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Design Report

Redesigning Concept of the UIN Raden Intan Lampung's Student Dormitory

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ABSTRACT

The existence of a dormitory in the UIN Raden Intan Lampung is one of the supporting activities for lectures. Plus, the number of students who come from outside the city of Bandar Lampung makes the dormitory a very interesting place to live. Meanwhile, the dormitory capacity is still very limited. Therefore, it is necessary to redesign so that capacity can be increased, and student activities can be accommodated. This study aims to redesign the current student dormitory. The research method is carried out by documentation at the site location, analyzing the problems and resulting the concept. The results showed that there were three main concepts in redesigning the student dormitory of UIN Raden Intan Lampung, namely: site and environmental, building user and the building itself.

Keywords: *redesign; dormitory; problem; users; Lampung, concept*

INTRODUCTION

Population growth and density from year to year continues to increase, this is proven in 2015 the population density in Lampung reached 8,117,268 people. The population density in Bandar Lampung reaches 979,287 people (BPS, 2014). One of the population densities is caused by the existence of several educational facilities such as the Raden Intan Lampung State Islamic University (UIN RIL).

UIN Raden Intan Lampung is a large campus that is supported by all facilities. It has a large enough attraction for prospective students both from within and outside the city, the data of students who enter the Raden Intan Lampung State Islamic University every year is increasing, this is evidenced from 2014- 2018 totaled 25,347 students.

The number of prospective students who want to enter this big university automatically increases the need for housing, especially for those who come from outside the city and do not have a place to live close to the university. Lots of residential places are offered in the area around the educational institution, ranging from boarding houses to rented houses.

One of the facilities provided by the UIN Raden Intan Lampung university is a dormitory that is used for those who come from outside the city, or who are far from where their parents live (in the city) and there are also reasons to want to be more independent.

Student dormitories are shared residences for students that are built in various scales, ranging from small scale (up to 50 rooms) to very large scale (more than 200 rooms). Student dormitories are also residential buildings for students while studying with the aim of being able to interact socially as an effort to develop their personality. As a place to live for students who initially do not know each other, each student needs to think about problems related to patterns of interaction between individuals and the living environment in the dormitory (Wulandari, Akmal, Yohanes, & Nasrudin, 2020).

Apart from that, the dormitory must also be able to meet the needs of its residents, especially the area or size of the room that is sufficient. In general, the problems that often occur in student dormitories are the comfort experienced by users, both circulation and living space in student dormitories such as corridors, stairs and so on. if these problems are not addressed this can cause inconvenience problems for student dormitory users.

Previous study about dormitory was already done by several researchers. In China for instance, the research about air conditioners has been conducted for understanding the characteristics of their usage (Chen, Zhuang, Zhang, Fu, & Zhang, 2017). In addition, study about ventilation rate was done (Liu, Wang, Zhang, Dong, & Song, 2015). Furthermore, students' thermal comfort (Ning, Wang, Zhang, & Ji, 2016), life cycle and cost assessment (Huang, Liu, Krigsvoll, & Johansen, 2018). On the other hand, another study about heat and power in dormitory conducted in Iran (Khalilarya, Chitsaz, & Mojaver, 2021). Recently, study about SARS-CoV 2 detection in USA (Vo et al., 2022)(Lu et al., 2022)(Jain et al., 2022).

Meanwhile the recent research about the student dormitory of UIN Raden Intan Lampung was done (A. S. Munawaroh & Jajuli, 2019)(Ai Siti Munawaroh, Jajuli, & Kustiani, 2020). Student dormitories should meet the comfort and in accordance with the standards set so that students can study and study well. Therefore, it is necessary to find out the best concept of the UIN Raden Intan Lampung's student dormitory in order to redesign that building.

METHODS

The method used in this research is descriptive qualitative. While the data collection technique used in this research is a field survey. The results of the field survey are then described graphically using several design software. Identification is done by taking into account the condition of the location when conducting a field survey for further analysis based on literature studies such as books, regulations, journals and other internet sources. While recommendations are made by the author based on relevant references. The concept is made by taking from the recommendation.

RESULT AND DISCUSSION

Environmental and Site Aspects

Problems

The research location is in the educational development area of the Sukarama region. This area is designated as a service area that functions as a supporter of the Provincial Government Center, higher education, Trade and Services, Settlement/ Housing, Home Industry, and Conservation/ City Forest.

