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LESS SPACE, MORE SPATIALITY FOR LOW-INCOME HOUSING UNITS IN EGYPT: IDEAS FROM JAPAN.

Nemine Abdel Geilil

Abstract

In 1996, the Egyptian government launched a national housing project for low-income families. To minimize cost, it has progressively reduced units' sizes. Numerous surveys indicate that unit specifications were based on political and economic criteria, rather than on users' needs, which resulted in the recurrence of the persistent phenomenon of individual modifications. A number of scholars and architects concerned with this phenomenon are advocating the revival of the social design principles of traditional Cairene houses (16th – 19th century) after adapting them to contemporary needs. However, they provide no concrete solutions as to how to achieve this in small scale units located in multi-storey buildings. During my research in Japan, I was introduced to traditional middle class urban houses. Their practical designs used to resolve issues of privacy, internal flexibility, storage, and family growth can be beneficially applied to housing units in Egypt. This paper first explains why relying solely on traditional housing designs to resolve social issues associated with low-income units in Egypt is both fanciful and incomplete, then discusses why ideas from Japanese homes can be beneficially applied to low-income housing units in Egypt. Third, this paper examines issues in these units and the resultant modifications by Egyptian households. Next, it analyzes concepts of spatial organization, modular systems, partitioning, and storage in traditional middle class urban houses in Japan. Finally, this paper formulates proposals for

fulfilling the social needs of occupants in Egypt by integrating these ideas into low-income housing units.

Keywords

National housing project; youth housing project; future housing project; middle class urban houses in Japan; naka-roka-gata.

Introduction

In 1996, the Egyptian government launched a national campaign entitled "Shelter for All" that aimed at providing an "appropriate home" for lower-income families. Administrated by the New Urban Communities Authority, it is financed by a combination of direct government subsidies, loans, and contributions by wealthy businessmen, contractors, real estate investors, and financial institutions.

The program included two housing projects: the "Youth Housing Project" (1996) and the "Future Housing Project" (1998) (see Amer, 2002; Maher, 2007; The Ministry of Housing Utilities and Urban Communities [MHUUC], 2001; MHUUC, 2010; <http://www.urban-comm.gov.eg>) each

to construct 70,000 affordable dwelling units in 15 new cities. The first project was divided into four phases. The first phase offered four different unit plans with a floor area of 100 m² each. In the second phase of the project, twelve 70 m² floor area plans were available, and in the third phase the unit area was further reduced to 63 m², available in two housing unit models. The two unit models of the fourth and last phase of the project have floor areas from 50 m² to 57 m².

years, become the typical low-income housing unit available on the market.

The government recently launched the 2005-2011 "National Housing Project" as part of the same campaign. The targeted number of housing units has been increased to 500,000, to be constructed over a 5 year period. Floor area per unit will vary from the typical 63 m² (Figure 1) to very small rental units, 42m² (Figure 2), for the extremely needy (MHUUC, 2010).

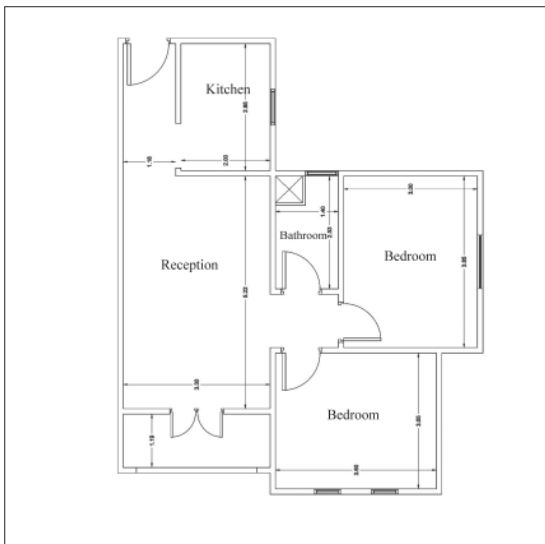


Figure 1: A typical 63 m² housing unit in the National Housing Project (Source: Reproduced by the author from MHUUC, 2010).

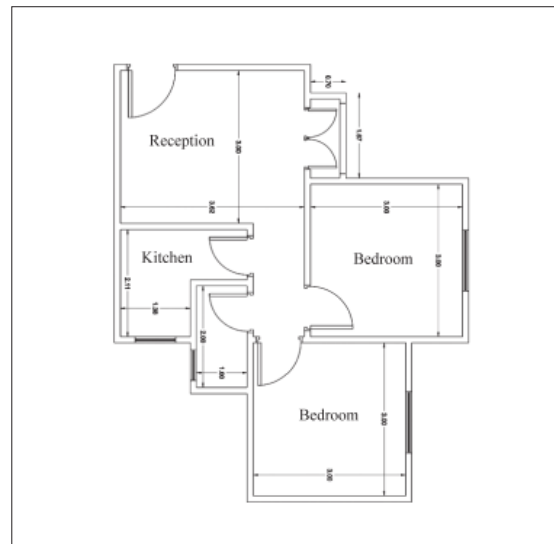


Figure 2: A typical 42 m² housing unit in the National Housing Project (Source: Reproduced by the author from MHUUC, 2010).

The Future Housing Project aims at building 70,000 units (63 m² each) with two plans, identical to those of the third phase of the Youth Housing Project. The 63 m² unit has, in recent

Problem/ Objectives

A survey completed by architects, researchers and university professors concerning the

government's low-income housing projects reveals that the majority of those who took the survey believes that specifications of the "appropriate shelter" provided by the government projects are determined according to economic and political criteria and do not consider the users' social needs (Maher, 2007). To reduce costs and to complete the targeted number of housing units promised by former president Mubarak in his election program, the government adopted a policy of reducing the units' floor area from 100 m² in the first

phase to 50 m², and eventually to 42 m². One cannot deny that the government has made an effort to build housing units that are, at least externally, more attractive than the unsightly and inhospitable public housing blocks built in the 1960s, 70s and 80s. According to the users, however, the government has sacrificed their need for privacy, flexibility, and family growth for the sake of the project's external image (according to a survey carried out by Maher, 2007, on households living in these housing units, see Figure 3).



Figure 3: General view of the National Housing Project in 10th of Ramadan City (Source: Arab Contractors official website <http://www.arab-contracting.com>).

Although extensive researches on users' needs, post-occupancy evaluation and the designs of new and older housing units are available, none of them was seriously considered in the planning of prototypes. In any case, even these researches do not offer tangible solutions as to how to manage issues such as privacy, storage space, adaptability to changing lifestyles and family growth within such small areas. As a result, many households individually modify original unit designs to adapt them to their needs.

A number of scholars and architects concerned with this phenomenon are advocating the revival of the social design principles of traditional Cairene houses of the 16th – 19th century after adapting them to contemporary needs. However, they provide no concrete solutions as to how to achieve this in small scale units located in multi-storey buildings. The opportunity to perform research in Japan has allowed me to study traditional small middle class urban houses. Although developed from an entirely different cultural background, these small Japanese houses have social design principles similar to those of traditional Cairene homes. Yet they encompass simple, practical and organic design patterns that could significantly contribute to resolving small housing unit issues in Egypt.

