Travel Behavior of the Engineering Students of UNHAS and UIN Alauddin in Meeting the Needs of Shopping Facilities

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Abstract. In the last ten years, there have been two developing universities in Gowa Regency (Faculty of Engineering, University of Hasanuddin and UIN Alauddin). Both universities are the centres of growth in housing and settlements, especially student rental houses. The development of housing has not yet been served with adequate housing/city infrastructure and facilities. The purpose of this study are: 1) to analyze the student travel behaviour in meeting their shopping needs (daily or monthly), 2) to explain the visit location of shopping facilities of those groups of student, 3) to arrange the resource development directions for environmental and sub-district development. The data were collected from field surveys, and online questionnaire using non probability sampling. The analytical method used were spatial and descriptive analysis. The results of analysis showed that the dominant student travel behaviour using a motorcycle, both for daily and periodic shopping needs. Travel behaviour always done together (two people). Behaviour movements, using motorcycles, both to the service centre in the environmental scale or district and city scale. The location of the visit is an environment scale service centre with a distance of ± 200 meters and a district or city scale service centre with a distance of > 5 km. Direction of development to support the dominant path of students using motorbikes within short reach is, provided a bicycle lane and pedestrian shade. In addition, the procurement of mass transportation to support long-distance travel to district and city-scale shopping centres. Development of sub-district service centres can be directed using the concept of mixed use and smart transportation (TOD), where the distance of the two groups of student housing is within a radius of ± 5.2 km.

1. Introduction

A campus or university is a small community that can trigger the growth of the surrounding urban area. At present the Faculty of Engineering of Unhas and UIN Alauddin campuses are centers of growth that encourage the construction of rental housing to meet the needs of students living around the campus. The construction of the campus in the Samata-Bontomarannu education area has a significant influence on the surrounding physical area such as an increase in building density and population. The education area also influences the social conditions of the community. Like the level of education, work, culture, community habits, and religion.

Along with the increase in students each year also raises a variety of student behavior, especially student travel behavior in meeting their needs. This is certainly a special concern for business people to understand the behavior of Unhas and UIN Alauddin Engineering students as one of the main samples in getting better understanding and planning to conduct business activities around Bontomarannu-Samata.
The purpose of the research: 1) analyze the behavior of the students of Unhas Engineering and UIN Alauddin in meeting the needs of shopping facilities; 2) explain the location of the visit of Unhas Engineering and UIN Alauddin students' shopping facilities in meeting their needs 3) arrange direction for the development of environmental infrastructure in meeting the shopping needs of Unhas Engineering and UIN Alauddin students according to the student's travel behavior.

2. Literature Review

2.1. Behavior
Behavior is an action that is directly involved in obtaining a need for goods and services, besides that the behavior involves a decision making process before doing something, behavior is a process (individual or group) in meeting their needs and desires [1]. Behavior is dynamic, meaning that behavior is always changing and moving all the time. This has implications for the study of consumer behavior [2]. Social behavior is a term used to describe the general behavior exhibited by individuals in society, which is basically in response to what is considered acceptable or unacceptable by one's peer group [3].

Behavior in selecting a product is based on or influenced by factors: a) cultural factors, b) social class, c) social group and reference factors, d) family, e) personal factors, f) location factors.

2.2. Travel Classification
Travel is a one-way movement from the home zone to the destination zone, including walking. Stopping by chance is not considered a destination of movement even if it is forced to make a change of route. Movement is often interpreted as the movement back and forth, in the science of transportation usually the analysis of the two must be separated. Five categories of residence-based movement objectives, namely:
   a. Movement to work
   b. Movement to school or university (movement with the aim of education)
   c. Movement to shopping
   d. Movement for social interests
   e. Movement for recreational purposes

   The purpose of the work and education movement, called the main movement goal which is a must to be carried out by everyone every day, while the other movement objectives are only optional and not routinely carried out [4].