The Basic Building Coefficient (KDB) in this area is 60% and the Building Floor Coefficient (KLB) is 2.7 (PERDA, 2021). In this area there is UIN Raden Intan Lampung with thousands of students, but the available dormitories still do not meet the needs of most students who want to live there. Based on these problems, identification and analysis were carried out regarding the possibility to redesign the student dormitory of UIN Raden Intan Lampung which could accommodate housing, teaching and learning facilities and socializing. This redesign is expected to provide benefits for students. The problems that often occur in this area, when viewed from the environmental and site aspects are:

1. The achievement and circulation of entrance access to reach the site is quite far from the main road and the facilities needed by students. The arrangement of entrance access is an important thing that must be considered in order to make students comfortable in carrying out daily activities.



Figure 1. Access and circulation

2. Environmental activities around the site are dominated by student and lecturer activities with very high teaching and learning activities. In addition, there is agricultural land so that zoning arrangements are needed to form an ideal zoning channel and location for the needs of residents.

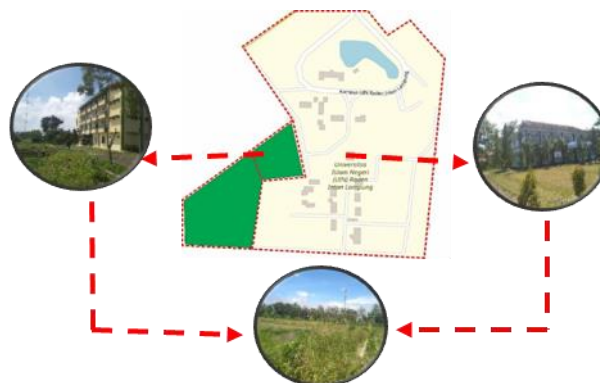


Figure 2. Environmental Activities of Site

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3. Organize and determine the area of the student dormitory that is comfortable with the environment in the middle of the education area. The redesign of the building in the middle of the educational area must pay attention to what is designed, so that the design can blend with the buildings around it and do not damage or cause problems to the environment.

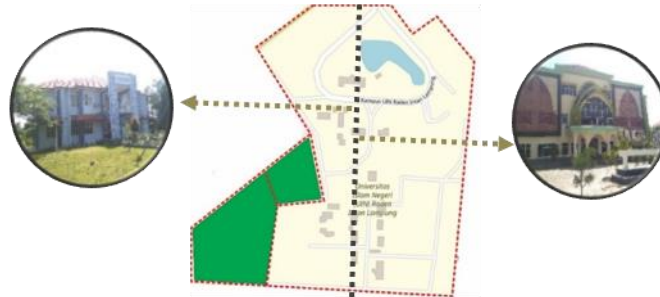


Figure 3. Site Environment Arrangement

Characteristics and Activities of the Environment Around the Site

Analysis of environmental characteristics around the site aims to determine the dominant land use in the area. The environmental characteristics and activities surrounding the site affect the long-term development or progress of development at the designated site. The chosen design site is a site on the campus area of UIN Raden Intan Lampung, Sukaramere, Bandar Lampung. The criteria to be considered for selecting this site are as follows:

1. Relatively flat site, potential for land development.
2. Located not far from campus and still within the campus area.
3. There is a potential site that can be developed.
4. The site between the main roads.

