm environment and the benefits of biophilia. Olfactory considerations are important for spaces where large groups of people are sitting for long durations.

These design recommendations take into consideration spatial strategies such as journey, transition spaces, movement integration, and accessibility. Contextual strategies include responding to the site, flexibility and adaptability. Community driven strategies include governance for decision-making, collaborative work with stakeholders, and meditation tradition alignment. The IEQs explored through these strategies are lighting environment, indoor air quality, thermal environment, acoustic environment, materials and colour, and biophilic elements.

An overarching consideration was taken for sustainable and inclusive design. For instance, passive strategies are prioritised, adaptive reuse strategies are suggested, and local material choices are promoted. Inclusive design practices include accessible design and inclusion of various stakeholders, including users and meditation tradition leaders.

This study focused on key IEQs—lighting environment, thermal environment, acoustic environment, indoor air quality, materials and colour, and biophilic elements. Based on the survey, which focused on the experiential qualities and therefore did not capture feedback relating to materials and colour, the following hierarchy of IEQs was identified:

1. Acoustic environment
2. Indoor air quality and thermal environment
3. Biophilic elements
4. Lighting environment

While the survey results suggested this ordering, the hierarchy should not be viewed as absolute. All indoor environmental conditions play an important role in shaping the meditation experience, and their relative influence is likely to vary depending on context, cultural background, and individual sensitivity. The findings therefore highlight user-reported priorities but ultimately underscore the need to consider all IEQs as integral to the design of meditative spaces.

5.2. Applications of Findings

From a practical perspective, this research contributes a comprehensive set of design recommendations intended to inform the development of meditation centres. These recommendations encompass a range of design practices and are adaptable to both rural and urban contexts, while also accommodating different governance structures and funding models. Such breadth ensures their applicability across diverse settings and enhances their potential impact.

The overarching aim of this research is to promote and support meditation practices that contribute to improved mental and physical health. By providing an evidence-based framework for design, the findings offer a valuable resource for architects, planners, and policymakers to facilitate the establishment of meditation centres, thereby improving accessibility to the practice. Importantly, the recommendations are not limited to purpose-built centres as they also highlight the potential for existing environments to be adapted into meditative spaces. For example, the introduction of Vipassana meditation programmes within prisons has demonstrated promising outcomes, enabling inmates to engage in self-reflection and mental health improvement. Ronel et al. (2013) identified such initiatives as part of a broader 'positive criminology' approach, evidencing benefits for rehabilitation and behavioural transformation [43].

Given the financial and structural barriers that often restrict access to wellness practices in contemporary society, the creation and adaptation of meditation spaces represent a pathway to enhanced inclusivity. Beyond the development of dedicated centres, the recommendations also encourage adaptive reuse strategies and the integration of meditative environments within informal or everyday contexts, such as homes and workplaces, or in high-stress environments such as workplaces or hospitals [66]. In doing so, the findings advocate for more widespread and equitable access to meditation practices.

Figures 10 and 11 show the application of some of the design recommendations. A dome can be seen on top of a pagoda (Figure 10) which hosts solitary meditation cells. The symmetrical and high ceiling created by this dome creates an acoustically reverberant and contemplative environment that is conducive to meditation. The walking path in Figure 11 is meandering, which facilitates mindfulness and deliberate movement. The balance between neat landscaping and presence of biodiversity provides biophilic benefits while limiting distractions.

Figure 10. Dome of the Pagoda at a meditation centre in Navi Mumbai, India. Photograph captured by first author.

Figure 11. Walking path at a meditation centre in Navi Mumbai, India. Photograph captured by first author.

5.3. Limitations

While this study provides valuable insights into the spatial, environmental, contextual, and experiential dimensions of meditation centres, several limitations must be acknowledged.

Firstly, there is an inherent tension in the relationship between meditation practice and its physical environment. While creating a calm, carefully controlled space can facilitate relaxation and ease of focus, it may also risk oversimplifying the reality of meditative practice. Meditation is not solely about comfort but often involves confronting distraction, discomfort, and psychological challenge. Overly serene or idealised spaces could unintentionally dilute the depth and intensity of the meditative process, especially for more advanced meditators, thereby limiting the applicability of findings to more rigorous or traditional forms of practice.