2.3. The choice of Mode of Travel
The interaction between students and shopping locations requires students to decide how the interaction should be done, because interactions that occur between students and shopping locations will lead to travel, which in turn requires a choice of modes [5]. In choosing a mode of transportation there may be little choice or no choice at all. People who have a mode choice are called Captive to that mode. If there is more than one mode, the mode chosen will usually have the shortest, fastest and cheapest route, or a combination of the three. Decisions in modal choice are based on several factors such as time, distance, efficiency, cost, safety and comfort [1].

3. Research method
The research method is descriptive research, using qualitative and quantitative analysis with ArcGis 10.1 analysis tools. The research locations in Somba Opu and Bontomarannu Subdistricts were divided into 3 location segments, namely the distance of 500 m, 501-800 m, and 801-1200 m with the coordinates of the Unhas Technical Campus and UIN Alauddin.

   The population in this study were all Unhas Engineering students and UIN Alauddin who were still actively studying and living around the study site. The research sample consisted of 184 students, consisting of 89 students from Unhas Engineering and 95 students from UIN Alauddin.
Research variables namely social community include: individual / group, community internal and external community and use of modes include the type of mode, vehicle ownership and costs. Visiting locations include: places visited, distance of shopping locations, length of travel, scale of service centers.

4. Findings and Discussion

4.1. The Analysis of Student Travel Behavior in Meeting the Needs Of Shopping Facilities

Tables 1 and 2 show the student's travel behavior (Unhas Engineering and UIN Alauddin) according to the location of residence based on the number of respondents to the social travel behavior of the student community according to the location of residence in terms of 2 factors namely internal and external factors. Internal factors that are intended in this study are friends of one study program, one boarding / rented building and fellow regional friends, while for external factors that are friends from different campuses / departments and with local residents.

| Table 1. Unhas engineering student behavior according to the location of residence |
|---------------------------------|------------------|---------------|
| No Location of Residence       | Travel Behavior  | Number of Unhas Respondents |
| --------------------------------|------------------|-----------------------------|
|                                | Internal Community | Eksternal Community |
|                                | 1    | 2   | 3-5 | 1   | 2   | 3-5 | Total |
| 1 500                          | 9    | 14  | 15.7% | 0  | 0%  | 1  | 1,1% | 1  | 1,1% | 0 | 0%  | 25 |
| 2 501-800                      | 18   | 35  | 39.3% | 2  | 2.2% | 2  | 2.2% | 2  | 2.2% | 0 | 0%  | 59 |
| 3 801-1200                     | 1    | 3   | 3.4%  | 0  | 0%  | 0  | 0%  | 0  | 0%  | 0 | 0%  | 5  |
| Total                          | 28   | 53  | 59.5% | 2  | 2.2% | 3  | 3.4% | 3  | 3.4% | 0 | 0%  | 89 |

| Table 2. UIN Alauddin student behavior according to the location of residence |
|---------------------------------|------------------|---------------|
| No Location of Residence       | Travel Behavior  | Number of UIN Alauddin Respondents |
|                                | Internal Community | Eksternal Community |
|                                | 1    | 2   | 3-5 | 1   | 2   | 3-5 | Total |
| 1 500                          | 4    | 23  | 24.2% | 9  | 9.5% | 0  | 0%  | 3  | 3.2% | 0 | 0%  | 39 |
| 2 501-800                      | 9    | 22  | 23.2% | 8  | 8.4% | 1  | 1%  | 2  | 2.1% | 2 | 2.1% | 44 |
| 3 801-1200                     | 2    | 6   | 6.3%  | 2  | 2.1% | 0  | 0%  | 2  | 2.1% | 0 | 0%  | 12 |
| Total                          | 15   | 51  | 53.7% | 19 | 20%  | 1  | 1%  | 7  | 7.4% | 2 | 2.1% | 95 |

Based on table 1 and table 2, where the radius of 501-800 is the most dominant service radius of activity occurring by the perpetrators of the trip. Student behavior based on internal factors and external factors where the behavior of traveling with internal communities has a percentage of 61.7% of Hasanuddin University students and 41.1% of UIN Alauddin students is more dominant behavior occurs compared to the behavior of external communities. This is due to close kinship relations.

