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Malaysian Mosques Internal Design Considerations: A Systematic Literature Review

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Abstract

Mosques should represent a connection between prayer and God, this symbolization should be reflected in the exterior and interior design. Malaysian mosques characterise a variety of styles, from small traditional structures to massive landmark complexes. While there are more than 5000 mosques in Malaysia, there is not enough literature on the mosque architecture in Malaysia. By utilizing systematic literature review method, this research investigates the related resources discussing the internal spaces of mosques in Malaysia and puts together the extracted information as a framework for planners and designers to gain a better understanding of the users' needs before designing. The first objective is to explore the standards and design considerations for mosque design in general. Secondly, this paper is looking to discover design considerations for Malaysian mosques in particular. Later, by examining existing literature, considerations for physical, technical, and psychological aspects are extracted. Finally, suggestions on further investigation are made.

Keywords: Islamic Architecture; Sustainable Mosque Design, Universal Mosque Design, Mosque Design Standards, Mosque Decoration

Introduction

The literal meaning of the word mosque (masjid) is "the place of prostration" (Colledge, 1999; Faghfoory, 2014). In many verses of Qur'an, the importance of mosque is mentioned: "[That light shines] through houses [of worship] which Allah has ordered to be raised, and where His Name is mentioned." (Qur'an, 24:36) Mosque is a place of being totally obedient to the will of God. The most acknowledged and respected mosque in the world is Kaabah, which is considered the pivot of the world and Qibla to Muslims, towards which people turn to do their prayers. It can be said that all mosques around the world is somehow extension of

Kaabah(Faghfoory, 2014). Mosque is highly valued in Islam, for it is viewed as the house of Allah, a place of prayer and good deed, and is known to be Islam's first institution(AbulQaraya, 2015). Mosque should represent a connection between prayer and God, this symbolization should be reflected in the exterior and interior design, both in form and order of spaces(Mahmoud & Al-Sakkaf, 2023). Furthermore, any monument ascribed to Islam in whatever location has religious, cultural, patriotic, and historical roots there. The architecture of these bases changed as they developed. With its origins in Islamic beliefs, customs, and architectural contexts, various cultural influences have produced distinct types of Islamic architecture(Ahsani et al., 2024).

Establishing the mosque institution as the center of the Muslim community is essential to its comprehensive development (both spiritually and physically). This institution must support and assist Muslims in the wide range of difficulties that arise daily in modern society(Asif, Utaberta, Mohd Yunos, Ismail, & Ismail, 2015) The mosque is integral to all facets of devoted Muslims' lives and serves as their main source of engaging with global events, both as individuals and as communities(Al-Krenawi, 2016).

Islam has spread throughout the world and almost one fifth of the world's population are Muslim(Hakim, 2008). The majority of Muslim population live in northern and central Africa, the middle east and southeast Asia. Muslims predominate more than 30 countries, some of which are more than 90% Muslims, including Egypt, Afghanistan, Pakistan, and Türkiye(Waldman & Zeghal, 2023; WolrdPopulationReview, 2023). Malaysia is one of the countries that is considered a Muslim majority country with the population of more than 16 million followers which consists more than 60% of the total population. Also Islam is considered the Malaysia's official religion(Lockard, Ahmad, Bee, & Leinbach, 2023; WolrdPopulationReview, 2023).

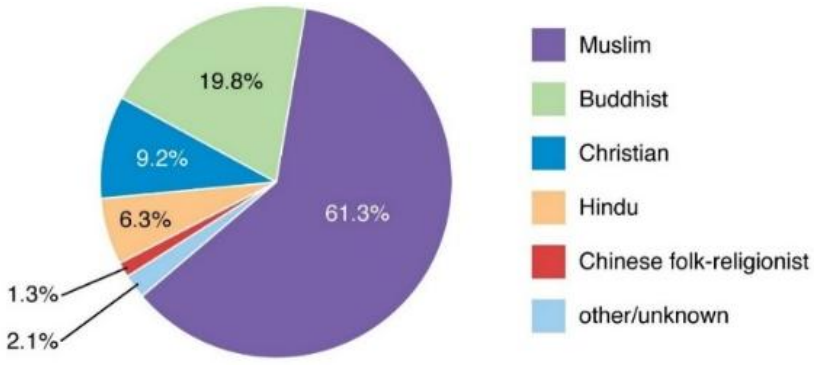


Figure 1: Religious distribution between Malaysian population (Lockard et al., 2023)

According to scholars, the Malay nobility who converted to Islam and preached the Islamic faith among the general population were responsible for the widespread adoption of Islam on the Malay Peninsula(Baharudin & Ismail, 2016). While there are more than 5000 mosques built in Malaysia, and increasing in number with the passing years(Hussein & Rani, 2023), still there is not enough literature on the subject of mosque architecture in Malaysia(Tajuddin, Rasdi, & Utaberta, 2007). This systematic review in the design consideration of Malaysian mosques and prayer spaces can help scholars get to know the areas that were less investigated in the previous studies and give an overview of what has been done until today.