Secondly, the subjective nature of meditation itself presents significant methodological challenges. Meditation is not a uniform activity, it encompasses a wide variety of traditions across cultures, each with its own philosophies, spatial preferences, and embodied practices. Even within a single technique, the lived experience of meditation differs between individuals, shaped by factors such as experience level, cultural background, and personal disposition. To homogenise these diverse practices risks erasing the nuance of meditation as a global phenomenon. Consequently, while this study identifies common spatial and environmental themes, its findings should not be interpreted as universally prescriptive.

In terms of methodology, while the mixed-methods design of this study facilitated a holistic understanding of the research topic, several limitations in data collection warrant consideration. The scoping case study review offered a global perspective on meditation centre design; however, access to certain forms of data such as performance data was limited, and the analysis considered differences in rural, urban, and suburban contexts without systematically addressing geographical and cultural diversity, which may influence the applicability of the design recommendations. The expert interviews provided valuable insights into the rationale behind design decisions and enabled retrospective reflection on completed projects. Nonetheless, the inclusion of experts from diverse cultural contexts, while helping to mitigate cultural bias, may also have limited the depth of culture-specific insights and thus affects the transferability of the findings to a single cultural setting. Similarly, the user surveys captured meditators' perspectives on their experiences, yet the

potential for response bias remains, as participants may have consciously or unconsciously tailored their responses to perceived expectations.

Although the research highlights transferable principles and the design recommendations are overarching and prescriptive, its conclusions are inevitably shaped by context. Caution should be exercised in applying them universally.

6. Conclusions

This study investigated the design principles and environmental factors that optimise meditation centres, addressing a gap in existing research. Using a mixed-method exploratory sequential design, it integrated qualitative and quantitative approaches including a scoping case study review, expert interviews, and survey data. The analysis identified recurring patterns in effective meditation centre design, as well as context-specific adaptations. The findings contribute to both academic understanding and practical guidance, offering evidence-based insights that link environmental qualities, spatial design, and user experience.

The key findings of this research can be summarised as follows:

Recurring design practices in existing meditation centres include spatial, contextual, and community-driven practices. IEQs, namely indoor air quality, lighting environment, acoustic environment, thermal environment, materials and colour, and biophilic elements, have a great impact on the meditation experience and therefore should be considered throughout the design process of meditation centres. The identified recurring design practices were consolidated into a set of design recommendations (Table 12).

Sensory distractions can hinder the meditation experience so the environment should be designed to support calmness and introspection. The IEQs that influence the meditation experience from the user's perspective, in ascending order of impact, are as follows:

1. Acoustic environment
2. Indoor air quality and thermal environment
3. Biophilic elements
4. Lighting environment

While this study encompassed participants and case studies from diverse geographical and cultural contexts, its aim was to generate transferable insights rather than universal principles. The design recommendations emphasised how design can support shared cognitive and affective mechanisms across meditation traditions while accounting for local and cultural specificity.

Future research can be conducted on meditation centres to expand the scope and depth of this study. Direct engagement with meditation centres would enable the collection of more robust performance data and facilitate comparative evaluation of design practices. Longitudinal studies that track the impact of design practices on meditation experiences over time can provide stronger causal evidence. Furthermore, a larger and diverse sample size of case studies, expert interviewees, and meditators can improve the transferability of findings by providing a wider range of cultural and geographic perspectives. This would illuminate how design practices are shaped by local traditions, governance structures, and resource constraints. In order to strengthen the user-centered research, psychophysiological studies, such as heart rate variability measures, can be conducted to reduce self-report bias.

The design recommendations that were generated as the outcome of this study consolidate the key findings and offer a practical solution to meditation spaces. Existing literature and insights from various participants during this study highlighted the subjective and philosophical nature of meditation. However, the results suggested that the physical environment shapes not only comfort and focus but also fosters key philosophical and

social dimensions of meditation. The recommendations are designed to be applicable to various contexts beyond meditation including adaptive reuse and everyday environments such as homes, workplaces, schools, correctional facilities, hospitals, and more. Future studies can be extended to study such building typologies. Investigating the impact of meditation spaces across such varied contexts could broaden the societal relevance of this research and inform policies aimed at equitable access to wellbeing practices.

In conclusion, this study offers an evidence-based understanding for meditation centre design. By integrating environmental, spatial, and community considerations, the recommendations provide actionable guidance for creating spaces that facilitate introspection, comfort, and social and philosophical engagement, while remaining adaptable to diverse contexts.

