**POST OCCUPANCY EVALUATION ON DESIGN FACTOR OF ABLUTION AREA IN MUSHOLLA: SHAH ALAM SHOPPING CENTERS**

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# Abstract

# Musholla is one of the facilities provided in the shopping malls. In Islam, cleanliness is the main aspect especially when someone wants to pray. The ablution area is one of the important areas that are highly accessible in the Musholla and the importance of providing it is also a part of Islamic virtue as this area is places of cleansing certain parts of the body in a certain order or in Arabic, it called as ‘wudu’. Since there is lack of guideline and document specifically on ablution area, this paper is to give some fundamental criteria for the ablution design guideline. To get the result, this research is to identify the design factors of an ablution area that make comfortable for users in the Musholla. Also, this research is to investigate the effectiveness of the ablution design in the Musholla. For that reason, the observation and data collection has been carried out at selected case studies, which are Mall A and Mall B. Since Malaysia does not have specific guideline for ablution area, the post occupancy evaluation for current ablution design is very important, as it can lead the architects and designers in designing the better ablution area. This research is carried out using quantitative and qualitative approach which are interview session with the local authorities, questionnaire survey to the users, and observation to evaluate the effectiveness of the ablution area at those buildings. The conclusions for this research pointed out that there are several factors should be considered into the ablution design such as size, space arrangement between clean zone and non-clean zone, facilities for Person with Disabilities (PwDs), ergonomic aspects for ablution unit, maintenance and security. Hence, the recommendations on the fundamental criteria for an ablution design guideline are provided.

# Keywords:

Musholla, Ablution, Shopping Mall, Post Occupancy Evaluation

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# BACKGROUND OF STUDY

# Facilities provided in the shopping malls such as parking lots, toilets, changing rooms, breastfeeding rooms, including musholla are very important that need to be considered by the building management. Ablution area is one of the important areas that are highly accessible in a musholla. The importance of providing it is also part of Islamic virtue as a Muslim will clean off certain parts of the body in a certain order or in Arabic is called ‘wudhu’ which it is an individual needs to embrace a specific cleansing procedure upon entering solah (Bakar et al. 2015; Suratkon et al. 2014). Solah without wudhu’ would not be acceptable in the sight of Allah SWT (Abu Ubaida, 2013). In many Islamic countries including Malaysia, there are neither guidelines nor standard in designing an ablution area. Some of the spaces are designed and constructed based on the existing ablution area. However their understanding on the elements and concept of ablution in Islam is doubtful (Abu Bakar et al., 2015). Therefore, summarized few issues and problems in ablution design.

# Table 1: Issues and problems in ablution design

|  |  |  |
| --- | --- | --- |
| Variables | Issues | Authors |
| Size | Insufficient size of the ablution area and narrow space when taking ablution | Abu Bakar et al. (2015) |
| Inconsistent ratio between the size of the prayer room and ablution. Ratio must be based on the built up area of the shopping complex  | Maamor in Nizam Yatim, (2013), (Hamid et al. 2016)) |
| Long queued during peak hours and demand overflow due to overcrowd | Hamid et al. (2016) |
| Comfort and safety  | Can cause discomfort in using the space and constitute a safety hazard  | Hilliard et al., (1999) |
| Injuries can occur during taking ablution such as back pain and slip  | Boy Nurtjahyo M., (2013) |
| Not dirt-free and slippery  | Hamzah, et al (2015) |
| Gender separation need to adhere but the routes connecting to ablution and praying area still connected.  | Mokhtar, A. (2005) |
| Water  | Water splashed during wudhu’ | Syah, M.A. & Jasmi, K. A. (2008) |
| Water overflow and get puddle due to insufficient different floor level, gradient and proper drainage | Rahim, A. A. et al. (2014) |
| Guideline and standard | Insufficient to support designers with minimum acceptable design | Mokhtar, A. (2003) |
| Inconsistent ratio between the size of the prayer room and ablution | Maamor in Nizam Yatim (2013) |
| Suggestion minimum of 9m2 to 20m2 or 6.1m x 6.1m for a musholla in a business areas but contrary with the average mall size in Malaysia at 600,000 square feet (Lum 2015) | Jabatan Perancangan Bandar dan Desa (2011) |
| Maintenance | Not well maintain | Hamzah, et al (2015) |
| The management sometimes did not give good attention | Rusdi (2016) |
| Space arrangement | Locate the room in inappropriate space and improper location | Hamzah et al (2015) |
| Built near the parking space, next to the toilet or hidden area | Bakar et al. (2014) |
| Insufficient understanding of architects and designer on three main component of ablution which are dry, semi-wet and wet surface.  | Syah, M. A. & Jasmi, K. A., (2008) |
| Circulation and access between praying area and ablution need to follow concept of ‘clean-zone’ | Mokhtar, A. (2005) |
| Ergonomic aspect | To consider the ergonomic aspects and the anthropometric dimension for the position while taking wudhu’ either standing or sitting position  | Boy Nurtjahyo. M, (2013), Dawal (2016) |
| Facilities for PwD | Consider the Persons with Disabilities (PwDs) | Rahim et al (2014) |

