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QUALITATIVE RESEARCH INTO MOTIVATIONS AND BARRIERS TO CYCLING
IN UMP CAMPUS

NADIAH BT HUDOH @ RAMLI

Thesis submitted in fulfillment of the requirements
For the award of the degree of
Bachelor of Engineering (Hons) Civil Engineering

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JUNE 2016

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I hereby declare that the work in this project report is my own except for quotations and summaries which have been duly acknowledge. The project report has not been accepted for any degree and is not concurrently submitted for award of other degree.

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ABSTRACT

Nowadays, global warming has become one of the main concerns of our world. The role of transportation is significant as it emits 15% of the total emission of Carbon Dioxide (CO₂). As an environmental friendly, cycling is considered as an alternative for cars and other motorized vehicles, especially for short journeys. This study has revealed the barriers and motivations to cycling among UMP community. A total of 120 respondents was selected for this survey, represented the male and female. Review of literature was conducted and a questionnaire survey was used to obtain the information needed to meet the requirements of this inquiry. The reasons provided as barriers to cycling are safety issues, health / ability to ride issues, time issues, and weather issues. After gathering the data, a descriptive analysis was performed with the help of SPSS (version 17) in getting cross tabulation data and finding 'mean' values for each questions. From the results, four main barriers were identified as the main findings, which were: drivers not educated in safety for cyclist / unaware of cyclist, lazy/tired / no motivation, takes more time than alternative commutes and the weather is extreme hot. For the motivators, two ways were identified. One is to organize an interesting cycling activities and another one is to provide a bicycle lane. The mean value for the motivators is higher than barriers which is 4.38. Based on these findings, some solutions were proposed to improve the attitude, solve the obstacles, and meet the demands to promote cycling in UMP Gambang Campus so that a high level of sustainability can be achieved.

ABSTRAK

Pada masa kini, pemanasan global telah menjadi salah satu kebimbangan utama kepada kita. Peranan pengangkutan adalah penting kerana ia mengeluarkan 15% daripada jumlah pelepasan Karbon Dioksida. Sebagai pengangkutan yang mesra alam, berbasikal dianggap sebagai salah satu alternatif kepada kereta dan kenderaan bermotor lain terutamanya untuk perjalanan jarak pendek. Kajian ini telah mendedahkan halangan dan motivasi untuk berbasikal dalam kalangan masyarakat UMP. Seramai 120 responden telah dipilih untuk kajian ini yang mewakili lelaki dan perempuan. Kajian literatur telah dijalankan dan kajian soal selidik telah digunakan untuk mendapatkan maklumat yang diperlukan bagi memenuhi keperluan kajian ini. Sebab-sebab yang diberikan sebagai halangan untuk berbasikal adalah isu keselamatan, isu kesihatan / keupayaan untuk menunggang, isu masa dan isu cuaca. Selepas mengumpul data, analisis deskriptif telah dijalankan dengan bantuan SPSS (versi 17) untuk mendapatkan penjadualan data silang dan nilai purata bagi setiap soalan. Hasil daripada kajian yang telah dijalankan, empat halangan utama telah dikenalpasti sebagai dapatan utama iaitu pemandu tidak berpendidikan dalam keselamatan penunggang basikal / tidak menyedari penunggang, malas / penat / tidak ada motivasi, mengambil masa yang lebih lama berbanding kenderaan lain dan cuaca terlalu panas. Bagi motivasi, dua cara telah dikenalpasti. Salah satunya adalah menganjurkan aktiviti berbasikal yang menarik dan menyediakan lorong basikal. Nilai purata bagi motivasi adalah lebih tinggi daripada halangan iaitu 4.38. Berdasarkan dapatan ini, beberapa penyelesaian telah dicadangkan untuk memperbaiki sikap, menyelesaikan halangan dan memenuhi permintaan untuk menggalakan pelajar berbasikal dalam UMP kampus Gambang supaya tahap kemampanan yang tinggi boleh dicapai.

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LIST OF ABBREVIATIONS

SPSS	Statistical Package for Social Science
UMP	University Malaysia Pahang

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Increasing global concern about the sustainability of our urban centers and the impacts of transport have resulted in a focus on achieving mode change from motor vehicles to more sustainable modes such as walking, cycling and public transport (Pucher et al., 2003). This has been supported by (Skinner and Rosen, 2007) where sustainable modes such as cycling has been used widely and orientedly in towards of achieving sustainability of urban centers. Bicycles are a mode of non-motorized transportation that have many benefits, such as reducing environmental problems and reducing the cost of journeys. Even though bicycles have a low energy consumption, whereas there is no need to apply fuel to run the bicycle but they bring fitness to their users. Cycling proves to be one of the most effective exercises, to shed off those extra calories and get rid of flabby abs. Even a small amount of cycling can prove to be good enough to boost metabolism level, thereby fastening the ideal weight loss program. It helps to improve the overall balance and coordination.

However, cycling is not being considered as an alternative mode by social community in younger generation today especially in the University Malaysia Pahang (UMP) campus in Gambang. Using bicycle in UMP is not a popular usage among some students. This is because only first year students are likely to be encouraged to bring bicycle as a mode of transport because they are prohibited to bring other transportation during the first semester. When comes to the next semester, they were no more upholding

this good habits due to some barriers. The consequence of barriers involve risk of cycling to commute from one place to another place as it considered not safe to travel. Another factor which influenced the students to have less interest in cycling due to social community reputation surrounding their environment. Social community reputation is one of the internal factor which can impact students to change in behavior, attitudes, norms and also habits. Therefore using bicycle to commute seems to have lack motivation in usage among students due to misconception of barriers.

1.2 BACKGROUND OF STUDY

Generally, there are numerous environmental, social, health and economical advantages of promoting cycling for transport and the benefits of intensifying cycle trips to both the individual and society (Jensen et al., 2000; Morris, 2004). This study explore about UMP's community in Gambang on their motivation to use bicycle to commute and also their barriers against making trip using a bicycle. The results obtain will then be develop to promote healthy cycling programs in the campus itself. During the study, four groups or type of cyclist will be identified. It encompasses recreational, car substitute riders, necessity commuters and fitness trainers. The prevalence of these groups and concepts would be worth exploring as part of a quantitative survey. Concept of what defines a person as a 'cyclist' will also be explored.

1.3 PROBLEM STATEMENT

Universities have allowed various modes of transportation being used in campus, such as cars, motorcycles, and bicycles. Nevertheless, students nowadays want to have a better convenience and a better travel speed when commuting in campus. Thus, this leads to a number of motor vehicles such as private cars and motorcycles have been increased. This situation emerged especially in universities that offer dormitories on and around campus. Knowing to the emerging especially in a number of motor vehicles ; noise and air pollution, increased budgets for road maintenance, shortage of parking space, and traffic jams during rush hour. Moreover, the number of students who commute by bicycle

to and from campus has been decreased in some universities tremendously. Despite of decrease in cycling, this form of transportation actually provides many benefits to individuals and also to the society. The ineffective guidelines lead students to use private cars or motor vehicles while the number of cyclists remains limited. According to the above problems, by identifying what are the real barriers and identifying what are the real motivators to bike riding will help to analyse problems and difficulties pertaining to bicycle usage in campus. The final results of this study are to produce practical guidelines to encourage cycling in campus to meet student needs.

1.4 OBJECTIVES

The objectives of the research are:

- To identify barriers and motivators to bike riding among UMP community.
- To determine the potential cyclist and current cyclist among UMP community.

1.5 SCOPE OF STUDY

This research limits its study area to University Malaysia Pahang, Gambang campus only. It focus to UMP community in the campus among potential cyclists and current cyclist. These two groups will be split into male and female.

1.6 SIGNIFICANT OF STUDY

The study recognizes what makes a person as a cyclist, hence to discover what are the criteria's that influenced in their cycling habit. Provision of cycling infrastructure within UMP network will be added as an incentive and initiative to uphold cycling habits subsequent from the result obtain in qualitative research into motivations and barriers to cycling in UMP campus.

CHAPTER 2

LITERATURE REVIEW

2.1 DEFINITION OF TRANSPORTATION

The basic and the main definition of transport or transportation is the movement of people and goods from one place to another. “The term is derived from the Latin trans, meaning across and portare, meaning to carry”, taken from Wikipedia (<https://en.wikipedia.org/wiki/Transport>).