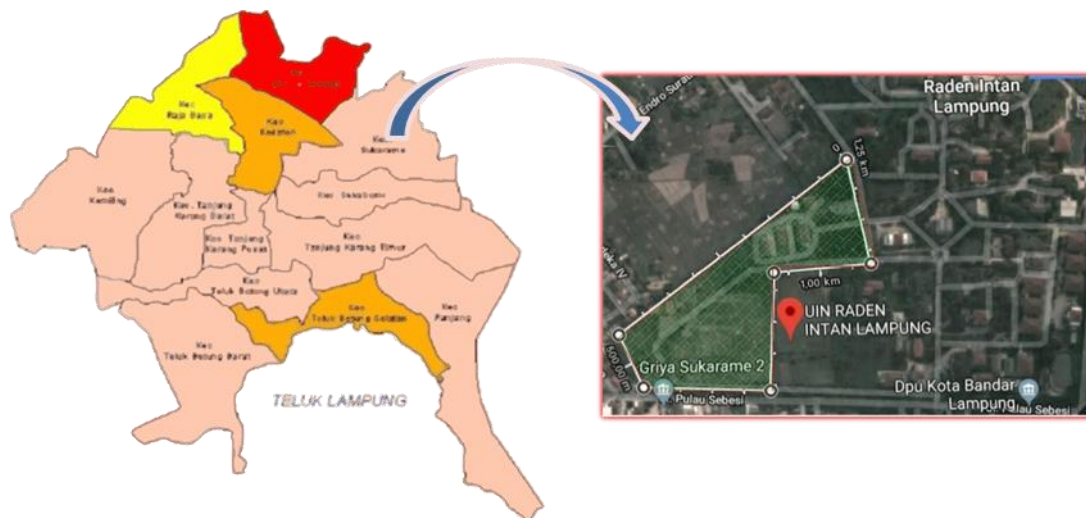


Figure 4. Site Location

The following is data regarding the selected site locations:

- | | |
|------------------|--|
| a. Site location | : The site location is on Letnan Kolonel H Road, Endro Suratmin Road, Sukaramere District, Bandar Lampung City, Lampung Province, Indonesia. |
| b. Site area | : Total design site area \pm 6.3 Ha. |

- | | |
|-------------------------------------|---|
| c. Site restrictions | : Site restrictions are houses residents and rice fields. |
| d. Building base coefficient (KDB) | : Building base coefficient (KDB) is 60%. |
| e. Building floor coefficient (KLB) | : Building floor coefficient (KDB) is 2.7. |
| f. Number of floors (JL) = KLB: KDB | = 162.810 M2: 36.180 M2
= 4.5 Floors |

At the design site, namely the student dormitory of UIN Raden Intan Lampung, there are many activities or activities carried out around the site:

- Around the site the most activities carried out are the learning process because the site is located in the campus environment.
- Activities around the hostel are agriculture and rice fields as well as trading.
- Around the site there are also sports activities because there is a soccer field that is intended for students to exercise every afternoon.

Environmental Base

Environmental baseline analysis aims to determine the description of the face of the environment around the planning and design site (site location). It is intended that at the time of determining the concept of planning and design, researchers can incorporate the surrounding elements that are around the site to create environmental harmony both in terms of building facades and functionally.

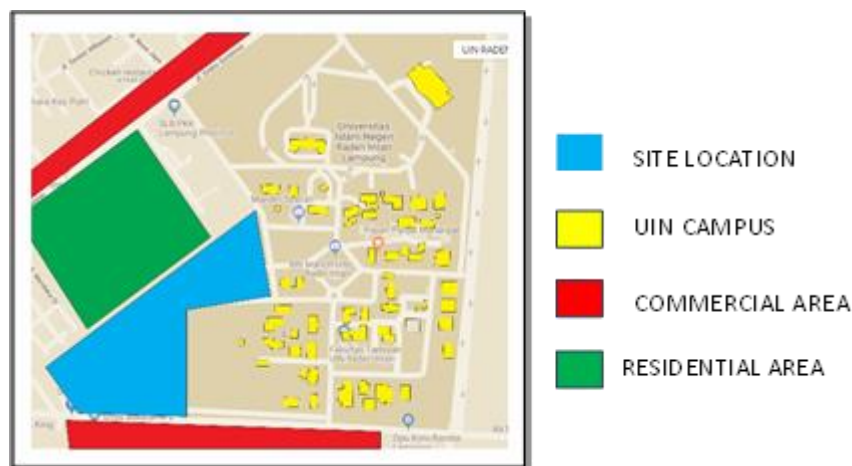


Figure 5. Environmental Base

The picture above describes the results of a review of the environmental baseline around the location of the student dormitory redesign planning site. From the results of this review, the area around the site location is dominated by rice fields and trade as well as the UIN Raden Intan Lampung campus. From these data it can be concluded that around the site location there are no facilities to support learning facilities, it is necessary to redesign student dormitories so that the learning process becomes comfortable.

Site Form and Topography

Analysis of the shape and topography of the site aims to describe the condition of elevation or slopes, contours and landforms at the site to be designed. This is useful as a basis for determining the existing laying of the building mass and building design solutions to the site topography.

