

Modular mobile Mosque (3M) prototype as socio-cultural incubator

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Abstract

This study explores an under researched part of contemporary Islamic architecture. It presents a new approach to design Mosques allowing a multi-faceted space that brings people together to enable prayer, unity, community collaboration, innovation and social connections. It may serve any groups giving particular attention to people impacted from environmental disasters, displaced from wars, and other unforeseen events. The Mosque becomes a place of worship, of hope, in transition as people reflect from the world around them. The method employed for this study is ‘research through design’, which is a process of design that allows new insights, knowledge, practices and final product to come into being. The proposed 3M (Modular Mobile Mosque) prototype design is a simple rectangle with a small-subdivided courtyard spaces. It is inspired by the Prophet Muhammed’s (PBUH) Mosque in AlMadinah that allows for multiple spatial variations. Customized modular container like units are placed together like a puzzle. It is a self-sustaining entity that employs every element with a sustainable function such as a solar minaret uses solar panels for energy and an inverse tent structure collects rainwater. Moreover, local attributes are assimilated into the design as needed to reflect regional identity and foster social relationships and community bonds. This research contributes to knowledge by advancing the current state of Mosque designs for various relief areas and stands as a prospective model for universal applications to elevate the quality of places of worship where they need it most.

Keywords: Mosque, Mobile, Modular, Multi-functional, Sustainability, Socio-cultural, Research through Design.

Introduction

A Mosque is derived from the Arabic term Masjid, which means a place of prostration and is a sign of submission to the will of God. Although, it's primary role is for Muslims to pray their five daily prayers, the Mosque is not only a house of worship. It is the center of all Muslim life. In fact, the Prophet Muhammed's (PBUH) Mosque in AlMadinah was a genuine community center for many religious, social, political, administrative, and cultural functions becoming a catalyst and head quarters for early Muslim civilization and expansion across the continents. Mosques where at the heart of Islamic cities, as focal points, landmarks, and centers dominating the skyline, while in part directing the city's organic intricate urban form. The Mosques served as community centers and in it's vicinity was discussed important matters, intellectual discourse, and Muslim's would gather to break their fasts in the holy month of Ramadan. Early Islamic schools and universities trace their roots from major Mosques such as AlAazhar in Egypt. The first Hospitals also evolved from early care facilities adjacent to Mosque's in Baghdad. Therefore, the Mosque played a significant role in many social and cultural facets of life in Muslim societies.

Despite the importance of the Mosque, today many Muslim countries have preferred the Mosque to remain only as a house of worship. Some have attributed this to simply politics to reduce the impact Mosque's have on people and how they relate to their governments. This may be true, however it also limits the Mosque's multi functional role as the heart of the community. As a result, many Mosques today are only open during prayers and sometimes Quranic study groups. This also supports a separation between the Mosque and Muslim life, which contradicts Islamic teachings that call for harmony, balance, and integration between religious practices and daily life.

This paper intends to revisit the adjacent functions of the Mosque by examining the potential to design and build a Mosque prototype for different communities and especially

humanitarian relief areas. These areas are in dire need for support and aid to regroup and build back their communities, therefore, the Mosque becomes of paramount importance and is pivotal in these efforts for not only as a place of worship but also to revive its role as a leader and center of all parts of Muslim life. It does this by employing a ‘research through design’ methodology as means to better understandings, develop, and introduce a new Mosque design for refugee camps, natural disaster zones, and other areas and people who may need it. The Mosque here serves as a place of worship, a place of peace, tranquility, a much-needed safe haven to bring hope and aspirations for a better future. The Mosque also serves as a community relief center to lead humanitarian efforts in food, medicine and etc. It promotes social programs and local cultural practices to foster better understandings thus the proposed Mosque design intends to work as a social and cultural incubator. The first stage of this study explores the design, while the second stage builds the prototype. Outlined and discussed in this paper is the first stage.

