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# Space and Behaviour: Study on Spatial Use of the Low-Cost Housing and its Residents

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## Abstract

This research provides empirical evidence on behavior, daily activities, use of space of residents living in low-cost housing in Jakarta. This study is focused on the contemporary housing units' issue which were designed with little regard for users' behaviour activities and which, by neglecting some of their fundamental needs (Heimsath 1977) and further leads to a range of both residents' positive and negative perceptions toward their space and conducting a coping behaviours. The primary data, collected through semi-structured interviews with 21-sqm unit residents of low-cost housing in Jakarta, were analysed and interpreted by qualitative-quantitative methods using the Statistical Package for Social Science (SPSS) and results were further presented in descriptive form. This study revealed that the design strategies for the 21-sqm units inadequately meet the residents needs of daily activities and spatial use which was proven from residents' negative perceptions of space and the rooms' functions which is being utilized inappropriately and ineffective ways. The residents were enforced to adopt various coping-strategies and modes of spatial-adjustment to compensate for both physical and behavioural limitations of their living space and extended areas within housing-complex. The implications of findings suggest that architects should develop design ideas based on a more profound knowledge of potential users' behaviour and daily activities, particularly in designing low-cost housing in which the users are mostly not involved in the design process.

**Keywords:** Keywords: Behaviour; Perception; Space; Housing

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## **1. Introduction**

Housing is one of major issues for the City of Jakarta, Indonesia. Specifically, this concerns providing homes that meet the demands of both physical well being and psychological needs of occupants. To date such expectations have not been fulfilled. Early research has shown that what housing has been provided tends to concentrate on the minimum space requirement for housing units in terms of economy of floor space, types and number of rooms. Initial research has also indicated that it is in response to these spatial disadvantages by residents that they have sought various coping strategies to deal with their particular physical environment leading to an adaptive use of their architectural setting.

The focus of this paper, as an outcome of fieldwork findings, concerns how occupants have dealt with various physical domestic environments. This will provide the evidences how the inhabitants living within 21sqm unit of low-cost housing in Jakarta conduct their activities and how then the occupants perceives toward their space as well as their efforts to cope with their physical environment available to them.

## **2. Literature review**

Architects are required to realize the Importance of Human Dimension in Architecture. The reality has shown that human beings have modified their environments by creating a human-built world to augment their natural settings for many centuries (Bell et al., 1978). The formal process of design which is concerned with the needs of human beings is therefore required to anticipate unexpected modification of their environment. The facts indicate that in dominant situation of modern life, individuals live in a setting which was not built for them (Boutourline, 1970). Even worst, the current design process, involving the owner, the architect, and the regulatory government, behavioral data is not currently developed and quantified for the purposes of a building or planning project, nor is feedback a part of the process (Heimsath, 1977). Poor communication between users and the environmental planner and designer (i.e. architects, planners) and their tendency to turn towards expert knowledge instead of user needs has become another disadvantage perceived by the users of buildings (Sarwono, 1992).

The importance of the human dimension in architecture is becoming crucial to consider. Izumi's diagram has appeared how psychological phenomena related to building design. The diagram is useful in understanding the meshing of human and non-human components in architectural fabric. A fundamental premise behind the investigation into the field of environment and behaviour involves the assumption of a systematic interrelationship between architecture and patterns of human behaviour. Those buildings containing both people and objects need to be more humanized (Holahan, 1978). Residential buildings, Hospitals and Penitentiaries are one example to be considered in this light.

A successful result of an environmental design is determined by important factors. The criteria is one to meet the needs of user behaviour implemented in functional and floor space requirements as well as to meet the standard of social condition (Sarwono, 1992).