According to Wikipedia statement that transportation is a trip from an origin to a destination taken primarily at the level of the individual traveler or the movement of goods, to accomplish some purpose. At the level of a metropolitan region, transportation is the aggregate of thousands or, in many cases, millions of individual trip-making decisions.

Meanwhile, several types of transportation systems which provide connectivity with other societal functions have common components. Bovy determines these components as follows;

- The infrastructure (the roads, stations and terminals)
- Vehicles (wheeled, flying, floating, operating single or in a row)
- Order of the flows (dependent of the vehicle or the infrastructure)
- The operation system (control of the traffic, management, organization, security).

A distinct determination held by Morlok identifies those components like:

- terminals
- transportation network
- roadway interchanges
- vehicles
- control systems

However the functional components of transportation can be summarized as:

- Fixed facilities; The physical component of the system constitute the network of links (roadway segments, railway track, pipes), nodes (intersections, interchanges, transit terminals)
- Flow entities; The units that traverse the fixed facilities (vehicles, railroad cars, large tractor-trailer combinations)
- Control system; Consists of vehicular control and flow control. Vehicular control depends on individually guided vehicles, which is controlled manually or automated. Flow control organizes the operation of streams of vehicles and reduces the conflicts between vehicles. This system consists of signing, marking, and signal systems. (Papacostas and Prevedouros 1993)

The components classified above are complementary of each through the transportation planning process. As in the city planning process, the land allocation and the transportation planning processes are depending on each other. From this view point, the functional components of transportation planning become the major concern of city planner. It is clear that an eight-lane roadway would be implemented when 40% of transportation demand is served by bus transportation modes, and a four-lane roadway would be implemented when 80 % of the demand is served by buses.

2.2 THE CLASSIFICATION OF TRANSPORTATION SYSTEMS

Several ways of classification can be hold for transportation systems. According to types of technology they employ, the type of service they provide, the ownership and so forth. Each of these is the viewpoints of different perspectives.

Through the view point of Bovy, transportation systems have been classified through technical and functional criteria. The technical classification in major determines the physical independency of the system. The concept of independency depended on being effected by other modes of transportation or not. The air and water transportation types are the best examples of systems that operate uninterruptedly by other modes. The systems operating on physically separated routes like trains and some highway transportation modes also operate uninterruptedly. The criteria of the classification consist of;

- **Type of the route** determines whether the operation route is natural or implemented (the examples of air and water transportation systems operate on natural operation routes).
- **Flexibility** determines whether the operation route is suitable for flexible operation or it is fixed (most of the public transportation modes operate on fixed guide ways, schedules).
- **Type of the operation** determines whether the operation is continuous or not (moving staircases, moving platforms are only examples of continuous operating transportation modes).
- **Position of the vehicle** determines whether the vehicle is suspended or not and whether it operates in air or water (Elker 1981).

Meanwhile the classification held through the functional criteria consists of:

- whether the system operates by motorized vehicles or not
- whether the system is suitable for individual or mass transportation
- whether the system operates on routes with other types of transportation or uses a reserved operation track. (Elker 1981)

The transportation system is further categorized into four major subsystems according to the medium by which the flow elements are supported. These subsystems are commonly referred to as modes, but it should be understood that this term is also used to make finer distinctions between the various means of travel.

1. Land transportation
 - Highway
 - Rail
2. Air transportation
 - Domestic
 - International
3. Water transportation
 - Inland
 - Coastal
 - Ocean

2.3 CLASSIFICATION OF PUBLIC TRANSPORTATION

The aggregation of diversities of functional components in transportation systems constitutes the features of transportation systems. The classification schemes generally concluded through these features. Meanwhile these features can be summarized into three sub-systems like;

- **Technologic features;** passenger capacities, the hour capacity, the physical independence, flexibility, the speed, energy consumption, comfort of the system, geologic-geographic-geometric standards.
- **Economic features;** infrastructure and management costs, the expenditures of the system subsidized by public, administrator or consumer, the labor force consumed.
- **Environmental features;** the effects of the system on the environment, probability of accidents, adaptation to the environment, etc (Elker 1981).

Variation of the transportation systems resulting from technological features draw attention as the result of technological developments and some futuristic solutions as proposed. To that extent, the classification held below, which were taken through major features like the capacity comparisons, speed up comparisons and technological developments of the modes. The comparisons through the economic features between the conventional modes will be dealt with in the next chapter. The aim to limit the amount of modes resulted from the distribution rates of public transportation as the great amount of the passengers is still transported with land based modes.

• Demand Classification

The most important feature of transportation is its capacity. The capacity of a transportation system is normally expressed in terms of the maximum number of passengers per hour that can be carried to any point in the system. Consequently, to determine the appropriate transportation mode, the travel demand forecasting process - classifications – has always been held according to the quantitative data.

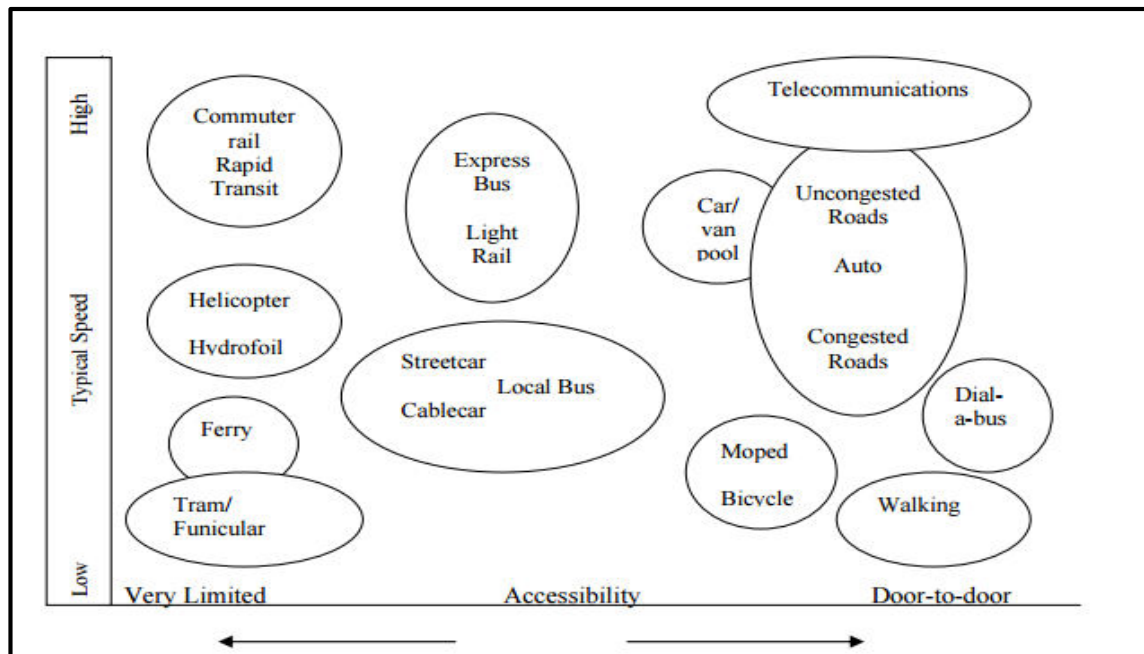


Figure 2.1: Typical Urban Transportation Modes (Hutchinson1974)

2.4 BICYCLE

A bicycle, often called a bike or cycle, is a human-powered, pedal-driven, single-track vehicle, having two wheels attached to a frame, one behind the other. A bicycle rider is called a cyclist, or bicyclist.

Bicycles were introduced in the 19th century in Europe and as of 2003, more than 1 billion have been produced worldwide, twice as many as the number of automobiles that have been produced. They are the principal means of transportation in many regions. They also provide a popular form of recreation, and have been adapted for use as children's toys, general fitness, military and police applications, courier services, and bicycle racing.

The basic shape and configuration of a typical upright, or safety bicycle, has changed little since the first chain-driven model was developed around 1885. But many details have been improved, especially since the advent of modern materials and computer-aided design. These have allowed for a proliferation of specialized designs for many types of cycling.

2.4.1 Uses of bicycles

From the beginning and until today, bicycles have been employed for many uses. In a utilitarian way, bicycles are used for transportation, bicycle commuting, and utility cycling. Military uses of bicycles include communications, reconnaissance, troop movement, supply of provisions, and patrol.