4.2. The used of Mode

4.2.1. Type of Mode. Type of mode is the type of vehicle used by students from the location of residence for travel divided into 5 types of modes, namely: walking, bicycle, motorcycle, car, and public transportation.

Based on Tables 3 and 4, the types of transportation modes used by students of Hasanuddin University and UIN Alauddin according to the location of residence are divided into five categories, where the motorized transportation mode is the most dominant mode used by students of both Hasanuddin University and UIN Alauddin by 88.8% and 81.1% to shopping facilities both living in the three segments and outside the study location.

The existence of public transportation is still rarely used by students who live in rental residences around the Technical University of Unhas and UIN Alauddin as modes, due to the large number of
private motorbike ownership in Tables 6 and 7 and inadequate public transport routes to the location of student shopping visits at both study sites Table 5.

In this study shopping facilities can be reached on foot but most students prefer to use motorbikes (Tables 3 and 4). However, this behavior is dominant in Unhas Campus students, whereas for UIN Alauddin students most prefer to walk because in the 500 meter service radius they have shopping facilities in the form of supermarkets (shops).

**Table 3.** The Types of mode of transportation of Unhas engineering students according to the location of living for travel

| Type of Transportation | Individual | 2 People | 3-5 People | Total |
|------------------------|------------|----------|------------|-------|
|                        | 500        | 501-800  | 801-1200   | 500   |
|                        | n %        | n %      | n %        | n %   |
| Walk                   | 0 0%       | 2 2,2%   | 0 0%       | 1 1,1%|
| Bicycle                | 0 0%       | 0 0%     | 0 0%       | 3 3,4%|
| Motorcycle             | 10 11,2%   | 14 15,7% | 1 11,1%    | 14 15,7%|
| Car                    | 0 0%       | 4 4,5%   | 0 0%       | 0 0%  |
| Public transportation   | 0 0%       | 0 0%     | 0 0%       | 0 0%  |
| Total                  | 10 11,2%   | 20 22,4% | 1 1,1%     | 15 16,8%|

**Table 4.** The Types of mode of transportation of UIN Alauddin students according to the location of living for travel

| Type of Transportation | Individual | 2 People | 3-5 People | Total |
|------------------------|------------|----------|------------|-------|
|                        | 500        | 501-800  | 801-1200   | 500   |
|                        | n %        | n %      | n %        | n %   |
| Walk                   | 0 0%       | 1 1%     | 1 1%       | 4 4,2%|
| Bicycle                | 0 0%       | 0 0%     | 0 0%       | 0 0%  |
| Motorcycle             | 4 4,2%     | 9 9,5%   | 1 1%       | 22 23,1%|
| Car                    | 0 0%       | 0 0%     | 0 0%       | 0 0%  |
| Public transportation   | 0 0%       | 0 0%     | 0 0%       | 0 0%  |
| Total                  | 4 4,2%     | 10 10,5% | 2 2,1%     | 26 27,4%|

**Table 5.** The use of mode of students in general

| Research Location | Shopping Area       | Types of Mode       |
|-------------------|---------------------|---------------------|
| Engineering       | Panakukang Mall     | Motorcycle and Car  |
| Faculty of        | Giant               | Motorcycle and Car  |
| Unhas             | Ramadhan Stationery | Motorcycle          |
|                   | Royal Mart          | Motorcycle          |
|                   | Balang-Balang Market| Motorcycle and walk |
|                   | Afternoon Market    | Motorcycle and walk |
|                   |                     | Pete-pete from the Poros Malino St. to Alauddin |
|                   |                     | Public transportation not available |
|                   |                     | Public transportation not available |
|                   |                     | Public transportation not available |
|                   |                     | Pete-pete along the Poros Malino St. |
|                   |                     | Pete-pete along the Poros Malino St. |
4.2.2. The Ownership of Vehicle. Based on table 6 and table 7, the vehicle ownership of Unhas and UIN Alauddin students according to the location of residence is divided into five categories, where motorbike vehicles are the type of vehicle most commonly owned by Unhas and UIN Alauddin students as many as 67.5% and 60% this shows that motorcycle ownership has become one of the dominant modes used by students for access to shopping facilities both in segments one and segments two and three.

