International Journal of Innovation and Industrial Revolution
EISSN: 2637-0972
IJIREV
Volume 8 Issue 26 (September 2026) PP. 1008-1022



INTERNATIONAL JOURNAL OF INNOVATION AND INDUSTRIAL REVOLUTION (IJIREV)
www.gaexcellence.com/ijirev

ASSESSING USABILITY FOR PEOPLE WITH DISABILITIES IN MOSQUE DESIGN

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Article Info:

Article history:
Received date: 30.07.2026
Revised date: 18.08.2026
Accepted date: 27.09.2026
Published date: 30.09.2026

To cite this document:

Mat Sahadi, M. N. I., & Bachek, S. H. (2026). Assessing Usability for People with Disabilities in Mosque Design. *International Journal of Innovation and Industrial Revolution, 8*(26), 1008-1022.

DOI: 10.35631/IJIREV.826060

Abstract:

This study evaluates the usability and accessibility of mosque environments for persons with disabilities (PwDs) by applying Universal Design principles. Although many mosques incorporate accessibility features to comply with regulatory requirements, compliance alone does not necessarily ensure meaningful, independent, and dignified participation in worship. A mixed-methods approach was employed, comprising site observations, questionnaires involving mosque users (n = 30), and semi-structured interviews with architectural professionals and mosque stakeholders. The assessment examined key usability dimensions, including entrances, circulation routes, prayer halls, ablution facilities, sanitary amenities, and wayfinding systems. The findings reveal that while mobility-related provisions are generally adequate, significant shortcomings remain in sensory accessibility, ergonomic ablution facilities, and inclusive prayer arrangements. The study demonstrates that regulatory compliance alone is insufficient to achieve practical usability and holistic inclusion. By integrating user experiences with architectural evaluation, this research proposes a user-centred evaluation framework that bridges the gap between accessibility standards and real-world usability, providing evidence-based recommendations for the design and retrofitting of inclusive mosque environments. The findings advance Universal Design research while offering practical guidance for architects, policymakers, and mosque administrators seeking to create equitable and accessible places of worship.

Keywords:

Accessibility, Inclusivity, Mosque Design, Universal Design, Usability

International Journal of Innovation and Industrial Revolution
IJIREV
EISSN: 2637-0972
Volume 8 Issue 26 (September 2026) PP. 1008-1022

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Introduction

Mosques are often associated with spaces for Muslims to worship. However, these spaces have recently begun to expand their functions, serving as community hubs, not just for worship or spiritual purposes. These venues act as critical gathering points where diverse religious, educational, and social pursuits integrate to shape the identity of the Islamic community. Yet, current architectural limitations often hinder this inclusive potential, as many existing structures fail to provide adequate access for congregants with diverse physical or sensory abilities, thereby restricting their full engagement in these essential communal activities (Nazir et al., 2019; Suhardi et al., 2024).

Mosques are now more open to the public and have become hubs of community activities that bring together people of various races and religions. From a positive perspective, it is one of the da'wahs in developing the Islamic message. Yet, this outreach mission is fundamentally compromised when persistent architectural barriers preclude vulnerable populations, such as the elderly and persons with disabilities, from full and dignified participation within these communal spaces (Rahmad & Syar, 2023; Samad et al., 2019; Soraya, 2026).

The openness of the mosque institution in making it a community centre must be in line with the main principles in Islam, which guarantee the rights of all people, whether healthy or persons with disabilities (PWDs), to perform worship or participate in activities organised by the mosque. Mosques should be inclusive worship centres and must provide disability-friendly facilities. In addition to PWD, the need for this inclusive worship centre also needs to be created for the elderly and the temporarily disabled. To meet the rights of all groups, the design of mosques must emphasise universal and inclusive characteristics. Implementing these standards, particularly in sensitive areas such as ablution facilities and sanitary blocks, is essential to uphold the dignity of congregants with diverse mobility requirements. Research consistently indicates that when these critical ritual spaces lack thoughtful accommodations—such as proper grab bars, sufficient circulation room, and ergonomic flooring—they present substantial barriers to independent participation (Nazir et al., 2019; Samad et al., 2019). By proactively addressing these architectural deficits, mosque administrators can ensure that their physical environment truly reflects Islamic principles of compassion, fostering an atmosphere where all members of the community can worship with independence and ease (Rahmad & Syar, 2023). Furthermore, the substantial costs of retrofitting existing buildings often require mosque administrators to find a practical balance between undertaking extensive architectural renovations and phasing in more accessible, user-friendly upgrades over time. In addition to budgetary limitations, a widespread deficit in understanding the legal and architectural entitlements of individuals with disabilities further impedes the effective adoption of inclusive design measures.