Background Literature

Islamic artistic philosophy

It is essential to understand Islam in order to understand Islamic civilizations and their cities. The foundation of a Muslim’s faith is the belief of *La illaha illa Allah Muhamed rasool Allah* - that there is no God but God and Muhammed is his prophet. The Holy Scripture of Islam is The Holy Quran, the final revelation from God to humanity, intended to reteach the doctrine of monotheism, a message conveyed to numerous Semitic prophets of earlier times. The basic principles in the Quran provide the creation of a whole culture and civilization ranging from lifestyle to architecture and the arts. Allah is described in the Quran as a transcendent Being of Whom no visual or sensory experience is possible. “No vision can grasp Him... He is above all comprehension (The Holy Quran:6:103)... Nothing is like unto Him” (The Holy Quran:42:11). He is beyond exhaustive description, and incapable of being represented by any anthropomorphic or zoomorphic image. In fact, “Allah is that which defies answers to the questions of who, how,

where, and when? It is this idea of ultimate oneness and transcendence of Allah that is known as *tawhid*” (AlFaruqi:1982:163).

Islamic art, architecture and aesthetic creativity was to fulfil the declaration of faith of *La illaha illa Allah* – that there is no God but God and He is completely other than human and other than nature. The goal of its art could not be achieved through depiction of man and nature. “It could be realized only through the contemplation of artistic creations that would lead the percipient to an intuition of the truth itself that Allah is so other than His creation as to be unrepresentable and inexpressible” (AlFaruqi:1982:163). Lois AlFaruqi professor of Islamic studies eloquently describes Islamic artistic philosophy:

The aspect of Transcendent which the Islamic doctrine taught was that God is infinite in every aspect – in justice, in mercy, in knowledge, in love. However, one might try to enumerate His many attributes, or describe any one of those attributes as applied to Him, the attempt would end in failure. His qualities are always beyond human comprehension and description. The pattern, which has no beginning and no end, which gives an impression of infinity, is therefore the best way to express in art the doctrine of *tawhid*. It is the structures created for this purpose that characterize all the arts of the Muslim peoples. It is these infinite patterns, in all their ingenious variety, that provide the positive aesthetic breakthrough of the Muslims in the history of artistic expression. It is through these infinite patterns that the subtle content of the Islamic message can be experienced (Ibid:163).

The Islamic city has usually been seen as a maze by visitors who did not comprehend its internal logic. However, this intricate pattern is like any other Islamic infinite pattern (Ibid:431). The cities grew semi concentrically around the Major Mosques, rivers or the sea. As they expanded courtyard houses started to follow stopping only for the protective walls. This was their beauty, their internal logic an urban pattern expressing the “concept of infinity” that made it a uniquely Islamic City.

The Mosque

The first Mosque in Islam was the Prophet Muhammed's (PBUH) Mosque in AlMadinah and served as a model for early Islamic Mosque architecture. It was made of a mud brick structure enclosed in a rectangular courtyard, and porch covered by palm branches. The architectural plan is an aisled or hypostyle hall where internal design modules exist without pronounced disjunction (AlFaruqi:1982). This plan has been favored for Mosque construction throughout the Muslim world. It also provided the foundational architectural elements for all Mosques that followed. Figure (1) illustrates these elements while the most important architectural Mosque elements are listed below:

1. The Qibla (direction of the Kaba in the Holy city of Mecca).
2. The Mihrab is a niche in the Qibla wall and usually is the most ornate part of a mosque with Quranic inscriptions.
3. The Minbar is a pulpit in the form of a staircase where the Imam gives the sermon for Friday prayer.
4. The Minaret is a tall structure attached to the Mosque and is used to call people to prayer.
5. The Sahn is a courtyard where usually fountains are placed for worshippers to preform ablution before prayer.