| Research Location | Shopping Area       | Types of Mode                                      |
|-------------------|---------------------|---------------------------------------------------|
| UIN Alauddin      |                     | Public Transportation                              |
| Samata            |                     | Private                                           |
|                   |                     | Motorcycle dan mobil Pete-pete from UIN Alauddin to |
|                   |                     | Emmy Saelan field                                 |
|                   |                     | Motorcycle, car and public transportation Pete-pete |
|                   |                     | from UIN Alauddin to Emmy Saelan field             |
|                   |                     | Motorcycle and walk Pete-pete from UIN Alauddin to |
|                   |                     | Emmy Saelan field                                 |
|                   |                     | Motorcycle, Bicycle and walk Pete-pete from UIN   |
|                   |                     | Alauddin to Emmy Saelan field                      |
|                   |                     | Motorcycle and Car Public transportation not available |

Table 6. The Ownership of vehicle of Unhas engineering student according to the location of residence

| Travel Behavior according to Residence | Individual | 2 People | 3-5 People | Total |
|----------------------------------------|------------|----------|------------|-------|
|                                       | 500 | 501-800 | 801-1200 | 500 | 501-800 | 801-1200 | 500 | 501-800 | 801-1200 | n | % | n | % | n | % | n | % | n | % | n | % |
| Car and Motorcycle                     | 1   | 1,1%    | 0%       | 0%    | 1   | 1,1%    | 2%       | 2   | 2,2%    | 1%  | 1,1%  | 0%   | 0% | 0% | 0% | 0% | 0% | 0% | 5  |
| Motorcycle                             | 7   | 7,9%    | 15%      | 16,9% | 1   | 1,1%    | 10%      | 11,2 | 23%      | 25,9%| 3     | 3,4%  | 0% | 0% | 1% | 1,1%| 0% | 0% | 60 |
| Car                                   | 0   | 0%      | 0%       | 0%    | 0   | 0%      | 0%       | 0   | 0%      | 0%  | 0%    | 0%   | 0% | 0% | 0% | 0% | 0% | 0% | 1  |
| Bicycle                               | 0   | 0%      | 0%       | 0%    | 0   | 0%      | 0%       | 0   | 0%      | 0%  | 0%    | 0%   | 0% | 0% | 0% | 0% | 0% | 0% | 1  |
| No Vehicle                            | 2   | 2,2%    | 3%       | 3,4%  | 0   | 0%      | 4%       | 4,5%| 12%      | 13,5%| 0%    | 0%   | 0% | 1% | 1,1%| 0% | 0% | 22 |
| Total                                 | 10  | 11,2%   | 20%      | 22,5% | 1   | 1,1%    | 15%      | 16,9%| 37%      | 41,6%| 4     | 4,5%  | 0% | 0% | 2% | 2,2%| 0% | 0% | 89 |

Table 7. The Ownership of vehicle of UIN Alauddin student according to the location of residence