International Journal of Innovation and Industrial Revolution
IJIREV
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Literature Review

Prioritising accessibility in mosques is essential for fostering truly inclusive religious environments. As these institutions serve as central hubs for spiritual and communal life, ensuring they are accessible affirms the dignity, belonging, and participation of every congregant, regardless of their physical or sensory abilities. By removing architectural barriers, mosques not only facilitate physical access but also strengthen the social and spiritual bonds of the community, creating a unified space where all individuals can engage meaningfully. Yet, the effective adoption of such inclusive measures is frequently obstructed by lingering societal stigmas and a widespread deficit in awareness regarding the fundamental right of persons with disabilities to participate in communal worship without undue hardship (Rahmad & Syar, 2023; Samad et al., 2019). This pervasive tension between the foundational Islamic mandate for inclusive equality and the pragmatic failure of existing architectural infrastructure necessitates a comprehensive re-evaluation of mosque design priorities. To address this gap, the subsequent discussion examines the foundational role of Universal Design principles in religious architecture, identifies the persistent structural challenges that hinder equitable access, and reaffirms the critical importance of ensuring that all communal worship spaces are truly welcoming and accessible for every congregant.

Universal Design and Accessibility in Religious Spaces

Universal Design (UD) emphasises environments that are inherently accessible to individuals, including those with disabilities, without requiring specialised adaptations. This approach is particularly relevant in religious spaces like mosques, which are public buildings used frequently for daily prayers and weekly congregations. Accessibility in mosques involves addressing barriers that hinder individuals with disabilities from performing religious rituals. Common challenges include inaccessible entrances, ablution areas, lavatories, and prayer halls, as well as issues with auditory accessibility for individuals with hearing impairments during sermons or calls to prayer (Fawzi, 2016). The integration of UD principles in mosque design ensures inclusivity and equal participation for all worshippers, aligning with the broader goals of social justice and equality (Lanteigne et al., 2022). Ensuring that mosques are accessible to individuals with disabilities is a vital step toward fostering truly inclusive religious spaces, reflecting foundational Islamic principles of compassion and equality (Rahmad & Syar, 2023). Mosques serve as central hubs for spiritual and communal life; thus, removing architectural barriers—such as inaccessible entrances, ablution areas, and prayer halls—is essential to affirm the dignity and belonging of all congregants, regardless of their physical or sensory abilities (Aji et al., 2022; Fawzi, 2016; Tariah et al., 2018). When accessibility is proactively prioritised through the integration of Universal Design principles, it transcends simple physical modification, fostering an environment where individuals with diverse mobility requirements can participate independently and with dignity (Ahmed, 2022; Suhardi et al., 2024). Ultimately, prioritising accessibility creates a unified community, ensuring that all members can meaningfully engage in worship and communal activities without systemic exclusion, thereby aligning physical environments with the broader goals of social justice (Hamraie, 2016; Lanteigne et al., 2022; Niya et al., 2015).

Challenges in Mosque Accessibility

Despite the importance of accessibility, many mosques fail to meet the required standards. Studies have highlighted deficiencies in areas such as ramps, handrails, signage, and ablution

International Journal of Innovation and Industrial Revolution
IJIREV
EISSN: 2637-0972
Volume 8 Issue 26 (September 2026) PP. 1008-1022
facilities, which are often not designed for wheelchair users or individuals with mobility issues. For instance, an assessment of the Sheikh Zayed Grand Mosque revealed that while some areas were accessible, others were categorised as less accessible or entirely inaccessible, necessitating improvements in circulation areas, ramps, and prayer spaces (Suhardi et al., 2024). Similarly, audits of mosque facilities in Malaysia showed compliance rates ranging from 43% to 64% with national accessibility standards, indicating a lack of prioritisation and awareness regarding the needs of disabled users (Nazir et al., 2019). These results highlight the imperative for the systematic integration of universal design principles within mosque architecture. Within the Malaysian context, the adoption of UD across public and religious facilities is critical for facilitating equitable access for individuals with disabilities (Niya et al., 2015). Although the Malaysian Standard MS 1184:2014 provides fundamental accessibility guidelines for built environments—inclusive of places of worship—substantial discrepancies persist between newly established mosques and existing structures subject to renovation (Nazir et al., 2019). While contemporary mosque designs frequently incorporate UD principles from their inception, older facilities encounter considerable obstacles in retrofitting existing frameworks to align with current accessibility mandates.