Site contours are relatively flat with contours of ± 0.00 m to $+1.00$ m. With such a contour shape, there will be no cut and fill on the site which will be calculated based on KDB needs. Indonesia has two seasons, namely the rainy season and summer which are very useful for determining the orientation of the building mass. While the wind direction is influential as a reference to determine where the openings will be placed.

View

There are views from various directions, namely east, west, south and north, among others.

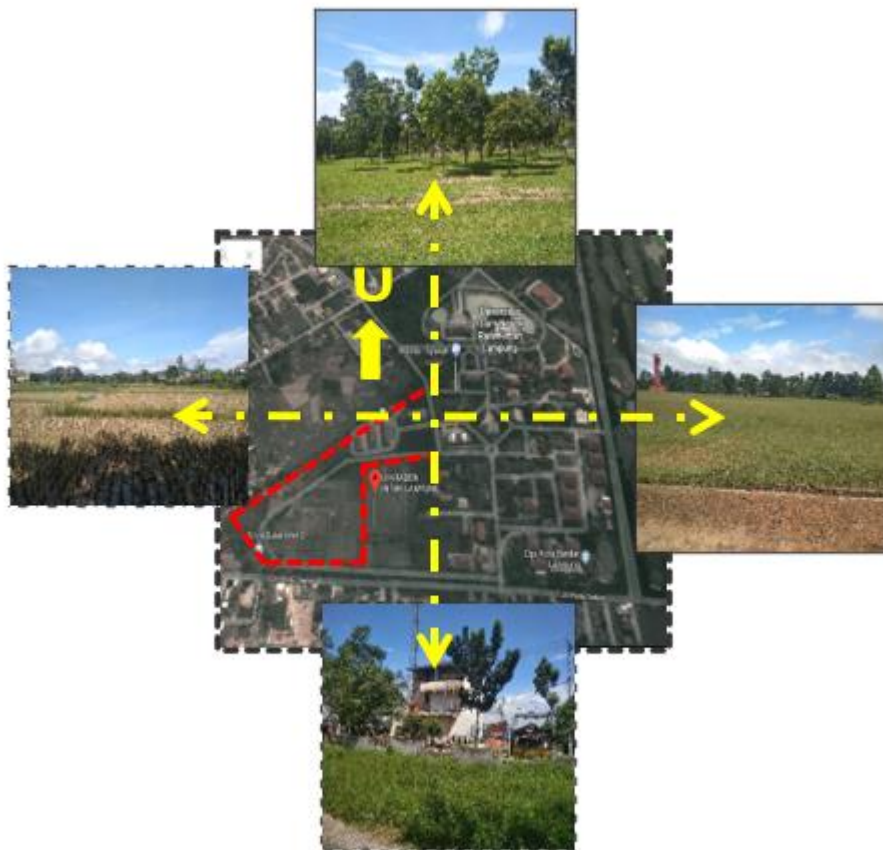


Figure 6. Site Views

1. In the east there is a view of the football field and will be used as a means of supporting student dormitories.
2. While in the west is a view facing housing.
3. The south direction is a view overlooking the Sebesi Island Road, and opposite the Public Works Office of the City of Environment. This view is used for the entrance in case of an emergency.
4. The north direction is the best view, because this view faces lush trees and rice fields.

Noise

Noise at the site comes from motorcyclists and cars located on the Pulau Sebesi road and the campus road and Endro Suratmin road. The highest noise level is on the Pulau Sebesi road, which can be

judged by the volume between 100-115 vehicles/ minute and the distance close to the site. The moderate level of noise comes from Jalan Endro Suratmin and the campus road. How to overcome this can be by using soundproof construction on the walls of the room, planting trees as a sound filter and providing distance to the building.



Figure 7. Site Noises

Climatology

The building can be positioned in a straight line with the north and south orientations on the front and back using the analysis of the sun's orientation. In order to avoid letting too much glare into the structure, it is possible to maximize the use of sunshine as natural lighting in the south and north. By employing double glass, heat from the sun may be captured in the east and west. The direction of the building, the layout of the space, and the choice of materials must all take into account the wind and sun's route. Since the location faces south, the sun is very bright and scorching first thing in the morning.

