

Increasing Comfortability, Security, Privacy in Residential Function of a House

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Abstract— Residential function buildings are buildings that can accommodate the need for housing. In designing a residential function building, it is necessary to pay attention to the attributes to meet the needs and comfort of the occupants. This study aims to analyze the fulfillment of attributes in residential houses. It is carried out as a projection of the fulfillment of the attributes of an apartment as one of the residential function buildings which consists of several houses. Data was collected by means of interviews and field observations, then the data were analyzed. The results of the study found that the attributes that need to be met in designing a residential space are comfortability, safety, security, and privacy.

Index Terms — Residential Function Buildings, Residential Houses, Apartments, Fulfillment Attributes.

I. INTRODUCTION

Residential buildings are functioned to accommodate the need for housing, including buildings for single dwellings, row houses, flats, and simple dwellings. Physically, the building's space consists of interior and exterior. The residential function building has several rooms that have undergone design adjustments to support daily activities. In this context, comfortable condition will affect human behavior (Kim et al., 2017; Gautam et al., 2019). It means it will also have a psychological impact (Brunsgaard et al., 2012). In other words, a comfortable house is a house that is able to accommodate the psychological needs of its occupants (Susanto, 2007; Fabi et al., 2017). Spatial patterns can be one aspect that supports the creation of a comfortable space in a residential function building (Graham et al., 2015). Adjustment of space with occupants can maximize the function of the house so that the needs and comfort of residents are met (Rizi, 2021).

Apartment as a form of residential function building is a residence, consisting of a sitting room, bedroom, bathroom, kitchen, which is located on one floor of a large multi-story building. It is usually equipped with various facilities such as luxury swimming pool, gyms, shops. In terms of space requirements, apartment and residential units are quite similar. Therefore, a spatial study of residential houses is expected to be one way of approaching the spatial design approach for apartments. Based on the background, the formulation of the problem in this study is identified as

follows:

AQ1. Does the spatial layout of the residence meet the attributes for its occupants?

AQ2. What are the factors that influence the attributes of residents in a residential house?

II. LITERATURE REVIEW

According to Indonesian Law No. 1 of 2011 concerning Housing and Settlement Areas, a house is a building that functions as a suitable place to live, a means of fostering a family, a reflection of the dignity and worth of its inhabitants, as well as an asset for its owner. The function of the residence can be categorized into 3, namely the function of the house in general, the function of the residence individually, and the need for housing related to the family or group (Sunarmi, 2013). In general, residential houses meet the physical and psychological needs of residents. Individually, it will meet the needs of each occupant. As a group, they have the flexibility to change the need for space in the house.

Aspects of meeting the requirements for health and home comfort according to the General Guidelines for Healthy Simple Homes contained in Decree of the Minister of Housing and Infrastructure Number 403 of 2002 (2002) are lighting, air conditioning and air temperature and humidity. Moreover, components and arrangement of residential rooms based on the Decree of the Minister of Health of the Republic of Indonesia No. 829/Menkes/SK/VII/1999 include some requirements. The specifications are that floor is waterproof and easy to clean, the walls of the house are ventilated and especially in the bathroom and laundry room they are waterproof and easy to clean. Moreover, the ceiling of the house is easy to clean and is not prone to accidents, the ridge of the house is 10 m and there is a lightning rod, the room is arranged according to its function and designation and the kitchen must have smoke exhaust facilities.

According to the Directorate General of Human Settlements (1997), a component that must be owned by a healthy home is to have windows and doors that function as ventilation and the entry of sunlight with a minimum area of 10% of the floor area. Regarding interior layout, Suptandar (1995) argues that interior design is a system or way of arranging an indoor space that is able to meet the requirements of comfort, security, physical and spiritual satisfaction for its users without neglecting aesthetic factors. There are six elements that must be considered for interior planning, including activities, space and room layout, space-forming elements, filling room/furniture, conditioning and lay out.