UD extends beyond physical accessibility to address broader issues of inclusion and social engagement. By incorporating UD principles, mosques will be able to create environments that have diversity for user needs, including those of ageing populations and individuals with situational limitations. This approach not only benefits people with disabilities but also enhances the overall usability and functionality of the space for all worshippers (Izani et al., 2019). Moreover, the adoption of UD in mosque design reflects a commitment to eradicating discrimination and fostering a sense of belonging within the community (Hamraie, 2016). As such, integrating UD into the design and renovation of mosques is essential for creating inclusive religious spaces that uphold the principles of equality and dignity for all.

The Importance of Accessibility in Mosques

Mosques serve as vital religious and community hubs for Muslims, hosting daily prayers, weekly congregations, and various social activities. However, accessibility challenges persist, particularly for individuals with disabilities, urban dwellers, and marginalised groups. Research highlights that accessibility in mosques is not merely a logistical concern, but a fundamental issue tied to inclusivity, equity, and the fulfilment of religious obligations. For instance, wheelchair users often face barriers such as inaccessible entrances, ablution areas, and prayer halls, forcing them to pray in isolation at home, which undermines their ability to participate fully in communal worship (Aji et al., 2022; Fawzi, 2016; Tariah et al., 2018)Similarly, physical barriers like steep ramps, lack of handrails, and inadequate signage further hinder independent access for persons with disabilities (Stetieh, 2023; Suhardi et al., 2024) These findings underscore the need for universal design principles and adherence to accessibility standards to ensure that mosques accommodate diverse user groups effectively (Aji et al., 2022; Suhardi et al., 2024)

Urban planning and spatial equity also play a critical role in mosque accessibility. Studies in cities like Abu Dhabi, Dubai, and Banda Aceh reveal that the spatial distribution of mosques often fails to meet the needs of local populations, particularly in suburban and high-density areas (Alawadi et al., 2023; Fuady et al., 2024) Accessibility is influenced by factors such as street design, plot density, and the strategic placement of mosques, which can either enhance or limit pedestrian access (Alawadi et al., 2023). Moreover, the integration of public

International Journal of Innovation and Industrial Revolution
IJIREV
EISSN: 2637-0972
Volume 8 Issue 26 (September 2026) PP. 1008-1022
transportation and walkable pathways is essential to address traffic congestion and improve accessibility in urban contexts (Alawadi et al., 2023; Rahim et al., 2015) These findings highlight the importance of aligning mosque infrastructure with broader urban development goals to create inclusive and sustainable communities. Refining the immediate mosque surroundings is crucial to enable independent navigation for congregants with disabilities, thereby alleviating potential social exclusion and the emotional distress resulting from persistent physical and environmental obstacles.

Methodology

This study adopts a mixed-methods research design to investigate the accessibility and usability of mosque environments for persons with disabilities (PwDs) through the lens of universal design principles. The research compares two mosque typologies in Malaysia: a newly constructed mosque designed with consideration for persons with disabilities (PwDs) in accordance with the Uniform Building By-Laws (UBBL) and Malaysian accessibility standards, and an existing mosque that has been retrofitted to incorporate PwDs' accessibility requirements. The study evaluates how architectural planning, regulatory compliance, and spatial usability influence inclusive participation within religious spaces. This comparative analysis highlights the critical tensions between the proactive integration of universal design principles during the initial architectural conception and the complexities of retrofitting legacy structures. By juxtaposing these two distinct approaches, the study seeks to identify not only the physical barriers that persist in older buildings but also the operational and systemic challenges faced by administrators tasked with enhancing accessibility within constrained spatial and budgetary environments. Consequently, the findings aim to offer empirical evidence that can guide future renovation strategies and support more inclusive design policies for existing religious infrastructure.

Two primary objectives guide the research:

1. To assess the accessibility and usability of mosque environments for persons with disabilities (PwDs) in a newly built mosque and a retrofitted mosque.
2. To examine the extent to which the accessibility facilities in both mosques align with Malaysian accessibility regulations and Universal Design principles.