| Travel Behavior according to Residence | Individual | 2 People | 3-5 People | Total |
|----------------------------------------|------------|----------|------------|-------|
|                                       | 500 | 501-800 | 801-1200 | 500 | 501-800 | 801-1200 | 500 | 501-800 | 801-1200 | n | % | n | % | n | % | n | % | n | % | n | % |
| Car and Motorcycle                     | 0   | 0%      | 0%       | 0%    | 0   | 0%      | 2%       | 2   | 2,1%    | 0%  | 2%    | 2,1%  | 1% | 1% | 3% | 3,1%| 0% | 0% | 7  |
| Motorcycle                             | 4   | 4,2%    | 7%       | 7,4%  | 1   | 1%      | 17%      | 17,9 | 16%      | 16,8%| 2     | 2,1%  | 5% | 5% | 5% | 5%  | 0% | 0% | 58 |
| Car                                   | 0   | 0%      | 0%       | 0%    | 0   | 0%      | 0%       | 0   | 0%      | 0%  | 0%    | 0%   | 0% | 0% | 0% | 0% | 0% | 0% | 2  |
| Bicycle                               | 0   | 0%      | 1%       | 1%    | 0   | 0%      | 0%       | 0   | 0%      | 0%  | 0%    | 0%   | 0% | 0% | 0% | 0% | 0% | 0% | 2  |
| No Vehicle                            | 0   | 0%      | 1%       | 1%    | 0   | 0%      | 7%       | 7,4%| 8%       | 8,4% | 4     | 4,2%  | 3% | 3% | 2% | 2,1%| 2% | 2,1%| 27 |
| Total                                 | 4   | 4,2%    | 10%      | 10,5% | 2   | 2%      | 26%      | 27,4%| 24%      | 25,3%| 8     | 8,4%  | 9% | 9% | 10%| 10,5%| 2% | 2,1%| 95 |
4.2.3. Lane. The lane that are passed by Unhas Engineering students and UIN Alauddin in traveling in meeting the needs of shopping facilities are as follows:

1. Afternoon Market
   - Faculty of Engineering of Unhas (STTP Gowa St. and Poros Malino St.).
   - UIN Alauddin Samata (Sultan Alauddin St., H.M Yasin Limpo St., Macanda St., Macanda II St., STTP Gowa St. and Poros Malino St.) and also (Sultan Alauddin St., Poros Malino St., STTP Gowa St. and Poros Malino St.).

2. Balang-Balang Market
   - Faculty of Engineering of Unhas (STTP Gowa St. and Poros Malino St.).
   - UIN Alauddin (Sultan Alauddin St., H.M Yasin Limpo St., Macanda St., Macanda II St., STTP Gowa St. and Poros Malino St.) and also (Sultan Alauddin St., Poros Malino St., STTP Gowa St. and Poros Malino St.).

3. Royal Mart
   - Faculty of Engineering of Unhas (Poros Malino St., STTP Gowa St., Poros Malino St., Sultan Alauddin St.) and (Poros Malino St., STTP Gowa St., Macanda II St., Macanda St., H.M Yasin Limpo St., Sultan Alauddin St.).
   - UIN Alauddin (Sultan Alauddin St.).

4. Ramadhan Stationery
   - Faculty of Engineering of Unhas (Poros Malino St., STTP Gowa St., Poros Malino St., Sultan Alauddin St.) and (Poros Malino St., STTP Gowa St., Macanda II St., Macanda St., H.M Yasin Limpo St., Sultan Alauddin St.).
   - UIN Alauddin (Sultan Alauddin St.).

5. Giant
   - Faculty of Engineering of Unhas (Poros Malino St., STTP Gowa St., Macanda II St., Macanda St., H.M Yasin Limpo St., Sultan Alauddin St., Tun Abdul Razak St.).
   - UIN Alauddin (Sultan Alauddin St., H.M Yasin Limpo St., Sultan Alauddin St., Tun Abdul Razak St.).

6. Panakukang Mall
   - Faculty of Engineering of Unhas (Poros Malino St., STTP Gowa St., Macanda II St., Macanda St., H.M Yasin Limpo St., Sultan Alauddin St., Tun Abdul Razak St., Aroepala St., Letjen Hertasning St., Adiyaksa St.).
   - UIN Alauddin (Sultan Alauddin St., H.M Yasin Limpo St., Sultan Alauddin St., Tun Abdul Razak St., Aroepala St., Letjen Hertasning St., Adiyaksa St.).

4.3. Analysis of the Location of Shopping Area for Unhas Engineering Students and UIN Alauddin in Meeting the Needs

The location of the University of Hasanuddin University and UIN Alauddin's student shopping visit with the travel distance and service center scale visited as follows:

4.3.1. The Location of Shopping Area. The dominant shopping locations were visited by Unhas Engineering students and UIN Alauddin doing shopping at a distance, namely Panakukang Mall and Giant. Next to the location of short-distance student shopping visits, namely in the Balang-Balang Market for Unhas Engineering Students, and Ramadhan Stationery for UIN Alauddin students.