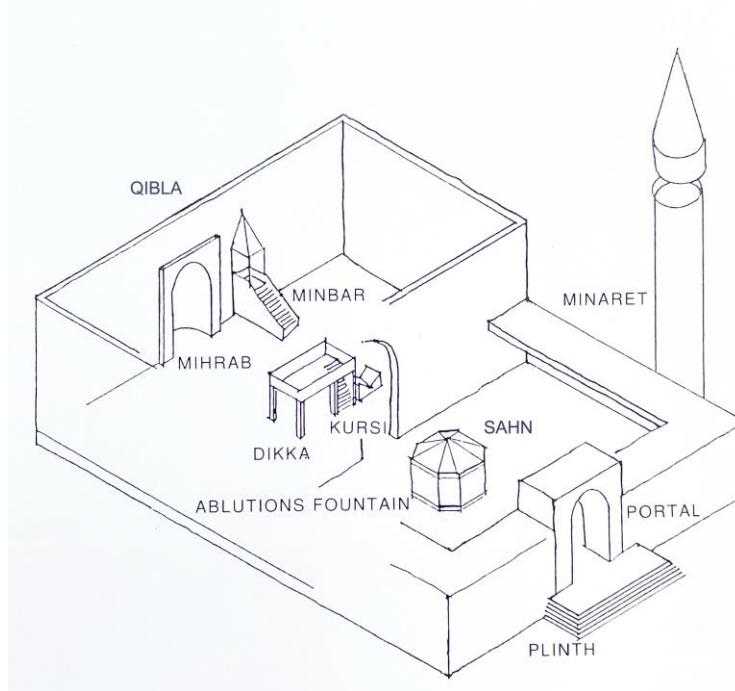


Figure (1): Representation of a Mosque's architectural elements Source: (Frishman and Khan: 1994)

Together these elements remain universal in all Mosques of the Islamic world. The differences reflect the diversity of Muslims cultures, which span the continents using different materials, patterns, colors, and form to reflect local cultures and environments. For example, the courtyard Mosques of Arabia were meant to create a microclimate and provide a sanctuary of peace from the outside world. They used local materials and were made of mud-bricks. Similarly, the Great Mosque in Mali is made of sun-baked earth bricks and coated with plaster suited for African culture and the hot arid desert while a Mosque in China uses traditional Chinese architectural form, gardens and colors. These ingenious Mosque design's all reflect how Islam has accommodated the innovation of Muslims to customize their places of worship to give importance for local culture and environment.

Mosque as multi-functional community center

The Prophet Muhammed's (PBUH) Mosque was a model for Islamic Mosque architecture in its function, elements, and spatial arrangement. It was also the heart of early

Muslim rule and played a significant role as the focal point for the community. Many scholars have researched and highlighted the importance of the Mosque in this regards (AlFaruqi:1982) (Frishman and Khan: 1994) (Omer:2010).

The mosque is accommodative of every beneficial activity concerning worship, education, politics, economy, security and social relation, which enabled the nascent and ambitious society to make civilizational headway (Omer: 2010). Similarly, Wardak stresses that while the social organization of the mosque is, in some important ways, a response to and shaped by exclusionary practices in the wider society, it plays a central role in the maintenance of order within the Muslim community (Wardak: 2002). “Mosque is the nucleus of a Muslim community all over the world. And this institution is not only known for the religious rituals practices inside it, but also for the social and communal activities that take place within its premise” (Utaberta and Asif: 2017).

Most literature covered in this topic is on how existing Mosques that serve the above mentioned goals, however, there is little evidence of new Mosque prototypes to fulfill the needs of people in emergency zones that may last from weeks to months and sometimes years. Instead people mostly used existing Mosques as places of shelter during disaster recovery. In their paper “Mosques as Emergency Shelters in Disaster Prone Regions” Utaberta and Asif discuss how Mosques may be used as a gathering point for the community and an evacuation center that serves as a transition facility before they go back home (Utaberta and Asif: 2017). Other researchers focused on spatial analysis on the utilization of Mosque in the tsunami disaster mitigation (Azhari et al.:2019). While others explored the role of the mosque in disaster management by documenting and analyzing its role in rural settings in the aftermath of the 2005 earthquake in Pakistan (Cheema et al.:2014).