A mixed-methods strategy was selected to provide both measurable and experiential perspectives on accessibility. Quantitative data were collected through structured questionnaires distributed to mosque users, including PwDs and relevant stakeholders. The questionnaires evaluated key accessibility components, including entrances, circulation spaces, prayer halls, ablution facilities, and signage systems. Statistical analysis was used to identify usability patterns and to compare accessibility performance between the two mosque settings. To complement the quantitative findings, qualitative data were obtained through semi-structured interviews and focus group discussions involving mosque administrators, designers, and users. These methods enabled the exploration of lived experiences, implementation challenges, and perceptions regarding inclusive mosque environments. The qualitative component also provided a deeper contextual understanding of how universal design principles are interpreted and applied in practice.

International Journal of Innovation and Industrial Revolution
IJIREV
EISSN: 2637-0972
Volume 8 Issue 26 (September 2026) PP. 1008-1022

The integration of quantitative and qualitative approaches strengthens the reliability and validity of the research through triangulation. By combining infrastructure-based evaluation with user-centred experiences, the study provides a more holistic assessment of mosque accessibility. The methodology ultimately supports the development of practical recommendations for improving inclusivity and meaningful participation of PwDs within religious spaces.

Results and Discussion

This research focuses on the accessibility conditions within two distinct mosque settings in Selangor: Masjid Puncak Alam and Masjid An-Nur. These sites were selected to represent different approaches to mosque design and management, offering a basis for evaluating the implementation of universal design principles in practice. The findings of this study reveal important insights into the current state of accessibility and universal design implementation in mosque environments in Selangor, particularly within Masjid Puncak Alam and Masjid An-Nur.

Data Collection

Data were systematically collected from 30 respondents through structured questionnaires, which provided quantitative insights into user experiences and perceived accessibility. This information was further enriched by semi-structured interviews with two architectural professionals directly involved in the design and management of these mosque environments, offering a deeper understanding of the institutional and practical challenges faced in ensuring inclusive spaces for all worshippers. Furthermore, non-participant observations were conducted across various ablution platforms to document the ergonomic suitability and physical safety features of these facilities. These systematic observations enabled an empirical evaluation of how accessibility design measures perform under real-world usage conditions, effectively bridging the gap between regulatory compliance and the actual lived experience of users by identifying potential safety hazards and ergonomic barriers that may not be fully captured through surveys alone.

Demographic Overview

The respondent distribution consisted of 60% male and 40% female participants, providing relatively balanced gender representation. The largest age group was between 51 and 60 years old (36.7%), followed by respondents aged 21 to 30 years (26.7%). This is significant because older users are more likely to experience mobility limitations, visual impairments, and physical discomfort, making their perspectives highly relevant in evaluating mosque accessibility. Additionally, 33.3% of respondents identified as Persons with Disabilities (PwDs), while 70% of the total respondents reported having some form of disability, including physical, visual, and cognitive impairments. The majority of respondents were frequent mosque users, with over 60% visiting daily or weekly. This indicates that accessibility barriers are not occasional inconveniences but recurring obstacles that directly affect participation in religious and community activities.

International Journal of Innovation and Industrial Revolution
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IJIREV
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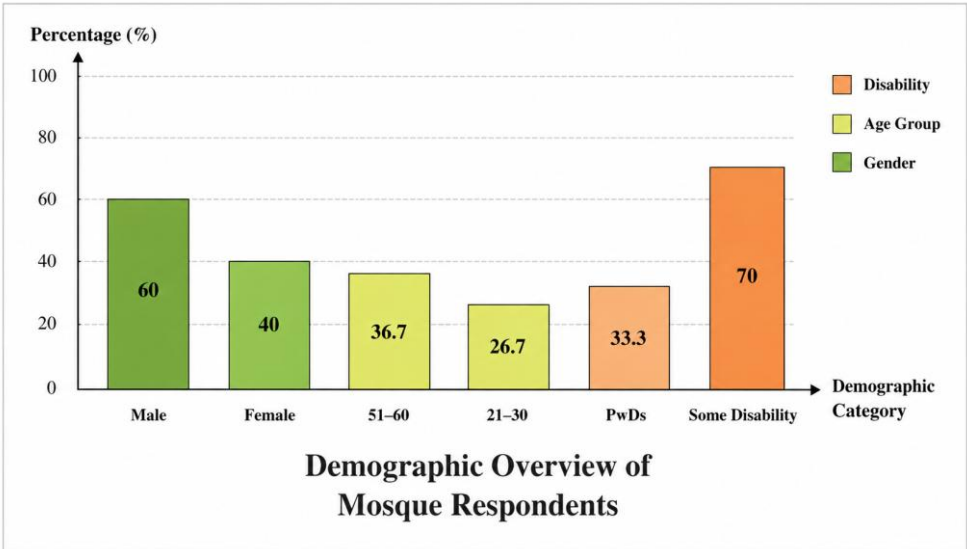


Figure 1: Demographic Profile Of Survey Respondents, Including Gender, Age, Disability Status, And Frequency Of Mosque Visits.