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Appendix A

Definitions

To ease conceptual clarity, key concepts are defined and/or explained in this section.

The term ‘design practices’ is to be used in this research to encompass architectural concepts that extend beyond the physical building, including those that are material, spatial, sensory, conceptual, and behavioural [67]. In the context of meditation centres, they include the architect’s formal intentions for spatial sequencing and materiality, the environmental qualities that impact the users, and the integration with cultural or spiritual narratives.

‘Meditation’ has an age-old and diverse history, with traditions that teach techniques ranging from silent mindfulness to movement-based rituals. Due to its depth and history, no single definition captures its breadth [15]. It is a practice that is taught through several techniques [10]:

- Transcendental Meditation—chanting-based practice

- Mindfulness Meditation—attention to breath sensations
- Sahaja Yoga Meditation—'thoughtless awareness'
- Religious or Spiritual Traditions—including but not limited to: Buddhist Zen meditation, Christian scripture-based, Hindu and Sufi breath meditation [68], Jain silent meditation [69], etc. For this research, meditation is framed as a secular mindfulness activity that aims to cultivate equilibrium, foster concentration, and promote peace in daily life.

Some techniques, which are sometimes termed 'quasi-meditation', include chants or visualisations, while others require minimal stimulation and focus on sitting in silence [10].

Meditation is an umbrella term that encompasses many teaching methods [70]. Each teaching method, practiced by its own group of followers in a unique way and for its unique purpose, will be referred to as a 'Meditation Tradition' in this research. While they may have commonalities in their core values, it is important to acknowledge that each technique requires an individual approach to spatial design. Some examples of meditation traditions that are referred to in this study are: Vipassana, the Triratna Buddhist Community, and the Art of Living.

'Indoor environmental qualities' (IEQs) encompass the physical and sensory characteristics within the built environment that influence occupant health, comfort, and mental wellbeing. The core domains that have been extensively studied as fundamental aspects of indoor environmental quality (IEQ) [17,18] are thermal environment, lighting environment, acoustic environment, and indoor air quality (IAQ). This study also recognises the importance of biophilic elements [19,20] and materials and colour [21,22]. Each of these IEQs are explored further in Section 2.2. The terms 'qualities' and 'conditions' are used interchangeably in this study.

Appendix B

Table A1. Case Study Review. Note: "#" denotes the serial number of the project for reference.

#	Project	Architect	Location and Year	Area and Capacity	Use	Site Typology	Materials	Natural Light	Electric Light	Ventilation	Thermal Comfort	Acoustic Strategy	Biophilic Elements	Height (m)
1	Sunset Sala and Meditation Cathedral [71–73]	Chiangmai Life Architects	Chiang Mai, Thailand (2018)	147 m²	Spiritual practice, meditation	Rural—hillside	Bamboo	Skylights, open facade		Natural	Passive	Quiet by nature of site	Connected to landscape, views, natural materials	-
2	Maitrimandir [74–77]	Roger Anger	Auroville, India (2008)	1018 m²	Spiritual practice, meditation	Suburban	White marble, white carpet	Central skylight, heliostat with mirror	Stimulates effect of natural light	Natural	Natural cooling system	Quiet by nature of site	Connected to gardens	29.5
3	Sattrapirom Meditation Centre (Vipassana) [78–80]	Ken Lim Architects	Rayong, Thailand (2017)	1000 m²	Meditation, accommodation	Rural—grove and orchards	Concrete, cement, brick	Glazing, dim light	-	-	-	Quiet by nature of site	Views to nature	
4	Bohyun Buddist Meditation Centre [81,82]	Design by 83	Busan, South Korea (2023)	270 m²	Buddhist temple, meditation, education, accommodation	Urban	Wood-coloured metal, granite, timber cladding, paper lanterns, brick	Windows	-	-	-	-	Natural materials	-