Sometimes the Mosques are overwhelmed by being an “emergency shelter”, and therefore, alternative more effective Mosque prototypes designed specifically for humanitarian relief zones become important. There is a gap of literature with regards to not only recognizing

the importance of Mosque's in emergency zones but to provide an alternative design that further community needs in time of crisis. Some researchers looked at Mosque categories (Mortada:2003) developed from the Arab Urban Development Institute, which referred to three types of Mosques; Masjid al-jami (daily mosque), Masjid al-jomah (Friday mosque), and Musalla (prayer hall).

This paper proposes yet a fourth type of Mosque, which is a Mosque prototype that serves the needs for humanitarian relief areas. It may be considered between the daily Mosque and the Musalla. It is a Mosque that is constructed as a modular system that may be reconfigured and adjusted according to specific local needs and environment conditions. The adjust Mosque activities may also be attuned to the different situations. For example, it may provide educational services to lower income communities or a make shift clinic to support relief from environmental disasters. The flexibility of the concept allows for rapid deployment and easy construction to adapt to various scenarios.

Methodology

Research through Design

The method used for this study is 'research through design' which is similar but slightly different from 'research by design'. It is a practice-based inquiry where the design process and final product becomes a way to gain new knowledge. Although, this concept has been used for centuries by experimentation and trial-and-error to develop design (Groat &Wang:2013), the role and value of research in architecture has only recently emerged as an accepted research method. It is a dynamic and evolving concept in an academic context (Ibid:2013). Research through design or RtD was a term coined by Frayling in 1993. He described RtD as design as a particular way of thinking to gain a particular approach to knowledge to understand certain things that are outside design (Frayling:1993).

Some researchers see research through design as a design inquiry that produces an artifact with the intended goal of societal change (Binder & Redstorm:2006)(Swann:2002)(Zimmerman et al:2007). Zimmerman and Forlizzi define it as an “approach to conducting scholarly research that employs the methods, practices, and processes of design practice with the intention of generating new knowledge” (Zimmerman et al:2007). It is the process of “iteratively designing artifacts as a creative way of investigating what a potential future might be” (Zimmerman et al:2010). It uses trial and error to constantly develop projects in the real world (Toeters et al:2013).

There is a fine line between the two design research methods in architecture. Research by design, is defined as research which design is explored as a method of inquiry usually by the development of a project in which it uses different mediums such as, sketches and mapping. Others see research by design as gaining experience from practice and its process of designing as pillars of research (Verbeke:2011). The design frames and guides the methods, data collection, and results of the study. Thus, both research by or through design approaches become valuable in gaining new insights and knowledge, which may have a tangible impact on people’s quality of life (Fraser:2013).

For this study, the process of design empowers the researcher to explore multiple paths towards a new Mosque prototype. Knowledge gained in the process contributes to existing knowledge, which in turn enriches discussions between theory and practice. The process of research is itself sometimes considered more important than the product. It is through the architect’s design, design experiences, data collection and application of strategies that generates new understandings and transforms it into knowledge better acquired and expressed (Barrett & Bolt:2010). In research by design, the practitioner becomes a “practitioner-researcher” (Nelson:2013).

Proposed Mosque Prototype Design

The proposed design aims at meeting the International Organization for Migration (IOM) on Design Developments of Evacuation Centers that stipulates that victim's of disasters prefer to stay as close to their home as possible (IOM-OIM: 2013). The Mosque prototype is designed to move where and when it's needed and transforms its adjunct functions to meet contextual constraints. As discussed this may take shape as community engagement and social service providers for undervalued or poverty stricken areas, war zones, refugees camps, and environmental disasters. It can also serve the function to engage with the community in other ways such as a catalyst to drive programs to promote prayer among the youth and charity initiatives in Ramadan. The proposed prototype may also be essential to provide Mosque services for newly established residential districts that either do not have a built Mosque yet or it's under construction.

Modular components

The Modular design concept basically subdivides the Mosque into smaller parts called modules that come together to build a larger structure. The parts may be modified, replaced, and recreated to adapt to worshipper needs and different environmental constraints. Some modules or spaces within spaces may be developed and serve new purposes. For this prototype Mosque the modules have been derived from the dimensions of a standard container unit, which has a width of 2.44 meters height of 2.59 meters and length of 12.19 meters.

