Re-design Shared Room Based on Behavior Architecture Approach (Case Study: Male Student Dormitory, Institut Teknologi Sumatra)

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Abstract. A shared room as a public facility in a dormitory is a particular facility that supports student learning activities. The learning process carried out together can increase student creativity and higher productivity. It shows from the learning ethos of students who have the principle of group learning. Of course, with this habit, facilities are needed to accommodate activities with a large enough capacity. An attractive space design can influence a person's psychology to learn and interact. This study aims to improve the shared space design quality to make it more attractive for students' learning activities and social interactions. The behavior architectural design approach is used based on the questionnaire results, which states that students have not maximally used the shared space. The aspect of behavior variables used in this research methodology is interaction. Interaction is the researcher's primary reference to answer the effectiveness of using shared space as a public space. The result shows that the standard room can be maximized as a space for activities that support the learning process and socialize for students. This finding can be a reference to improve the design consideration for future student dormitory design, especially for shared room design in the dormitory.

Keywords: shared room, behavior architecture, interaction, socialize

1. Introduction
Architectural design arises because one's needs include physical, environmental, contextual, and functional space requirements [1]. The relationship between the function of private occupancy and shared facilities in a building seems stagnant. The character of a room affects the behavior and expectations of building occupants [2]. It means that occupants need a new solution to create a more flexible and dynamic room character.

The dormitory is one of the learning support facilities for students. Not only as a means of learning, but dormitories also function as accommodation, communication, and socialization among students. Student outreach activities, such as social gathering activities, group work, student association activities, or sports activities, require a particular room to accommodate these various activities. Social interactions at the male student dormitory are held quite often every day, especially on weekends. So, many students often gather in a place around the dormitory. Moreover, sometimes they take the initiative to make stalls in empty areas.

n the other hand, using a shared room as a public facility in a dormitory is a particular facility that supports student learning activities. The learning process carried out together can increase student creativity and higher productivity. It shows from the learning ethos of students who have the principle of group learning. Of course, with this habit, facilities are needed to accommodate activities with a large enough capacity. An attractive space design can influence a person's psychology to learn and interact. It is the basis of researchers researching to make an impressive facility as a shared room, which functions as a facility for student activities.

In this case, the researcher tries to develop a shared room design in this building. There are three research points: the sports room on the 1st floor, the main hall on the 1st floor, and the social space on the 2nd floor.
Students have used these three rooms for activities. However, based on questionnaire data, the researcher sees that space’s function and effectiveness in terms of intensity are not sufficient to be satisfied. It causes researchers to redesign the room to improve the quality of shared space design to make it more attractive for students’ learning activities and social interactions. The behavior architectural design approach is used based on the questionnaire results, which states that students have not maximally used the shared room as a whole.

2. Literature Review

Behavior architecture is the science of designing, which refers to essential aspects of human attitudes and responses to their environment. It aims to create a particular space and atmosphere that is following human behavior and the environment and culture by considering the principles of behavior architecture, including human communication and the environment, the physical and psychological activities of the inhabitants, meet the aesthetic, composition, and aesthetic values of the form [3]. In other references, the behavior architecture approach is a method based on behavior performance elements that create a link between occupants’ activities and the physical environment [4].

Architectural design is a complex process in which scientific and social problems must be combined with the user and balanced to get a favorable response that answers a need [5]. Thus, the design process is based on the idea that ‘architecture is a place that supports action.’ It posits that the creators created spaces to become places after they have lived and occupied. Being a place requires people to inhabit, experience, and absorb space (potential places) into the placement system that is already in their minds. The spaces and areas generate emotions and feelings that drive user behavior [1]. The extensive and growing literature has underlined that typically college students will perform efficiently and correctly in their studies and better adapt social environment as they receive appropriate care for their well-being and living conditions in their student residence [6].

The existence of shared space is a symbol of the community, especially in a settlement with good relationships with others, marked by commonality. Shares space accommodates the community’s communal activities (both positive and negative) from the economic, social, and cultural needs [7]. A shared space consists of two parts: the physical aspect (shared facilities and floor areas) and a behavioral part (human). The ideal situation is one in which both parts operate effectively. Most research has been undertaken on the first part, focusing on user characteristics’ role in a shared space’s success. That indicates that users with different backgrounds and characteristics may share rooms successfully because their perceptions and living experiences are different. In other words, a preferable and successful shared space is one designed for the characteristics of the residents [8].

Students need a shared space where they can spend time and activity space together. University life is a time when the social sphere is expanding, and as a result, social activity increases. Dormitories play an essential role in helping students socialize. Dormitories should support social activities and sports because they contribute to students' social education and the environment [9].

The concept of dormitory activities by Bonny, 2014 cited [10] classifies the types of activities that occur in dormitories that are including personal, educative, communicative, recreational, management, support, service, and sports activity that socialization activities are included in communicative activities that are used as variables public spaces in a settlement will play an important role if they contain elements of comfort, relaxation, and a passive activity such as sitting, standing while watching the activities that are happening around them, interaction activities between residents and a move that is not monotonous (discovery) [11].

3. Methods

The aspect of behavior variables used in this research methodology is interaction, where interaction is the basic reference for the researcher to get answers from the effectiveness of using shared room as a public space.
Figure 1 shows that the first step of the method is the initial observation of the buildings. The observation is meant to have a direct experience regarding the real condition of the research object. The observation was conducted with immediate visitation to the building and through the technical construction drawing to see the zoning and the dormitory facility since the early design process. Furthermore, the observation information becomes the reference to formulate the research variable related to occupants' behavior.