General Accessibility Performance

The findings demonstrate that mosques generally perform better in providing basic physical accessibility than in addressing sensory or cognitive accessibility needs. Features such as ramps, alternative routes to staircases, and wheelchair-accessible doorways received relatively positive responses from participants. This suggests that mosque developments have begun acknowledging the importance of mobility access for wheelchair users and elderly worshippers. However, tactile guides, Braille indicators, and navigational aids for visually impaired users received significantly weaker responses. Many respondents selected neutral or disagree options regarding the presence of these features. This indicates that accessibility implementation remains heavily focused on visible physical disabilities while neglecting sensory and cognitive inclusivity. The findings reflect a broader issue where accessibility is often interpreted narrowly through mobility requirements rather than holistic universal design principles.

International Journal of Innovation and Industrial Revolution
IJIREV
EISSN: 2637-0972
Volume 8 Issue 26 (September 2026) PP. 1008-1022

Mosque Accessibility Performance

Accessibility Feature	Physical	Sensory	Cognitive
Ramps	Positive	Neutral	Neutral
Alternative Routes	Positive	Neutral	Neutral
Wheelchair-Accessible Doorways	Positive	Neutral	Neutral
Tactile Guides	Weak	Weak	Weak
Braille Indicators	Weak	Weak	Weak
Navigational Aids	Weak	Weak	Weak

Figure 2: Comparative Accessibility Ratings Across Entry and Circulation Components.

The results show strong performance for mobility-related provisions, whereas sensory and cognitive aids scored lower, highlighting a design approach that remains mobility-centric rather than holistically universal.

Another notable observation is the high number of neutral responses across several accessibility items. This may indicate inconsistent implementation between mosque facilities, lack of user awareness, or uncertainty regarding accessibility standards. The findings, therefore, suggest that accessibility provisions are fragmented rather than systematically integrated into the overall spatial experience.



Figure 3: Barrier-Free Transition from The Parking Area Into The Multi-Purpose Prayer Hall, Featuring A Level Surface Free Of Steps, Ramps, Or Thresholds To Support Independent Access For Persons With Disabilities.

International Journal of Innovation and Industrial Revolution
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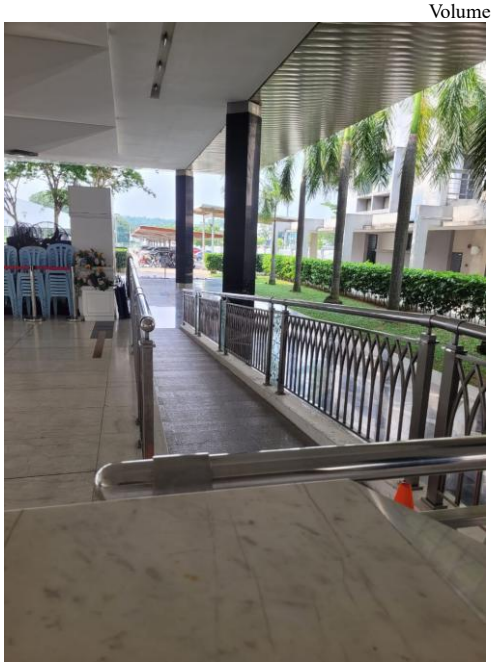


Figure 4: Compliant Wheelchair-Accessible Ramp with Continuous Dual-Height Handrails, Demonstrating Adherence to MS 1184:2014, UBBL By-Law 34A, And Principles 6–7 Of Universal Design at The Mosque's Main Entrance.

Prayer Areas and Ritual Facilities

Accessibility within prayer and ablution spaces showed mixed levels of satisfaction. Respondents generally agreed that ablution areas were moderately accessible for users with mobility or balance difficulties. Nevertheless, significant dissatisfaction was reported regarding the availability of grab bars, seating support, and ergonomic assistance within ablution spaces. This finding is particularly important because ablution areas involve wet surfaces, repetitive movement, and balance transitions, making them one of the most physically demanding spaces for elderly and disabled users. The results indicate that while circulation access may be considered during design, ritual ergonomics and bodily movement requirements are often overlooked.