Aims and Objectives

This research is aiming to investigate the related resources which are discussing the internal spaces of mosques in Malaysia, and put together the extracted information as a framework for planners and designers in order to have a better understanding of the users need before designing.

The first objective of this research is to explore the standards and design considerations for mosque design in general. Secondly, this paper is looking to discover internal spaces design considerations for Malaysian mosques in particular.

The increasing trend of high-rise strata living in urban Malaysian cities have further encouraged the growth of strata developments. Two Acts plays significant roles in ensuring the well-being of the purchasers, strata home owners as well as administering the developers and the management bodies, which is the Strata Title Act 1985 (Act 318) and the Strata Management Act 2013 (Act 757). Under the Act 757, with each completion of a stratified development, requires a management body to manage and maintain the building, facilities and the overall quality and sustainability of the common properties within the strata property, as well as the responsibilities of parties involved within the strata development.

Several studies have argued and concluded that the reality of the strata law that has given broad powers to the Management Bodies, but has failed to instil good governance. The law introduced does not counsel enforceable standards of good governance (Wong, 2019). Gaps were also found between the responsibilities of the management bodies and the residents' role in ensuring smooth management and maintenance works.

The objective of this paper is (i) to highlight the role of the strata management stakeholders, namely the Commissioner of Buildings (COB) and the management bodies, (ii) to analyse enforcements taken by the COB failure to comply with the Act 757 and (iii) to identify the most common issues raised based on the frequency of the enforcement taken. The outcome of this paper will identify whether the current existing Act 757 is sufficient and able to sustain the overall strata management ecosystem.

Methods

This paper, utilizes the Systematic Literature Review (SLR) methodology. SLR is a method that enables gathering relevant information on a subject that satisfies the eligibility requirements that have been established as well as providing an answer to the research questions that have been asked(Mengist, Soromessa, & Legese, 2020).

In order to find the relevant information about internal design considerations, journal and conference papers that include keywords of "Malaysian mosque" or "Malaysia AND mosque" were extracted from research data bases, namely "Science direct", "Springer link", "Taylor and Francis Group", "JSTOR", "MDPI", "Emerald Insight", and "Research gate". The Table 1 shows the results that searches displayed and how many of the articles were in fact related to Malaysian mosque designs.

Table 1
Data Bases and The Number of Related Paper Found

Data Base	Number of Displayed Papers	Papers Related To Malaysian Mosque Design
Science direct	669	7
Springer link	810	2
Taylor and Francis Group	14	1
JSTOR	3	1
MDPI	218	-
Emerald Insight	565	1
Research gate	1000	37

Among these 49 extracted articles, some of them were repeating and 19 of them did not include information related to internal design of the mosque, and solely focused on the exterior formal architecture. 26 articles were left for further investigation.

During the deeper analysis of these papers, some of them were merely a descriptive case studies that either introduce a certain mosque or compare them to one another, trying to classify them into different classes and styles(Utaberta, Sabil, & Asif, 2020; Yusof, Haron, & Mutalib, 2014).

This research starts with introducing internal mosque design considerations in general, as it is true almost everywhere in the Islamic world. Then moves on to further explore the design considerations in Malaysian mosques.

Result

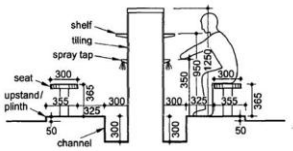
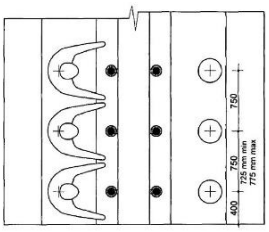
In this section first general consideration and standards that is necessary to withhold, in any mosque around the world is presented, afterwards, studies done on Malaysian mosque is reviewed to extract information on internal design of the mosques in Malaysia, from the ablution area to decorations.

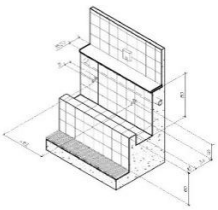
General Mosque Design Considerations

When discussing the design considerations behavioral pattern, and mosque necessary facilities must be taken into account. For Muslims it is not obligatory to pray in a mosque except for Friday prayer, yet it is highly recommended. Therefore, all Muslims, from young and healthy, to children and elderly or people with disability should be able to participate in communal prayers. It must be held in mind that a mosque's prayer area must be oriented towards the qibla(Rosniza Othman, Inangda, & Ahmad, 2008).

Below in the Table 2 the main and common spaces are presented with the design considerations found in books and articles about the subject.