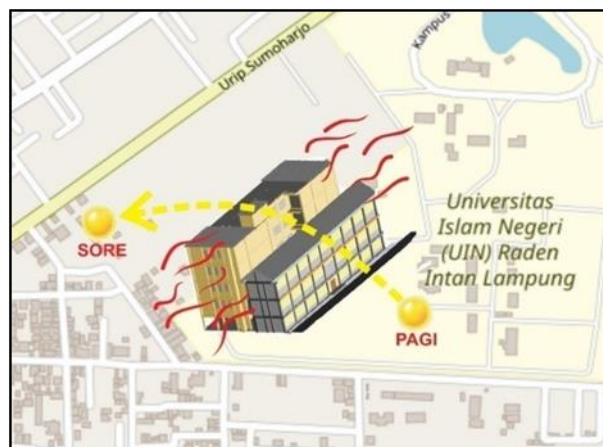


Figure 8. Sun's Orientation to the Site
Source: Google Map 2019

Alternatives:

- a. The impact of sunshine on the chosen material will determine whether the space is hot or cold. As a result, in this instance, the choice of materials and the design of openings for tall buildings must be reassessed because they have an impact on the building load and wind pressure.
- b. The usage of apertures like windows and skylights is planned with big proportions and covered with sun shading to allow sunlight to enter the building appropriately and reduce the need for lighting during the day.
- c. Plants are planted on the side of the structure that receives direct sunshine; the plants chosen are shade plants, which allow direct sunlight to first pass through the plants before entering the building. Only rooms on the first and second floors use this technique.
- d. Plants or trees can be used to help with comfort planning or to deal with the effects of severe winds.
- e. The use of fin grilles can lessen the amount of wind pressure that enters the structure, and an alternative for the top room is the kind of window opening.

Environmental Utilities

At the existing site, the disposal of dirty water is found in roadside ditches and swamps. The yellow dotted line is a swamp, and the white dotted line is a ditch. In the planning realization, wastewater disposal must be treated with the STP system, both bathroom water and laundry water. The water that comes out of the STP is water of third-class quality, it can be used for watering plants and washing equipment and is not for consumption. Collect dirty water in a retention pond that functions as groundwater absorption.



Figure 9. Environmental Utilities

Site Accessibility

There are two accessibility to get to the site of Endro Suratmin Road and Pulau Sebesi Road, the analysis of the two accessibilities were;

1. Endro Suratmin Road is the main road or secondary arterial road.
2. Has a width of 5.5 meters with 2 lanes and 1 lane and 6 meters GSB.
3. The median of the road is only the dividing line.
4. There are no pedestrians beside the road, only trees and gutters.
5. The intersection in front of the UIN Raden Intan Lampung entrance location sometimes causes traffic jams because there are no road signs.
6. Pulau Sebesi Road is the second access road just south of the site with a road width of 4 meters which is currently bordered by a concrete fence.
7. There are no pedestrian ways but there is drainage.



Figure 10. Access to Site

Alternatives;

1. Make an application to the transportation office to install traffic lights.
2. Completing the zebra cross markings as a crossing point.
3. Widening of sidewalks up to 1.2 meters.
4. Provide pedestrians on Endro Suratmin Road and Pulau Sebesi Road.
5. Provide drainage as a rainwater channel.

Building Orientation

The size and type of apertures in the building will be determined by the view from within. to be able to make the most of the opening's ability to serve as a guide or a vista. Therefore, it is important to take into account the potential of the surrounding environment and the sun's orientation.



Figure 11. Building Views

1. To the south, the orientation of the building in the south direction leads to Jl. Pulau Sebesi which is the road to housing so that in this direction you can only see residential areas.
2. To the north, the orientation towards the north leads to the rice fields. View in this direction is the best among the others because we are presented with the beauty of the rice fields.

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3. To the east, the orientation towards the east gets a view of the campus building and the football field.
4. To the west, the orientation of the west also leads to densely populated settlements.

In the results of the analysis, it can be explained that the building will be oriented between the east and west directions longitudinally. This is so that the building mass can be situated on the north side of the site, which is the nicest section of the site, and face south.



Figure 12. Building Mass Orientation

Site, Zoning and Spatial

Zoning analysis is carried out based on previous analyzes of environment, sun, noise, view, and achievement. Referring to these analyzes; the data can be concluded as follows:



Figure 13. Site Zoning

Landscaping

The landscape on the site is still vacant land with lots of vegetation. While hard material is used to avoid mud and dirt for pedestrians, paving blocks are used for sidewalks.