The aim of this paper is to offer more flexible and practical ideas to address the social needs of families living in small scale, low-income housing units in Egypt by integrating ideas from traditional middle class urban houses in Japan. It focuses however, on internal spaces and is not concerned with the in/out relationship i.e. windows and balconies, an issue that I examined in detail in my previous research work

(Abdel Gelil, 2006a, 2006b).

In order to realize such goal, the paper first explains why relying solely on traditional housing designs to resolve social issues associated with low-income units is an approach that is both fanciful and incomplete, then discusses why ideas from Japanese homes can be beneficially applied to housing units in Egypt. Third, it examines issues in low-income housing units in Egypt and the resultant modification by households. Next, it analyzes concepts of spatial organization, modular systems, partitioning, and storage in middle class urban houses in Japan. Finally, it formulates proposals for fulfilling the social needs of occupants by integrating these ideas into small housing unit design in Egypt.

Traditional Cairene Houses: The Only Reference?

The lack of spatial restrictions due to the large size of traditional middle class houses in Cairo (typically between 400 m² and 600 m²) facilitated spatial organization consistent with socio-religious beliefs and customs. Architectural design features that were easily implemented included: the vertical and horizontal separation between the salamlik (spaces for male guests) and the haramlik (a space reserved for the women of the household, from harem, see Petersen, 1996); the hierarchy of spaces (an entrance zone for strangers, a takhtabosh or seating area for non-intimate or temporary visitors, a maq'ad for intimate friends, a qa'a for large gatherings, etc.); the introverted layout of one or more courtyards and the maggaz, an indirect (twisted) entrance (on traditional Cairene houses see Maury, Raymond, Revault, & Zakariya, 1983; Revault,

1988). The unfeasibility of including such spaces in floor areas as small as 50 – 63 m² or, lately, 42 m² is obvious.

While it does not provide concrete or standard solutions, the traditional Cairene house serves as a basis for inspiration for housing design principles and guidelines. Amini (1993) argues that there are no such things as standard designs or modules for traditional homes and it is almost impossible to find two identical houses; the general traits are the same, but design solutions are complex and vary a great deal. Khan (1978) also agrees that the significance of Islamic architecture has never been in quantitative proportions; an architectural proportion that was appropriate in one building was seldom directly reproduced in another building. Accordingly, standard dimensions or standard forms of spaces and plans that everyone can follow have never been developed.

Moreover, the social ideas derived from, or inspired by, traditional houses must first be adapted and adjusted to contemporary requirements. A house design that served to address a particular socio-cultural setting can never be copied to another period. For instance, Egyptian women's privacy needs today differ enormously from those of women who lived between the 16th and 19th centuries. In accordance with the norms of veiling, gender segregation and home seclusion during the Ottoman period (1517-1806; on women's veiling during this period, see Badran, 1988; Chelhod, 1990; El Guindi, 1999; Tucker, 1983; Zuhur, 1992), residential quarters were organized in a way that preserved the separation between the harim (female quarters) and any public spaces such as the street, residential court, or

the qa'a (reception hall). The role of women in that era was that of onlookers; they spent hours in the upper floors, hidden behind mashrabiyyas (wood latticework fixed to the windows of traditional residences), taking part in the emotion of the street (Prisse d'Avignes, 1983), from a distance, watching the dances, and listening to Qur'an readings performed in the court or the qa'a on the ground floor (Lane, 1908).

Contemporary Egyptian women's conception of privacy is different. Women today no longer have to hide behind a harem's mashrabiyya during religious and social occasions held at their homes (on contemporary women and veiling in Egypt see Ahmed, 1992; Antoun, 1968; Badran, 1988; Chehold, 1990; El Guindi, 1999; Hoffman-Ladd, 1987; López-Rocha, 2001; Macleod, 1991; Mule & Barthel, 1992; Nasser, 1999; Perkins, 2002; Reese, 1998; Tucker, 1983; Zuhur, 1992). They are now perceived as active partners in the receiving and welcoming of guests. The veils, hijab, they wear in the presence of male guests who are not relatives (as stated by the Qu'ran) allow them to fulfil their role with comfort and confidence. A woman at home also engages in many outdoor activities such as hanging out the bedclothes and laundry, watching her children play outside, or calling for a merchant and negotiating the price of groceries. Moreover, there are varying degrees of modesty and concerns about privacy among women across, and even within, households. Also, a woman's concern about being seen by men differs depending on several factors such as her age, the time of day, and weather conditions etc. (Ghannam, 2002). The meaning of veiling and privacy has changed, and contemporary apartments should reflect these changes in

present-day privacy needs. A housing unit should not be totally introvert or strictly separated into a haramlik and a salamlik; its design must be flexible enough to allow for the transformation into private, semi-private, or public spaces according to the circumstances. In other words, unit plans should make it possible to cope with changing privacy needs, especially in view of the extremely limited space available.

Beyond the Islamic World: Ideas from Japanese Houses

In the course of my research work in Japan, I was introduced to traditional middle class urban houses, typical of the period between the late 19th century and up to the 1980s and developed from the earlier Samurai residences. Engel (1964), a German scholar who has studied residential Japanese architecture of this period extensively, points out that the fascinating solutions to requirements of simplicity, outdoor/indoor relation, flexibility, modular coordination and most importantly, variety of expression provided by the classic domestic architecture of Japan make this a stimulating field of study, which no architect should neglect. Although developed from an entirely different cultural background, these small Japanese houses have social design principles similar to those of traditional Cairene houses. Yet they encompass simple, practical and organic design patterns providing privacy, internal flexibility, efficiency, maximum use of space, storage, and future growth possibilities, all of which could significantly contribute to resolving small housing unit issues in Egypt.

In medieval Japan (1185-1600), the principal value of the individual consisted of being a

necessary component of an important whole. The universal practices followed were not so much the result of moral principles as such, as they were due to the influence of the social form of the time, feudalism. The continued existence of this social form depended largely upon the preservation of existing forms and the preclusion of the new ones. Regulating individual family customs and manners to ensure that they were in conformity with universal standards was but one of the many devices employed. It was within this feudal society and system of government that a unique Japanese manner of living was established across the entire country (Engel, 1964). This style of living directly affected housing designs.

Common ideas can easily be detected between Japanese and Islamic house designs. However, unlike Islamic houses, Japanese houses did apply standard architectural patterns. Some of the features that were common to both Japanese and Islamic houses are: an entrance zone that completely shields the house from view; the separation between guest quarters and the household; a second entrance; the division of the toilet zone into separate compartments and efficient storage space.

Unlike Islamic houses, spatial relationships in Japanese houses were not fixed. Lightweight, removable partitions could easily be re-arranged, allowing internal spaces to be adapted according to circumstances. A modular system, known as the ken, made it possible to organize space into simple architectural solutions, and allowed for easy construction and future extensions. The use of a standard module does not imply that

all Japanese houses were identical; on the contrary, this modular system gave rise to an endless variety of floor plans found all over Japan and even within the same district.

Another difference between the Japanese house and the traditional Cairene house is that they were organized according to totally different architectural scales. While the size of an average traditional middle class Cairene house was between 400 m² and 600 m², a 200 m² Japanese middle class house was considered to be very spacious, and houses with floor areas from 30 m² to 70 m² were quite common. Whatever its size, common design standards were consistently applied in Japanese houses. This is why the Japanese house is a valuable reference for the management of social needs and space problems in very small areas.