Table 2
General Spaces and Their Design Consideration

Space	Standards and Consideration
Entrance	It is ideal if the entrances to the prayer hall are in the back of the prayer hall (across from Qibla). Although side entrances are acceptable, they should be placed distant from the Qibla wall(Mokhtar, 2009).
	Preferably be wide and without doors (or wide doors that open to outside) (Mokhtar, 2009)
Sahn	A fountain is frequently found in the courtyard; its waters provide a welcome respite in hot climates and are important for the ablutions before prayer(Weisbin, n.d.).
	In the courtyard, trees were frequently planted. In other instances, the court was covered in (Hillenbrand, 1991).
Shoe Rack Space	Simultaneously, other users collect their shoes from the racks and put them on. The space also serves as the lobby of the prayer facility. (Mokhtar, 2009)
	A space width of around 200cm in front of each shoe rack. (Mokhtar, 2009)
	As many seats as the space allows (outside the 200cm) is recommended.
Bathroom	Squatting toilets with a water tap are required(Fairweather, Al-Samarraie, & Adler, 1999)
	Toilets should be placed in compartments rather than cubicles; they must also have solid walls, not thin partitions or openings at the floor(Fairweather et al., 1999).
	Bathrooms should not be located behind the Quibla wall or above the prayer hall(Mokhtar, 2009)
	Toilet must be at right angles to the direction of Mecca(Neufert, 2019).
Ablution (Wudoo) Area	 Figure 2: Section of ablution(Fairweather et al., 1999)  Figure 3: Plan of ablution(Fairweather et al., 1999)

Space	Standards and Consideration
	 Figure 4: Proposed comfortable dimensions for an ablution station model. (Mokhtar, 2009)
Prayer Hall	 Figure 5: Men at praying(Neufert, 2019)
	Distance between lines of prayer, is usually considered 120cm, therefore the depth of praying hall is better to be measured in multiples of 120cm(Mokhtar, 2009).
	People pray facing Mecca (Quibla) in uninterrupted lines that fill up completely one after the other(Mokhtar, 2009).
	It is advised that the flooring material clearly define the areas where prayers should stand(Mokhtar, 2009).
	At least 0.82 m2 per person for praying(Neufert, 2019).
Mihrab/ Qibla Wall	Mihrab is where the leader of prayer or Imam stands facing the Qibla wall(Fairweather et al., 1999; Mokhtar, 2009).
Maqsura/ Chamber	Maqsura was created, to shield the ruler from attacks of the enemies(Hillenbrand, 1991).
Minbar/Pulpit	If the public facility is scheduled to host the weekly ceremonial group prayer on Friday, a minbar may be constructed where a speaker stands or sits facing the congregation(Mokhtar, 2009).
Dome (not a necessary part)	Two practical functions; one is to echo the words of the imam inside the mosque and the other is to cool the hot air when it rises upwards and draws in cooler air from outside. Modern technology compensates for the two functions above(Fairweather et al., 1999).

For understanding the facilities and their role, a knowledge about the main behavior that take place in a mosque is necessary. When the call for prayer (Adhan) echoes in the city, Muslims start to arrive to mosques. Upon arriving to the prayer facility, a person will undertake one of the following, governed by religious rulings:

Remove shoes and proceed directly to the prayer hall.

Remove shoes and proceed to the ablution space to execute the ablution routine (about 1.5 - 2.0 minutes), then proceed to the prayer hall.

Go to the bathroom, which usually entails a trip to the ablution space, and then to the prayer hall.(Mokhtar, 2009)

One of the primary causes of uncomfortable and unsafe prayer facility design is the problematic relationship between the prayer hall, entryway, ablution area, and bathrooms. Mokhtar (2009) presents a bubble diagram in Figure 6 to illustrate an ideal relationship. The diagram clearly distinguishes two design zones: clean and unclean. The clean zone comprises

areas where users do not wear their shoes. As a result, the shoe removal and shoe rack space is barely outside the line dividing the two zones.

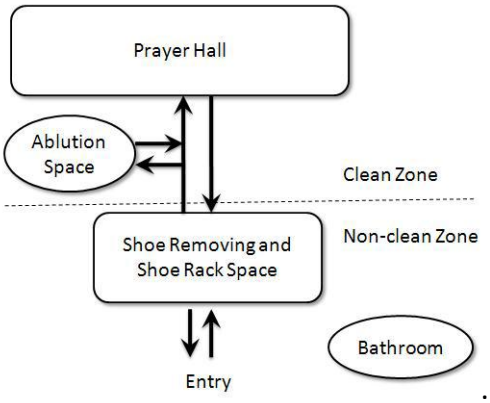


Figure 6: Relationship between spaces in the prayer facility(Mokhtar, 2009).

