

03

RECONFIGURING HOME SPACES: AN EXPLORATION OF THE SPATIAL DIMENSION OF LOW-INCOME HOUSING FROM THE DWELLERS' PERSPECTIVE

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ABSTRACT

Providing quality housing has been a major agenda item in the effort to achieve a decent standard of living for all Malaysians by 2030. However, previous housing schemes especially for low-income people have shown no signs of further innovation in improving the quality of domestic space based on the findings of previous studies which continue to discuss the suitability of space design with the social patterns of dwellers. This article investigated the underlying knowledge from the perspective of the dwellers through the exploration of the spatial dimension. Using the creative method, this study processed the information from the dwellers on how the domestic activities were transferred to the dreamhouse model and revealed how the spatial order can be reconfigured creatively by the designer. This research clearly illuminated the underlying knowledge of spatial characteristics based on low-income opinions.

Keyword: Housing, Domestic space, Research tools, Creative Methods

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INTRODUCTION

One of the 2030 agenda on Sustainable Development Goals (SDG) is to make cities a settlement that is comprehensive, inclusive, safe, resilient, and sustainable. It is in line with the Wawasan Kemakmuran Bersama (WKB), which aims to provide a decent standard of living to all Malaysians by 2030. If seen, SDG and WKB are related to survival in terms of city life, home location, household, and home options. In Malaysia, mass housing development has been carried out since 1969 where Flat Pekeliling housing at Kuala Lumpur is often used as an example. Mass housing development continues to be developed to this day, and designers have manifested the aspirations of the government by producing housing products from the concept of 1 room to 3 rooms (Yahya et al., 2021; 2022). However, with the development of housing development, especially the concept of domestic space, the debate on the suitability of the design with the social patterns of the dwellers continues to be debated. It can be concluded that the space offered by the designer is still not ready to be standardised because there is still a problem with how the design suits the social pattern of the dwellers (Yahya et. al 2021).

Interestingly, this domestic space issue is rarely getting attention to tackle this problem (Yahya et. al 2021). However, there have been several studies that have attempted to identify the social patterns of dwellers to improve the quality of housing design in Malaysia. Seo & Marcus (2016) used multi-methods, namely questionnaires, surveys, and space syntax simulation, while Mahmud (2010) used open interview and survey methods to study this problem. Even though they have come across amazing findings, they eventually proposed a similar design that uses the basics of the open building concept. Their statement is almost the same: domestic space should be determined by dwellers to fulfil their needs.

Therefore, the main objective of this research article is to explore the views of low-income people on how they are using the space to dwell as a new direction to tackle the problems. The project begins with current research work in which the authors were previously involved, exploring the new concept of B40 Group's Housing in Malaysia. Throughout the focus group discussion with low-income people, the participants used various components of a physical model to express their intuition about their image of a dream house.

LITERATURE REVIEW AND METHODOLOGY

In his book "Creative Exploration," David Gauntlett (2007) noted that there are several different ways to explore identity creation. Ingram (2011) has used the plasticine model to explore the gap between successful habits in education and those of working-class students. This technique is meant to encourage the student to construct a visual representation of how they encounter different fields. Gauntlett (2007) also used a creative method to explore the focus group which a range of professionals on how they feel on Monday morning by asking them to create a model of their identity using Lego. All these approaches share the philosophy that doing something creates both a connection to the research process and a semantic memory of participating in the process, and that the eye and ear should be taken as seriously as the voice (Dean, 2014).

This research adapts the creative method as a tool to collect data on the social patterns of occupants in the domestic space (Figure 1). It is based on the physical model of domestic space, which has been set at a 600mm x 600mm grid at a scale of 1:75. The various pattern of room space is made to give the occupants the option to create a living space layout based on the aspirations of their social patterns.