The question that may be raised here is how are designers or architects to be made aware of user needs in order to develop design alternatives. In the book written by Bell, Fisher and Jeffrey and Loomis it was said that no single idea occurs more frequently in studies linking environmental design and behavioural science than the concept of user needs or benefits (Bell et al., 1978). One example of such a set of user benefit criteria has been proposed by Murtha (1976). Murtha's criteria are classified as four dimensions of user benefits: behaviour facilitation (functional conformance & spatial conformance), physiological maintenance (climate conformance & hazard regulation), perceptual maintenance (sensory initiation & sensory conformance) and social facilitation (social initiation & social isolation) (Fisher et al., 1984). User-oriented design criteria not only make such needs an important consideration but also emphasize the active role of users in the design process (Bell et al., 1978). In addition to this, it is highly desirable to have explicit behavioural criteria in mind before a new building or setting is constructed. Specification of behavioural criteria is then thought important for the effective communication between behavioural scientists and designers or architects (Fisher et al., 1984). The communication means with the tools of research conducted multidisciplinary.

In relation to the Izumi diagram on the meshing of human and non-human components in architectural fabric, the case studies of low-cost housing in Jakarta should be considered to be design focused towards the human. The case studies will consider the importance of the human dimension in architecture and essential for build a well-designed environment. Design ideas geared towards human psychological requirements particularly in the case of low-cost housing in Jakarta, will start to consider the needs of the users' behaviour, the users' perception, the users' preference towards the home that relates directly to themselves. The active role of the user in the design process is therefore taken into account. It is expected that the resulting alternative design ideas will satisfy and support the explicit and implicit needs and values of the occupants through the improvement new designs, the improvement of minimum building standards, and clarification of user needs and preferences, etc.

In the case of low-cost housing in Jakarta, both physical and socio-psychological problems are to be found. Using a previous study, problems concerning physical housing conditions have been identified as having a minimum space for the unit, a minimum floor space provided for most of the rooms available in the unit and minimum types of room available (Komarudin, 1997). The needs of the occupants to facilitate their behaviour seem to have been insufficiently considered. The case studies conducted is an attempt to resolve and further analyse these issues. It will focus upon behaviour patterns and the actual space needed to accommodate the needs of residents with their activities in such a contemporary neighbourhood, characterized by a very heterogeneous unit based on the nature of the geography, the numbers and kinds of people, the socio-economic status of these people, their ages, cultural background, and housing form (Altman and Wandersman, 1987). The behaviour pattern of occupants will be investigated to see how the spaces function in the units and housing complex.

Perception is that part of our mental process by which, from our own particular point of view, we engage with the world around us in which we experiences and strive to gain satisfaction (Ittelson, 1969). Furthermore, this contact is through our belief that the only things we can know about the world come to us through the medium of our senses (Ittelson, 1969).

Human perception toward the environment is relatively based on the interaction occurring between each individual (with his/her personality, background and experiences) and the environment in which he/she lives (Sarwono, 1992). Human perception towards the environment encompasses the meaning we derive from an environment. Does the environment make sense to us? Environmental perception includes the valuation, or determination of good and bad elements. Indeed the affective and evaluative components of environmental perception are the roots of forming attitudes toward the environment (Fisher, 1984).

Previous studies on low-income housing in Jakarta have reported that low-income housing occupants have their own perceptions, not only toward their physical setting but also toward the social and psychological aspects. The socio-psychological disturbance of occupants, include feeling restricted when having guests visiting their home, noise, feeling uncomfortable, difficulty to concentrate, not being creative, not feeling free to do their own activity. Physiological and technical disturbances are also perceived by occupants such as the lack of space available creating poor air circulation in the room resulting in a feeling of stuffiness and difficulty in making space arrangements (Komarudin, 1997).

A need to cope with the physical environment is initiated upon the perception of the environment by an individual, in interrelation to physical objects. If this perception cannot be accepted by the human, it then will be followed by stress and the effort to cope with the environment (Bell et al., 1978). Successful coping strategies involve adaptation and adjustment. Adaptation is the way in which we change our behaviour to fit environmental demands, while adjustment is the way in which we change the environment to fit our behaviour (Bell et al., 1978).