Issues in Low-income Housing Units in Egypt: Modifications and Households Behavior

Numerous social studies and surveys have been conducted on the behavior of residents of new or old public housing units, and how they adapt their living spaces to their needs (Abdel Fattah, 1994; Depaule & Noweir, 1986; El Kadi, 1996; Habraken, 1980; Hammouda, 1992; Hegazi, 2002; Salama, 1994; Sibley-Behloul, 2002; Steinberg, 1984; Tipple, 1999, 2000; Taktak, 2002; survey by the author in 2005 at Zeinhom public housing for lower income). The older versions of public housing blocks such as Ain El Sira, Workers City in Helwan and Masaken Zenhom, built in the 1960s, 1970s, and 1980s, represent extreme examples of uncontrolled extensions and construction activities carried out by the inhabitants (studied and documented by

Habraken, 1980; Salama, 1994; Steinberg, 1984; Tipple, 1999, 2000). Modifications instigated by the inhabitants began with the closing off of balconies and ended with the building of horizontal and vertical extensions ranging in size from 30 m² to 67 m² (from Figure 4 to Figure 7). In the recent housing units, modifications by residents have already begun and will most probably continue in very much the same manner as those of older units (see Figure 8). For the most part, the collected data indicate that the primary reasons for these modifications and additions are (1) privacy needs, (2) inflexibility/inefficiency of internal space and (3) the need for additional rooms.

Modifications Related to Privacy Needs

To ensure the privacy of the unit itself, the family often installs a partition or builds a wall in front of the main entrance to the unit in such a way as to form a 'lobby' of sorts, rather than having a door or entrance that opens directly unto the entire guest area. Alternatively, the entrance door hinges are moved so that it opens in a direction that screens the interior from view (visitors will see a wall instead of the entire outer part of the unit). A curtain or a folding door is frequently added between the corridor leading to the bedrooms and the guest area to protect the privacy of the sleeping zone. Inhabitants of these units also are not able to get used to the concept of open kitchens that look out directly unto the guest area, so they add doors or curtains to kitchen entrances. Furniture placement also plays an important role in providing privacy both among household members themselves, and between the inhabitants and their visitors and/or neighbors (Maher, 2007). Shades, shutters or curtains are often installed on windows or balconies for reasons of privacy and not

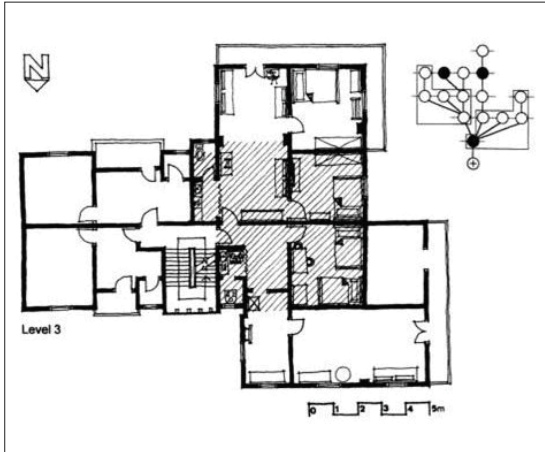


Figure 4: Extensions in older housing units in Helwan. The shaded area is the original unit (Source: Tipple, 2000).

necessarily as protection against the sun This paper focuses on internal adaptations of the unit rather than external ones (more detailed studies on adaptations related to windows and balconies are found in Abdel Gelil, 2006a, 2006b; Depaule and Noweir, 1986; El Kadi, 1996; Hammouda, 1992).

Modifications Related to Inflexibility / Inefficiency of Space

To maximize the use of available space, people replace hinged doors with sliding ones. Balconies are sacrificed; they are closed off to supplement available interior space. Sometimes the small balcony off the kitchen is also closed off to create a laundry space where the washing machine is installed (Sibley-Bahloul, 2002). Where this is not possible, some households place the washing machine in the kitchen and move the refrigerator into the living



Figure 5: Vertical extensions in an old public housing block in Cairo; the extension provides a large kitchen and a third room (Source: Tipple, 1999).

room or a bedroom (Amer, 2002). Due to the lack of space in these units, families usually use balconies and the space under beds and on top of wardrobes for storage.



Figure 6: Extensions in Zenhom housing (Masaken Zenhom), Cairo. Note the difference between the front and back blocks (Source: Author).

Modifications Related to the Need for Additional Rooms

Because Egyptian society is still guest-oriented, occupants of even the smallest apartments give special attention to the guest area – the outer part usually called the 'reception'. Most users prefer not to transform the guest area into a family living room. However, the need for a room where the family can gather, eat, study, watch TV, etc is indispensable. Young couples who have recently moved into their housing unit frequently use one of the two bedrooms (in general the bedroom intended for future children) as a temporary living room; the guest area ('reception') is thus used only to receive guests (Maher, 2007). In older public housing units where families have already had children, it has been reported that inhabitants assign a dual function to one of the two bedrooms, using it as a family living room during the day and a bedroom at night, reserving the guest area for receiving guests (Sibley-Behloul, 2002). I regularly refer to the older public housing units because they are good indicators of future



Figure 7: An extended room using wood and bricks in Masaken Zenhom (Source: Author).

changes that will very likely occur in the newer housing projects.

According to a survey administered to 100 households living in the Youth Housing Project in Al Obour City (Maher, 2007), one of the users' major concerns was the need for separate sleeping quarters for grown boys and girls (Islamic requirement, see Abu-Dawud, n.d., hadith n. 495). Users indicated that the two

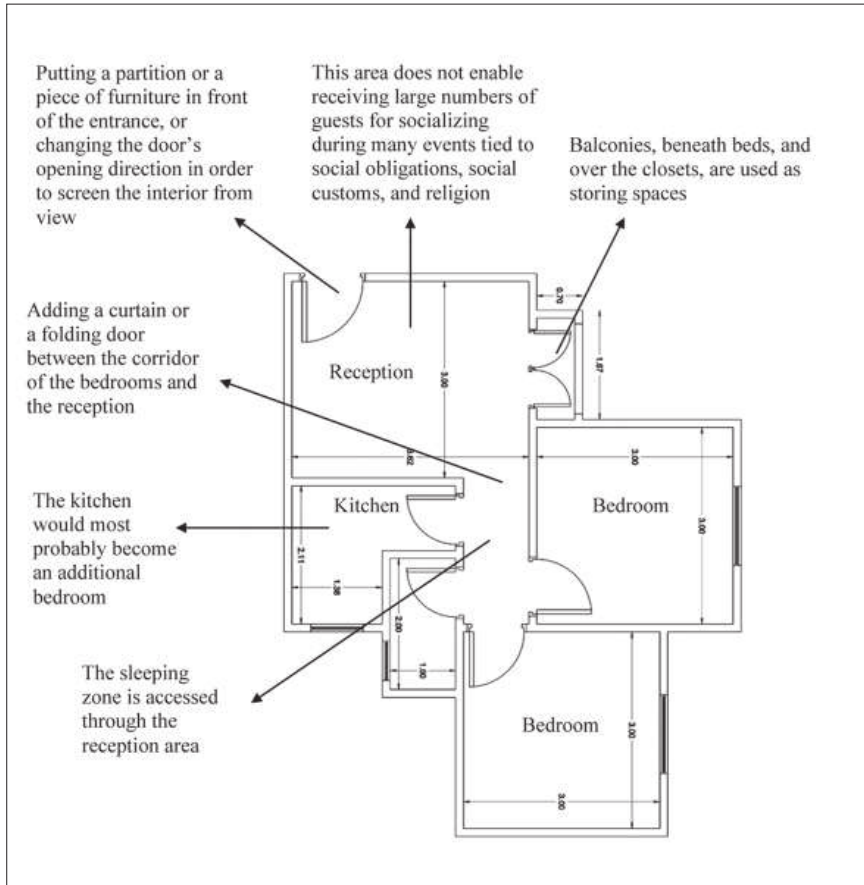


Figure 8-a: Behaviors and modifications in the National Housing Project. 42 m2 unit (Source: Author).