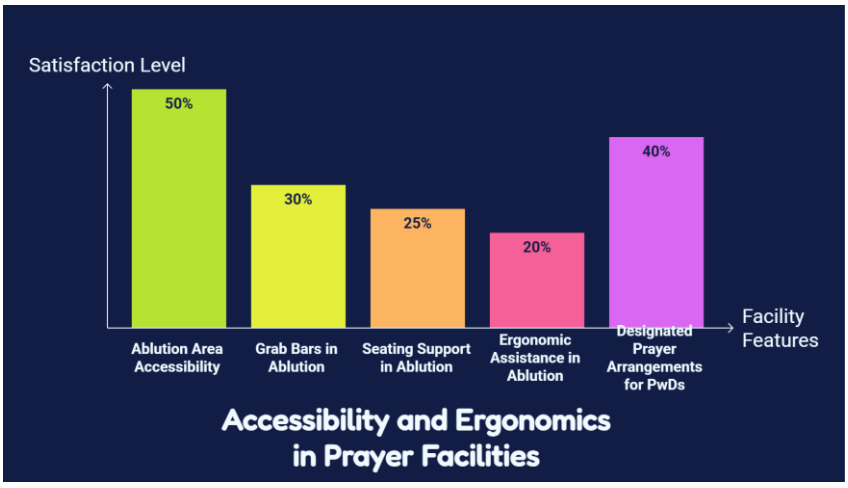


Figure 5: Satisfaction Ratings of Prayer-Facility Accessibility Features, Ranked from Highest (Ablution Area Accessibility, 50%) To Lowest (Ergonomic Assistance In Ablution, 20%).

International Journal of Innovation and Industrial Revolution
IJIREV
EISSN: 2637-0972
Volume 8 Issue 26 (September 2026) PP. 1008-1022

Similarly, responses regarding designated prayer arrangements for PwDs were inconsistent. This suggests that many mosque prayer spaces still prioritise conventional able-bodied worship patterns rather than accommodating diverse physical capabilities such as seated prayer or wheelchair-based participation. Consequently, some disabled worshippers may continue to experience spatial exclusion during congregational worship.



Figure 6: Linear Ablution Area with Elevated Stone Stepping Blocks Providing Access To Wall-Mounted Taps.

Although not fully wheelchair-compliant due to the raised stepping platform, partial access is retained, allowing wheelchairs to approach from the adjacent level walkway for assisted ablution.

Amenities and Navigation

Among all accessibility features, accessible restrooms were perceived as the most important amenity by respondents. This highlights the strong relationship between accessibility, dignity, independence, and sustained participation in religious activities. Audio support systems for hearing-impaired users and accessible signage also received high importance ratings, indicating increasing awareness of inclusive communication needs within mosque environments.

International Journal of Innovation and Industrial Revolution
IJIREV
EISSN: 2637-0972
Volume 8 Issue 26 (September 2026) PP. 1008-1022