The elements that affect the landscape arrangement are:

1. Soft elements (soft materials)

Soft elements include grasses, shrubs, and trees. This element is employed as a ground cover element, a directing element, a source of shade, and a barrier, serving as both a noise and a heat barrier system barrier. The chosen plant must satisfy a number of criteria, including resistance to pests and diseases, longevity, ease of planting and maintenance, ability to grow in lowlands, and attractive shape.

2. Hard elements (hard materials)

Hard elements include pedestrian cover elements and street furniture. The function of the hard element is as a guide, circulation path, aesthetic element, and orientation center.

The site region experiences so intense sunlight that it must be mitigated by landscape design, namely by including enough foliage. The placement of plants can serve as a natural filter by capturing dust, air pollution, and sound in addition to providing protection from the sun's heat and directing outside airflow.

Human Aspect

Table 1. Human Aspect

No	Type of activity	User	Activities	Space Requirement
1	Main/ private	Students	Sleep Eat Bath Urinate	Bedroom Dining room Bathroom toilet
2	Education	Students	Study	Shared study room
3	Social	Students and guests	Chat Or socialize	Common sitting room
4	Support	Students and administrators	Eat and drink together Do photocopy and buy college supplies Daily necessities laundry Cash withdrawal Joint event Worship	Canteen Photo copy Cooperative Laundry ATM Multipurpose building
5	Administration	Administrators	Administrative activities Give Information	Islamic Prayer Room Administration room Information room
6	Service	Technician and cleaning staff	Keeping an eye on the generator Controlling power supply Storing goods Staff and cleaning staff	Generator room control room Panel Warehouse Staff room and cleaning room
7	Sport	Students	Sport	Field (outdoor)

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The human aspect is one of the most important factors in designing a building, because humans in this context are the actors of activities in a building. Based on the data obtained, the number of students at UIN Raden Intan Lampung from 2014-2018 was 25,347 students.

Therefore, there are many things that must be considered in redesigning this area, the site is located in a campus environment where there are many human activities around it. Based on this aspect, this area is quite dense and has problems including:

- a. Student activities are very dense; it requires circulation of space and a room that is wide enough to make it easier for students to carry out activities.
- b. There is no place to accommodate student activities in weekly, monthly or yearly activities.
- c. The number of students is increasing every year and the dormitory facilities are not increasing, therefore many students are staying
- d. Because students are busy with activities that concern them with environmental cleanliness, such as littering.
- e. Sufficient accessibility for people with disabilities.
- f. Adding land area for students who bring private vehicles

Analysis of Space Requirements Based on Activities

Analysis of space requirements based on activities carried out by students every day in general.

Table 2. Analysis of Space Requirements Based on Activities

No	Activity Type	Users	Activity	Space Needs
1	Main/ private	Students	Sleep Eat Bath Urinate	Bedroom Dining room Bathroom Toilet
2	Educative	Students	learn	Shared study room
3	Communicative	Students and guests	Chatting Socialization	Shared living room
4	Support	Students and administrators	Eat and drink together Photocopies and sells college supplies Selling daily necessities Washing and ironing Cash withdrawal Joint events Worship	Canteen Photocopies Room Cooperative laundry ATM Multi-Function room Musholla
5	Management	Management	Administrative activities Giving Information	Administration room Information room
6	Service	Technicians and cleaners	Supervising the generators Controlling the electricity supply Storing goods	Generator room Control room Panel Warehouse Staff and janitor's room

No	Activity Type	Users	Activity	Space Needs
			Staffs and cleaners resting	
7	Sport	Students	Sport	Sport Field (outdoor)

Analysis of Grouping by Nature of Activities

Based on the activities in the student dormitory as well as the differences in goals between users, it is classified from the characteristic of its activities into private, semi-private, public, and service areas as follows:

Table 3. Analysis of Space Requirements Based on Activities

No	Users	Activities	Characteristic
1	Students	<ul style="list-style-type: none"> -Sleep -Eat -Bath -Urinate -Learn -Chat -Eat and drink together -Make a photocopy and buy college supplies - Daily necessities - Food and drink together - Cash withdrawal -Joint event -Worship -Sport 	<div>Private</div> <div>Semiprivate</div>
2	Administrators	<ul style="list-style-type: none"> -Administrative activities -Give information 	Semiprivate
3	Guests	<ul style="list-style-type: none"> - Visiting friends - Sitting in the garden - Parking bicycles/ vehicles 	Public
4	Technicians and cleaners	<ul style="list-style-type: none"> - Visiting friends - Sitting in the garden - Parking bicycles/vehicles -supervise generators -control the power supply -storing goods -staff and cleaning staff 	Service

The activity actors are users of the Raden Intan Lampung Student Dormitory facilities as shown in the following scheme.