unit is only satisfactory when the children of the family are at a young age. Surveys administered to occupants of old public housing units where the children had grown up revealed that parents occupy the master bedroom, daughters use the second bedroom and sons sleep in the guest area, which is also used as a living room (triple function). This need lead

inhabitants to think of creating an extra room. Some households transformed the kitchen into a bedroom, closing off the service balcony of the kitchen and using it as a tiny kitchen (Sibley-Behloul, 2002). Other households went even further. Extensive uncontrolled modifications were made by the occupants of the Workers' City in Helwan and the Medinet Nasr Estate

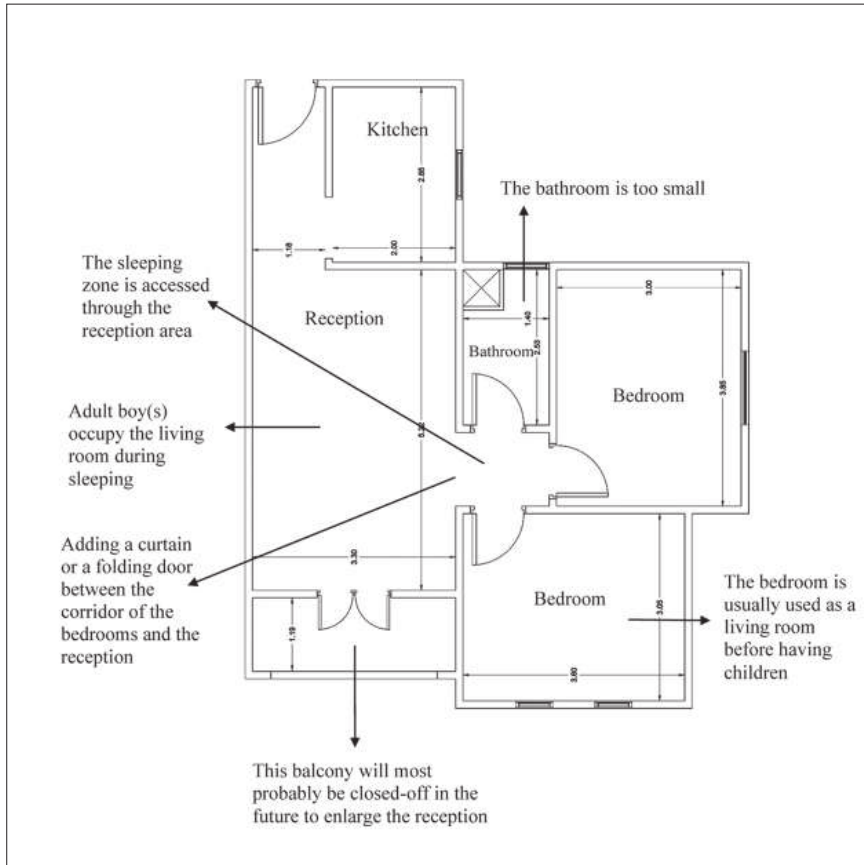


Figure 8-b: Behaviors and modifications in the National Housing Project. 63 m² unit (Source: Author).

in Cairo, both old public housing blocks. The inhabitants cooperated among themselves and engaged the services of specialized contractors to build stacks of rooms attached to the mother building. The new rooms provided accommodations for growing children (boys) as well as for young married couples forced to remain in the parental home because of the

unavailability of alternative housing. The total average cost for this type of vertical extension was only 5000 LE per building, approximately 1000 USD (Habraken, 1980; Sibley-Bahloul, 2002; Tipple, 1999, 2000). This is another indicator of possible uncontrolled building extensions that might also occur in the new housing projects.

Design Patterns of Traditional Middle Class Urban Houses in Japan

Historical Background

During the Early Modern period in Japan (1603-1867), also known as the Edo period, the Tokugawa bakufu (shogunate) established a system whereby it ruled the country with the support of feudal lords known as daimyo. The Tokugawa bakufu divided Japanese society into four classes: the military class (Samurai); farmers; craftsmen and merchants. Each of the four classes had its own type of dwelling (Yoshida, 1969). Tokugawa building regulations aimed at preserving class distinctions and preventing intermixture among classes. For example, the general appearance and size of a dwelling were clear indications of the owner's wealth and class; also certain rooms such as the genkan (entrance hall) and the ante-room (among many other elements) were restricted to the samurai's dwellings (Amini, 1993). During the Meiji restoration (1868-1912), the Tokugawa bakufu system was abolished and its social structure abandoned. Civil servants and industrialists replaced the military as the dominant social class and adopted the samurai dwelling tradition in their houses (Yoshida, 1969). Middle class urban houses, developed from the earlier Samurai houses, became typical of the period from late 19th century up to the 1980s (Inaba & Nakayama, 2000; Yoshida, 1969).

Initially, the rooms of this type of house were opened unto and could be accessed from one another through internal partitions. They had no distributing corridor and therefore provided very little privacy. With the increase of Western influence in the early-twentieth century, the issue of internal partitioning was discussed by

a number of foreign and Japanese architects, and the English word "privacy" first appeared (there is no equivalent for the word 'privacy' in the Japanese language, see Engel, 1964; Inaba & Nakayama, 2000). The architects underlined the need for conferring a certain amount of independence to individual rooms (Inaba & Nakayama, 2000). The solution was to create corridors between rooms. This was achieved by the "interior corridor type" (nakaōka gata) plan (Figure 9). First appearing in the early 1900s, this plan continued to be used in typical middle class houses throughout the Showa period (1926-1989) (Inaba & Nakayama, 2000). The entire house was purely Japanese except for the occasional western-style reception room, located to one side of the entrance hall (as a result of Western influences, in late-nineteenth century a Western-style reception room was added to these urban houses, see Sand, 2005). This type of Japanese middle class house is examined below in terms of: (1) its typical spatial organization, (2) modular systems and room addition capacity, (3) internal partitioning and (4) storage.