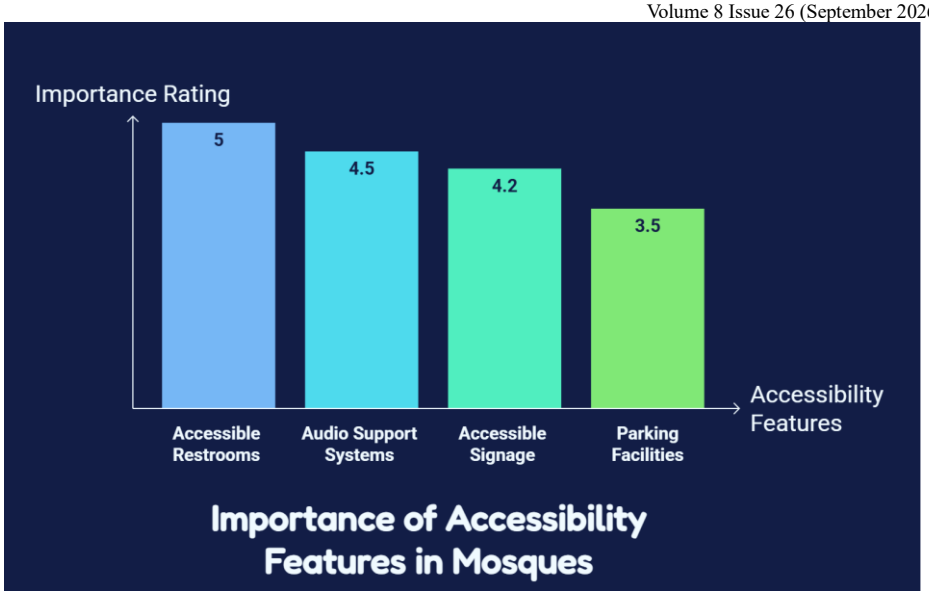


Figure 7: Importance Ratings Of Accessibility Features In Mosques. Accessible Restrooms Scored Highest (5.0), Followed By Audio Support Systems (4.5) And Accessible Signage (4.2), While Parking Facilities Received The Lowest Rating (3.5).

However, responses regarding parking facilities for disabled users were more varied. This may reflect inconsistencies in parking allocation, circulation planning, or proximity between parking spaces and mosque entrances. The findings imply that accessibility should not begin only at the building entrance but throughout the entire user journey from arrival to participation.

User Satisfaction and Professional Perspectives

Although respondents expressed only moderate satisfaction with current mosque accessibility conditions, there was overwhelming support for improving accessibility through Universal Design implementation. Most participants strongly agreed that mosques should adopt more inclusive design approaches and supported initiatives to improve accessibility for all users. The interview findings further reinforced these survey results. Both architectural professionals emphasised that accessibility in many mosque projects is still treated as an "add-on" or compliance requirement rather than an integrated design philosophy. The interviews also highlighted the gap between technical compliance and actual usability, where some facilities may meet dimensional standards but fail to function effectively for PwDs in real situations. Additionally, the interviewees stressed that cultural attitudes and limited awareness among mosque committees continue to hinder accessibility improvements. Accessibility is often perceived as serving only a small minority rather than benefiting the broader community, including elderly individuals, children, and temporary users with mobility limitations. Despite these challenges, both professionals strongly linked Universal Design principles with Islamic values of dignity, compassion, equality, and communal participation.

International Journal of Innovation and Industrial Revolution
IJIREV
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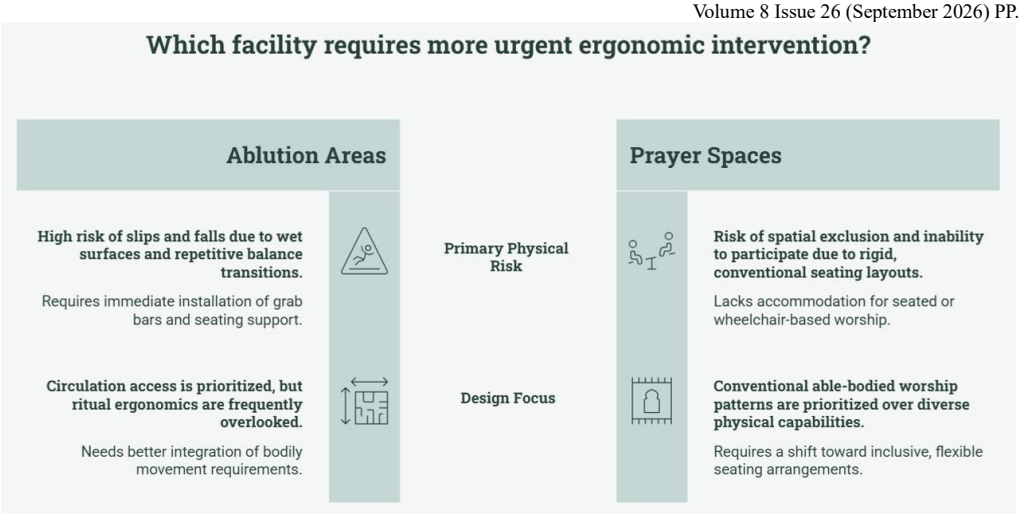


Figure 8: Comparative Ergonomic Assessment of Ablution Areas and Prayer Spaces, Identifying Both as Urgent Candidates for Ergonomic Intervention.