5	Won Dharma [34,83,84]	HanrahanMeyers Architects	New York, United States (2007)	280 m², 80 people	Retreat, accommodation, meditation	Rural—hillside	Wood	Southern orientation, filtering screens	Low-voltage fluorescent/LED, solar-powered fluorescent low exterior lighting	Cross ventilation through courtyards	Passive cooling: courtyards, geothermal wells, PV, biomass boiler, radiant in-floor heating. Spray-foam insulation, low-e glass	Courtyards for silent walking meditation, sound zoning, sound-proofed doors, triple glazed windows	Dappled sunlight, natural materials, views to nature, landscape architecture	7.6
6	UNESCO Meditation Space [85–87]	Tadao Ando	Paris, France (1995)	452 m²	Monument, memorial, meditation	Urban	Exposed concrete, irradiated granite	Opening in roof	-	-	-	-	-	6
7	Windhover, Stanford University [88–92]	Aidlin Darling Design	Stanford University Campus, CA, USA (2014)	370 m²	Contemplative centre, art gallery	Urban—university campus	Rammed, dark-stained oak, glazing, cedar slats	Glazing, louvres, skylights	Lutron lighting system, spotlights on art	Sustainable mechanical ventilation	Mechanically heated and cooled radiant flooring system	Ambient sound—fountains	Connected to oak grove, garden, bamboo plants, water acoustics, natural materials	6.1

8	Vajrasana Buddhist Retreat Centre [28,93–95]	Walters and Cohen Architects	Suffolk, England (2016)	130 m², 60 people	Meditation, accommodation, Buddhist Ordination	Rural—farm	Plywood, painted blockwork, dark brick, charred timber, resin	Perforation in walls	Flexible lighting control, variety of luminaires	-	Heated flooring system	Spray foam treatment on ceiling sound zoning	Dappled sunlight, connected to nature	8
9	Forest Pond House [96–98]	TDO Architecture	Hampshire, England (2012)	6 m², 1 person	Meditation, children's den	Rural—forest	Plywood, glass, copper	Open facade	1 luminaire	Open facade	Open—site responsive	Quiet by nature of site	Connected to landscape	-
10	Inscape Meditation Studio [99]	Architectonics	New York, United States (2016)	-	Meditation, lounge, retail	Urban	Bamboo	-	Colourful artificial lighting	-	-	-	-	-
11	Meditation Space for Creation [100]	Jun Murata	Beijing, China (2019)	78 m²	Meditation, art gallery	Suburban	Shipping container	Openings in wall	-	-	-	-	Views to nature	-
12	Yoga dojo [101,102]	MW Architects	Greater London (2019)	60 m²	Meditation, yoga (private residence)	Urban—residential	Engineering brick, metal roof grid, charred timber, sedum roof	Open pavilion	-	Open pavilion	-	-	Planted walkway, connected to garden	-
13	Buddhist Centre for Meditation (Ramagrama Stupa	Stefano Boeri Architetti	Ramagrama Parasi District,	Masterplan, 1000 people	Meditation, prayer, pilgrimage	Rural—largescale masterplan	Brick	-	-	-	-	Quiet by nature of site	Plantations, connected to meadow, central tree	-

	Masterplan) [103,104]		Nepal (2024)											
14	Space of Light (Museum SAN Pavilion) [105,106]	Tadao Ando	Wonju, South Korea (2023)	-	Meditation pavilion	Rural—mountain	Concrete	Opening in roof	-	Opening in roof	-	Quiet by nature of site	-	-
15	Self Revealing [107–109]	StudioX4	Taipei, Taiwan	-	Urban	-	Mineral paint, laminate flooring, plywood, mirrors, dark colours	Windows	Linear lighting, oculus LED	-	-	Volumetric sound re-direction	Natural materials	Low ceiling
16	Zenbo Seinei Retreat [110,111]	Shigeru Ban	Awaji Island, Japan (2022)	648 m^2	Meditation, accommodation, hospitality, restaurant	Rural—ridge	Timber, wood, steel	Openings facades	-	Open facades	Open—site responsive	Quiet by nature of site	Connected to landscape	-
17	Meditation Hall [112]	Hilarchitects	Cangzhou, China	-	Meditation	Rural	Timber cladding, slate tiles, shallow water walkways	Glazing, lamellas	-	-	-	Quiet by nature of site	Landscaping, views	-
18	Waterside Buddhist Shrine [113–115]	Archstudio	Tangshan, China (2017)	169 m^2	Buddhist meditation, thinking, and	Rural—forest, riverside	Concrete, wood, terrazzo, stone, solid wood doors and windows	Large openings, skylights	-	-	-	Quiet by nature of site	Landscaping, courtyards, connected to landscape	-