Mosque Design in Malaysia

Malaysian mosques, represent a variety of types and styles, from small traditional timber structures, to massive landmark modern complexes(Shah, Arbi, & Keumala, 2016). Mosque in this country has changed not only in design but also in meaning. For example in Malaysia, when talking about mosques, it means the ones that Friday prayers take place, which is equivalent to Jame' mosques in other Islamic countries, while other smaller mosques where Friday prayer are not executed, is call Surau(N. Kassim, N. s. Abdullah, & Z. B. M. Taib, 2014a). Many of the research investigating Malaysian mosque, focus on classification of the types and styles of their design. As an example, Rosniza Othman et al. (2008) in their study "A typological study of mosque internal spatial arrangement: A case study on Malaysian mosques (1700-2007)" investigates different styles of mosques in Malaysia whether traditional, colonial or even hybrid, through their internal spaces and not through their built form. They investigated the Arrangement of the three elements of mosque; entrance /portal, prayer hall and verandah, and also the positioning of ablution areas. In this paper Rosniza Othman et al. (2008) give an analysis of spatial sequence of Malaysian mosques and the relationship between the main parts of the mosque.

General Internal Design Consideration in Malaysia

In this section studies that focus on different aspects of mosques are reviewed. These studies include physical elements as well as characteristics that can help with improvement of mosque environment in a more psychological aspect.

Psychological Aspects of Design

In a study, Ng et al. (2022) investigate the design element in Saidina Abu Bakar mosque to find out whether it is socially inclusive and friendly or not. Their study resulted that visual accessibility is highly effective on the sense of friendliness. They believe that "The visual permeability creates the message of "sharing" with outsiders." specially to the prayer hall and courtyard. On the same page, Samsudin, Mat Rabu, Mazlan, and Dodo (2021) aim to find a design strategy for a mosque to promote community friendliness. In their research they investigated The Al-Mujahideen Mosque as their case study, which is a two-story Medium-sized Qibla oriented mosque. Their results concluded into five design considerations: 1. The mosque should be intimate in scale quality, 2. It should provide an easy preview from the

outside, 3. It should possess an adaptive architecture style 4. It should have a flexible universal design 5. For social gathering activities, the location should be created with a permanence and impermanence landscape.

Universal Design

Mosque structure falls under the category of public structures that must be accessible and provide services to all types of people with a variety of abilities by imposing certain regulations. These regulations, which can be categorized into four broad accessibility issues, relate to the constructional aspects of buildings in both the regular course of events and during evacuation in the event of an emergency, these four counts as:

1. Approach to building from surrounding area
2. Horizontal circulation
3. Vertical circulation
4. Facilities and amenities.

All of the accessibility considerations stated above should support the idea of universal design. It is important for walkers and wheelchair users to access the mosque building from public pathways, parking lots, and drop-off locations. Then, without any barriers, difficulties, or reliance on outside assistance, a continuous flow of movement from the mosque's doors to all interior places is made. Additionally, they ought to support the horizontal circulation's dimension of orientation and navigation. Accessible vertical circulations must receive additional attention in Malaysian mosque buildings due to certain specifications. These precise considerations are required by the fact that most mosques in this nation have upper-level women's prayer rooms, escalating main prayer halls due to climate factors, and restrooms and ablution sections in lower levels. Finally, restrooms and ablution places should be easily accessible and placed near the worshiping halls and entrances of all mosque structures as these are crucial utilities(Niya, Utaberta, & Maulan, 2015).

The Prayer Hall is usually carpeted, which is a problem for wheelchair users because mosque caretakers express that wheelchairs brought in from outside are dusty and filthy due to dirt and maybe animal stool. It is still an issue that has not been resolved, and people with Disabilities (PwDs) are depressed because they are constantly asked to leave the Masjid and cannot perform their prayers(Abd Samad & abdul rahim, 2014).

In case of women and children, Suratkon et al. (2017) discuss female-friendly design of mosques by case studying Masjid Sultan Ibrahim, Universiti Tun Hussein On Malaysia. By utilizing questionnaires, they investigated the opinions and needs of Muslim women in a mosque. they explain the issues women have to go through before prayers such as ablution area that must be fully closed so the women feel safe and don’t need to wear hijab right away. They suggest some solution to improve mosque environment to be more female friendly. Ideally, the main prayer area and the ablution room should be created as a single unit and connected together. These areas should be completely enclosed, including the path between them. The act of performing ablution and preparing for prayer for women involves both removing and re-covering the veil, so it is crucial to have a completely enclosed space.

A well-equipped children's area is another amenity that ought to be taken into account. The lectures held in the mosque typically last between one and two hours. A well-equipped

children area should be situated close to the main prayer area so that the mothers can learn in comfort. While it is forbidden for women to enter the main prayer area while they are menstruating in Islam, this does not mean that they should be excluded from other activities held at the mosque. In order for the women to clearly see the imam or speaker during the prayers or any educational events, it is strongly advised that a good speaker and sound system be installed along with an LCD screen in the waiting area and prayer area.