1. Student Dormitory Occupants

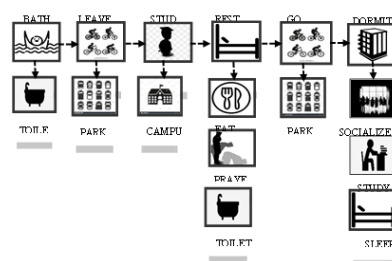


Figure 14. Dormitory Resident Activities

2. Managers and Technicians

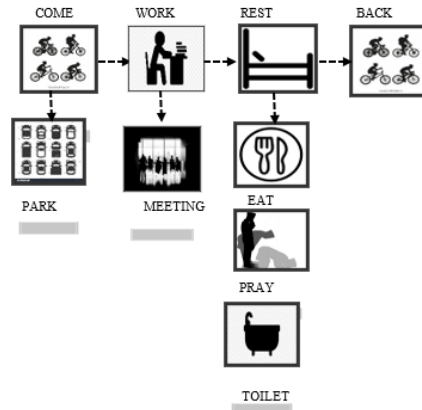


Figure 4. 1 Manager Activities

3. Guests

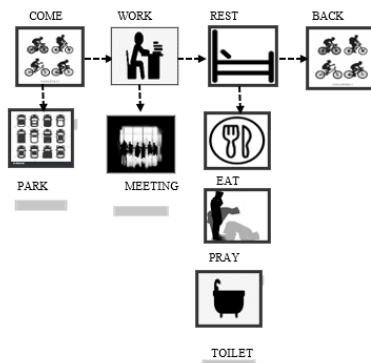


Figure 15. Guests Activities

Building Aspect

Problems in the aspect of the building arise due to factors from outside and from within. External factors such as access to circulation in and out of the site, climatic factors, environmental factors, and internal factors such as the preparation of building patterns, structural systems, utility systems. So, the factors that may arise and affect the building aspect of the planning area for the Redesign of the Student Dormitory of UIN Raden Intan Lampung include:

- How to arrange the placement of the planned rooms and buildings in order to accommodate the activities of the users.
- How is the orientation of the building so that it can obtain maximum and comfortable natural lighting and ventilation.
- How to design buildings in accordance with predetermined space standards and materials used in accordance with the needs of the surrounding environment.
- How to design a building for people with disabilities in accordance with space standards and user comfort.
- Arrangement of green open space in the building area so that it can be useful for users such as sports and socializing.

Space Requirements and Size

The space requirements for the Raden Intan UIN Student Dormitory are obtained from the space requirements of the previous building and then reviewed and calculated again with the standard space requirement formula from the "Architect Data" book:

Table 4. Dormitory Space Needs

Male/ Female Students							
Personal Main Activities							
Room Type	Room	Quantity	Standard	Source	Capacity (Person)	Area	Total Area
Double	Bedroom + toilet	1	4m x 4m	(Ernest & Neufert, 2000)	1250	16 m ²	20000 m ²
	total						20000
	Circulation 20%						8000
	Grand Total						28000 m ²
Educational Activities							
Library	Staff room	1	3.5m x 2m	(Ernest & Neufert, 2000)	4	7 m ²	28 m ²
	Locker room	1	3m x 4m	assuming	2	12 m ²	24 m ²
	Reading room	1	1m x 1m	(Ernest & Neufert, 2000)	2500	1 m ²	2500 m ²
	Computer room	1	1m x 1m	(Ernest & Neufert, 2000)	2	1 m ²	2 m ²
	Warehouse	-	10% of Reading room		1		250 m ²
	Total						2801 m ²
	Circulation 20%						5602 m ²
	Grand Total						8403 m ²
Support Room Standard							
	Mosque		1m x 0.6m	assuming	2500	0.6 m ²	1500 m ²
	Cooperative room		10m x 7m	assuming	-	70 m ²	70 m ²
	ATM	1	1.5 m x 1.5m	assuming	4	2.25 m ²	9 m ²
	Photocopy	1	2 m x 1.2m	assuming	6	2.4 m ²	14.4 m ²
	Canteen	1	1m x 1.2m	(Ernest & Neufert, 2000)	2500	1.2 m ²	3000 m ²
	Multifunction room	1	0.6m x 1m	(Ernest & Neufert, 2000)	2500	1 m ²	1500 m ²
	Total						6090.4 m ²
	Circulation 20%						1218.08 m ²