In the case of low-cost housing in Jakarta, prior research indicated that residents of low-cost housing have a tendency to cope with their given environmental setting for many reasons (Sarwono, 1992). The disadvantages they perceive, will thus make them disappointed with a resulting stress on their lives and that will influence their behaviour (Komarudin, 1997). This research also tried to find whether the occupants of low-cost housing tend to cope with their physical setting. The case studies of low-income housing that will be conducted will investigate more clearly the would-be behaviour of coping with the environment (adaptation/adjustment), made by the occupants in order to make their home environment more meaningful for them.

### **3. Research methodology**

Post Occupancy Evaluation which involved semi-structured interview, field observation and photography was conducted. Semi-structured interviews were conducted toward the occupant of 21 sqm units as a respondents. This interview was carried out in low-cost housing complexes located in Central Jakarta. Random sampling was employed determined for the research, was sought proportionate samples from 81.3% of the total units available. The number of samples to be taken are a total of 39 units or households (Out of 48 Units available living in particular type of 21 sqm units).

There were major areas of information and assessment covering information such as Social Economic Conditions, Diary Log of Occupant's Behavior Pattern (daily basis); Occupant's perception of their existing



payments, a post office, a kindergarten, Resident Association Offices (*Persatuan Penghuni Rumah Susun*), neighbourhood economic enterprise (*Koperasi Warga Lingkungan Rumah Susun*), and The *Perumnas* Office; kindergarten. The most common commercial facilities provided include: mini markets (miscellaneous); salons (hairdresser); VCD and Play Station rental shops; commercial public telephones. Other commercial business include: public Internet shops; privately-owned offices; small restaurants, canteens (cafeteria), cheap food stalls (*Warteg*); laundries; centres offering courses (sewing, English, reading Qur'an, music); computer rentals, a computer printing shop; printer shop, photocopy shops; tailors, boutiques; motorcycle workshops; film production house, a music studio; cosmetic shops; bird food shop, vegetable markets, fruit shops; bookshop and stationary suppliers; newspaper agency, advertisers; building and hardware suppliers, electronic shops, services and electrical suppliers; mobile phone shop; automobile air conditioning services, car accessory shops; upholsterers (sofa repairs); billiard rooms; storage warehouses.



Figure 2. The residential neighbourhoods

#### 4.2. Socio-demography conditions

There was an average of 4.02 occupants per household within the units of 21 sqm type. The floorspace per person is 5.22 sqm/pp. The residents were equally distributed by gender, with an average age of between 28 and 31 years, with the most frequent age group between the range of 25 and 55.9 years old (the productive age). The focuses of religious belief in the units were Moslem, Christian (including Catholic) and Buddhist. Moslems were the most prevalent in all complexes. The majority of residents had an education level between Junior and Senior High School, although Diploma and University degrees were also found in small numbers. Typical occupation in the 21sqm units were cited as "Housewife", "student", "entrepreneur", "private driver" and "private employee". The occupations of private employee and student were significant.

### 4.3. Residents' behaviour activities

There were varieties of activity types recorded by occupants. These include home chores, defined as cooking, ironing clothes and cleaning the house. Showers twice daily, working, studying and looking after the children were also typical. Typical leisure activities included playing with friends, playing with the Play station console, taking walks within the housing complex, relaxing at home and drinking and chatting with neighbours. Listening to the radio or music, watching TV/VCD and afternoon sleeps were also found as typical. Next to these, praying and attending religious services within the complexes, and physical exercise such as gymnastics were also practiced. Other outside activities included shopping at traditional markets, both outside the housing complexes and in the commercial areas within the complex. Buying snacks was typical for occupants. All details types of activities, preferred time the occupants conduct the activities, space used for the activities as described in Table 1 – 11.