The determination of the space is based on 3D models of furniture and sanitary items such as toilet bowls, shower roses, single and bunk beds, sofas, tables, and kitchen cabinets. A black card is used as a symbol on the door that connects the entire domestic space. Figure 1 shows the hardware used in the fieldwork conducted at the Seri Semarak Housing of Project Perumahan Rakyat (PPR), Kuala Lumpur. In the data collection activity, the dwellers were asked to construct the real domestic space in which they lived at the time. Then, the researcher will check accordingly the results obtained to ensure that the results obtained should be the same as their real residential units. This procedure is to ensure that the occupants understand how to use these tools so that the second procedure can be carried out, which is to arrange the domestic space based on the aspirations of their social patterns.

The results of data collection will be analysed using Justified Permeability Graph (JPG) measurements to interpret the meaning of the domestic. The Real Relative Asymmetry (RRA) value extracted from JPG form can give a picture of the centrality that relates to all space as a whole space contained in the spatial system (Seo, 2014) where the value of RRA describes how permeable the space in the spatial configuration. A low RRA value means higher integration, while a high RRA value means high segregation (Faris Ali & Ahmad Sanusi, 2010). Therefore, measurements from the JPG form can empirically distinguish the logic of social patterns as opposed to looking at the geometric form of a plan that is highly likely to be biased by the researcher's knowledge.



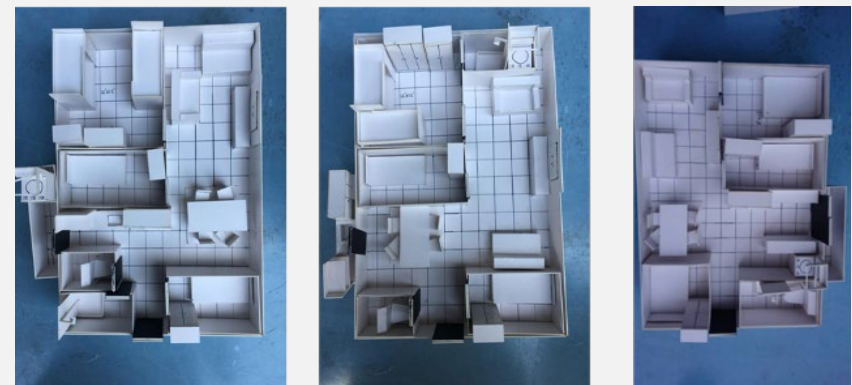
(b)

Figure 1(a,b) : Physical model used as a tool to acquire the knowledge from the occupants through their expression on how they arrange the spaces to dwell.

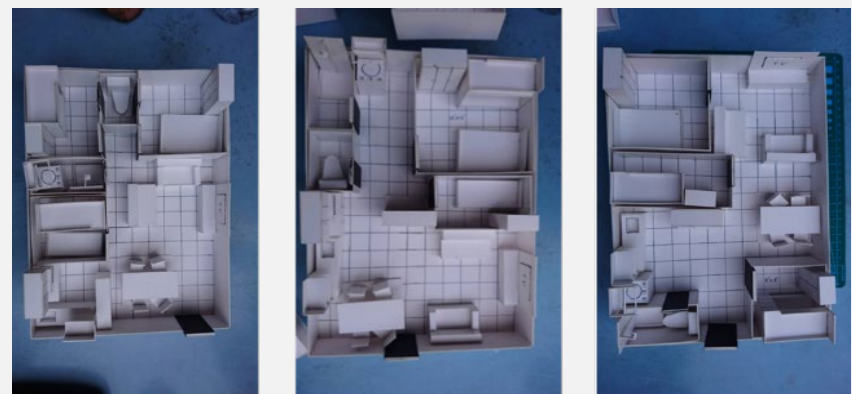
(source: Author)