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							Grand Total	7308.48m ²
Standards for Communicative Activities and Recreational Activities								
Common room	Common sitting room	1	1m x 1m	(Ernest & Neufert, 2000)	2500	1 m ²	2500 m ²	
	Playing room							
	Recreation room							
	total							2.500 m ²
Circulation 20%								500 m ²
							Grand Total	3.000 m ²
Service Activity Room Standard								
Service	Generator room	-		(Dechiara et al., 2001)	1	25 – 30 m ²	30 m ²	
	Panel control room	-		(Dechiara et al., 2001)	1	25 – 30 m ²	25 m ²	
	Warehouse	-		(Dechiara et al., 2001)	1	25 – 30 m ²	30 m ²	
	Laundry	-	5m x 5m	assuming	1	25 m ²	25 m ²	
	Staff and Janitor room	-	5m x 5m	assuming	1	25 m ²	25 m ²	
	total							135 m ²
	Circulation 20%							27 m ²
							Grand Total	162 m ²
Standar Ruang Pengelola								
Management room	Administration room	1	3m x 5m	(Ernest & Neufert, 2000)	-	15 m ²	15 m ²	
	Waiting room	-	4m x 4m	assuming	-	16 m ²	16 m ²	
	Information room	-	3m x 3m	assuming	-	9 m ²	9 m ²	
	Toilet	1	1.5m x 1m	(Ernest & Neufert, 2000)	2	1.5 m ²	2.25 m ²	
	Total							42.25 m ²
	Circulation 20%							8.45 m ²
							Grand Total	50.7m ²

Space Connectivity

Based on the considerations in analyzing the spatial relationship, the activities carried out by each group are then grouped into spatial functions.

Parking Needs

To determine parking needs the author assumes that visitors use private vehicles and public transportation (city public car). To determine the parking area, each building area of 60 m² parking space is provided 12.5 m².

Based on the space requirement capacity that has been made in the previous table, it has been assumed that there are 2500 residents using 39% private vehicles (4% cars, 15%

motorbikes and 20% bicycles) and 61% walking. This means that 975 residents use private vehicles, and 1413 residents walk.

- a) Parking for Goods Needs : 2 small trucks.
: $2 \times 21 \text{ m}^2 = 42 \text{ m}^2$
- b) Parking for Disabled : $3.70 \text{ m}^2 \times 5.00 \text{ m}^2 = 18.50 \text{ m}^2$
- c) Parking for Private Vehicle:
- Cars : 4% of residents use cars (400 people) or 100 people. In 1 car contains 4 people, so the calculation of visitors who use a car is 400 people: 4 people 100 cars.
- Motorcycle : Occupants who use motorbikes (375 people) 15% or 375 people. In 1 motorbike contains 2 people, so the calculation of visitors who use motorbikes is 375 people: 2 people, 187 motorbikes.
- Bicycle : Occupants who use bicycles (500 people) 15% or 500 people. In 1 bicycle contains 1 person, so the calculation of visitors who use motorbikes is 500 people: 1 person is 500 motorbikes.
- d) Private Vehicle Parking Area: Cars = $100 \text{ cars} \times 12,5 \text{ m}^2 = 1100 \text{ m}^2$
: Motorcycles = $187 \text{ motorcycles} \times 2,1 \text{ m}^2 = 392.7 \text{ m}^2$
: Bicycles = $500 \text{ bicycles} \times 2,1 \text{ m}^2 = 1050 \text{ m}^2$

CONCLUSION

The results showed that there is analysis that conducted, namely: space requirements based on activities and Grouping by Nature of Activities. In addition, there are three main concepts in redesigning the student dormitory of UIN Raden Intan Lampung, namely: site and environmental concept, building user concept and the building concepts.

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