Mobility

Although the Mosque is known as a solid permanent structure grounded to its surroundings, this Mosque design proposes the opposite. The Mosques moves and is a dynamic, fluid, living entity that allows multiple reconfigurations to engage with people and their daily practices and truly serves for the needs of the people. The container base model shape has been used to allow the components to move easily and quickly to be reassembled where needed. The containers are then placed into trucks to be transported to the site and assembled or four

containers are then placed into a mega container and may be transported to the site by helicopter. The building process is shown in Figure (3).

Sustainable strategies

The design also takes into account that during disasters the state's water supply may be vulnerable, and therefore, a rainwater collection system is installed. Furthermore, passive solar energy is used in the form of a solar minerat makes the building independent from the grid. There may not be enough energy to power the Mosque from this alone, and therefore, a hybrid green generator is used that is an off-grid and sustainable alternative to polluting, conventional units. The generator reduces CO2 emissions, by using batteries charged by solar panels. This method reduces operating costs dramatically and enables freedom of movement for the proposed mobile prototype Mosque.

The interior finishes proposal uses foamed sustainable rubber floorings that makes it comfortable for prayer while easy to clean and adjust within the modular system. Carefully placed reused wooden columns and recycled mesh screens have also been applied to provide a visual connection with the surroundings while enclosing the space. The columns also serve as louvers and may be open to allow cross ventilation or shut to prevent rain or harsher weather.

Social and cultural activities

The design allows for multiple spatial organizations. Sixty percent of the Mosque will be allocated for prayer space and forty percent will be multi-functional and act as a socio-cultural incubator that may take shape as educational services such as a nursery or day care for families that need to regroup after natural catastrophes. The center will enable families to leave their children in a safe place to give them and an opportunity to find work and rebuild their houses and lives.

Another essential adjunct function for the proposed Mosque may be to act as a platform to promote health services. This may be done in partnership with other organizations such as doctors without borders or white helmets in the form of immunization drives and supporting local

communities who do not have access to healthcare. In emergency events the Mosque may respond as part of a larger field hospital.

The modular system makes it easy to subdivide the spaces according to each situation and local needs. A community room provides a multi-functional space that may be used as a place to relax, socialize, and heal in times of crisis. A kitchen is used to cook and distribute food for famine stricken areas. A charity organization may use the space for a donation drive. The concepts advantage is to allows for a variety of functions and services at the same time. One such proposal may be illustrated in figures (2), (3), and (4) below.