					contemplation									
19	Lai Yard Meditation Room [116,117]	Ming Gu	Nanjing, China (2017)	-	Meditation	Urban—residential	Glazing, wood	Glazing, blinds	-	-	-	-	-	-
20	Riondolo [118,119]	Giovanni Wegher	Stelvio National Park, Italy (2014)	7.3 m², 1 person	Meditation pavilion	Suburban—park	Wood	Small openings	-	Open facades	-	Quiet by nature of site	Connected to landscape, natural materials	5.2
21	Meditation Pavilion and Garden [120,121]	GMAA	Geneva, Switzerland (2013)	-	Meditation pavilion	Suburban	Wood, steel, water body	Skylights	Spotlights	-	-	-	Landscaping, mist	-
22	Meditation Chambers [122,123]	Office of Things	Bay Area, California, USA (2017)	9.3 m²	Meditation	Urban—offices	Soft furniture, mirrors	None	Colourful lighting	-	-	Sensorial sounds	-	Low ceiling
23	Meditation house in the Forest [123]	Kengo Kuma and Associates and STUDiO LOiS	Krun, Germany (2018)	141 m²	Meditation, yoga	Rural—forest	Fir boards, zinc	Small openings	-	-	-	Quiet by nature of site	Dappled light, views to landscape	-

Appendix C

Interview Guiding Questions.

1. Could you outline your professional background and your experience with designing meditation centres?
2. How many meditation projects have you worked on and could briefly describe their scales or any particular one that stuck with you?
3. What were some of the driving factors for you during the design process for [the project]? Client requirements, site conditions, etc.?
4. Did you refer to any design guidelines or requirements when working on [the project]?
5. Are there any spatial or environmental features that you consistently incorporate in your design process or any that consistently arise across projects?
6. How did you consider indoor environmental qualities such as IAQ, thermal comfort, acoustics, and lighting in the design?
7. In your professional opinion, is there a hierarchy of importance between these indoor environmental qualities regarding their impact on meditation experiences?
8. Have you engaged with end-users in your design of meditation spaces?
9. Have you received feedback on this project post-occupancy? Are there any specific successes? Or areas that require improvement?
10. Can you talk about some considerations for inclusivity and sustainability in design decisions?
11. In your opinion, what design practices have you found to be supportive for meditation?
12. Do you think it's possible to create a general guideline for meditation spaces, or should they always be context-specific?

Appendix D

MC Code: ___ Meditation Centre Survey 2025

Information and consent: I am carrying out a study on the design of meditation centres for a Master's dissertation at UCL. You have been invited to participate in this survey because you are a user of a meditation centre. However, if you are below the age of 18 years, you cannot participate. **Your rights**: **Participation is completely voluntary.** All responses are **anonymous**. As anonymity does not allow us to trace back who participated, you cannot withdraw your responses once you handed in this sheet. **What you consent to**: **By participating, you confirm you are at least 18 years old and give consent that we use your responses for this dissertation and future research**. For further information, email the researcher, Pearl Doshi, at pearl.doshi.24@ucl.ac.uk, or the dissertation supervisor, Francesco Aletta, at f.aletta@ucl.ac.uk.

All questions relate to this meditation centre / space. There is also space for further comments.

1. **How frequently do you meditate?**

Daily	A few times a week	Weekly	Monthly	Rarely or 1st time

2. **When meditating indoors, do you prefer to be in a meditation centre / space or at home?**

Meditation centre / space	Home

3. **The room in which I meditate impacts my experience.**

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

4. **The presence of natural light improves my meditation experience.**

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

5. **Good indoor air quality (considering ventilation, humidity, and lack of indoor air pollutants) improves my meditation experience.**

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

6. **A thermally comfortable space, where it isn't too hot or cold, improves my meditation experience.**

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

7. **Quieter spaces improve my meditation experience.**

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

8. **The presence of plants improves my meditation experience.**

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

9. **How distracting do you find indoor environmental conditions (e.g. noise, lighting, temperature) during meditation?**

Not distracting	Neutral	Very distracting

10. **This centre / space creates an overall comfortable space to meditate in.**

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

Additional comments:

Please return completed questionnaire to the researcher or email a photo to pearl.doshi.24@ucl.ac.uk

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