4.3.2. Distance of the Location of Shopping Area. The distance of the shopping location to the two research locations, the closest distance that can be reached by UIN Alauddin students is 0.2 km to the shopping location, the Royal Mart. The closest distance that can be reached by Unhas students is 0.2 km to the shopping location, the Evening Market. Whereas the farthest distance reached by UIN Alauddin students was 6.6 km and the farthest distance reached by Unhas students was 10.3 km with the same shopping location, Mall Panakkukang.
4.3.3. Travels Time. Travel time of students from the rental residence to the location of the means of meeting the needs of shopping facilities according to the location of residence. For Unhas Engineering students, the biggest travel time is 15-30 minutes to get to shopping facilities by 51.7%, while for UIN Alauddin students 54.7% spend <15 minutes.

4.3.4. Scale of Service Centers. The service zone for student shopping locations is divided into three segments: first, the Environmental Service Center (PPL) is a settlement center that serves to serve inter-village scale activities; second, the Regional Service Center (PPK) is an urban area that functions to serve sub-district or several village scale activities; third, the Regional Activity Center (PKW), which is an urban area that functions as a center for industrial and service activities serving provincial or several regency scales. For the first zone, the scale of the Environmental Service Center (PPL) found in the two research sites, namely Balang-Balang Market and Royal Mart, is the location of the largest shopping visit visited by students on both campuses, then the Regional Service Center (PPK) is in Giant and Regional Activity Centers (PKW) are located in Panakukang Mall (MP).

4.4. Direction of Environmental Infrastructure in Meeting Needs
4.4.1. The planning of Pedestrian. In general, students make a dominant movement using motorized vehicles to shopping locations, so it can be directed towards the provision of shaded pedestrian paths, and bicycle lanes in order to encourage students to use modes of transportation that can improve health, safety, and environmentally friendly.

4.4.2. Provide the Mass Transit. In general, students travel to shopping locations at a distance (> 5 km) using a motorized transportation mode, then the procurement of mass transportation (pete-pete, BRT) is directed, to support student travel to the location of service centers at the sub-district and city scale.

4.4.3. Development of Service Center in District Scale. Unhas Engineering Students and UIN Alauddin made a shopping trip at three service centers, namely: environmental service center, sub-district service center, and city service center. To reduce the movement of student shopping at the scale of sub-district service centers and city service centers, directed towards the development of sub-scale service centers that can support both Unhas and UIN Alauddin student residential centers (± 5.2 km distance) can be directed by considering the concept of developing mixed land functions (mixeduse) and transportation friendly (TOD).

5. Conclusion
Students’ trips to shopping locations generally behave in general terms, that is, having friends on the road, dominant on a small scale of 2 people (all students behave similarly in 3 segments of the research location). Travel companions are generally from the same study program or neighboring boarding. Movement behavior using motorcycle transportation modes, both in close proximity to the neighborhood shopping center or to the district and city shopping centers. His travel behavior to the environmental service center is via the environmental road (± 6.00m). Behavior of travel to the service center at the sub-district and city scale is via heavy motorways (Jn. Poros Malino, or Jln. Hertasning).

Behavior of student shopping visit locations has the same goal, namely at an environmental scale service center with a distance of achievement ± 200 meters (Pasar Balang and Ramadhan Stationery) and a service center at the sub-district and city scale with a distance of> 5 km (Giant Hertasning, and Panakukang Mall). Directions for the development of environmental infrastructure to support the movement path of students who are dominantly using motor vehicles to shopping locations, so that the direction of shaded pedestrian pathways and bicycle lanes can be directed to encourage students to use modes of transportation that can improve health and be environmentally friendly. In addition it is directed towards the procurement of mass transportation to support student trips to service centers at the sub-district and city scale. The development of district scale service centers that can support both
Unhas and UIN Alauddin student residential centers (± 5.2 km distance) can be directed by considering the concept of developing mixed use and transportation-friendly functions (TOD).

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