Spatial Organization

The house is divided by a corridor running from east to west, with family quarters in the south and a kitchen, bathroom, and privy (and sometimes a maid's room) in the north. With the exception of utilitarian spaces (kitchen, bathroom, and privy), the Western-style reception room and the entrance hall, room designations are difficult to translate into languages other than Japanese. This is because the rooms combine multiple functions and their names have no corresponding meanings in other languages. The Japanese room names mentioned below therefore only provide a clue to the original

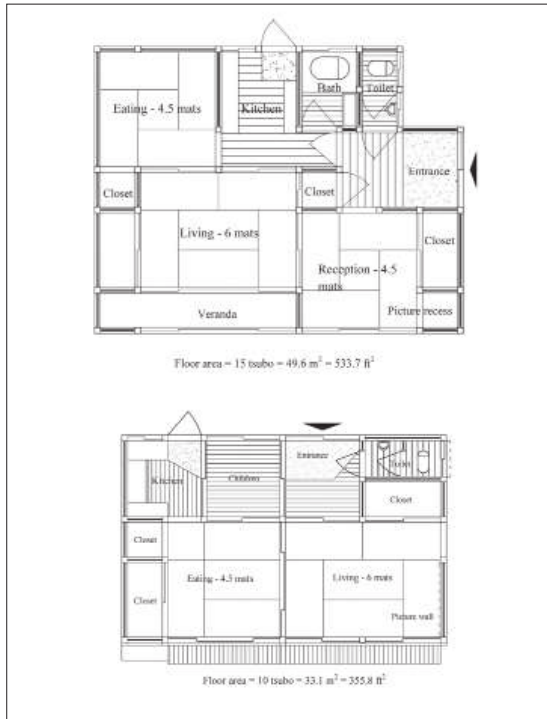


Figure 9: Examples of typical interior corridor type (nakarōka gata) plan. First appearing in the early 1900s, this plan continued to be used in typical middle class houses throughout the Showa period (Source: Reproduced by the author from Engel, 1964).

purpose of each room (original room names were traditionally maintained in spite of the fact that room usage has changed, see Engel, 1964).

Engel (1964) gives the following description of middle class urban houses in Japan (see Figure 10, also Yoshida, 1969). The first space

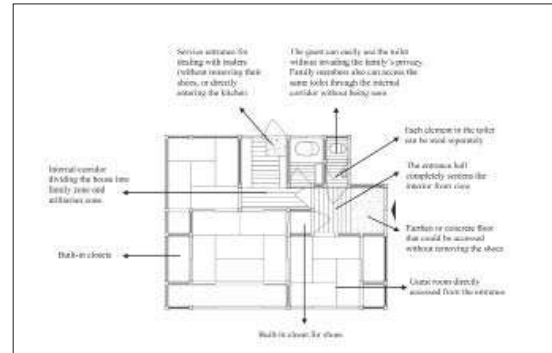


Figure 10: Spatial relationships in a typical nakarōka gata plan (Source: Engel, 1964; labeled by the author).

in the house is an entrance hall (genkan) that completely screens the interior of the house from view. The entrance hall plays such an important role in Japanese residences that that no less than 10% of the entire floor area - even in the smallest houses (33 m² – 50 m²) - is devoted to it. The beginning of the entrance hall is slightly lower than house level, followed by an elevated part that is at the same level of the entire house. The entrance hall has many important functions: it is indispensable because of the Japanese custom of removing shoes in the lower part before entering the elevated part of the house; it serves as a place where both guest and host can comfortably kneel and bow to each other before entering the reception room and, finally, it ensures the privacy of the entire house because it is closed off with partitions while also providing separate access to any room in the house. It leads directly to the Western-style reception room (yōma, or yōshiki ōsetsuma,) when it exists, and provides direct access to utility spaces and to home's Japanese-style rooms. The latter are covered

with floor mats (tatami) and include a guest room (ōsetsuma or kyakuma) that has a picture alcove (tokonoma), an ornamental shelving recess (tana) and, occasionally, a decorative study place (shoin), all of which are built-in (see Figure 11).



Figure 11: A guest room with a picture alcove (tokonoma) and an ornamental shelving recess (tana) (Source: Black, 2000).

From the reception room, guests can easily use the bathroom without invading the family's privacy. In addition, family members can access the same bathroom through an internal corridor without being seen. Because the bathroom is divided into three or four compartments (the urinal, the washstand, the toilet, and the

bathtub) that can all be used separately, it is convenient for all family members (Figure 12).

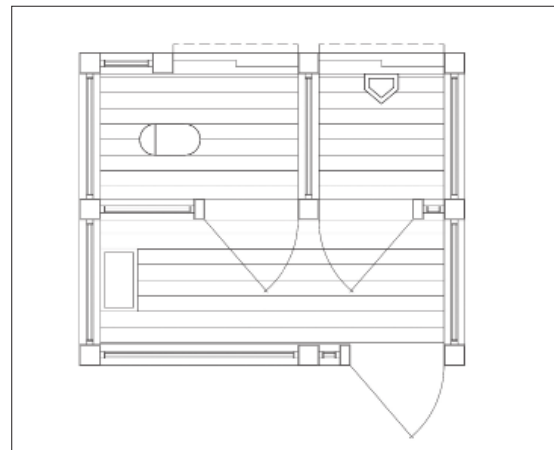


Figure 12: The Japanese bathroom is divided into three or four compartments (the urinal, the washstand, the toilet, and the bathtub) that can all be used separately (Source: Reproduced by the author from Engel, 1964).

The service entrance to the kitchen (kateguchi), which has an earthen or concrete entrance hall, allows merchants to come directly into the kitchen without having to remove their shoes. The dining room (chanoma) is usually placed adjacent to the kitchen. In addition to being as a place for family meals, it is also a room where family members gather around the charcoal brazier, can serve as a sleeping space, and is the space where the lady of the house does her domestic chores and keeps her utensils (it is furnished with built-in closets). Other mat-covered rooms are added to the Japanese house without having any specific function like the ima, or living room (literally,

space of being). This room is sometimes used for some of the functions of the chanoma, provides space for family gatherings and may also be a day-and-night room for the children.

Modular System

Although the metric system has been in use since 1891 (during the Meiji restoration) in Japan, the design of many houses and apartments is still defined by the traditional measuring systems. Room arrangement and floor areas are based on standardized spatial units on a two-dimensional grid, using the tatami mat as the ordering unit (Engel, 1964). What we call tatami today first appeared during the Heian (the ancient name of present-day Kyoto) period (794 – 1185) in the shinden zukuri, or “palatial style,” adopted by the aristocracy in their residences (the process whereby this style developed is not clear, see Inaba & Nakayama, 2000). Tatamis took on the multiple roles of chair, cushion, bed and stool. They were used as throw mats (okitatami) and were laid down in different parts of the room depending on the circumstances. Similar to the present-day tatami, they were rectangular and measured about 90 by 180 centimeters. Their shape and size seem to indicate that they were based on the measurements of the human body as shown in various painted scrolls from that era. The shift from these okitatami to the fixed tatami mats that completely cover the floor of the room began in the 15th century houses of the Samurai. It had three basic functions: a bed of standardized dimensions, a cushion for sitting and a covering for the entire floor (Ueda, 1990). During the Edo period, the ken – the length of one tatami mat – became the official standard unit for the Japanese measuring system (Nishihara, 1968). The primary reasons for this development were the ken’s close link to daily life, its close

relationship to human measurements, and its practicality of use. The ken controlled everything in the house, from large spaces to minute details. For example, the width of the corridor is equivalent of that of one tatami mat (90.5cm, half a ken). Room sizes were, and still are, commonly described by the number of mats (using the term jo as one tatami mat) even if a room has a wooden floor (Yoshida, 1969). For example, a room that measures 1.5 ken (1 ken = 6 shaku = 1.818m = 6ft) by 1.5 ken, that is 2.73 by 2.73 meters or 9ft by 9ft (about 7.45 square meters or 81 square feet), is called a 4.5-mat room (for a comparison between the ken, shaku, and meter, see Figure 13). A room of 1.5 ken by 2 ken is a 6-mat room, a room of 2 ken by 2 ken is an 8-mat room, etc.

