

Review Article

Systematic Literature Review Effect of Dormitory Design on Occupant Behavior

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Abstract: Dormitories are one of the important facilities in educational institutions that help carry out educational activities themselves. However, socialization activities in the dormitory often cause conflicts and disputes between residents due to cultural differences, the habits of each individual who lives in one room so that it influences the behavior of everyone who lives there. In addition, the design aspects of the dormitory are also important to study regarding the success factors of the design so that it can provide comfort for residents. This research will look at the extent to which research related to dormitory buildings influences the behavior of its residents and will map out the factors that determine the success of the hostel design. The research used the systematic literature review method by searching journals from the last 15 years using the PoP application, then reviewed with the keywords dormitory, design, and behavior and using the Scopus indexer. So that the results of the study show that the design aspects of the dormitory play an important role in the comfort and behavior aspects of the occupants. The social needs of the hostel are needed to create a design that can encourage positive interactions and provide a good community life within the hostel. The research results can be used as a reference for future dormitory designs.

Keywords: Dormitory, Design, Behavior

1. Introduction

Dormitories are places where groups of people live for a certain period of time. The dormitory is also a building that functions as a place to live that accommodates many residents. In general, dormitories are designed on a micro scale that can accommodate around 50 residents, and on a macro scale it can accommodate up to 200 rooms in a dormitory building [15]. As for various activities and activities such as socializing, studying, washing, ironing, eating and drinking, bathing, personal activities, and others. So that the dormitory requires a more flexible space, in order to facilitate the activities of the occupants. This indirectly forms the character of a room, so that it becomes a factor influencing the behavior of dormitory residents.

In designing dormitory buildings, always follow the standards that have been set. As dormitory buildings are divided according to the types of users [8]. According to

Kilicaslan, what is meant by types of dormitory building users are male dormitory buildings and female dormitory buildings. As for the dormitory building rooms, they are arranged according to user activity. In general, dormitory buildings have rooms consisting of a living room, common room, bed or bedroom, and toilet. However, for the discussion of this research, it will only discuss bedrooms or rooms in dormitory buildings.

Interestingly, bedrooms or rooms in dormitory buildings are arranged unlike bedrooms in general. As the sleeping room in the dormitory is arranged using: a dormitory system or shared sleeping rooms, in which one room is filled with 8-12 residents; and use a double room system or individual rooms. This is according to the release of a book "Time Saver Standards for Building Type" explaining the space requirements for a minimum dormitory size having a ceiling

height of 2.4 m. For more details, we can see in the table below:

Table 1. *Standard Bedroom in Dormitory.*

Number of Beds	Number of People	Min. Area Required (sq ft)
2	4	120
4	8	240
6	12	360
8	16	480
10	20	600
12	24	720
14	28	840
16	32	960

Source: De Chiara & Callender, 1990

From the discussion above, in applying the dormitory design concept it is necessary to utilize unused areas as places for joint activities. So that all activities and spaces can function flexibly [9]. However, all this time the standard design of a dormitory is only focused on the function of the room alone, and does not see the influence of the room on the behavior of its users.

Thus this study aims to see how far research has been carried out regarding dormitory buildings that influence the behavior of its residents, and what opportunities exist to enrich dormitory design standards in the Indonesian government through PUPR regulations. Different from Ratri Wulandari's research where she included literature from various sources and without classification of year of publication and substance in her research which only leads to behavior in general, so the substance of this research focuses on how hostel standards deal with residents' anti-social behavior. This study uses a systematic literature review method in the last 15 years which is then carried out a literature review to draw conclusions about what behaviors affect residents related to the influence of dormitory design. The literature data collection technique was carried out using the PoP application, with reference to the last 15 years of literature, using the keywords dormitory, design, and behavior and only using the Scopus indexer.

2. Research Methods

This study used the systematic literature review method through searching journals from the last 15 years using the

PoP application using the dormitory, design, and behavior keywords and using the Scopus indexer, which then grouped topics from keywords in existing writing, carried out by identifying themes. research with existing problems and conclude it into research results.

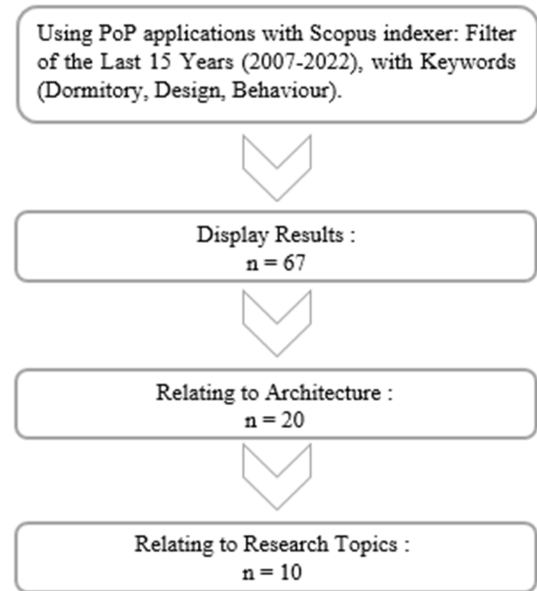


Figure 1. *Data Filtering Stages.*

The data and findings that have been obtained are followed by analysis to obtain aspects that need to be considered in the concept of dormitory buildings and occupant behavior that arises in dormitory buildings, and analysis will be carried out by discussing them against existing PUPR standards.