2.4.2 Different bicycle for different situation

2.4.2.1 Utility bicycle

Utility bicycles are principally used for short-distance commuting, running errands, shopping, leisure or for transporting goods or merchandise. Utility bikes may also be seen in postal service, in war, and for employee transportation inside large workplaces (factories, warehouses, airports, movie studio lots, etc.). In some countries, entire fleets of utility bicycles may be operated or administered by local or national government agencies as part of a . Utility bicycles often feature a step-through frame so they can be easily mounted, single speed, or with internal hub gearing, and drum brakes to reduce the need for maintenance, a center stand kickstand so it can be parked easily, and a basket or pannier rack to carry personal possessions or shopping bags.

In Singapore, and sometimes Malaysia, old utility bicycles are often seen with the windshields and engine covers of 125cc motorbikes and painted in highly attractive colors. Although virtually none have a real engine attached for them, most of them are used for decoration only. Many choose this type of bicycle due to the low price (relatively) and availability.



Figure 2.2: Utility bicycle

2.4.2.2 Hybrid bicycle

Hybrid bicycles blend characteristics from more specialized road bikes, touring bikes and mountain bikes. The resulting "hybrid" is a general-purpose bike that can tolerate a wide range of riding conditions and applications. Their stability, comfort and ease of use make them popular with beginner cyclists, casual riders, commuters, and children.

Hybrids typically borrow the flat, straight handlebars and upright seating posture of a mountain bike, which many beginning bicyclists find comfortable and intuitive. Hybrids also employ the lighter weight, thinner wheels and smooth tires of road bikes, allowing for greater speed and less exertion when riding on the road. Hybrid bikes often have places to mount racks and bags for transporting belongings, much like a touring bike.

Hybrid bikes have spawned numerous sub-categories satisfying diverse ridership. They are classified by their design priorities, such as those optimized for comfort or fitness and those offered as city, cross or commuter bikes.



Figure 2.3: Hybrid bicycle

2.4.2.3 Mountain bicycle

A mountain bike or mountain bicycle is a bicycle created for off-road cycling. Mountain bikes are typically ridden on mountain trails, fire roads, logging roads, single tracks and other unpaved environments. These types of terrain commonly include rocks, washouts, ruts, loose sand, loose gravel, roots, and steep grades (both inclines and declines). Mountain bikes are built to handle this terrain and the obstacles that are found in it like logs, vertical drop offs, and smaller boulders.

Mountain bike construction differs from a typical bicycle in many ways. The most noticeable differences are the inclusion of suspension on the frame and fork, larger knobby tires, more durable heavy duty wheels, more powerful brakes, and lower gear ratios needed for steep grades with poor traction.



Figure 2.4: Mountain bicycle

2.5 ADVANTAGES OF CYCLING

Cycling has been reported to be fun and accessible form of activity (Telfer, 2003), it is considered as a moderate intensity physical activity which has been shown to decrease risk of mortality (Andersen, et al., 2000), improve cardiovascular performance (Hendriksen et al., 2000), lower cholesterol and risk of heart attack (Australian Department of Environmental Protection and Bike West, 1999). Additionally, cycling has been shown to have positive benefits on social interaction (O'Connor and Brown, 2007), mood and self-esteem (Garrard et al., 2007) and levels of depression and stress (Scully et al., 1999).

The most commonly cited reasons for cycling are enjoyment and fitness as well as low cost, flexibility and relative speed (Clearly and McClintock, 2000). Cycling can also offer convenience and freedom, saving people time in peak hour, with vehicle speeds in peak hour similar to (or lower than) cycling speeds (Australian Bicycle Council, 2010). Cycling can also save people money with the costs of operating and maintaining a bicycle 5% of that of a motor vehicle (Tranter, 2004).

2.6 BARRIERS TO CYCLING

Literature identifies several different barriers to cycling. These include perceived lack of safety and also the embarrassment of being sweaty at work or wearing cycling gear in the workplace (Scott and Span, 2009). Other inhibitors to commuter by cycling include distance from home, disorganization, work and post-work commitments (TNS, 2010). Social norms and culture pose barriers to cycling. In Australia and particularly in Perth, there exist a car dominated culture, where most people think it is acceptable to always travel by car, even for a short trips (Bauman et.al. 2008). This social norm, coupled with a lack of bicycle infrastructure represents major barriers to an increase in the uptake of cycling (Bauman et.al. 2008).

Closely linked to bicycle infrastructure is more located in urban design. However, low density developments, with poorly connected street networks can increase average journey distance and perpetuate the social norm (Giles-Corti et.al, 2005). The most often cited factors that prevent people from cycling are travel distance (Kingham et al.2001), traffic safety, heavy traffic, inconsiderate drivers, pollution, bad weather (McClintock and Cleary, 1996; Nankervis, 1999), not being fit enough (Wardman et al.,1997) and social pressure (Davies et al., 2001).

2.7 EFFECTIVE EFFORTS TO INCREASE CYCLING

Despite the barriers to bicycling, active transportation is a common contemporary topic among health researchers because of its implications for physical and environmental health. Several studies have been published looking at different forms of promotion and changes to the built environment to assess which have been the most effective.

2.7.1 On – road bicycle lanes

Bicycle lanes are separate lanes for bicyclists to share the road with motor vehicle drivers. They can either be “protected,” meaning they have a physical barrier between the bicyclist and the driver, or the delineation may just be apparent through a white stripe on the road that separates the two lanes. Although the former are typically preferred by bicyclists because they feel less vulnerable from collisions, the latter are much more common because the expense is far less. Roads with bicycle lanes have been shown to positively correlate with the presence of bicycle-commuters (Parkin et al., 2008; Dill and Carr, 2003). Additionally, roads that have new bicycle lanes installed have typically seen an increase in bicycle-commuters as well (Barnes et al., 2006).

2.7.2 Bicycle parking

Having safe, secure, convenient bicycle parking available at one's destination has been shown to significantly increase the likelihood of bicycling for transportation. In order for bicycle parking to be considered adequate, the facilities need to be in well-lit, open areas (as opposed to behind a building, in which bicycle theft may be more plausible), as well as placed in locations where they can serve the most bicyclists; one study that looked at the effects of implementing safe and secure bicycle parking at common destinations estimated a total round-trip reduction of 27 minutes in commute time (Hunt & Abraham, 2007).

2.7.3 Education and training

Although there have been few published studies regarding evaluations of education and promotion of bicycling, there is evidence that these programs can have a positive effect, especially when used in conjunction with other efforts, such as implementation of bicycle-related infrastructure.

An evaluation of a program in Sydney, Australia, showed that over half of participants were bicycling more often sixty days after the completion of an educational program that taught defensive bicycling (Telfer, Rissel, Bindon, and Bosch, 2006). Typically, in order for bicycling promotion to be effective (as is the case with many forms of health promotion), those who are on the receiving end of the promotional efforts need to have access to a physically supportive environment (Carnell, 2000).

2.7.4 Shower facilities

Although evaluative literature on the impact of having shower facilities available is sparse, because personal hygiene is such a common theme among non-bicyclists, the estimated effect of being able to shower at one's destination is substantial, particularly if the destination is a professional environment (Wardman, Tight, and Page, 2007).

2.7.5 Bicycle Racks on Public Transit

Because many people do live farther from their workplace or university than they would like to bicycle, a viable alternative is using public transit for part of the commute. To do so, however, it is necessary that buses and trains are equipped to transport bicycle; putting bicycle racks on buses has been shown to be a worthwhile investment, as the revenue it brings in from the additional bus riders surpasses the cost of installation (Hagelin, 2005). The Transportation Research Board (2005) has reported that bicycle facilities on public transit are being used more and more frequently.

2.7.6 Safety in Numbers

Although it probably comes as no surprise, greater numbers of bicyclists present in a given area tends to make people more comfortable with the idea of bicycling themselves. In fact, one study showed that bicycle fatalities actually increased after the implementation of a mandatory helmet law because the institution of the law deterred many people from bicycling. Despite the protective factors associated with wearing a helmet, the dramatic decrease in the number of bicyclists led to lower expectation on the drivers' part of needing to be cautious of bicyclists; this lack of preparation led to more bicycle-motor vehicle collisions (Robinson, 2005).