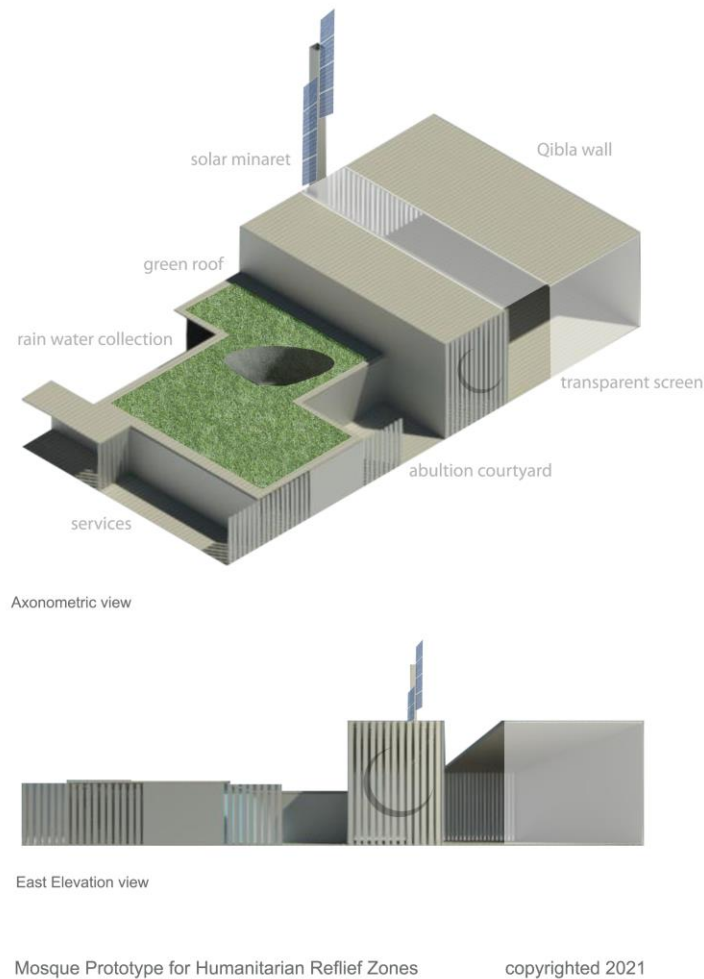


Figure (2): Axonometric view and elevation of the proposed Mosque Prototype for Humanitarian Relief Zones (Source: The Author:2021).

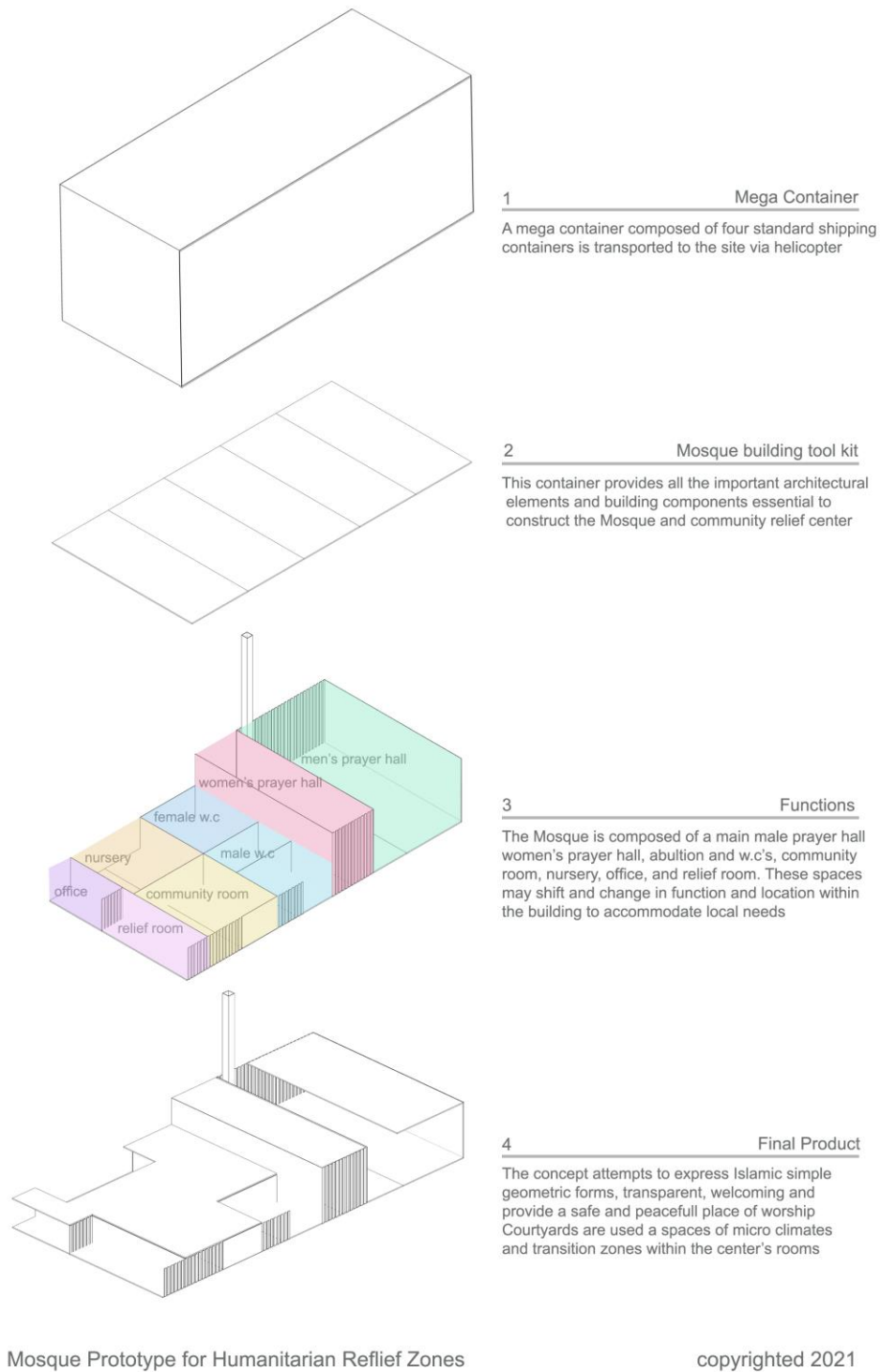
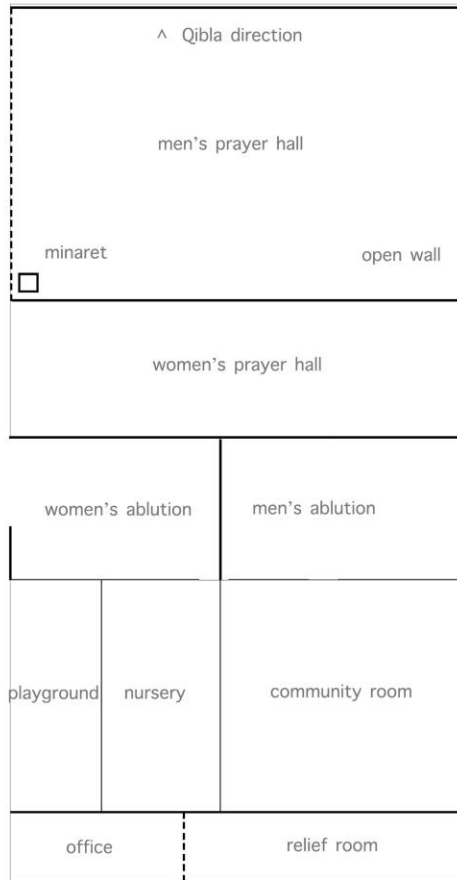