According to Sailer & McCulloh (2012), layout is the

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process of determining the need for space to maximize space potential by preparing a practical arrangement of detailed use of space at a reasonable cost. Harmony in spatial planning will affect productivity, efficiency, effectiveness and user comfort (Ganesan, 1984). This can be achieved by applying several methods, including selection of materials and elements of space in accordance with its function, arrangement of harmony in the arrangement of furniture, dimensions of furniture that are proportional to the size of the space (Callender, 1973). The other methods include by creating an atmosphere of space in accordance with the functions and wishes of the user (Ginting et al., 2018). Arrangement of furniture is managed according to its purpose and function without neglecting the circulation of space users (Alahudin et al., 2018). Lastly, the influence of color and pattern of room decoration is very important in creating a psychological and optical impression on the users of the space (Hendrassukma, 2016; Chowdhury et al., 2021; Gunter, 2000).

III. METHODOLOGY

The method used in this research is qualitative. The research approach uses a behavioral mapping method, which describes an area where humans carry out activities to obtain data on the behavior of using space and show the relationship between this behavior and a specific design form. Behavioral mapping is done by means of place-centered mapping (mapping based on place).

Data collection techniques used are interviews, observation. Interviews were conducted by means of direct question and answer and through questionnaires to informants. Observations are carried out directly in the field by observing the room of the object of observation by means of place-centered mapping. The focus of this research is a discussion of the attributes that exist in residential function buildings, including comfortable, safety, security, privacy, visibility.

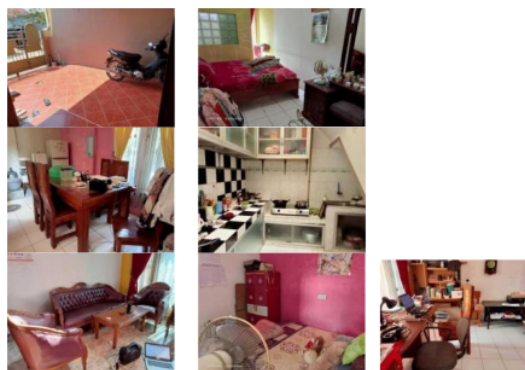
The locus in this study is a two-story residential house with the address at a housing complex in Karawang Regency, West Java. The purpose of this study was to determine the fulfillment of the attributes in residential homes that can be implemented into apartments. This research is expected to increase knowledge regarding the fulfillment of the attributes of residential function buildings and can be a guide in designing residential function buildings.

IV. RESULTS

The house that is the object of observation is oriented to the northeast (75° from the north). In terms of space, this house has undergone several renovations related to the need for 2 floors of space. The occupants of the house consist of 4 family members, namely father (61 years old) who works as a lecturer, mother (47 years old) works as a housewife, Second Child (21 years old) is a fresh graduate student, and third child (19 years old) is a student. The first child in this family is known not to live in a residential house due to work outside the city.

The house has 12 rooms which are divided into two floors. On the first floor there is a terrace, living room, master

bedroom, first child's room, dining room, and kitchen. On the second floor there is a second child's room, a third child's room, a television room, a dry clothes room, a warehouse, and a balcony.



Source: Resource Documentation (2021)

Figure 1. Rooms in the first floor

In the first floor, the terrace is used as a parking lot for 2 motorbikes. At night, one of the motorbikes will be parked in the living room. The living room is rarely used to receive guests. There was a change in the function of the room into workspace for the father. At night, the living room is used as a motorbike parking lot. The main room is used as a place to sleep for parents. En suite bathroom facilities are available. In the morning it becomes mother's place of work. This room is also used as a place of worship for parents (Figure 1).

First children's room is not occupied by the first child. There was an increase in area due to the renovation of the combined space. There are two zones in this room, namely the sleeping zone and the study zone. This room is used as a place to sleep and study as sleep zone for second child, and third child, while study zone is used by mother, second and third children. Lastly, the dining room is used to serve food and an alternative place to study/work, and used by all members of the family. The kitchen is used for cooking and washing dishes by all members

In the second floor, there are some rooms such as second and third children's room, television room and warehouse. The room for the second child is used by the second son for study, rest, and worship, while the bedroom for the third child is rarely used by him. The routine activity carried out is opening and closing windows (Figure 2).