# This paper aims to identify the design factors of ablution that will contribute users’ satisfaction as well as guidance in providing fundamental criteria in ablution design.

# RESEARCH METHODOLOGY

# This research is a combination of quantitative and qualitative approach where the details are shown in . Results from each method will be analysed separately and then triangulated to provide strong and comprehensive findings.

# Table 2: Research methodologies

|  |  |  |
| --- | --- | --- |
| Methods | Techniques | Analysis |
| Questionnaire surveys | Developed from Department of Work Post Occupancy Evaluation (POE) form (Jabatan Kerja Raya, 2013)with further modification. Selection of respondents was based on the combination of convenience, random and purposive samplingsQuestionnaire in Likert scale rating which was from one – strongly disagree to 4 – strongly agreeDistributed in total of three weeks comprised of weekdays and weekend. Surveys took place from 1 pm – 8 pm  | Descriptive and factor analysis |
| Interview session | With two local authorities which represent the expertise of related guideline and regulation in building design and planning | Thematic analysis |
| Case studies | Rough observation with some sketches and measurement | Discussion |

# Both malls are located at Shah Alam, Selangor with similar commercial floor area approximately at 65,000-meter square. Some information was inaccessible due to restriction from the building management.

# RESULTS AND DISCUSSION

# *Descriptive analyses*

# A Chi-square test of independence was calculated comparing the frequency of satisfaction level among users on praying and ablution areas in both malls. This test was done to ensure that both case studies with similar overall facilities area at 65,000 meter square are significant even though praying and ablution sizes and dimensions were unidentified due to restricted information and inaccessible permission. Results in shows that there are significant relationships on both level of satisfaction for Mall A and Mall B.

# Table 3: Overall satisfactions cross tabulation

|  |  |  |  |
| --- | --- | --- | --- |
|  | Satisfied | Very satisfied | Dissatisfied |
| Overall satisfaction on the design of the praying area *X*2 (2) = 21.821, *p* <.001 | Mall A (N=75) | 56 | 19 | 0 |
| Mall B (N=75) | 50 | 8 | 17 |
| Total | 106 | 27 | 17 |
|  |  |  |  |
| Overall satisfaction on the design of ablution area*X*2 (2) = 22.187, *p* <.001 | Mall A (N=75) | 56 | 19 | 0 |
| Mall B (N=75) | 48 | 9 | 18 |
| Total | 104 | 28 | 18 |

# Further descriptive analyses were carried out after the significance levels of both case studies have been determined. Among the respondent, 72% were female and 28% were male. The ranges of their age were from 15 to 20 years old at 38% and 21 to 25 years old at 62%. The Musholla will be operated usually after 12 noon and users will start using it for Dhuhr. Among the 150 users whose questionnaires were analysed, shows the highest percentage was 48% for Dhuhr in between 2 pm to 3 pm. About 47% of the respondents used the musholla at 7 pm to 8 pm for Maghrib. Other groups of time duration were in a minimum range of percentage at 23% to 6%. This pattern can initially tell that more people tend to use the musholla for Dhuhr and Maghrib. These patterns cannot be compared with results from other researchers as up to the knowledge of the researchers, statistics on mushollas usages in a shopping complex based on different time are still unavailable.