Table 1. Activity and the use of space for home chores activities

Types of Activity	Preferred Time	Type of Space used	(%)
Cooking (8.0%)	10-10.59am	Kitchen	8.0
Washing clothes (1.8%)	8-8.59am	Bathroom	1.8
Washing dishes (0.6%)	5-5.59am	Bathroom	0.6
Drying clothes (1.2%)	12noon-00.59pm	Balcony	0.6
		Corridor	0.6
Clothes ironing (0.6%)	8-8.59am, 10-10.59am, 11-11.59am, 1-1.59pm	Bedroom	0.6
Preparing breakfast (1.8%)	7-7.59am	Bedroom	1.8
Cleaning the house (4.9%)	7-7.59am	Bedroom	4.9

Notes: Bedroom = main open plan space within the unit

Table 3. Activity and the use of space for taking bath / shower

Types of Activity	Preferred Time	Type of Space used	(%)
Morning shower	6-6.59am	Bathroom	26.4
Afternoon shower	4-4.59pm	Bathroom	19.0

Table 4. Activity and the use of space for working

Types of Activity	Preferred Time	Type of Space used	(%)
Working outside hc (35.6%)	2-2.59pm, 3-3.59pm	Various places outside hc	35.6
Working within hc (6.7%)	8-8.59pm	Bedroom area within unit	0.6
		Sitting/commercial area on the ground floor	1.2
		Small shop "Warung" on the ground floor	4.9

Table 5. Activity and the use of space for studying

Types of Activity	Preferred Time	Type of Space used	(%)
Studying (4.3%)	8-8.59pm	Bedroom	4.3

Table 6. Activity and the use of space for leisure

Types of Activity	Preferred Time	Type of Space used	(%)
Playing with friends (18.4%)	5-5.59pm	Bedroom	1.2
		Sitting/commercial areas on the ground floor	14.1
		Akbar mosque	1.2
		Neighbour's house	0.6
		Open space within hc	0.6
		Various places outside hc	0.6
Playing guitar (1.2%)	1-1.59pm, 2-2.59pm, 3-3.59pm	Open space within hc	1.2
Playing Play station (0.6%)	12noon-00.59pm, 1-1.59pm, 2-2.59pm, 3-3.59pm, 8-8.59pm, 9-9.59pm, 10-10.59pm	Bedroom	0.6
Playing football (1.8%)	5-5.59pm	Sitting/commercial areas on the ground floor	0.6
		Sport court within hc	1.2
Playing volleyball (0.6%)	4-4.59pm	Sport court within hc	0.6
Playing chess (1.2%)	6-6.59pm, 7-7.59pm	Bedroom	0.6
		Sitting/commercial areas on the ground floor	0.6
Reading books (0.6%)	6-6.59am 1-1.59pm	Bedroom	0.6
Reading newspapers/magazines (1.2%)	2-2.59pm	Bedroom	1.2
Walking within hc (1.2%)	6-6.59am	Sitting/commercial areas on the ground floor	1.2
Sitting & drinking to relax (3.7%)	4-4.59pm	Bedroom	3.1
		Sitting/commercial areas on the ground floor	0.6
Sitting & chatting with neighbours (2.5%)	6-6.59pm, 7-7.59pm, 8-8.59pm	Sitting/commercial areas on the ground floor	1.8
		Small shop "warung" within hc	0.6
Listening to the radio/music (0.6%)	10-10.59am	Bedroom	0.6
Watching TV/VCD (24.5%)	8-8.59pm	Bedroom	24.5
Getting together with the family (6.7%)	9-9.59pm	Bedroom	6.7
Afternoon Sleep (26.4%)	2-2.59pm	Bedroom	25.8



Table 7. Activity and the use of space for looking after the children

Types of Activity	Preferred Time	Type of Space used	(%)
Looking after the children (3.7%)	7-7.59am	Bedroom	2.5
		Bathroom	0.6
		Sitting/commercial activity area on the ground floor	0.6