Figure 2. Rooms in the second floor

The television room is used as a family relaxing place. This room is used as a place for tutoring on Wednesday-Thursday with 2 students and Saturday-Sunday with 3 students from 16.00-18.00. Its users are the member of family and the tutor. Moreover, the warehouse is used as a place to store unused/damaged items. There is a bathroom and a washing machine in it. Its users are also the member of family and the tutor. Moreover, there is a drying room in the second floor. This room is used as a place to put dry clothes, piles of books, spare furniture. Its users are the member of family. Lastly, another space is balcony used as a place to dry clothes and grow crops, used by all members of the family. To conduct space analysis, observations were made on Wednesday, October 6, 2021 at 14.00 - 17.00 with the place centered mapping method.

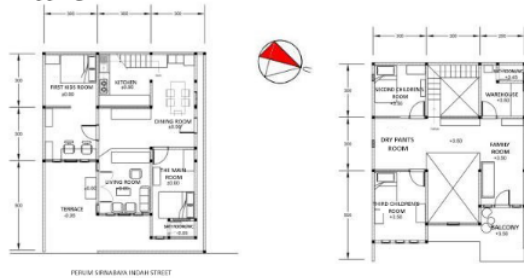
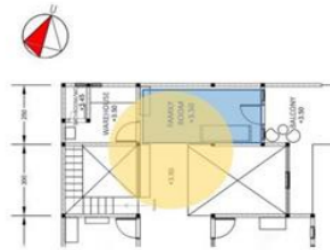
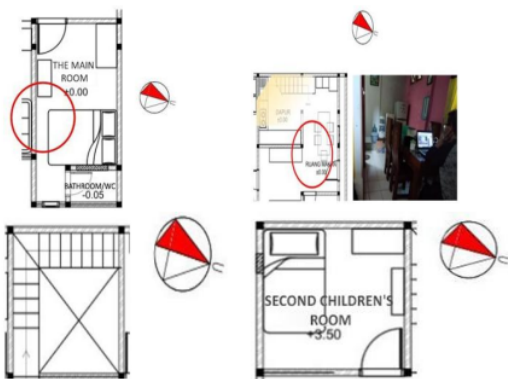


Figure 3. House Plans on the First Floor (Left) and Second Floor (Right)

The analysis showed that in master room, the problem found is ergonomics. To access the private bathroom, residents have to walk sideways because access to the bathroom is only ± 30 cm (Figure 3).



Source: Author's Analysis (2021)

Figure 4. Household Rooms Analysis

In dining room, the problem found is visual comfort. During the day, the condition of the dining room is dark due to the lack of natural lighting. Another observation is the stairs. The problem found is ergonomics. The length of the steps is only 70 cm while the space requirement for one person is 60 cm. In addition, the height of each step is 20 cm (Figure 4).

In the stairs, the problem found is ergonomics. The length of the steps is only 70 cm while the space requirement for one person is 60 cm. In addition, the height of each step is 20 cm. Moreover, in the second children's room, the problem found is thermal comfort. In this room there is only glass block as a source of natural lighting, there are no windows or other openings facing the outside of the building as a source of natural ventilation. Lastly, in television room, the problems found are anthropometry and visibility. The television room has another function as a tutoring room. In that room there is only 1 folding table measuring 50cm x 35cm x 40cm as a tutoring facility. Tutors tend to lie on the floor during the lesson.

The tutoring students who attended were students from the elementary school education level. Residents do not hesitate to go to the rooms in the house. However, to access the warehouse area, residents must pass through the television room. Occupants sometimes feel embarrassed to go to the warehouse during lessons because the tutors can't focus on seeing the occupants accessing the warehouse.

V. REDESIGN GUIDELINES

Based on observations on the object of the residential case study, it was obtained that several attribute fulfillments in the residential house were obtained. In the main room it was difficult to access the en suite bathroom. The solution is to increase the amount of space to meet the needs of the occupants' space. The minimum circulation path can be accessed by one person, which is 60 cm. The type of double bed mattress must be accessible on the left and right sides of the mattress while the single bed mattress is allowed to only be accessed on one side. Each room must be equipped with openings as a source of natural ventilation for air circulation and natural lighting sources to minimize the use of lights during the day.