From an Islamic perspective, parents must educate their children in order for them to understand and obey God's commands. Exposing children to mosques is an excellent approach for developing these values in them(Abu bakar, Zulkifely, Majid, & Ibrahim, 2019). Mohd Marsin, Sapawi, Raja Shahminan, and Syed Ariffin (2015) investigates characteristics that make the mosque a child-friendly environment. They used a survey based investigations, where they asked children to answer some questions about mosque environment. The spaces and interior design of the mosque were important in the respondents' eyes. The most important aspect of the physical environment is enough space, followed by gathering areas and interior design, while physical planning and mosque form (typology) are seen as being the least important. The layout of the space as well as the mosque's ornamentation and decoration are in some ways considered important.

Sustainable Design

In the case of sustainable design, Mohamed (2020) suggests that The traditional Malaysian mosque designs have evolved naturally over several centuries and have demonstrated to be sustainable solution for construction in Malaysia, a country with a hot and humid climate. By literature review and case study, he aims to outline sustainable approaches in traditional mosques in Malaysia. The table below shows their findings in internal parts.

Table 3
Internal considerations in traditional mosques that in in lined with sustainable design (Mohamed, 2020)

Approach	Description
Large Window Opening	A large window opening improves natural ventilation and lighting. It improves visual accessibility and comfort.
Area With Open Space (Without a Full Wall)	In the traditional mosque such a space known as a balcony or veranda is designed to be around the main praying hall.
Openings on Wall Other Than Window And Door	wooden carvings and timber louvers. These elements on the wall also allow for additional natural ventilation and daylighting.
Open Floor Plan	In interior spaces, such as main praying hall, open floor plan helps the space to be are to be a naturally ventilated.
Multiple Entrances And Its Design	it is typical to have many entrances around the praying hall to allow for easy access by the occupants.
Building Orientation	Due to the religious factor, mosques are constructed towards the Qibla.

Furthermore, Sanusi, Abdullah, Azmin, and Kassim (2019) aim to identify and evaluate the passive design strategies adopted by Colonial style mosques in Malaysia. By using case study method, they concluded that The Verandah is the Royal Colonial Mosques' most significant and effective passive design strategy. There was a smaller drop in air temperature in the main

prayer hall than there was in the Verandah. secondly, the wide openings are also significant and practical. Verandah (serambi) is a climatic response to preserve the main prayer hall, as well as a transition zone within the mosque that differentiates formal and informal activities (Shah et al., 2016). The verandah is usually utilized for informal religious classes and is occasionally used as a meeting spot for casual conversation before or after communal prayers. Similar to the role of courtyards, the verandah will also serve as an additional praying location when necessary(Othman et al., 2008).Moreover, in a research M Mohd Siraj and Ismail (2021) did, by examining 5 mosques they aimed to identify characteristics and elements best suit sustainable communal development. Their findings indicate that a mosque design should take into account the values of natural characteristics and be climate-responsive. This will guarantee a high-quality interior and exterior of the building that are distinctive and efficient in terms of appearance.

Bathroom and Ablution Area

Utaberta and Shakir (2021) and Haraty and Utaberta (2019) investigate the ablution space's health and sanitation of the Malaysian ablution space. Their methods included physical observation, architectural drawing analysis, and interviews. During their study they looked deeper into design form, ventilation, cleaning status, and user experience. Their study resulted that numerous physical problems with regard to space cleanliness can result from a lack of natural light. It further explains that the current ablution area situation required a lot of labor and cleaning, and that it only gets worse during congregational prayers. Because the ablution area fills up during Friday prayers, the natural ventilation system is insufficient. Comparatively speaking, larger ablution areas exhibit a more hygienic environment. Also, the area where the ablution spaces are located shouldn't contain the toilets.

They make some suggestions for design which are as follows:

1. It is possible to use natural ventilation.
2. Especially during the times of prayer, uphold a higher standard of cleaning.
3. It is more efficient in many ways to have just one main bathroom. However, one of the design suggestions for large mosques is to include easily accessible outdoor ablution areas. Additionally, it reduces the pressure on the main ablution room during peak hours.

Lighting and Acoustic Considerations

Certainly, lighting and acoustics are an essential component of any design that can change the environment to better or worse. However, both lighting and acoustics find a different meaning and consideration when it comes to the mosque design. For example, the importance and metaphorical richness of light in Islamic architecture cannot be overstated(Matracchi & Sadeghi habibabad, 2021). Architects have employed equipment and procedures that better reflect and circulate light to create a religious ambiance in mosques. Thus, they have developed various effects that have contributed to the development of the heavenly and spiritual ambiance of mosques by using light, and by generating shade and light (Kassim et al., 2014a). Also, Ismail et al. (2015) in their study on the role of the light, consider lighting a sculpture. They analyze the harmony, hierarchy of daylight in federal territory mosque’s prayer hall with natural daylight in city of Kuala Lumpur or Putrajaya.