3. Results and Discussion

3.1. The Universe of Hostel Studies in the Last 15 Years

The research was conducted using the Systematic Literature Review (SLR) method with data sources from Scopus for the last 15 years by reviewing similar journals. Based on the results of the study, 67 articles were obtained from searches on key words. There are 20 articles related to architecture and those that display results related to topics, only 10 articles are obtained, with the following details:

Table 2. *Research Data.*

No.	Writer/ Writer team	Title	Journal Name	Year	Journal Substance
1.	Yuan, Changzheng. Lv, Jun. VanderWeele, Tyler J.	An Assessment of Health Behavior Peer Effects in Peking University Dormitories: A Randomized Cluster-Assignment Design for Interference.	PLoS ONE	2013	There are room groupings and zoning areas in dormitories that are not optimal for residents if the dormitories are divided based on their age.
2.	Ru, Lei Si, Wei	Dormitory management and boarding students in China's rural primary schools	China Agricultural Economic Review	2015	The ventilation ducts that were implemented which were not effective against the climate made the dormitory residents feel colder at night.
3.	Mmerek, Daniel Akpaca, Wilfried Denis	Investigation of students' comfort and adaptation in university dormitories in humid subtropical	Cogent Engineering	2021	Improved design of dormitory buildings that have not been able to make adjustments to the ambient temperature and climate so that the

No.	Writer/ Writer team	Title	Journal Name	Year	Journal Substance
		climatic area in winter in Chongqing, China			impact becomes an unsustainable building.
4.	Lo, June C. Twan, Derek C. K. Karamchedu, Swathy Kai Lee, Xuan Lynn Ong, Ju Van Rijn, Elaine Gooley, Joshua J. Chee, Michael W.L.	Differential effects of split and continuous sleep on neurobehavioral function and glucose tolerance in sleep-restricted adolescents	Sleep	2019	The application of the private concept to dormitory buildings but triggers minimal socialization towards residents and the environment.
5.	Kustiani Khidmat, Rendy Perdana	Re-design Shared Room Based on Behavior Architecture Approach (Case Study: Male Student Dormitory, Institut Teknologi Sumatra)	IOP Conference Series: Earth and Environmental Science	2021	The design quality of shared spaces in dormitory buildings is ineffective so that residents are not motivated to increase their creativity and productivity.
6.	Kustiani Khidmat, R. P.	Post-occupancy evaluation based on occupant behavior aspect	IOP Conference Series: Earth and Environmental Science	2021	In designing behavior-based dormitories, 8 aspects must be considered: Territoriality, Privacy, Interaction, Perception, Density, Ability, Adaptability, Endurance, and Comfort. Dormitory buildings that are designed to be remote from access to the main dormitory facilities significantly influence the behavior of residents and have an impact on the health of dormitory residents.
7.	Kapinos, Kandice A. Yakusheva, Olga Eisenberg, Daniel	Obesogenic environmental influences on young adults: Evidence from college dormitory assignments	Economics and Human Biology	2014	Space design that is intended to carry out joint activities but is set not to make noise in the room, so that it will form a pattern of occupant behavior to be calmer.
8.	Jiang, Jiani Meng, Qi Ji, Jingtao	Combining Music and Indoor Spatial Factors Helps to Improve College Students' Emotion During Communication	Frontiers in Psychology	2021	A well-designed dormitory should have different lighting locations on the sides of the building and sleeping arrangements oriented toward the rising sun.
9.	Dong, Yingjun Zhang, Xin	Investigation of the effects of awakening daylight on the morning alertness, mood, and sleep quality of male college students	Building and Environment	2020	Placement and layout design of space that is not effective can encourage the behavior of dormitory residents in terms of wasting power, so that this has an impact on the sustainability of the building.
10.	Brinkhurst, Marena Rose, Peter Maurice, Gillian Ackerman, Josef Daniel	What goes on behind closed doors? How college dormitory residents change to save energy during a competition-based energy reduction intervention	International Journal of Sustainability in Higher Education	2012	

In the table above 10 of the 67 data obtained which were then sorted according to the needs related to the research topic show the findings that the design of a hostel can be a factor in influencing occupant behavior. It is known that even though the data is obtained not only from architectural journals, there is a connection between the design of the dormitory space and behavior.