Table 8. Activity and the use of space for religious activities

Types of Activity	Preferred Time	Type of Space used	(%)
Reading the Qur'an (0.6%)	7-7.59pm	Bedroom	0.6
Praying for Moslem (12.9%)	6-6.59pm	Bedroom	9.8
		Balcony	2.5
		Small mosque "musholla" within hc	0.6
Attending religious activity (1.8%)	4-4.59pm, 6-6.59pm	Akbar mosque	0.6
		Small mosque "musholla" within hc	1.2
	5-5.59pm	Akbar mosque	1.2
		Small mosque "musholla" within hc	0.6

Table 9. Activity and the use of space for physical exercise/gymnastics

Types of Activity	Preferred Time	Type of Space used	(%)
Gymnastics / Physical exercise (3.1%)	5-5.59am	Bedroom	0.6
		Sitting/ccommercial areas on the ground floor	2.5

Table 10. Activity and the use of place for shopping

Types of Activity	Preferred Time	Type of Space used	(%)
Shopping, Daily shopping for cooking (7.4%)	8-8.59am	Sitting/commercial areas on the ground floor	4.9
		Traditional market	2.5
Buying snacks on the ground floor (0.6%)	3-3.59pm, 4-4.59pm, 6-6.59pm, 7-7.59pm, 8-8.59pm	Sitting/commercial areas on the ground floor	0.6

Table 11. Activity and the place: education and family services

Types of Activity	Preferred Time	Type of Space used	(%)
School, courses, and university (16%)	9-9.59am	Sitting area on the ground floor	3.1
		Various places outside hc	12.9
Transporting the spouse or children (7.4%)	7-7.59am	Sitting area on the ground floor	4.3
		Various places outside hc	3.1
Visiting relatives (0.6%)	8am-6.59pm	Various places outside hc	0.6

#### 4.4. Residents' Perception of rooms within unit

Semantic scale was used to indicate occupant's perceptions. The scale of 1 to 5 was adopted which the value of 1 to 5 means increasing from negative to positive responses. The means of 3.00 above obtained is categorized for a positive response and below those are categorized for a negative response.

Perception criteria were identified covering specific information required to understand occupants' level of perception toward the quality of rooms within unit. There were 16 (sixteen) criteria questioned and results as seen in Table 12-15.

Table 12. Occupants' Perceptions of Bedroom/Bedroom Zone within Unit

No	Criteria	Result
	How the occupant feels about the spatial, visual, heating and air conditions of the bedroom	
1	The number of rooms	<b>2.40</b>
2	Availability of floor space	<b>2.42</b>
3	Extension of the room	<b>1.27</b>
4	Flexibility of the room for its functions	<b>2.90</b>
5	The shape of room for usage	3.19
6	The natural lighting of the room	3.75
7	The glare from windows	4.08
8	Heating conditions of the room	<b>2.65</b>
9	Freshness/stuffiness of the room air	3.13
10	The room's air circulation system	3.50
11	The room's level of humidity	3.67
12	Visual privacy of room	<b>2.52</b>
13	Conversational privacy of room	<b>2.40</b>
14	Having a comfortable place to be alone	<b>2.02</b>
15	Having place to store possessions	<b>2.38</b>
16	Having a lock for the room	<b>2.21</b>

*Bold fonts: Negative Perceptions (less than 3 of the scale of 5)*

*Bedroom = main open plan space within the unit*

Table 13. Occupants' perceptions of bathroom

No	Criteria	Result
	How the occupant feels about the spatial, visual, heating and air conditions of the bathroom	
1	The number of rooms	3.48
2	Availability of floor space	<b>2.67</b>
3	The shape of room for usage	3.42
4	Heating conditions of the room	<b>2.90</b>
5	The room's air circulation system	3.23
6	The room's level of humidity	<b>2.75</b>