2.7.7 Bicycle-Friendly Universities

In addition to what has already been discussed, there are reputable criteria for whether or not universities are considered "bicycle-friendly." The League of American Bicyclists (LAB) is an organization that seeks to promote cycling for recreation, fitness, and transportation among all fronts, but has a special set of guidelines against which they judge universities throughout the nation as being bike-friendly or not. The honor (whose categories include platinum, silver, bronze, and honorable mentions) is considerable, particularly when it comes to applying for grants from outside institutions.

In order to be considered a bicycle-friendly university, LAB judges universities on five specific criteria, referred to as the “5 E’s”: Engineering (referring to items such as infrastructure and campus bicycle plans); Education (campus resources and programs for bicyclists); Encouragement (university promotion of bicycling and incentives for doing so); Enforcement (cooperation of campus police in taking traffic violations seriously); and Evaluation and Planning (program monitoring for future improvements of current efforts).

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

In this chapter it will be discussed on the methodology that being used in this research. This part plays an important role in determining whether the objective of this study can be achieved or not. It is focused on the method chosen for collecting data required and the flow in analysing the data collection that will be discussed further in Chapter 4. In general, the aimed of this study is to identify the motivators and barriers to cycling among UMP' student. Besides that, factor that affecting students to cycling in campus such as the distance from the place of residential to the place of study have to be identified in supporting the details. Data collection will be gathered through questionnaires that had been designed. Detail description of the research design will be discussed further in the research design section.

3.2 RESEARCH DESIGN

There are several phases that must be done in order to achieve the objective of this research including:

3.2.1 Desktop Study

The first task done is a project briefing by supervisor. The topic to be considered had been discussed together and the best topic to be study on had been selected. The selected topic for this project entitled; ‘Quantitative research into motivations and barriers to cycling in UMP campus’.

After selecting the topic, the study area could be classified based on the objectives of the project. In this project, UMP Gambang campus will be selected instead of Pekan campus because UMP Gambang has Sports Complex which fitness trainers will be taken into account in the observation. Next, all the information regarding to the topic and study area involved will be gathered together. Based on that information, project research could be done. All supporting and related data or information will be used to determine the scope of study and be as a guideline of project progress.

Participants for the qualitative stage will be recruited on the basis of a number of variables including :

- age (younger and older)
- gender (meeting the requirement to over-represent males)
- location from the residential to the place of study
- level of fitness/physical activity

3.2.2 Data Collection

Data collection process will be carried out through questionnaire survey. A well designed questionnaire will be used effectively to gather information and make it easier for the survey findings.

It is important that a questionnaire should be viewed as a multi-stage process beginning with the definitions of the aspects to be examined and ending with the interpretation of the results. Every question needs to be designed carefully and make it short in the range of answers so that respondent will complete the questionnaire prepared on time.

3.2.3 Data Analysis

In this study obtained, data will be analysed by using statistical answer from the questionnaire. All the collected data and answer from the questionnaire will be classified and categorized to make it easier to be transformed into the table. The results from the analysis then will be interpreted in order to be used to fulfill the objectives that had been set. It also will help to support the assumption and findings that been made

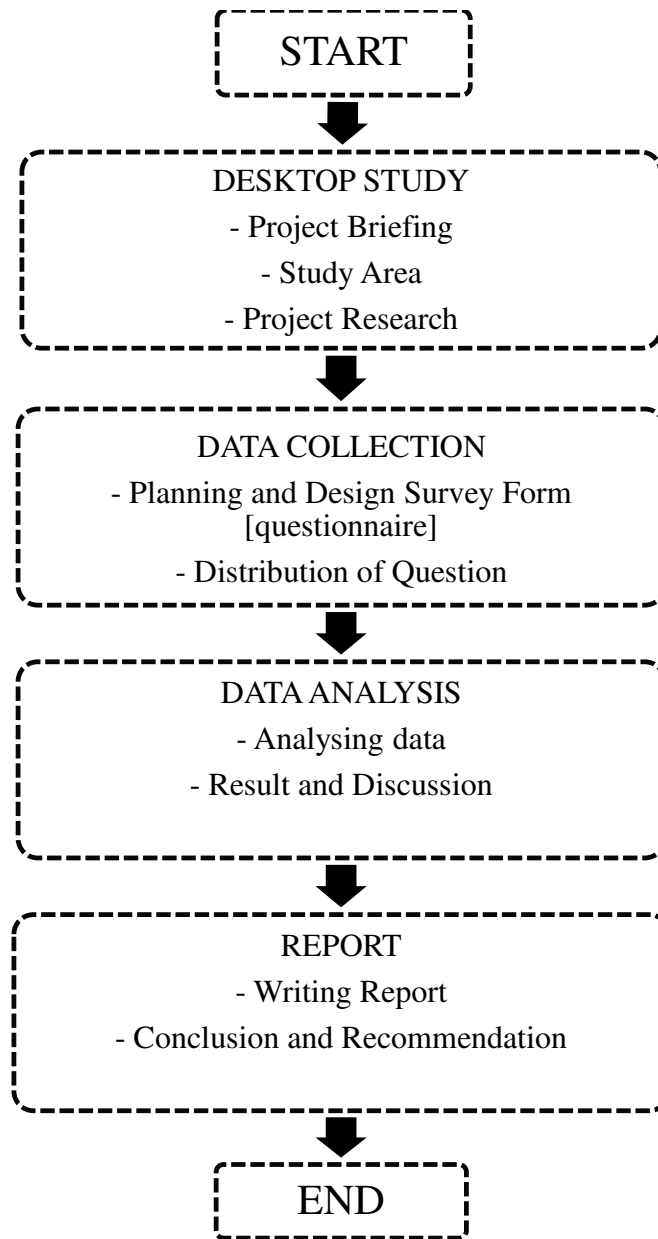


Figure 3.1: The flow of research methodology process

CHAPTER 4

RESULT AND DISCUSSION

4.1 INTRODUCTION

This chapter presents about the quantitative findings of the research. The purposes of this research are to identify the barriers and motivators in bike riding among UMP community and to determine the potential cyclist and current cyclist among UMP community.

Besides that, this study is designed to answer the three section of research questions by performing descriptive analysis to measure the background information of the respondents followed by the reliability of the variables in this research. The mean is used to analyse the degree of agreement of the barriers and motivators to cycle among the community. Furthermore, the mean also used to rank what is the highest factor that contribute to the barriers and motivators to cycle.

4.2 QUESTIONNAIRE DISTRIBUTION

The closed ended questionnaires were distributed to the targeted respondents in order to collect data for analysis. The targeted respondents of this study are current cyclist and potential cyclist in the UMP. The questionnaire consists of three sections which are section one, section two and section three. Section one is conducted to collect general information of the respondents. Meanwhile, section two is designed to examine the degree of agreement of the factors that leads to the barriers for student to cycle.

Section three is designed to examine the degree of agreement of the factors that leads to the motivators for student to cycle.

4.3 RESPONDENT'S PROFILE

Information on respondent's profile is obtained from section one of the questionnaire which contained demographic questions. This section consists of six questions to determine the profile respondents. However, the demographic questions are not significant to the research questions, but it is important to know the background of the respondents. In order to identify the respondent's background, demographic analysis was carried out through descriptive statistics. Cross tabulation analysis is used to determine the relationship of variables among gender, age, level of education and residential place.

4.3.1 Gender

For this research study, the questionnaire was distributed for the same amount of gender which are 50 % for male respondent and 50 % for female respondent.

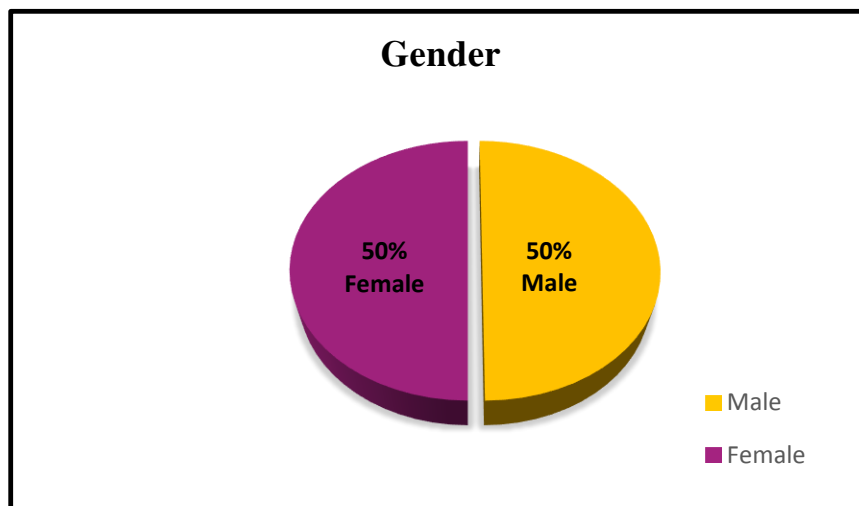


Figure 4.1: Gender

4.3.2 Age

From the obtained data collection, it shows that 95 % of respondents are from age 21 to 30 years old. There are only 5 % of respondent that age less than 20 years old while there are no respondent from 31 to 40 years old. It can be conclude that most of the respondent are in the second year until 4th year of their study.