# Figure 1: Time using the musholla

# *Factor analyses*

# Principal Component Analysis (PCA) were employed to do the data reduction and reducing the numbers of variables (Statsoft Inc., 2013) by determining the importance of a set observed variables (Field, 2009). The PCA was carried out with SPSS v.24.0 to identify the factors that are needed to explain the factors. The Kaiser-Meyer-Olkin measures verified the sampling adequacy for the analysis, KMO = .663 (‘mediocre’ according to Field, 2009). Bartlett’s test of sphericity is *X*2(630) = 7878.666, *p* <.001, indicated that correlations between item were sufficiently large for the PCA. These show that the sample size is adequate for factor analysis . The PCA was conducted on the 36 items with orthogonal rotation (varimax with Kaiser Normalization). Seven components had eigenvalues over Kaiser’s criterion of 1 and in combination explained 91.72% of the variance.

# Table 4 provides all the factor loadings after rotation. Six variables are retained as their factor loadings were more than 0.4 with two factors were deleted due to the given reasons. Results for reliability analysis for the remaining factors show good and acceptable Cronbach’s α between .698 to .960.

# Table 4: Rotated factor matrix (N=150)

|  |  |
| --- | --- |
|  | Component |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| GROUP 1: SIZE, SPACE AND DISABLE FACILITIES There is separation between space for shoes to ablution area | .960 |  |  |  |  |  |  |
| Effective ablution area to avoid overcrowding | .959 |  |  |  |  |  |  |
| Space for shoes is appropriate and neat | .959 |  |  |  |  |  |  |
| Effective space arrangement for waiting area during ablution to avoid overcrowding | .959 |  |  |  |  |  |  |
| Rack to put personal belongings during ablution | .955 |  |  |  |  |  |  |
| The distance of one water taps to another is appropriate | .903 |  |  |  |  |  |  |
| The distance of water tap from users is appropriate | .903 |  |  |  |  |  |  |
| Number of pipes at ablution area is adequate | .894 |  |  |  |  |  |  |
| Sufficient shoe rack, appropriate and ergonomic | .893 |  |  |  |  |  |  |
| Type of water tap is appropriate | .873 |  |  |  |  |  |  |
| Easy access for disable to take wudu' | .770 |  |  |  |  |  |  |
| Easy access for disable to the prayer room | .728 |  |  |  |  |  |  |
| GROUP 2: COMFORT AND SAFETYNo stagnant water at the ablution area |  | .932 |  |  |  |  |  |
| Distance from ablution area to prayer hall is appropriate |  | .932 |  |  |  |  |  |
| Comfort body position during ablution  |  | .932 |  |  |  |  |  |
| Aurat is under control during ablution |  | .932 |  |  |  |  |  |
| Cleanliness at ablution area is good  |  | .926 |  |  |  |  |  |
| There is separation between an ablution area to prayer hall |  | .926 |  |  |  |  |  |
| Prayer hall is spacious to avoid overcrowding |  | .926 |  |  |  |  |  |
| GROUP 3: MAINTENANCE Direction of kiblah is not facing the toilet |  |  | .936 |  |  |  |  |
| Floor finishes at prayer room is comfortable, safe and practical |  |  | .936 |  |  |  |  |
| Location of the prayer room is ideal |  |  | .930 |  |  |  |  |
| It is safe in this prayer room |  |  | .930 |  |  |  |  |
| The lamp / fan / air conditioner are adequate |  |  | .930 |  |  |  |  |
| Odour in this prayer room is acceptable  |  |  | .908 |  |  |  |  |
| Space arrangement for veil is appropriate and ergonomic |  |  | .581 |  |  |  |  |
| Floor finishes at ablution area is comfortable, safe and practical |  |  | .571 |  |  |  |  |
| GROUP 4: WATER AND ERGONOMIC ASPECTDrainage system at ablution area is effective |  |  |  | .802 |  |  |  |
| There is seat for elderly and disable to take wudu' |  |  |  | -.767 |  |  |  |
| Position of entrance door is appropriate to protect aurat |  |  |  | .600 |  |  |  |
| Splash barrier is sufficient to prevent users getting wet |  |  |  | .573 |  |  |  |
| GROUP 5: SECURITY Sufficient CCTV located along the access route to the prayer room  |  |  |  |  | .961 |  |  |
| Route to prayer area for disable is available |  |  |  |  | .961 |  |  |
| There is handrail at the ablution area\* |  |  |  |  |  | .780 |  |
| Water tap height is appropriate\* |  |  |  |  |  | .626 |  |
| You feel musculoskeletal problem during ablution such as back pain or hit on feet\*\* |  |  |  |  |  |  | .803 |
| Eigenvalue(Explained by variance, %) | 12.503(29.75) | 10.251(21.01) | 3.433(18.97) | 2.287(7.15) | 2.117(6.75) | 1.382(4.09) | 1.047(3.99) |
| Reliability(Cronbach Alpha, α) | .920 | .960 | .922 | .698 | .805 | .069 | - |