Common room sizes (Figure 14) are three-mat, four and one half-mat, six-mat or eight-mat. The standard built-in closet is the size of one mat. The toilet and the washroom each have a floor area of half a mat, while the bath size is two or three mats. The entrance hall area is usually one, two, or three mats. The standard length ken can also be subdivided into fractions of $\frac{1}{2}$ or $\frac{1}{4}$, i.e., into smaller intervals of 3 or $1\frac{1}{2}$ shaku. Thus, the order of ken also controls the details. As the standard unit of $\frac{1}{2}$ ken (3 shaku, 90.5 cm) is rather small for the width of corridors, toilets, and verandas, the width of these spaces is frequently enlarged to 3.5 or 4.0 shaku (about 120 cm) instead of 3 shaku (about 90 cm) (for more detailed explanation, see Engel, 1964; Nishihara, 1968; Yoshida, 1969).

In this manner the ken not only facilitates internal rearrangement, but also the connection of rooms along a grid system, creating the staggered-room-unit design pattern for which

Japanese buildings are noted; each of the units, being tied to the grid, never loses its cohesiveness with the other units, in spite of the total freedom of placement. As long as there is enough space, rooms could therefore be added to the house, constituting a state of organic growth (Engel, 1964).

Partitioning

The use of fixed walls and hinged doors in Japanese traditional houses is very rare. Rooms are divided by sliding panels made of opaque paper (somewhat resembling wall paper, see Figures 15 & 16) called fusuma (see Engel, 1964; Yoshida, 1969). Fusuma is also used to close built-in storage closets and wall cupboards. Sand (2005), in *House and Home in Modern Japan*, states that traditionally, dwellings were requisitioned as stages for public use during social occasions, principally weddings, funerals, and memorial services for the dead. On such occasions, house interiors would be opened to extended family, members of the local community, and professional associates by removing the sliding panels dividing the rooms, especially those between the *kyakuma*, (the Japanese-style guest room) and the *ima* (the living room), to create a single tatami-floored gathering space, the *zashiki*. Apart from the wooden grooves imbedded in the floor and the tracks and transom on the ceiling above, no trace of the original partitioning could be detected (Engel, 1964). For ventilation purposes, the entire house can be transformed into one big room in the summer, simply by removing all of the sliding panels (Yoshida, 1969).

The light weight and minimal thickness of the fusuma make it possible to combine or divide rooms very rapidly. Generally, two or four sliding panels are used, each panel weighing about three pounds (approximately 1.5kg). The fusuma is made of a cedar inner lattice framework of 1/2 inch (about 1.3cm) onto which are pasted several layers of paper. A single large sheet of high quality paper (with patterns or pictures) is used as the outer layer on each side of the partition. The entire panel is

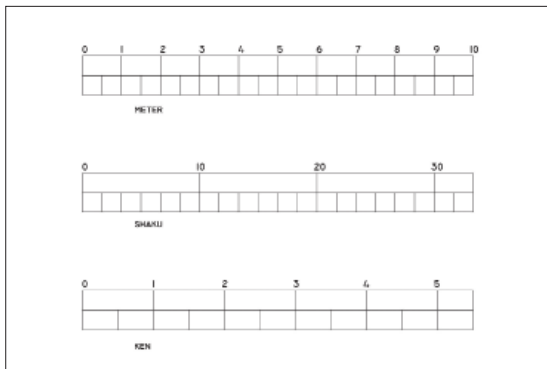


Figure 13: Comparison between three different measuring units: meter, shaku, and ken (Source: Reproduced by the author from Nishihara, 1968).

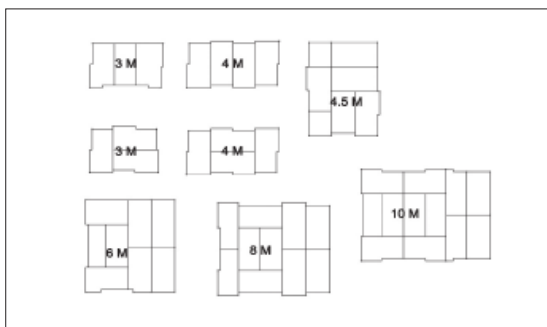


Figure 14: Common traditional Japanese room sizes, described by the number of mats (Source: Reproduced by the author from Nishihara, 1968).

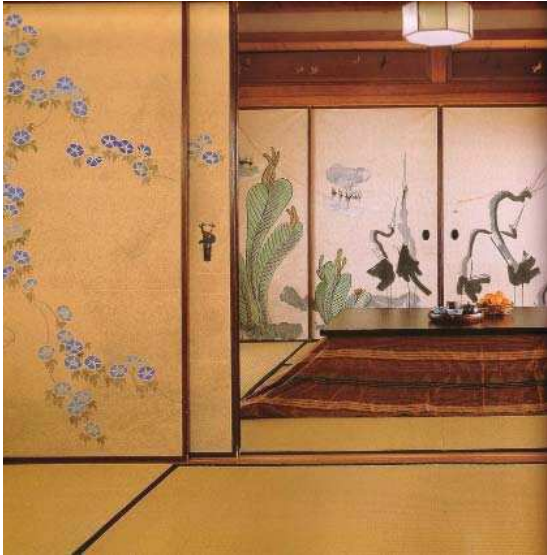


Figure 15: Sliding paper panels (fusuma) between two rooms. Note the wooden grooves imbedded in the floor and the built-in closet with fusuma in the background (Source: Black, 2000).

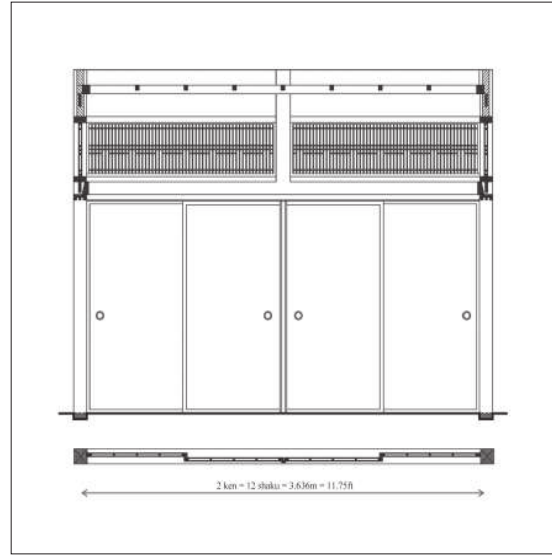


Figure 16: Elevation and plan of sliding panels with latticed transom ranma (Source: Reproduced by the author from Engel, 1964).

framed with a cypress or cedar frame. The use of fusuma panels greatly maximizes the use of internal space because the final thickness of the partition is only about $\frac{3}{4}$ inch (2cm), a small percentage of the available internal space. A latticed transom (Ranma) is usually located all along the upper part of the panels, allowing for constant ventilation between adjacent rooms (for the fusuma, see Nishihara, 1968; Yoshida, 1969).