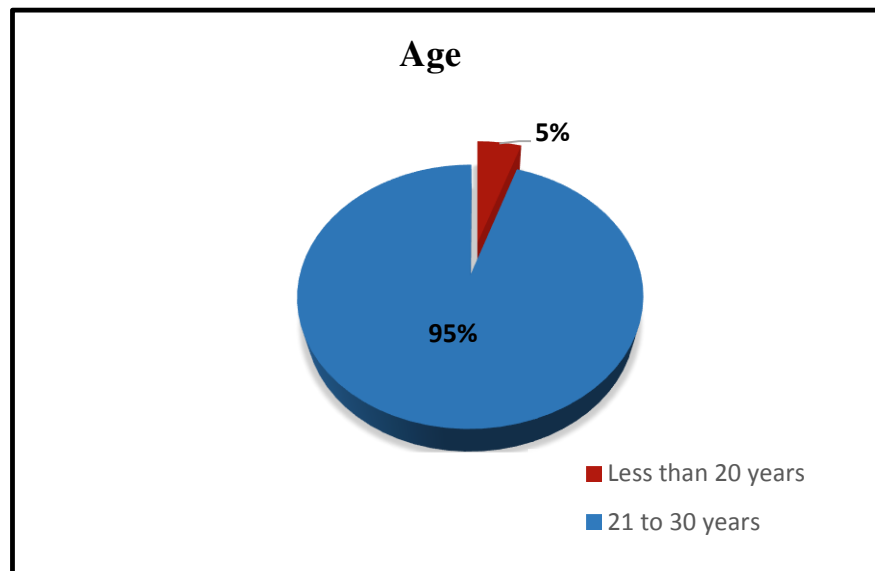


Figure 4.2: Age

4.3.3 Level of Education

In the Figure 4.3, it shows that the respondents come from the different level of education. The highest respondent are taking their Bachelor's Degree which contribute 93 % from the total respondent. There are 5 % of respondent from Diploma Student while the least respondent are from Master's Degree which is only 2 %.

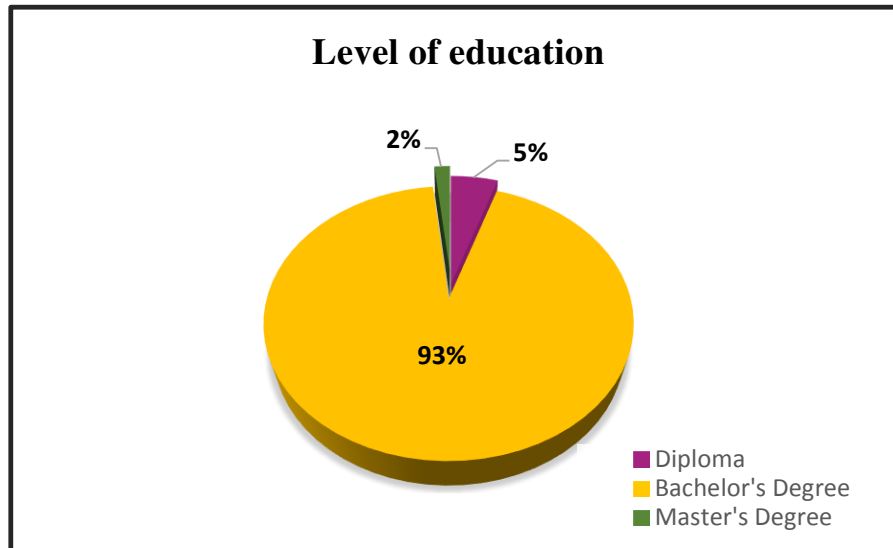


Figure 4.3: Level of education

4.3.4 Residential Place

As already known, in UMP Gambang Campus there are 4 hostel for student to stay which are KK1, KK2, KK3 and KK4. In this research study, data from male and female respondent that stayed in the campus and outside of the campus were collected. For female respondent, 20 respondent stayed outside the campus while 40 respondent stayed at KK1/KK3. Meanwhile 20 of male respondent also stayed outside the campus and 40 male respondent stayed at KK2/KK4. Figure 4.4 shows the residential place by gender.

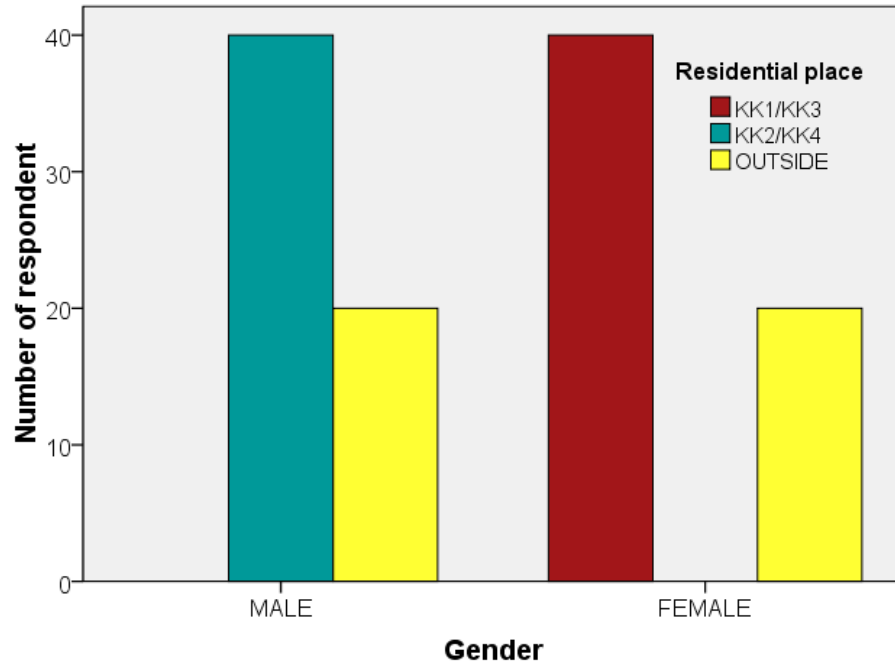


Figure 4.4: Residential place by gender

Table 4.1: Gender by Residential Place Crosstabulation

Gender	Residential Place			Total	
		KK1/KK3	KK2/KK4		OUTSIDE
MALE	Count	0	40	20	60
	% within Gender	0.0%	66.7%	33.3%	100.0%
FEMALE	Count	40	0	20	60
	% within Gender	66.7%	0.0%	33.3%	100.0%
Total	Count	40	40	40	120
	% within Gender	33.3%	33.3%	33.3%	100.0%

According to the Table 4.1, it shows that the percentage of student who stayed inside the campus is higher than student who live outside the campus. Only 33.3% male and female respondent are stayed outside the campus.

4.3.5 Mode of transportation

In this research, mode of transportation to the place of study is identified to observe the current cyclist and potential cyclist. The correlation among residential place and mode of transportation was analysed in the Figure 4.5 below. In the figure, it shows that all the respondent that stayed in KK1/KK3 are walking to the campus. Besides that, only 25 respondent from KK2/KK4 are cycling to the campus. Meanwhile student who's stayed outside the campus are taking car or motorcycle. There are minor number of respondent that taking bus to campus.