Table 14. Occupants' perceptions of kitchen

No	Criteria	Result
	How the occupant feels about the spatial, visual, heating and air conditions of the kitchen	
1	The availability of the floor space	<b>2.46</b>
2	Extension of the room	<b>1.63</b>
3	Flexibility of the room to its functions	<b>2.67</b>
4	The shape of room for usage	3.23
5	The natural lighting of the room	3.73
6	The glare from windows	4.15
7	Heating conditions of the room	<b>2.88</b>
8	Freshness or stuffiness of the room air	3.13
9	The room's air circulation system	3.42
10	The room's level of humidity	3.52

Table 15. Occupants' perceptions of balcony

No	Criteria	Result
	How the occupant feels about the spatial, visual, heating and air conditions of the balcony	
1	The availability of the floor space	<b>1.81</b>
2	Flexibility of the room to function	<b>1.96</b>
3	The shape of room for usage	<b>2.33</b>

#### 4.5. Coping behaviour of occupants

When the perceptions of occupants towards their units were found to be negative in some respects, their coping behaviour became crucial. Two types of coping behaviour were found, these being adjustment towards the space (space adjustment) and adaptation to the space.

It is the degree to which behaviour and environment or space are interrelated and impact upon each other that is investigated here. The results show that a significant number of households coped with the environment both through physical and functional adjustments to their unit space and through adaptation to the space.

In particular, the study found that the residents made both physical and functional adjustments. Of these, there were 10 types as seen in the Table 16 below. What the research further shows is that there were various types of space adjustment made by all households.

Table 16. Coping behaviour: space adjustment

No	Type of Adjustment toward the Space made by the households	Frequency (%)
	<b>Functional Space Adjustment</b>	
1	Balcony used for praying purpose with prayer carpet provided	4.2
2	Balcony used for sleeping purpose with bed provided	2.1
3	Bedroom used for having meals on the floor	72.9
4	Bedroom used for having meals with dining table provided	41.7
5	Bedroom used for having meals with mat/carpet provided to sit on	4.2
6	Bedroom used for praying purpose with praying carpet provided	47.9
7	Bedroom used for preparing food to sell (on the floor)	2.1
8	Sofa provided in the bedroom	16.7
9	Corridor used for children's space to play	2.1
10	Corridor used for drying space with wire/string provided	4.2
11	Corridor used for eating, chatting and relaxing purpose with chair/sofa/small table provided	-
12	Corridor used for gardening activities with flowerpot provided	-
13	Dining room used for sleeping purpose with bed provided	-
14	Kitchen used for ironing with ironing table provided	-
15	Living room used for ironing using sofa/table set	-
16	Living room used for praying purpose with prayer carpet provided	-
17	Living room used for preparing food to sell using sofa, chair and table provided	-
18	Living room used for sleeping purpose with bed provided	-
19	Living room used for sleeping purpose with mat	-
	<b>Physical Space Adjustments</b>	-
20	New space built on the spare ground floor area	-
21	New space created in the ceiling area for sleeping	2.1

Notes: Bedroom = main open plan space within the unit

Typical functional space adjustments toward bedrooms, made by the occupants of 21sqm units, are shown in Table 16 above. The study found that typical functional space adjustments of bedroom/bedroom zone were made for the purpose of having meals on the floor and prayer using a prayer carpet.

Other than functional space adjustments, physical space adjustments made by the occupants were also recorded (Table 17). The type of permanent physical space adjustments made in the 21sqm unit type was via

partitioning (56.2%). A full-partition was deployed the most in unit (25%). These types of physical space adjustments indicate that the occupants attempted to split the room in an attempt to create more spaces and private areas.

Table 17. Physical space adjustment: the use of partitions in the unit

No	Types of Partition	Frequency (%)
1	Full-partition (plywood)	25.0
2	Semi-full partition used (plywood)	-
3	High-furnitures used to split the rooms (>1.80m)	20.8
4	Short-furniture used to split the rooms (<1.80m)	6.3
5	Curtain	4.2
6	No Partition used in the unit	43.8
7	No response	-
	Total	100.00

Other than physical alterations of space, residents also demonstrated modes of coping with their environment via behavioural adaptation to the space. In other words, rather than making physical alterations, they attempted to change their behaviour to fit the space provided.