MAIN RESULTS

There are three focus groups of 3-6 people per group. All three groups were identified as knowing how to use the physical model to express their idea for the arrangement of space. All members of the group are aged between 45 and 60 years old, consisting of (Group 1) Mothers, (Group 2) Head of Malay households, and (Group 3) Head of Indian households. In this survey, there is no focus group from Chinese households because they were not interested in participating. After the participant constructs their house's model and asks them how they fix the furniture position, what becomes apparent show how the layout of the model logically function as a house. Figure 2 shows the current condition and configuration of their house in Seri Semarak Housing (2a) and the aspirations for their dream house (2b). All three groups also agreed that balcony space was not a requirement. They consider the balcony space to be a high-risk space because the space is prone to accidents, especially for children. In all house models, visually, it is interesting, especially the space imbalance that occurs immediately. The bedroom is very visible, where the expansion of the common space (kitchen, dining, and living room) stood out to the participants by using a large allocation of space for the bedroom. Beyond this, the position of the furniture also shows the policy of the participants in reinforcing the concept of accessibility in the function of an organised space.



(a)



(b)

Figure 2 (a,b): The outcome from the focus group discussion. (a) a real domestic space constructed by the participant. (b) a dream houses from the participant.

(source: Author)

The outcome of the focus group discussion has been translated into the form of a layout plan in JPG format to interpret the meaning of the domestic space through the social logic of space (Hanson J, 1994). Figure 2(a) shows the participants' understanding of how to organise the dwelling space by using the physical model in a three-dimensional situation. In this process, the participants successfully arranged the space without any errors to show the spatial configuration of their houses. By this outcome, this study conclude that participants can go to the next process that they need to construct their dream house. Figure 2(b) shows the participants' aspiration for their dream house with the same floor area as their current house. In this process, the participant successfully arranges the base of the space on the argumentation of their current house. They believe that they have improvised the current house design based on their views on the functionality of the space, how they control social encounters within the domestic space, and several opinions of their cultural intuitions.

The outcome shows the underlying knowledge of differences for each group. The differences not only can be found in the geometrical pattern of the houses model constructed by the dwellers but also can be justified through the graphical pattern through spatial composition resulting from path patterns and depth (Table 1). It also shows the differences between the existing house layout that has been designed by the designer and the model of the house constructed by the dweller in considering the meaning of the domestic space organization on how they deal with encounter situations such as male and women, hosts and guests, parents and children.

Based on the result (Table 1), it can be assumed that the design of domestic space from PPR Seri Semarak implies complexity with its deep unit plan, which has 11 spaces, while dreamhouses from the dwellers have only seven to eight spaces. Each JPG form from the dreamhouses from the dwellers revealed that the kitchen and living room is located at the open front and straightly connected as an integrated space also function as a laundry by using washing machine. Interestingly, these dreamhouses tend to use the minimum number of transitional spaces with the specific function of laundry and storage areas to link all the rooms, compared to Seri Semarak Housing, which had to use three transitional spaces with the single function of movement, a living room and a kitchen room, to do that.

In a closer look, it is found that the master bedroom is in a difficult position to cross if the guest is in the kitchen or living room. Finally, the toilet or bath position shows an interesting pattern. It appears as supporting facilities for the kitchen or living room which is open access to all bedrooms. The most important knowledge from this finding is that when transition space is used as minimally as possible, the kitchen and living room will obtain the ideal space for the dwellers. However, the drying yard seems not to be allowed in domestic space.

Table 2 represents the RRA value of each space, from low-level to high-level spaces. The living room and bed 3 integrating the low-level spaces in the Seri Semarak Housing, the RRA value of lower-level spaces is the highest compared to all dreamhouses. In Dreamhouse 2 and 3, the kitchen replaces the living room and assumes its integrating function. The RRA of both houses extremely changes become low from the range of 1.01-1.25 to the range of 0.25-0.50. This polarization reflects exactly if referring to the pattern of JPG form that has been shown in table 1.

Table 1: The outcome from the focus group discussion. (a) a real domestic space constructed by the participant. (b) a dream houses from the participant.