Figure (3): Diagram of proposed Mosque design as it relates to building process and functions (Source: The Author:2021).



Mosque Prototype for Humanitarian Relief Zones - Floor Plan

Figure (4): Floor plan of proposed prototype Mosque (Source: The Author:2021).

Reflections and future research

The paper only discusses stage one of the proposed 'research through design' proposed Mosque prototype for humanitarian relief areas. The methodological process is still incomplete and needs to further develop the design in the real world. Stage two would be providing a complete technical, specification working drawings of the above proposal and actually construct the Mosque. The research team would then conduct a post occupancy exam and monitor the design outcomes. An iterative design process will commence that further develops the design to

meet specific human needs in the ground. The idea is to move from theory to practice and vice versa until the prototype becomes a more resilient and adaptive vehicle that may be used anywhere in the world. The research also intends to highlight this idea and attract potential sponsors for building the prototype be it relief agencies and charity organizations. Therefore, future research and development is of paramount importance to continue with this concept as means to elevate people's quality of lives despite challenging circumstances.

Conclusion

This research intends to raise awareness of the need of a modular mobile Mosque prototype to serve people with diverse, economic, social and environmental challenges. The 3M (Modular Mobile Mosque) prototype is an evolving idea and the proposal may further be transformed to adapt to each response and environmental condition. It is by no means a final product rather a first step to experimenting with the idea of a new Mosque for the future that moves and accommodates for people that need support or have had their lives destroyed by war or natural disasters. History tells us that the Mosque concept plays many roles in Muslim lives so why not provide another, one that reaches out and welcomes worshippers to feel a sense of tranquility and peace in a time of hardship. Perhaps, this prototype may bring back what has been forgotten in Mosques, a much needed multi faceted leadership role and center of all Muslim life.

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