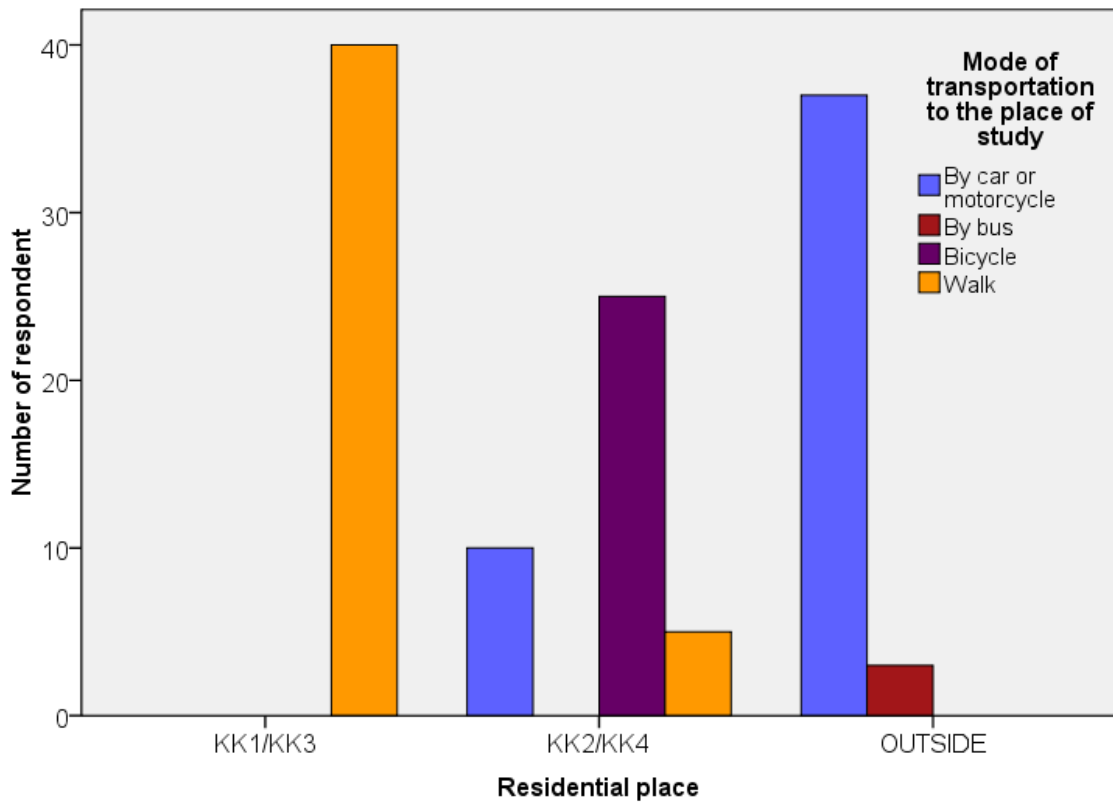


Figure 4.5: Mode of transportation by residential place

Table 4.2: Residential place by Mode of transportation to the place of study
Crosstabulation

Residential Place		Mode of transportation to the place of study				Total
		By car or motorcycle	By bus	Bicycle	Walk	
KK1/KK3	Count	0	0	0	40	40
	% within Residential place	0.0%	0.0%	0.0%	100.0%	100.0%
KK2/KK4	Count	10	0	25	5	40
	% within Residential place	25.0%	0.0%	62.5%	12.5%	100.0%
OUTSIDE	Count	37	3	0	0	40
	% within Residential place	92.5%	7.5%	0.0%	0.0%	100.0%
Total	Count	47	3	25	45	120
	% within Residential place	39.2%	2.5%	20.8%	37.5%	100.0%

Referring to the Table 4.2 above, car or motorcycle is the mode of transportation that respondent choose the most for commute to the campus. It is observed that only minor of respondent are taking bus to the campus. Besides that, it was reported that, 100% of female respondent are walking to the class. This is because the distance from KK1/KK3 to the campus is the nearest compare to KK2/KK4 and outside the campus. Student who take cycle to campus are only 25 students that stayed at KK2/KK4. Besides that, 92.5% student stayed outside the campus are taking car or motorcycle to campus. It can be conclude that the distance from residential place to the campus affect the choice of mode of transportation among student in UMP. Even though the distance from KK2/KK4 to campus is not too far, but there were 25% of student still took a car or motorcycle to the campus. This situation can be related to the barriers that affect their choice to cycle.

4.4 REASONS FOR CYCLING

4.4.1 To commute to the place of study

Regarding on data collection, the result is shown in the Figure 4.6 below. It was recorded that 45 number of the female respondent never took a bicycle to commute to the place of study. Only 15 number of the respondent shows that they use a bicycle to commute to the place of study frequently. By the way percentages shows that more than 50% of respondent are not a current cyclist because they rarely and never bike riding a bicycle to the campus.

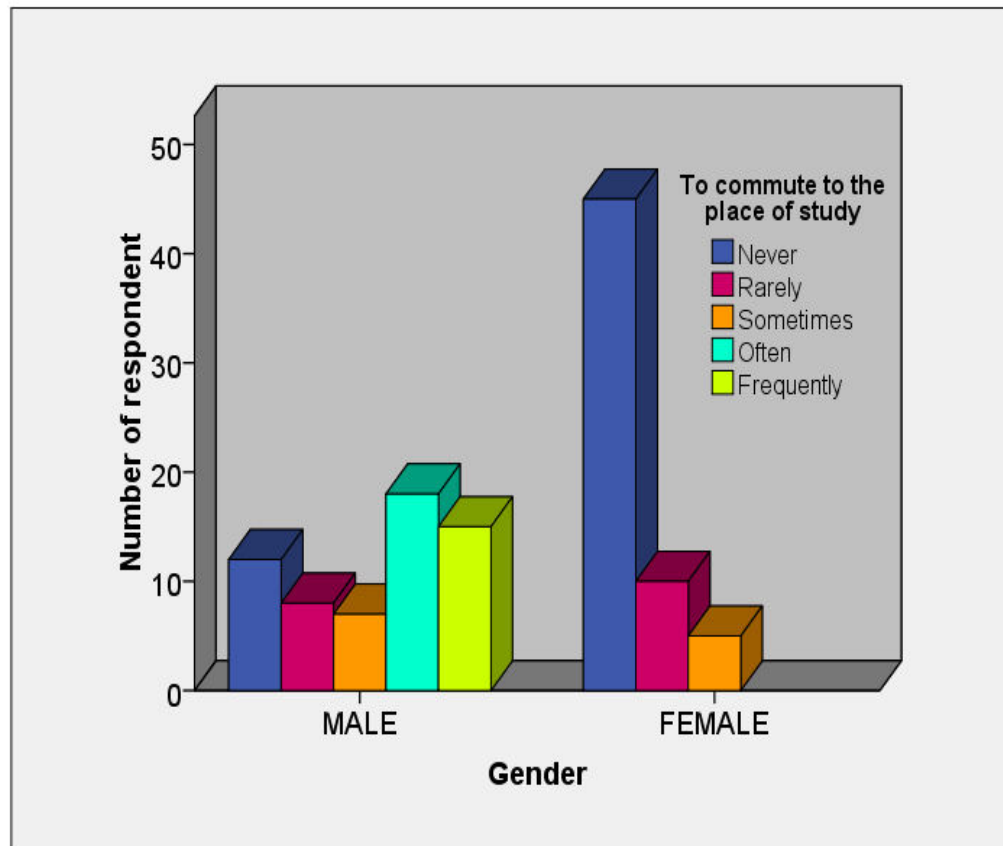


Figure 4.6: Number of respondent take bicycle to commute to the place of study

Table 4.3: Gender by to commute to the place of study Crosstabulation

Gender		To commute to the place of study					Total
		Never	Rarely	Sometimes	Often	Frequently	
Male	Count	12	8	7	18	15	60
	% within Gender	20.0%	13.3%	11.7%	30.0%	25.0%	100.0%
Female	Count	45	10	5	0	0	60
	% within Gender	75.0%	16.7%	8.3%	0.0%	0.0%	100.0%
Total	Count	57	18	12	18	15	120
	% within Gender	47.5%	15.0%	10.0%	15.0%	12.5%	100.0%

By comparing the gender, female respondent contribute to the highest percentage for never cycling to commute to the place of study. Only 8.3% of female respondent reported that they cycle to the place of study in a certain time. Compared to male respondent, 25% are frequently and 30% are often took a cycle to the place of study.

4.4.2 Recreation / exercise

From the result shown, most of the respondent did not interest in bicycle riding for recreation/ exercise. It is proven by only 7 male respondent are frequently and often bike a bicycle for recreation / exercise. Bike a bicycle for recreation sometimes in a time contribute to the highest number of female respondent which is 26 respondent.