Of the range of behavioural adjustments identified, some of these were perceived by residents to have improved their lives in some ways whilst worsening them in others. There were 16 types of behavioural adaptation discovered and that were perceived to improve the quality of life in the complex. A further 16 types were conceived as reducing the standard of living although essential for living within the complex.

The array of life improving changes identified in the complex included: becoming more sociable, shorter and more convenient travelling times between home and work, and cooking more comfortably in a smoke-free kitchen (using a gas stove). The residents also attended more sporting activities, shopping was more convenient via the use of the “vegetable man” visiting the complex daily and having more time for socialisation via the public facilities provided. In addition to this, it was considered there were improved ways to earn a living within the complex neighbourhood, and greater degrees of positive social behaviour and attitudes in response to the neighbourhood watch from the cultural perspectives (eg. not going home too late for ladies, etc).

On the other hand, those behavioural adaptations perceived as decreasing the quality of life included: going out less from the unit because climbing the stairs was tiring, noise late at night preventing sleep, poor socialisation due to bad neighbourhood conditions and less social activities within the neighbourhood.

The findings also measured to what degree the space impacted on behaviour and behaviour impacted on the space. As indicated, up to 10 types in the complex. These were made by 2.1 – 72.9% of occupants. Significant physical space adjustments were made by the occupants, through the way they physically extended space for 2.1% of units visited in the complex (extended space in the ceiling area). The use of

partitions was another typical form of physical space adjustment for 21sqm units. This type of adjustments was seen in 56.2% of the units in the complex.

The research revealed also how the space impacted on behaviour in all locations. In terms of behavioural adaptation, 32 types were recorded by occupants in the complex respectively (2.1 – 29.2%).

## **5. Conclusion**

In this study it was found that the housing provision needs to be enhanced to meet housing demands. Low-cost housing designed supposed to meet the need of space to accommodate the occupants' activities. Some activities counting for 42 different activities within 11 (eleven) classified groups of activities were found and some conducted not in the proper place or space as designed for the purposes. Architects need to take attention of what space/rooms needed for the occupants living in typical 21 sqm unit type.

Low-cost housing occupants have their own perceptions, not only toward their physical setting but also toward the social and psychological aspects. The negative perceptions of the occupants toward their housing units will be followed by their effort to cope with their physical environment.

Perceptions of low-cost housing occupants living in 21 sqm units, concerning in a few points identified as positives. However, occupants' perceptions toward the rooms within unit negatively perceived for the balcony for all the criterias such as the availability of the floorspace, flexibility of the room to function and the shape of room for usage. The typical occupants' negative perceptions found as the availability of space for all of rooms within the unit (Bedroom, bathroom, kitchen, balcony).

The occupants made coping with the physical environment. The occupants' perception toward the environment are outside their optimal range of stimulation which referring to conceptual model of environment adaptation it then clearly brought those to cope with the physical setting where they live. The coping conducted for both adjustment and adaptation. Functional and physical space adjustments are made by the occupants including the used of bedroom more than for sleeping purpose, the use of bedroom for multi purposes, the use of balcony for other purposes other than its functions and the function of the corridor, which is more personal rather than communal space. Adaptation behaviours are also made by the occupants, which make the occupants' lifestyle have changed for the betterment on one hand and worsen on the other hands.

The study has concluded that the behaviour and activities of occupants have impacted significantly on the way they use space: 59.5 – 100.0% of households in the 21sqm unit type have changed the space in either permanent or improvised ways. The study also exposes the significant impact space has on residents' behaviours: 27.0 – 66.7% of residents were found to have been affected in the ways discussed.

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