As can be seen here, the behavior variables are "interaction" with a measurement model using a Likert scale questionnaire. This variable aims to measure occupant satisfaction with social relationships and interactions between fellow occupants—the primary data collected from the questionnaire targets 200 respondents, which is the students. However, the questionnaire only reaches 116 respondents (58 %) for a male student. The use of variables was intended to measure the occupants' level of satisfaction regarding what they feel and think about the facility. Furthermore, this project's results are expected to improve the dormitory's design process as a recommendation.

4. Result and Discussion

Based on the questionnaire results, the authors ask four variable points regarding the interaction as a primary reference for the behavior variables. The questions posed are the availability of shared rooms in the building, how often students use the shared room, the various activities carried out in the shared room, and the students' duration doing activities in the shared room.

| Table 1. Variable interaction 1 | Frequency | Percent | Valid Percent |
|---|---|---|---|
| Variable | strongly unavailable | 2 | 1.7 | 1.8 |
| | unavailable | 9 | 7.8 | 8.1 |
| | available | 40 | 34.5 | 36.0 |
| | strongly available | 60 | 51.7 | 54.1 |
| Total | 111 | 95.7 | 100.0 |

In the Table 1 and Figure 2, from the question about "Is there a shared room in the building? " about 54% states that shared room is strongly available within the building. This means that in the dormitories, shared room
facilities are provided as a means of socializing students. Nearly half of the students in the dormitory already know and use this shared room.

Table 2. Variable interaction 2

| Variable       | Frequency | Percent | Valid Percent |
|----------------|-----------|---------|---------------|
| never          | 18        | 15.5    | 16.7          |
| ever           | 52        | 44.8    | 48.1          |
| strongly ever  | 38        | 32.8    | 35.2          |
| Total          | 108       | 93.1    | 100.0         |

Table 2 and Figure 3, from the question about "Do you often socialize with your colleagues in the shared room?" 48% stated that occupants often socialize with the other occupant in the shared room. This means that students are quite active in using the shared room as a means of joint activities.

Questions about students' activities often do in shared rooms; on average, most occupants answered that their activities are studying, social gathering, and tutoring. The long duration they are in the shared room is around 1-2 hours/day.

4.1. Designated Open Space 1 (Sport Room)

The authors try to apply the design concept with a behavior approach along with these data from the data obtained. The results obtained are several alternatives "Designated Open Space" in the areas used as case studies. The existing room is on the 1st floor, which functions as a sports room (Futsal). At the beginning of the drawing process, this room was used as a motorcycle parking space. However, it was converted into a sports room.

Figure 3. Pie chart of variable interaction 2

Figure 4. Plan of existing room 1

The authors' design departs from behavior theory, which states that the activities that occur are seen from the routine activities (how often space is used). This space is already functioning well but seen from space's physical performance as a communal sports space. It is not very useful, so the authors are trying to improve the design to aim for a more effective and productive space function. The occupants' character who always do some sports on weekends makes this room need to be designed according to its function.
As shown in figure 5 and figure 6, the use of a wall with patterned netting partitions with net material varies with the pattern character. The idea of this pattern character is a sporty pattern with vibrant coloring to make the interior look more energetic, sporty, and comfortable for sports. Besides functioning as a partition wall, it is also useful for user space's safety and comfort. The floor is then covered with artificial turf as a base in the field that reflects the space as a sports room.

4.2. Designated Open Space 2 (Main Hall)

The second shared room, located on the 1st floor, functions as an open space area. Based on the dormitory leader's information, the occupants rarely use this room due to its two spacious and lack of privacy. When the room is used to gather, it can disturb the occupants' comfort, including noise. There are also no facilities for sitting, so they are forced to sit on the floor when people gather.
Because the space is too spacious, the authors try to develop design ideas by adding exterior elements, such as seat settings, adding plants that serve as a buffer from the noise generated by the people gathered. The neon that functions as a lighting element when the room is dark or for the sake of night activities.

![Plan of designated open space 2](image)

**Figure 8.** Plan of designated open space 2

The concept of sociopetal seat sitting is used in this space, which attracts more intimate interaction relationships and distance for all occupants to do group activities. A sociopetal room affords interaction by orienting occupants toward each other [12].

![Elevation of designated open space 2](image)

**Figure 9.** Elevation of designated open space 2

### 4.3. Designated Open Space 3 (Social room)

The third shared room is on the 2nd floor, functioning as a social room that is usually used for group work. This room is often used for socialization activities, small and large gatherings. However, due to limited space, this room is often used interchangeably. Almost the same as in the second room, there were no seating facilities, so people were forced to sit on the floor.

![Elevation of designated open space 3](image)

**Figure 10.** Elevation of designated open space 3

As can be seen in the figure 11 and figure 12, the interior design is improved by replacing floor elements with wood parqueted floors and motivation patterned wall and glass partitions as an entry area and adding a whiteboard partition as a means of making it easier to convey something in writing or can be used as an LCD layer.
5. Conclusion

From the results of these results, it can be concluded that:

- About 50% of the residents stated that communal space is available in the building, and residents often socialize in communal areas. That means that communal space facilities are available as public facilities for building occupants. It shows in 3 communal rooms, namely sports room (1st floor), open space (1st floor), a social area (2nd floor)
- Based on the author's analysis, the obstacle that occurs is that residents do not maximally use the available communal space. Researchers try to redesign these spaces using a behavior approach, namely occupant behavior, activities based on interaction variables that occur in these spaces (sports, group work, social gathering).
- The result shows that the shared room can be maximized as a space for activities that support the learning process and socialize for students.
- This finding can be a reference to improve the design consideration for future student dormitory design, especially for shared room design in the dormitory.
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