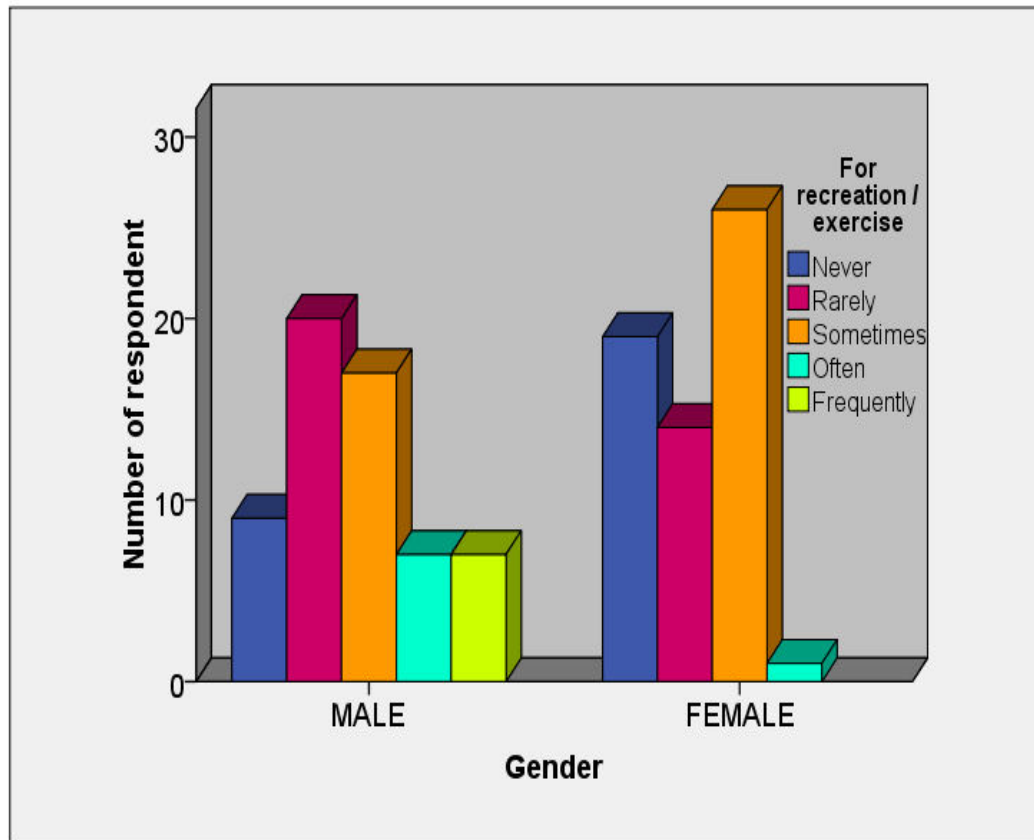


Figure 4.7: Number of respondent take bicycle for recreation/ exercise

Table 4.4: Gender by Recreation/ exercise Crosstabulation

Gender		Recreation/ exercise					Total
		Never	Rarely	Sometimes	Often	Frequently	
Male	Count	9	20	17	7	7	60
	% within Gender	15.0%	33.3%	28.3%	11.7%	11.7%	100.0%
Female	Count	19	14	26	1	0	60
	% within Gender	31.7%	23.3%	43.3%	1.7%	0.0%	100.0%
Total	Count	28	34	43	8	7	120
	% within Gender	23.3%	28.3%	35.8%	6.7%	5.8%	100.0%

According to the result shown in the table, the respondent are prefer taking a cycle for recreation/exercise compared to commute to the place of study. The percentage of female respondent who ride a bicycle for recreation/exercise sometimes in a time is higher than male respondent which is 43.3%. On the other side, it is reported that 23.3 % of male and female respondent never cycling for exercise.

4.4.3 Social interaction

When asked about the reason for cycling is for social interaction, 30 of female respondent reported they never ride a bicycle for their social interaction. Only 4 respondent said that they are use the bicycle for social interaction often and frequently. Others, for the male respondent often and frequently use a bicycle for social interaction shared the same number of respondent which is 7. This showed only several of UMP student are likely to ride bicycle for social interaction such as meeting friends, go to the shop and go to the library.

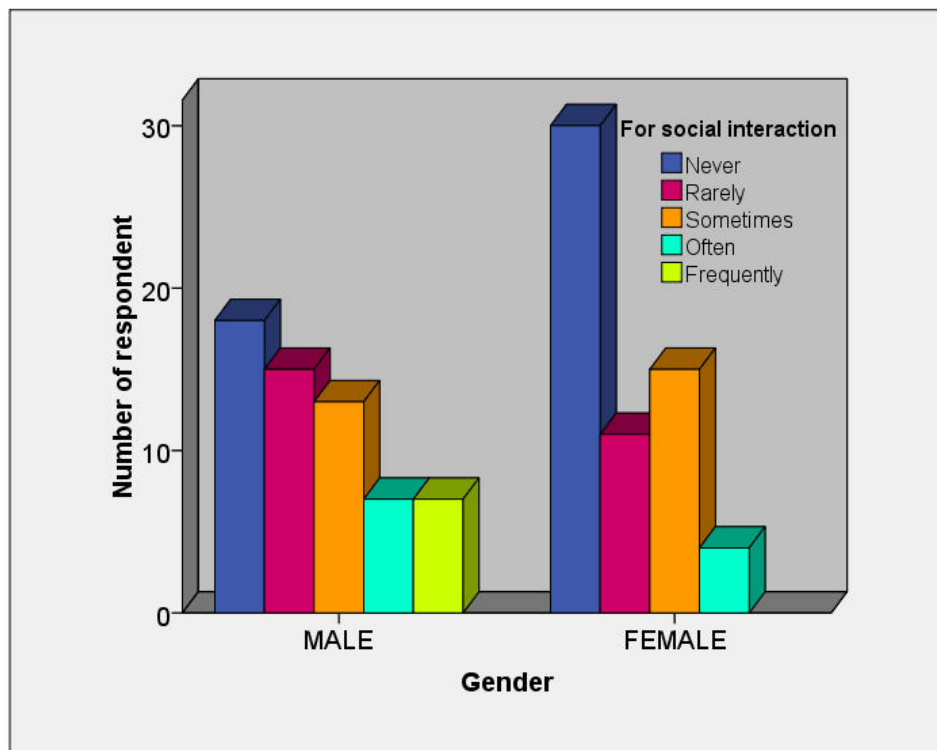


Figure 4.8: Number of respondent take bicycle for social interaction

Table 4.5: Gender by social interaction Crosstabulation

Gender		Social interaction					Total
		Never	Rarely	Sometimes	Often	Frequently	
Male	Count	18	15	13	7	7	60
	% within Gender	30.0%	25.0%	21.7%	11.7%	11.7%	100.0%
Female	Count	30	11	15	4	0	60
	% within Gender	50.0%	18.3%	25.0%	6.7%	0.0%	100.0%
Total	Count	48	26	28	11	7	120
	% within Gender	40.0%	21.7%	23.3%	9.2%	5.8%	100.0%

Most of the respondent reported that they never ride a bicycle for social interaction. It can be proved that 40% of respondent never cycle for this reason which is 30% from male respondent and 50% from female respondent. Only 6.7% of female respondent are often ride a bicycle for social interaction.

4.5 BARRIERS TO CYCLE

4.5.1 Safety Issues

There are various reason why the UMP community were not cycling and one of the reason is about the safety issues. It is reported that drivers who are not educated in safety for cyclist / unaware of cyclist is the main barrier for them to cycle which has the highest mean of 3.83. Referring to the Figure 4.9, it shows that 29 % were strongly agreed followed by 38 % agree and only 3 % of respondent were strongly disagreed that the barriers to cycle is because of drivers are not educated in safety for cyclist.

Besides that, respondent also reported that, there are lack of safety concerns in traffic that contribute to the barriers for them to cycle. Safety reasons/ road too dangerous is in

the ranking 3 followed by no parking space for the bicycle are also the barriers that make them feel lazy to take any risk if they were cycling to the campus.