	Seri Semarak Housing	Dreamhouse 1	Dreamhouse 2	Dreamhouse 3
Layout Plan				
Justified Permeability Graph (JPG) form				
Legend:	<p>⊕ EXTERIOR 3. BEDROOM 2 6. YARD ● TRANSITION SPACE</p> <p>1. KITCHEN 4. LIVING 7. BEDROOM 3 — SPACE LINK</p> <p>2. MAIN BEDROOM 5. TOILET 8. TOILET / BATH ▨ WALL</p>			

While the bedroom and toilet maintain high-level spaces. The value degradation reflects the growing integration of high-level spaces. The decreasing quotient conforms to our visual observation of the JPG form that there are two types of polarization of the space by the dwellers: living room and kitchen as an integration of low-level spaces at a very minimal range of RRA value. The analysis of the dreamhouses by the dwellers reveals that the two patterns of domestic space were surprisingly simple than what the designer predicted about how low-income people live in domestic spaces. More importantly, the JPG form in Table 1 suggests an explanation of how the pattern occurred. If the diagrammatic differentiation of integration spaces is evident in the development of B40 housing in Malaysia, then it seems to have been the policy selection that facilitated it.

Table 2: the integration order of syntactic interior value of the four layouts

	Mean Real Relative Asymmetry (RRA) Value							
	Low (Higher Integration)			High (Lower Integration)				
	0.00-0.25	0.26-0.50	0.51-0.75	0.76-1.00	1.01-1.25	1.26-1.50	1.51-1.75	1.76-2.00
Seri Semarak Housing				Living, Bed 3	Kitchen		Main Bed, Bed 3	Toilet, Toilet/Bath, Yard
Dreamhouse 1	Living				Kitchen, Main Bed, Bed 2, Toilet, Bed 3, Toilet/bath			
Dreamhouse 2		Kitchen			Living, Toilet/Bath	Main Bed, Bed 2, Toilet		
Dreamhouse 3		Kitchen	Living			Bed 3, Toilet/Bath	Main Bed, Bed 2	

Table 3: Spatial element of each of the houses

Spatial Elements	Seri	Dreamhouse	Dreamhouse	Dreamhouse
	Semarak Housing	1	2	3
Convex Spaces	11	8	7	7
Link	11	8	7	7
Max Depth	4	3	4	4
Total main entrance	1	1	1	1
Transition spaces	3	1	1	1

Using the Justified Permeability Graph method (Table 2), the sample configuration of the hypothetical model has been compared with the sample configuration from the case study of PPR Seri Semarak and the Dwellers Dream House. Through analysis using JPG format, all these graphs are arranged in such a way to place the entrance at the bottom, to give them the same entrance conditions for an accurate comparison. Investigating the basic content that makes up the configuration clearly shows the elements it contains. Table 3 shows the changes displayed in the Dwellers' Dream House from the data in the case study of PPR Seri Semarak. All Dwellers' Dream House shows the hidden dimension of domestic space activities in terms of spatial elements' usage.

By using the creative method that requires participants to use a physical model to build their dream house, it has revealed an interesting spatial dimension for designers to use as a reference in the design process. The results of the study have shown that residents use furniture in determining the configuration pattern of their homes. The arrangement of furniture has revealed the complexity of life in the domestic space. However, the researchers suspect that there is an influence from the configuration of the house they are currently occupying has an influence on determining the division of space. Because of this, the technique that the participants use in expressing themselves using furniture in the determination of space is a wisdom that needs to be learned by designers to produce a domestic space pattern for this group.

CONCLUSION

This paper explored the views of low-income people on how they use space to dwell in a limited space. In the beginning, we argue that the previous research method used to explore the hidden dimensions of low-income people's perception of domestic space was flawed. Then we proposed the creative method to illustrate what low-income people's dreamhouses look like through their views. Through this proposal, we analyse dreamhouses to reveal how they arrange the spaces based on their daily routine. First, the JPG form of the layout plan that had been collected revealed that the original plan of domestic space from Seri Semarak Housing needs to be modified according to the opinions of the dwellers base on how they need to control the social encounter within the domestic space base on their cultural intuition. It was found that the original plan had used more spaces rather than make it more integrated function. Second, using the value which is obtained from the JPG form, it was found that decrement of RRA value shows that the dreamhouse of low-income people led to a simple direction to all spaces and this numerically evidences that the dreamhouse is more integrated than the original plan of PPR Seri Semarak.