Overall, the findings demonstrate that while certain accessibility improvements have been introduced in mosque environments, the implementation of universal design remains partial and inconsistent. Current approaches still primarily focus on physical mobility access, while the sensory, cognitive, and experiential dimensions of inclusivity receive less attention. The study, therefore, highlights the urgent need for more comprehensive, user-centred, and integrated accessibility strategies in future mosque planning and retrofitting initiatives.

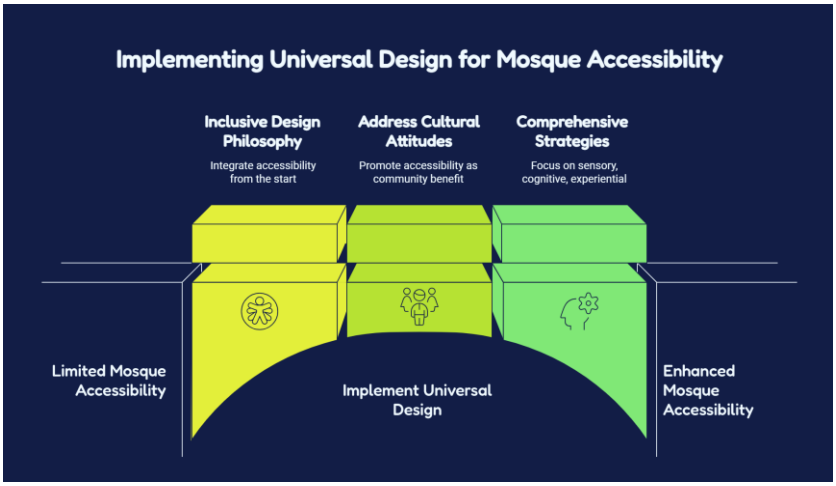


Figure 9: Conceptual Framework Illustrating the Implementation of Universal Design In Mosque Accessibility Through Three Pillars – Inclusive Design Philosophy, Cultural Attitudes, And Comprehensive Strategies – As A Transitional Pathway from Limited to Enhanced Mosque Accessibility.

By aligning these pillars, this conceptual model provides architects and mosque administrators with a strategic roadmap to reconcile technical design requirements with the broader spiritual imperative of fostering an inclusive environment for all worshippers. Addressing these multifaceted accessibility deficiencies necessitates a participatory planning approach that actively engages both mosque administrators and diverse congregants, thereby ensuring that physical and sensory modifications are both contextually appropriate and technically robust (Hayati et al., 2024; Munizar et al., 2026).

International Journal of Innovation and Industrial Revolution
EISSN: 2637-0972
Volume 8 Issue 26 (September 2026) PP. 1008-1022

Conclusion

This study demonstrates that although Malaysian mosques have made notable progress in providing basic physical accessibility, the implementation of Universal Design remains incomplete. While mobility-related facilities are generally adequate, significant deficiencies persist in sensory accessibility, ergonomic ablution facilities, inclusive prayer spaces, and user-centred design. The findings confirm that regulatory compliance alone does not guarantee meaningful accessibility or equitable participation for persons with disabilities. Future mosque planning and retrofitting should adopt a holistic Universal Design approach that integrates physical, sensory, and experiential accessibility to create truly inclusive and dignified worship environments for all.

Acknowledgements:	The authors would like to express their sincere gratitude to Universiti Teknologi MARA for providing the necessary resources and support throughout the course of this research. Special appreciation is extended to colleagues and peers who contributed valuable insights and constructive feedback, which greatly enhanced the quality of this paper.
Funding Statement:	"No Funding"
Conflict of Interest Statement:	The authors declare that there is no conflict of interest regarding the publication of this paper. All authors have contributed to this work and approved the final version of the manuscript for submission to the International Journal of Innovation and Industrial Revolution (IJIREV).
Ethics Statement:	This study was conducted in accordance with ethical research standards. Informed consent was obtained from all participants before data collection. Participation was voluntary, and respondents were assured of confidentiality and anonymity. The data collected were used solely for academic purposes.
Author Contribution Statement:	All authors contributed significantly to the development of this manuscript. Saiful Hazmi Bachek was responsible for the conceptualization, methodology, critical revision of the manuscript, and overall supervision of the study. Muhammad Najman Iqmal Mat Sahadi handled data collection, analysis, interpretation of results, contributed to the literature review, and drafted the manuscript. All authors read and approved the final version of the manuscript before submission.

International Journal of Innovation and Industrial Revolution
IJIREV
EISSN: 2637-0972
Volume 8 Issue 26 (September 2026) PP. 1008-1022

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