Even though daylighting and playing with shade and light in creating a spiritual atmosphere as well as energy consumption is important, In Malaysia, the majority of mosques have

artificial lighting systems, particularly in the main prayer halls, which are often found in the center of mosques. The main prayer rooms are typically surrounded by verandahs, which stops natural light from entering the mosque's interior. This conventional mosque design necessitates a lot of artificial lighting, which could result in considerable energy usage. Therefore, the windows or openings should be made to let in natural light while also preventing glare(Sanusi, Abdullah, Othman, & Jamil, 2021).

By utilizing field observation, and daylight analysis simulations of the prayer hall in the Colonial Mosques Sanusi, Abdullah, et al. (2021) aim to investigate the daylight performance of Colonial mosques in Malaysia. Their results, when exploring daylight conditions in Ubudiah Royal Mosque, Pasir Pelangi Royal Mosque, and Sultan Ibrahim Jamek Mosque, reveals that the daylight is influenced by the building orientation, shading elements, window to wall ratio, and window type.

They also count eight passive daylighting properties that should be considered while designing a well-lit mosque. These components include building form, opening properties, the height of the opening, verandah area, shading elements, windows to wall ratio (WWR), clerestory windows or openings at dome level, and interior surface properties.

Sanusi, Jamil, Abdullah, and Othman (2021) also, by utilizing the same methodology explored Effective Daylight Design Strategies, their findings show that the most effective daylighting design strategy is found to be the floor depth to window height ratio. The rule of thumb that should be taken into account is that D=2H, where D stands for floor depth and H for window height ratio.

Acoustic considerations too, are of special significance in mosque context. In terms of sound audibility and voice intelligibility, a good acoustic design will create a better and more comfortable environment in the mosque(A. Othman, Harith, Ibrahim, & Ahmad, 2016).
Some of the basic aural requirements that lead to the optimum acoustical environments are as followed:

- Sound audibility, which is the ability of everyone in the audience to hear sounds at a volume that is reasonable and consistent.
- Speech intelligibility, which states that regardless of the listener's position, all speech sounds should be understandable.
- The speaker's voice should sound as natural as possible so that listeners can identify the source of the sound and retain the impression of realism(Othman & Mohamed, 2012).

Othman and Mohamed (2012), investigated the influence of prayer hall’s proportion on the speech Intelligibility by examining Six mosques around Kuala Lumpur of various shapes, sizes and proportions. They used Rapid Speech Transmission Index (RASTI) to determine the intelligibility level in empty mosques. Their findings show that rectangular prayer hall with longer side is facing Qibla is better to achieve optimal speech intelligibility.
Othman et al. (2016) also investigated the acoustic design in mosques to provide acoustical comfort of congregations. As their method, they chose Masjid Al-Hussain situated in Kuala Perlis, Perlis, Malaysia as their case study, where they observed the worshiper’s behavior to see whether they are comfortable during the communal prayer and lectures. Moreover, they used interview to complete their data. They declare that the Al-Hussain Mosque applied good

acoustic design through carpet flooring, walls adorned with corals, quartz, granite, marble and pebbles, and the mihrab is of semi-circular shape.

In another research Hossam Eldien (2012) aimed to evaluate the acoustical performance of mosques in Shah Alam, Selangor. He chose two mosques, Sultan Salahuddin Abdul Aziz Mosque and Section 7 Mosque, for case study and comparison. He measured the acoustic parameters such as speech level, background noise and reverberation time, by determining several extended measuring points inside the mosque. The findings showed that mosque background noise was over the permitted threshold, but that listeners inside the mosque could comfortably hear and pray due to the speech level.

Ornament and Decoration

Islamic architecture's decoration serves numerous purposes. What it should emphasis on first and foremost is remembrance of Allah and unity with him(Ahsani et al., 2014b). They may be spiritual, educational, social, or psychological in nature. Mosque decoration, from a religious aspect, aims to convey a sense of divine omnipresence and simplicity by focusing on harmony and balance without concern for extravagance or magnificence. Among the functions appear to be the production of non-tectonic values, the disintegration of all those components that emphasize the structure in other architectural traditions, the balance and counterbalance of loads and stresses the actual mechanics of building(Kassim et al., 2014a; R. Othman & Zainal-Abidin, 2011).it is known that, in mosques decoration, people and animals are not permitted to be portrayed in the decoration. Plant and geometrical embellishments (arabesques), as well as Qur'anic texts, are popular and have evolved into a high art form in Arabic calligraphy(Neufert, 2019; Othman & Zainal-Abidin, 2011).