Moreover, the location of the toilet is better in an easily accessible location. Unless the toilet is intended to be a toilet inside. The dimensions of the existing stairs are not ideal, the length of the stairs is only 70 cm while the minimum requirement for human movement is 60 cm. Therefore, the

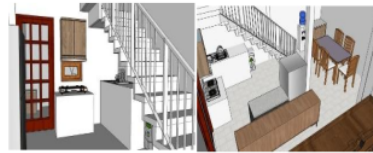
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dimensions were changed to 90 cm and the height of the steps from 20 cm to 18 cm. The stairs are equipped with railings and step nosing by preventing awkwardness on the stairs when passing by fulfilling the need for human space.

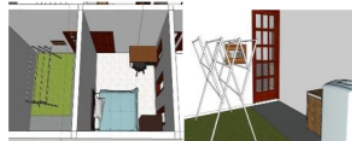
Some design recommendations that can be made to improve the space in the observation object residence are showed in Figure 5.



Main Room



Kitchen and Dining



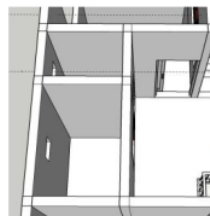
Children's Room 1



Stairs



Children's Room 1



Warehouse and Bathroom



TV Room and Lesson Room



Balcony

Source: Author's Analysis (2021)

Figure 5. Redesign Guidelines

The main room need to be changed in its room size from 5.3 m x 2.5 m to 4.5 m x 3m. Changed the location of the en suite bathroom to maximize natural light entering the room. Both sides of the mattress are accessible (60 cm). For kitchen and dining, the divider between the kitchen and dining room is removed to add to the impression of spaciousness and as a means of channeling natural light from the stairs and kitchen to the dining room. As for the first children's room, it has 2 zones, namely the study zone and the sleeping zone. The sleeping zone was converted into a semi-open laundry and drying room with the aim of adding a source of natural light into the adjoining room, namely the dining room and kitchen, while the study zone was used as the first children's room.

For stairs, the dimensions of the stairs were changed to meet the needs of the user's space for the width of the stairs from 70 cm to 90 cm and changing the height of the stairs from 20 cm to 18 cm. For the second children's room, its location was moved to the front of the house with the aim of getting natural ventilation. There are 3 openings in the form of windows as a means of air circulation and natural lighting with each window measuring 50 cm x 120 cm. As for warehouse, inside the warehouse on the existing floor plan, there are bathrooms and washing facilities. Because the laundry facility already has its own area, the remaining space needed is only a warehouse and a bathroom. The location of the warehouse and bathroom was changed to reduce the space. The location of the toilet is near the stairs for easy access to the bathroom from downstairs.

To redesign television room, the warehouse on the existing floor plan was replaced with a tutoring room. The layout of the furniture in the tutoring room and the television room is back to back with the aim that between the tutoring room and the television room there is a virtual boundary in the form of a void boundary on the left and a chair at the back of the room. For balcony, the balcony on the existing floor plan is in front of the house. Because the front of the house was converted into the second children's room, there was no access to the front of the house on the second floor. Therefore, the balcony was moved to the back of the house facing the laundry room.

VI. CONCLUSION

Based on the data from observations in a residential home, the study concludes that the study zone in the first children's room is a favorite place for the majority of residents to study and work because it fulfills the attributes of comfort, accessibility, and privacy. The results also highlight that the main room has not met the accessibility needs of the occupants, while the dining room has not met the convenience of visibility. As for the stair, although it is

equipped with railings and step nosing, it does not meet the attributes of occupant comfort and privacy. Moreover, the second children's room tends to be avoided for long-term activities because it does not meet thermal comfort while the tutoring room does not meet the privacy attribute.

As it is necessary to redesign to complete the attributes of the residence, the fulfillment of the attributes of residential function buildings need to be considered. The apartment as a building that becomes an alternative place to live must meet all the existing attributes, such as comfortable (comfort), safety (safety), security (security), and privacy (privacy) for the continuity of the occupants while living in the apartment.

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