This research suggested a deductive way of understanding the construction of domestic space based on low-income people's views. By focusing on the hierarchy of integrated functions of space, it was possible to reduce unnecessary space, such as transition space, to obtain more meaningful space, i.e., space sizing, space connectivity, and space formation based on its function. This paper has illuminated the underlying knowledge of spatial characteristics based on low-income people's opinions. It presented not only the drawing of the layout plan but was supported by a diagrammatic concept that can be elaborated in an innovative way by the design intuition of the architects for a better solution to achieve quality housing for low-income people.

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REFERENCES

- Faris Ali, M., & Ahmad Sanusi, H. (2010). Using Space Syntax Analysis in Determining Level of Functional Efficiency: A Comparative Study of Traditional and Modern House Layout in Erbil City, Iraq. *International Seminar on Tropical Eco-Settlements*, (pp. 131- 144). Sanur Denpasar, Indonesia.
- Gauntlett, D. (2007). *Creative Explorations: New Approaches to Identities and Audiences*. London, UK: Routledge
- Hanson, J. (1994). Deconstructing Architects Houses. *Environment and Planning B: Planning and Design*, 675-704.
- Dean, J. (2014) Drawing What Homelessness Looks Like: Using Creative Visual Methods as a Tool of Critical Pedagogy. *Sociological Research Online*, 20 (1), 2.
- Ingram, N. (2011) Within school and beyond the gate: The complexities of being educationally successful and working-class, *Sociology*, 45(2): p.287-302.
- Mahmud, M. J. (2010). *Renovation for Personalization: A Development Arm for Sustainable Housing*. Johor Bahru: Universiti Teknologi Malaysia Press.
- Nadiyah, N. H., & Nor Dina, M. A. (2020). *Housing Design for Urban Poor in Kuala Lumpur: A Literature Review*. Earth and Environmental Science. IOP Publishing.
- Nor Haniza, I., Afi Rosemary, M. A., Raha, S., & Muhammad Najib, M. Z. (2016). Rethinking Space Design Standards Toward Quality Affordable Housing In Malaysia. MATEC Web of Conferences.
- Seo, K.W. (2014). *Spatial Interpretation of Housing*. United States: ProQuest.
- Seo, K.W., & Sharifah Salwa, S. M. (2016). *Development of Incremental SI (Structure -Infill) Housing for Low Income Population in Malaysia*. Northumbria University and Universiti Teknologi Malaysia.
- Yahya, A.S, Hassan. A.A.G, Ahmad. MH. (2022). Discovering pattern of space layouts from low-income housing: A discussion of the New Normal preparedness after the Covid-19 pandemic. *IOP Conference Series: Earth and Environmental Science*, 1007(1),012019.
- Yahya, A.S, AAG Hassan, M.H Ahmad, PC & Leng. (2021). Pentakrifan sosial daripada pembuat dasar dalam rekabentuk ruangan untuk perumahan golongan berpendapatan rendah di Malaysia. *Akademika*, 91(2), 117-128. doi.org/10.17576/AKAD-2021-9102-10
- Yahya, A.S, Hassan. A.A.G, Ahmad. M.H. (2021). Stigma Desakan Ekonomi Menenggelamkan Kepentingan Piawaian Ruang Perumahan (Housing Space Standards) Dalam Menyediakan Perumahan Berkualiti Untuk Kumpulan B40 Di Malaysia. *Proceedings of the Malaysian National Economic Conference 2020-2021*, Available at SSRN: <https://ssrn.com/abstract=3819408>