Othman and Zainal-Abidin (2011) discuss why ornaments in the mosque interior is actually important, and what it stands for. Their observation shows that the first aspect of Islamic ornamentation emphasizes the power of endless patterns. This includes intricate geometric patterns that unmistakably show the limitlessness of Allah, the Almighty. Avoiding sharp contrast and providing a clear definition of scale and surface is also made easier by multiplying any geometric pattern of an architectural element on various scales within a single plane. The motifs of geometrical figures that appear in floral or vegetal figures are fitted on top of the fundamental geometrical rules. Arabic calligraphy is the second-ranking attribute of Islamic art. The simplest form of Naskh script, calligraphy is just joined letters; later, these letters are "plasticized" to allow them to be angulated, as in the oldest Kufic script, or stretched, prolonged, bent, thickened, overlapped, and complicated, as in the Thuluth script. They are occasionally made as three-dimensional arabesques to complement geometric compositions made of carved wood on screens or walls decorated with stucco. The three calligraphy types mentioned above—Kufic, Naskh, and Thuluth—are the most frequently used in Malaysian mosque wall decoration.

In another study, Kassim et al. (2014b) explore whether high excessive decoration in prayer hall is more preferred by users or minimal ornaments. Surveys and questionnaires were used as the primary methods for gathering data. A survey was done at the two mosques that were selected for the case study. One is highly decorated while another one is less decorated. Their findings indicate that the purpose of Islamic art's typology of motif is to aid mosque patrons in remembering Allah. Calligraphy motif and geometric pattern are the most common types

of motifs that can truly evoke those Tawhid feelings. Users are genuinely unsure of how a floral motif will aid in their remembrance of Allah when it comes to floral patterns. The beauty of the space can be enhanced, though, by a floral motif. According to the survey, visitors from both mosques prefer light and soft color for praying hall. Results indicate that regardless of how much or how little ornamentation motif is used, people are happy with it. The best way to use the motif is to reduce the color in large amounts. As a result, it won't stand out too much to those who look at it.

Furthermore, Kamarudin, Baydoun, and Mahidin (2020) explores the visual qualities of the calligraphy scripts in the mosque components to understand the relationship between the calligraphy placement and the mosque architecture within the interior and exterior of the buildings. They reviewed and analyzed calligraphies found in 10 mosques in Kuala Lumpur. According to their analysis, Thuluth script is the calligraphy style that can be found most frequently on mosque interiors. The Qiblah wall and the base of the domes both feature a significant amount of this type of script. A second kind of script used in mosques is called kufi. The analysis also shows that decorative calligraphy is concentrated in certain places in the mosques, particularly in the prayer hall, where it can be found on domes, doorways, interior walls, Qibla wall, and the mihrab (prayer niche). Other than these places, a lot of calligraphic inscriptions can be found on the upper part of doorways and entrance arches. The majority of the inscriptions at the mihrab, qiblah wall, domes, doorways, and interior walls are verses from the Qur'an. Asmaul Husna (the 99 names of Allah), the phrase "Basmallah," the names of the companions, zikr (phrases to be remembered), and dua (prayer of supplication quotes) are just a few of the Islamic phrases and words that adorn the locations. The findings demonstrate that the mosques' Qiblah walls are the most decorative features, but in a moderate way.

Figure 7: Qiblah walls of Federal Territory Mosque with Thuluth inscriptions(Kamarudin et al., 2020)

Figure 8: Doorway at Puncak Alam Mosque with Thuluth inscriptions(Kamarudin et al., 2020)

Discussion

In this section, first a summary of the findings are presented in the Table 4. Later, based on the findings a Space diagram is designed. The limits and gaps of the research also has been covered.

Table 4

Summary of the findings

Type of Considerations	Summary of Findings
General Considerations	To be more friendly 1. The mosque should be intimate in scale quality, 2. It should provide an easy preview from the outside, 3. It should possess an adaptive architecture style 4. It should have a flexible universal design 5. For social gathering activities, the location is created with a permanence and impermanence landscape (Ng et al., 2022; Samsudin et al., 2021).
	Some design consideration for ablution area cleaniness: 1. It is possible to use natural ventilation. 2. Especially during the times of prayer, uphold a higher standard of cleaning. 3. It is more efficient in many ways to have just one main bathroom. However, one of the design suggestions for large mosques is to include easily accessible outdoor ablution areas. Additionally, it reduces the pressure on the main ablution room during peak hours. (Utaberta & Shakir, 2021)
Universal Design	It is important for walkers and wheelchair users to access the mosque building from public pathways, parking lots, and drop-off locations. Then, without any barriers, difficulties, or reliance on outside assistance, a continuous flow of movement from the mosque's doors to all interior places is made. (Niya et al., 2015)
	Accessible vertical circulations must receive additional attention in Malaysian mosque buildings. (Niya et al., 2015).
	Restrooms and ablution places should be easily accessible and placed near the worshiping halls and entrances of all mosque structures as these are crucial utilities(Niya et al., 2015).
	In case of women, ideally, the main prayer area and the ablution room should be created as a single unit and connected together. These areas should be completely enclosed, including the path between them(Suratkon et al., 2017).
	In order for the women to clearly see the imam or speaker during the prayers or any educational events, it is strongly advised that a good speaker and sound system be installed along with an LCD screen in the waiting area and prayer area(Suratkon et al., 2017).