# Factor is deleted due to low Cronbach Alpha

# \*\* Factor is deleted due to single-item criteria

# *Triangulation analyses*

# The data triangulation is to highlight the potential problems based on the suggested factors which later being addressed from the multiple sources of data collection but within the same issues and problems (Yin 2009) that can be corroborated (Creswell & Clark 2011). In this research, quantitative data from the factor analyses and qualitative data from the interview sessions and musholla observations were triangulated.

|  |  |  |
| --- | --- | --- |
| Factors Analyses(N=150) | Guideline and standard(N=2) | Observation(N= 2) |
| Size, space and disable facilities  | In the guideline, minimum is 20’ x 30’. It is the initiatives of the building management to make the size bigger. No specific guideline based on size of building and occupant density. Therefore, the officer agreed that no specific guideline to address this factor. Agreed to have Universal Design Guideline.  | Both case studies have proper space management which separate the ‘clean zone and non-clean zone’ and ‘wet-surface and semi-wet surface’ appropriately.  |
| Comfort and safety  | The guideline only highlights the importance of separation between male and female which give comfort among users to protect their aurat. No specific guideline on other parameters specified for this factor.  | The buildings separate the wet surface, semi-wet surface and dry surface accordingly therefore no stagnant water at the ablution area. Measurements for ablution facilities were acceptable for Mall A. The ablution and praying area are hidden from the entrance therefore users feel comfort and safe.  |
| Maintenance | Architects, designers and planners should aware on this factor upon designing the musholla. The need for maintenance however not stated in the guideline.  | The musholla is clean with proper veil schedule. The carpet at praying hall is clean as well as the homogenous floor tiles at ablution area.  |
| Water and ergonomic aspect  | No inclusion of ergonomic aspect in the guideline.  | The buildings separate the wet surface, semi-wet surface and dry surface accordingly. The anthropometric dimension at Mall A is measured and their ablution unit measurement is acceptable.  |
| Security | No specific provision on safety in the existing guideline.  | No cctv and no security guard on duties.  |

# CONCLUSIONS

# Factor analyses from the qualitative approach have contributed to the initial required design factors for ablution area which derived from critical tabulation of literature reviews. The factors were then being validated from the interview sessions which show that all factors have insufficient attention all this while. Apparently, even though existing guideline provide minimum requirement compared to these suggested factors, observations on two musollas show that there are positive initiatives from the building management. These were supported with a good satisfaction level from the users in both malls as reported earlier. Therefore, it is strongly recommended to expand this investigation on other buildings at other places. This paper has contributed to the knowledge of design factor specifically for ablution area in musholla at shopping malls.

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