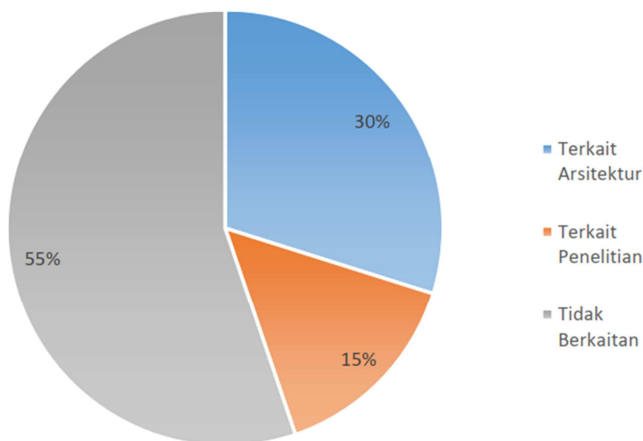


Figure 2. Percentage of the Number of Articles Found in the Study.

From the diagram above, it can be concluded that the keywords related to the hostel have been studied quite a lot. However, in the data obtained in the last 15 years, there were 67 articles that examined dormitories, but of the 67 writings, only 15% of the writings saw dormitories related to behavior, while 30% only saw dormitories related to facilities, physical buildings, spatial planning and so on. The remaining 55% is obtained without any relation to architecture or research topic.

3.2. Dormitory Design Related to Occupant Behavior

The keywords that are the topic of research show the results that dormitories have become a trend to date. However, the results of a review of papers that are relevant to the research topic show 10 papers out of a total of 67 writings in the last 15 years, from the 10 writings that became research data, it was found that there is a link between the dormitory environment and access to the activities of its residents [7]. For activities in the dormitory, residents have full control over the activities carried out such as turning off lights, fans and other electricity usage. However, the layout of the dormitories that are conceptualized and sized according to the goals of sustainability in the use of

electricity can provide a controlled regulatory effect on changes in occupant behavior [1].

In a health journal written by Yuan, C. et al [16] stated that dormitories that use a peer system or peers in sleeping activities in a shared room have a more positive behavioral influence in the room so that they can support the health of residents, also in a dormitory psychology journal which having a space as a place for joint activities accompanied by no sounds of disturbance from outside has an influence on the calm, emotional and behavior of residents [5]. Evaluation of dormitories from other studies using designs for parallel groups (stacked) and separate groups, showed different results. The behavior of the occupants of separate beds has a lower level of alertness as well as better working memory and executive function, quicker responses, and more positive moods [10].

The design of the dormitory towards the surrounding environment also needs to be considered, reviewed in other literature it was found that the dormitory facilities were incomplete and the dormitory environment's structure was very distant which had the potential to affect health, behavior, and slow down the development of residents [13]. In addition to the concept of a dormitory using a bedroom system using a peer system, it was found that behavior in the health aspect increased, and achievement in the academic aspect also increased. Many of the researchers have recommended designing dormitories using this peer-based system to improve behavior that can support the health and academics of residents [16]. Apart from this, designing a dormitory is important in seeing the effect of behavior in the dormitory room during the day and changing times as well as setting the occupant's bed, it was found that this had an influence on the morning alertness, mood, and sleep quality of the occupants [3].

When referring to the current dormitory design rules in Indonesia through PUPR Ministerial Decree No 1/prt/M/2019, it can be seen that the existing standards do not include considerations regarding occupant behavior. Because the standard only regulates things such as: room size, room layout, room functions, and so on, but not up to behavior settings. Based on a review of 10 related literature in the last 15 years, it provides an opportunity for PUPR regulations to be enriched through behavioral aspects.

In the presentation of the research results studied there is a connection that the dormitory building can influence behavior which needs to be discussed in depth. From the results of the literature review, that the dormitory has two concepts of dormitory buildings namely, the dormitory with the private concept and the dormitory with the communal concept. The concept of private and communal shows the different effects of buildings on the behavior of feelings of security and comfort [10]. However, the effect of the dormitory building on occupant behavior also depends on the ventilation system, lighting and layout of the building space [1]. This can also prove that the dormitory building has a significant influence on the behavior of residents.

However, the dormitories that are in accordance with the

standards set by the PUPR Ministerial Regulation Number 1/Prt/M/2019 are considered to meet the needs of residents, it's just that the standards set do not see any effect on occupant behavior due to factors from the dormitory design, therefore this research Further information is needed in assessing the influence based on residential buildings with a behavioral architectural approach.

In this study, based on the data obtained, it was found that the results of research with a solution if the PUPR Ministerial Regulation Number 1/Prt/M/2019 are enriched with a behavioral approach in designing and conceptualizing dormitory buildings have the potential to provide and trigger positive behavior towards residents.

4. Conclusion

That based on data from the last 15 years in this research which is sourced from Scopus dormitories have the potential for residents to behave. The difference is in dormitories with the concept of private rooms and communal rooms or with a block system. The private concept is said to have higher privacy when compared to a communal concept room, but this allows reduced encouragement to make friends, do activities with others, and socialize [2]. Whereas dormitory residents who are conceptualized using communal rooms have behavior that is more familiar with others and easy to socialize, as well as positive activities carried out because it encourages residents who prefer to do a lot of activities in the room together in terms of collaborating and exchanging ideas as well as other positive things, different with residents of private rooms who tend to be more aloof and anti-social so that the behavior and character of these residents makes them feel alien to people and the outside environment.

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