	A well-equipped children area should be situated close to the main prayer area so that the mothers can learn in comfort (Suratkon et al., 2017).
Sustainable Design	A large window opening improves natural ventilation and lighting. It improves visual accessibility and comfort(Mohamed, 2020; Sanusi et al., 2019).
	wooden carvings and timber louvers. These elements on the wall also allow for additional natural ventilation and daylighting (Mohamed, 2020).
	In interior spaces, such as main praying hall, open floor plan helps the space to be are to be a naturally ventilated (Mohamed, 2020).
	The Verandah is a significant and effective passive design strategy(Sanusi et al., 2019).
Acoustics	Rectangular prayer hall with longer side is facing Qibla is better to achieve optimal speech intelligibility (A. R. Othman & Mohamed, 2012).
	acoustic design through carpet flooring, walls adorned with corals, quartz, granite, marble and pebbles, and the mihrab is of semi-circular shape can help good acoustics(A. Othman et al., 2016).
Lighting	the daylight in Mosques are affected by the building orientation, shading elements, window to wall ratio, and window type (Sanusi, Abdullah, et al., 2021).
	The most effective daylighting design strategy is found to be the floor depth to window height ratio D=2H, where D stands for floor depth and H for window height ratio (Sanusi, Jamil, et al., 2021).
Decoration	The best way to use the motif is to reduce the color in large amounts. visitors prefer light and soft color for praying hall (Kassim et al., 2014b).
	Calligraphy motif and geometric pattern are the most common types of motifs that can truly evoke those Tawhid feelings(Kassim et al., 2014b).

Based on the findings authors have produced a diagram to show a possible arrangement for mosque. The Figure 9 demonstrates that the praying halls are better to be rectangular with longer side is facing Qibla, locker room better be placed in the shoe rack area, especially for women, since they want to change to proper clothes for prayers after ablution. A children area is also considered with access to both man area and women area, so if either of the parent bring a child can leave them there while praying or listening to Imam. The entrance to the praying halls, should be considered in the back of the hall and either from sides or in the wall opposite to the Qibla. The paths to take to enter the praying hall could be either from the entrance to shoe rack area and directly to praying hall, or entrance, shoe rack area ablution area and then praying hall. Bath rooms are considered in separate parts and considered unclean area.

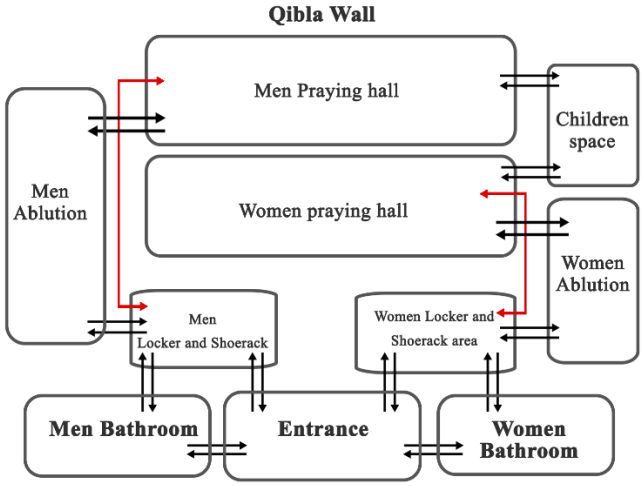


Figure 9: Spatial arrangement diagram

Previous studies, mostly focused on how efficient the existing mosque designs are and little about how to design mosque to be at its optimum functionality. There are gaps in climate-friendly designs for mosques in Malaysia, particular to the climate of Malaysia. There only have been clues that traditional designs could be useful. Yet, the traditional ways of building have its limits, because during their evolution, the technology was different from now, also the needs of people and way of lives have changed, therefore some standards that are aligned with sustainable developments goals, especially for the interior design and arrangement is needed.

Conclusion

In this research, a systematic literature review was conducted on Malaysian mosques, to investigate the internal design considerations found in journal and conference articles. 26 articles about internal design of Malaysian mosques were extracted and reviewed. The findings concluded a number of considerations, from psychological aspects, on enhancing sense of friendliness by adding transparency to the design, to universal design considerations that makes the mosques available to all, from wheelchair users and elderly to small children, by adding standard ramps in the entrance, legible signs in the interior design, and disable friendly ablution and bathrooms. Also some passive design solutions were presented such as using openings to enhance ventilation and lighting.

There are room for further investigation on sustainable design, and standards on how to design the mosque to be at its optimum functionality, as well as assisting spaces such as library and classes in the scope of Malaysia.

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