Storage

Storage is very important in Japanese houses; so important that the proportional space provided for storage in the average house is as much as 15% of the entire floor area, while in smaller

houses it can be as much as 17.5% (Engel, 1964). The importance of storage was a distinct architectural response to the habit of using living rooms for sleeping during the night since space had to be provided for convenient storing of bedding (sleeping on mattresses placed on the floor is a traditional custom still followed by many Japanese). All multipurpose rooms in Japanese houses are furnished on one side with built-in closets, called oshi-ire, that are about 90cm (1/2 ken) deep, equivalent to the width of the bedding and the mattress after they are folded (Figure 17). Removable sliding panels, identical to the internal partitions of the house, are used as closet doors, providing both maximum use of room space and easy closet ventilation.

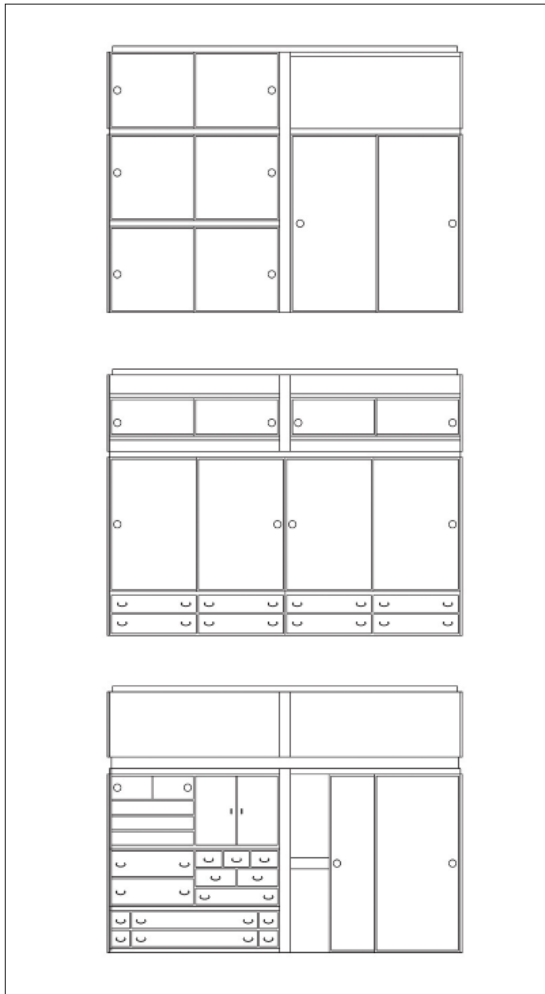


Figure 17: Three different designs of built-in closets oshi-ire (Source: Reproduced by the author from Nishihara, 1968).

Proposals for Social and Spatial Issues in Low-Income Housing Units in Egypt

Privacy Needs

As stated in the earlier part of the paper, households living in low-income housing in Egypt prefer leaving the outer part of the unit exclusively for guests. This is because Egyptian society is still guest-oriented and people are still accustomed to use their houses for entertaining on many social, religious and traditional occasions, such as the gatherings of relatives for iftar ("breakfast at sunset"), during the fasting month of Ramadan, socializing during the religious holidays of Eid al-Fitr ("Breaking of Fast Feast", at the end of Ramadan) and the Eid al-Adha ("Feast of Sacrifice") (see Arab, 2000). Another important traditional ceremony is the sebua, the traditional celebration of a child's birth (Fernea, 1995). Moreover, many events associated with marriage take place in the home. For example, the bride's family usually hosts the katb al-kitab ("marriage contract party"). It is also customary for newly weds to receive guests coming to wish them well for many days after the marriage (Sherif, 1999). Likewise, the days following a death in the family almost always entail visits from relatives and friends coming to offer their condolences (Rose and Boxgerger, 2000), and when a child passes a major final exam, relatives will also visit the family to congratulate. Obviously therefore, the housing unit should have a room to be used exclusively for guests (for proposed spatial relationships, see Figure 18). This room does not, however, necessarily have to be located in the same habitual outer part of the unit. It can be in the form of a separate, closed room that is accessed directly from an entrance lobby. The simple architectural composition of entrance

hall (genkan) / guestroom of the Japanese house can beneficially be applied in this case.

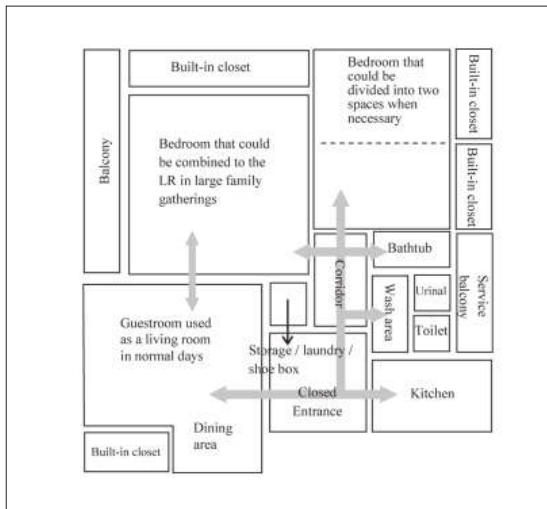


Figure 18: Proposed spatial relationships in a small scale housing unit in Egypt (Source: Author).

In addition, special attention must be accorded to the entrance. First, it should be an independent zone (like the traditional *maggaz* or the Japanese *genkan*) that screens the unit's interior parts from the view of entering guests, neighbors, the visits of tradesmen, bill collectors, or any of the other unexpected visitors that often invade the privacy of female household members. Second, accessibility to all other parts of the unit should originate from this space. If judiciously located, the entrance can solve many privacy issues by providing independent accesses to the guestroom and the family rooms, as well as to the kitchen. If possible, a secondary entrance can be added so that

women can enter their homes directly through the kitchen. The location of the kitchen should allow the family to use it without being seen by visitors. Since it is difficult to provide two toilets in a small-scale unit, the bathroom should be located in an intermediate position between the family rooms and the guest area so that it can be used by both visitors and family.

Room Efficiency / Flexibility

The proposed spatial relationships mentioned above (Figure 16) need not however be fixed or rigid. Due to the Egyptian custom of extensive socialization in the home, the housing unit should allow for the reception of large numbers of guests. Partitions should be used so that rooms can be combined and their areas enlarged simply by removing the partitions as needed. Privacy will not be an issue because contemporary women today receive and welcome guests, usually wearing veils, hijab, in front of non-relative male guests as stated by the Qur'an, which allows them to fulfil their role as hosts without concern. In addition, having the option to divide rooms with partitions will be a convenient method for providing separate sleeping quarters for teenage boys and girls. As mentioned earlier, this was reported to be a major concern of many households. To allow for a maximum use of space, hinged doors should be replaced by folding or sliding doors and partitions that should be as thin as possible, and the conventional wardrobes traditionally used by Egyptian families should be replaced by built-in storage areas.

However, the design of the partitions is a major concern. The high privacy the organization of the Japanese house provides stands in complete contradiction with the fact that

fusuma are unlockable and their materials are not sound proof (Yoshida, 1969). They provide therefore no internal privacy. Further research will be necessary to decide the design of these partitions, appropriate light-weight yet durable material, suitable sound insulation, lock systems to be used, etc.

Prayer, the central component of the Islamic religion, is another need that is not considered in housing designs. Because Muslims pray five times daily, some users create a separate prayer space within their homes by installing a partition and/or by simply laying down a prayer rug facing towards the qibla (Mecca). The creation of a distinct prayer area within the housing unit should not be considered a luxury; it shows a respect to religious needs. In Japanese houses, the presence of a sacred place was evident in the tokonoma – the picture recess that originated in Buddhist ritual. Even the tiniest traditional middle class houses had these alcoves, which generally consist of a picture scroll (originally religious) hung on the rear wall, a vase of flowers and a censer placed on a lower platform (the alcove in its familiar form is used principally for displaying treasured art objects) and the family changes these elements according to the season and the various associated festivals. For the Japanese the tokonoma has a kind of spiritual or moral significance, derived from its original sacred character. That is why it is considered the central feature of the room and the space in front of it is a place of honor usually reserved for guests (on the tokonoma see Yoshida, 1969; Parent, 2003). I propose that an alcove in the wall, symbolizing the apse of the qibla and oriented to it as well, be created in Egyptian housing units and a temporary, light-weight sliding partition

be installed, so that households can create a prayer area whenever it is needed.

Related to prayer is the ablution ritual. Before praying, Muslims have to wash, so each family member needs to use the sink several times daily. This makes a single compartment that contains the toilet, the sink and the bathtub inconvenient. Moreover, during the ablution ritual Muslims utter holy words that they are not allowed to pronounce in the toilet, which is considered to be a profane and unclean place. That is why, traditionally, the toilet was always in a separate compartment and washing was done outside of it (Maury et al., 1983). The Japanese houses observed provide a simple solution for separating the sink, toilet and tub in different compartments within a very small area.

The Need for Additional Rooms

In his observations on housing modifications, Habraken (1980) argues that the potential for introducing changes in a unit during its use is an important factor in the design of any housing environment. He compares housing development to agricultural cultivation where the role of the architect is similar to that of a gardener; he should know where different plants will take root and thrive and how to encourage their optimal growth. Habraken points out that architects are not trained in this mind-set; they tend, instead, to think in terms of finished products. He goes on to explain that when designing for a specific client, the relationship between architect and client guarantees the existence of a well-defined problem; the architect has to design something specific and complete. When designing housing projects, however, architects do not personally know the

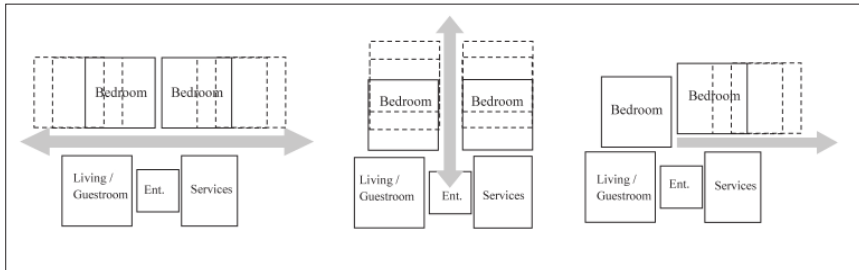


Figure 19: Alternative directions for extensions of public housing units (Source: Author).

future individual users, and therefore they need to assume a different attitude. Nevertheless, Habraken asserts that architects cannot relinquish all initiative to housing unit occupants, and should provide a physical structure with minimal legal and economic security to which occupants can introduce individual modifications.

This paper maintains that future extensions to housing units should not be prohibited; on the contrary, they should be encouraged and facilitated - but within a controlled framework. The building should allow for adding an extension to individual units, or extensions to several units, one above the other, as this is more economical. Studies on illegal extensions in old Egyptian housing blocks, undertaken by Habraken (1980), Salama (1994), Sibley-Behloul (2002) and Tipple (1999, 2000) indicate that cooperation among the occupants of different floors was not a problem in the addition of extensions to the mother building (adding several units above one another). As mentioned earlier in this paper, occupants of the Workers' City in Helwan and the Medinet Nasr Estate in Cairo, among others, were able to cooperate and to engage contractors to build extra rooms extending outward from the mother buildings.

These additional rooms provided independent sleeping quarters for boys and girls, and even served as accommodation for young married couples unable to buy separate homes. A central component of my future research deals, precisely, with the provision of guiding modules, easy construction methods and alternative directions for such extensions to public housing project units (Figure 19).

Conclusion

This paper has attempted to provide adaptable, practical solutions to the urgent social and spatial needs of low-income public housing in Egypt, particularly in light of the government's policy of providing smaller and smaller unit sizes in an effort to manage costs without reducing the targeted number of units, and the persistent phenomenon of unit modification and extension by occupants. As stated above, I realized, when I was in Japan, that traditional middle class urban houses successfully resolve social design principles that are not only similar to Islamic social principles but also to the contemporary needs of households in Egypt. Design ideas and architectural compositions that solve issues of privacy, internal flexibility, efficiency in space usage, storage, and family

growth were incorporated into the rethinking of more socially responsible housing units in Egypt and as proposed solutions for the social needs of the families living in these units.

The paper has recommended the adoption of architectural compositions that address privacy issues such as: guestroom location and access; entrance zone design (which can solve many privacy issues by providing independent accesses to the guestroom and the family rooms) and separate kitchen entrances to enable women to enter their homes directly through the kitchen. I have also discussed kitchen and bathroom locations (I proposed that the kitchen location should make it possible for the family to use it without being seen by visitors, while the bathroom should be located between the family rooms and the guest area so that it can be used by both visitors and family).

In addition, this study has advocated the application of architectural concepts aimed at enhancing the internal efficiency and flexibility of the unit, which in turn contributes to fulfilling a number of social needs. Concerning the reception of large numbers of guests in these small units on the occasion of the many social and religious events traditionally celebrated at home, the paper proposed the installation of removable partitions between rooms so that room areas can be enlarged as needed, simply by removing the partitions. Likewise, by using partitions to divide rooms, households can easily provide separate sleeping quarters for older boys and girls. Future research will be necessary to determine the design of these partitions, appropriate light-weight yet durable material, suitable sound insulation, lock systems to be used, etc.

To allow for a maximum use of space in general, I have suggested replacing hinged doors by folding or sliding doors and recommended that partitions be as thin as possible. Furthermore, the conventional free-standing wardrobes traditionally used by Egyptian families should be replaced by built-in storage areas - also sealed by sliding panels.

For praying purposes, an arch in the wall, symbolizing the apse of the qibla and oriented to it as well, should be created in Egyptian housing units and a temporary, light-weight sliding partition should be installed, enabling households to create a prayer area as needed. Also, the frequent use of the sink for the ablution ritual necessitates architectural plans accommodating separate toilets, sinks and bathtubs each in its own compartment within a very small area - a tremendous convenience for all family members.

Another very essential factor discussed in this paper is the importance of future extensions and additional rooms, both indispensable needs for growing families who cannot afford to move to larger units. Unit occupants invariably add these as they provide rooms for children, independent sleeping quarters for boys and girls, and serve as accommodation for newly weds who cannot afford to move into separate homes. This paper maintains that future extensions to housing units should not be prohibited; on the contrary, they should be encouraged and facilitated - but within a legally controlled framework. I have not proposed tangible solutions for this "controlled framework" in the present paper. A central component of my future research deals, precisely, with the provision of guiding modules, appropriate structural systems, easy

construction methods and alternative directions for such extensions to public housing project units.

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