Table 4.6: Mean and rank of factor that related to the safety issues

Safety Issues	Mean	Rank
Safety Reasons/ Roads too dangerous	3.48	3
No parking space	3.16	4
Safety concerns in traffic	3.60	2
Drivers not educated in safety for cyclist/ unaware of cyclist	3.83	1

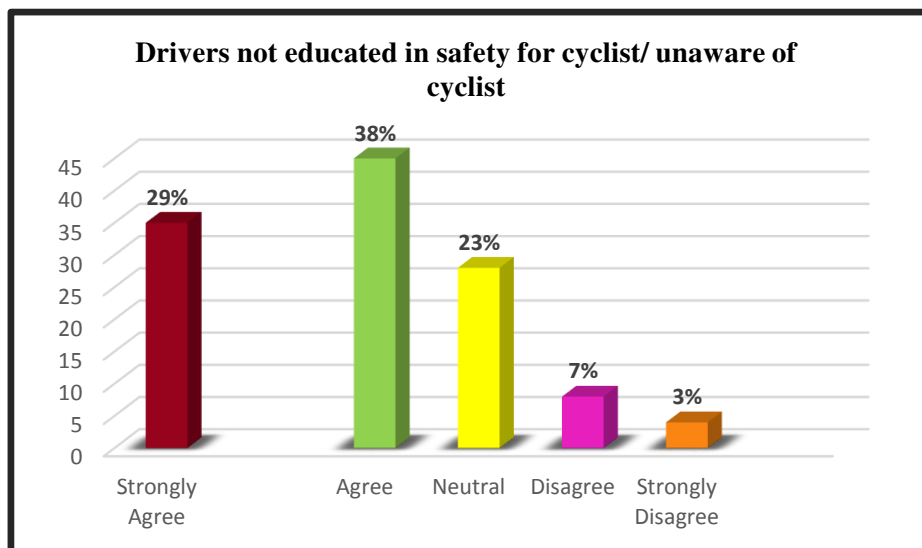


Figure 4.9: Number of respondents for drivers not educated in safety for cyclist/ unaware of cyclist

4.5.2 Health / Ability to ride issues

From the data collected, it shows that most of the student are lazy/ tired/ and no motivation that make it become a barriers for them to cycle. The mean for this factor is 3.39. Besides that, it was reported that they were lack of time to cycle. This is because bicycle is one of the sustainable mode of transportation that need human's energy and bicycle took a long time if compared to the others mode of transportation. Furthermore, they were not properly trained to cycle also contributes to the barriers to cycle which has a mean of 2.58. It can be said that, among of the students, they were not trained to cycle since they were small. So this situation make them not interested in cycling. Meanwhile, only a small portion of the respondent have a medical reasons / physically unable to ride which has a mean of 2.48. Table 4.7 shows the mean and rank of factors related to the health / ability to ride issues.

Table 4.7: Mean and rank of factor that related to the health/ability issue

Health / Ability to ride issues	Mean	Rank
Medical reasons/ Physically unable to ride	2.48	4
Lazy / tired / no motivation	3.39	1
Lack of time	3.38	2
Not properly trained	2.58	3

Figure 4.10 shows the percentage of respondent towards the level of agreement of lazy/tired/ no motivation. It shows that, 31% of the respondent agreed that the barriers to cycle is because they were lazy/ tired/ no motivation to ride. Meanwhile, 17 % were strongly agreed to this statement. Hence, this make this factor is the main barriers to cycle.

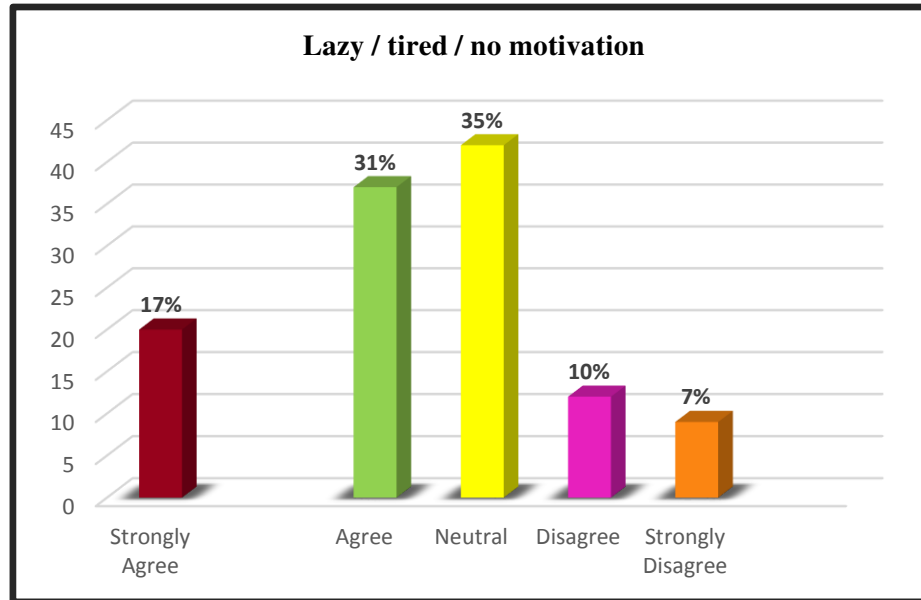


Figure 4.10: Number of respondent for lazy/ tired/ no motivation

4.5.3 Time issues

Time issues also one of the barriers to cycle. The respondent reported that bicycle is the mode of the transportation that takes more time than alternative commutes. The mean for this reason is 3.45. Bicycle is said takes more time than alternative commutes because bicycle did not use any engine to operate. Besides that, the respondent reported that they arrive at campus late if takes a bicycle to commute to the place of study. Table 4.8 shows the mean and rank of factors related to time issues. In the other hand, Figure 4.11 shows the number of respondent and percentage of respondent towards the level of agreement for takes more time than alternative commutes.

Table 4.8: Mean and rank of factors related to time issues

Time issues	Mean	Rank
Takes more time than alternative commutes	3.45	1
Arrive at campus late	3.43	2

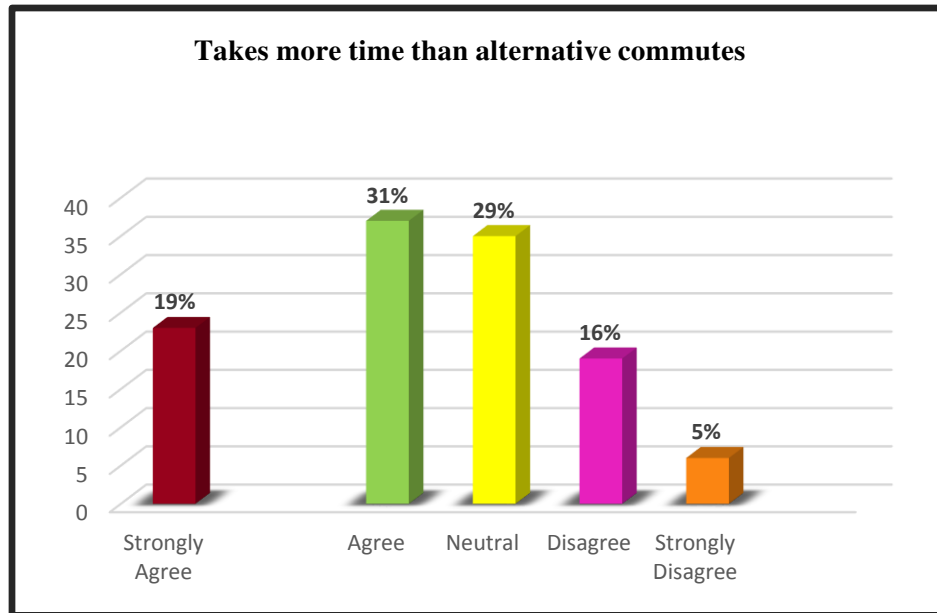


Figure 4.11: Number of respondent for takes more time than alternative commutes.

4.5.4 Weather issues

Weather issues such as extreme hot, rainy, wet surface and dark night also contribute to the barriers to cycle. Extreme hot has the highest mean which is 4.13 followed by rainy which has the mean of 3.95. This factor is the main reason why student not cycle to the place of study. If the weather is extreme hot, respondent will arrive at class sweaty and this situation makes them felt uncomfortable to focus in the class. Besides that, wet surface of the road and dark night are also barriers for them to cycle. Table 4.9 shows the mean and rank of factors related to weather issues.

Table 4.9: Mean and rank of factors related to weather issues

Weather issues	Mean	Rank
Extreme hot	4.13	1
Rainy	3.95	2
Wet surface	3.68	4
Dark night	3.88	3

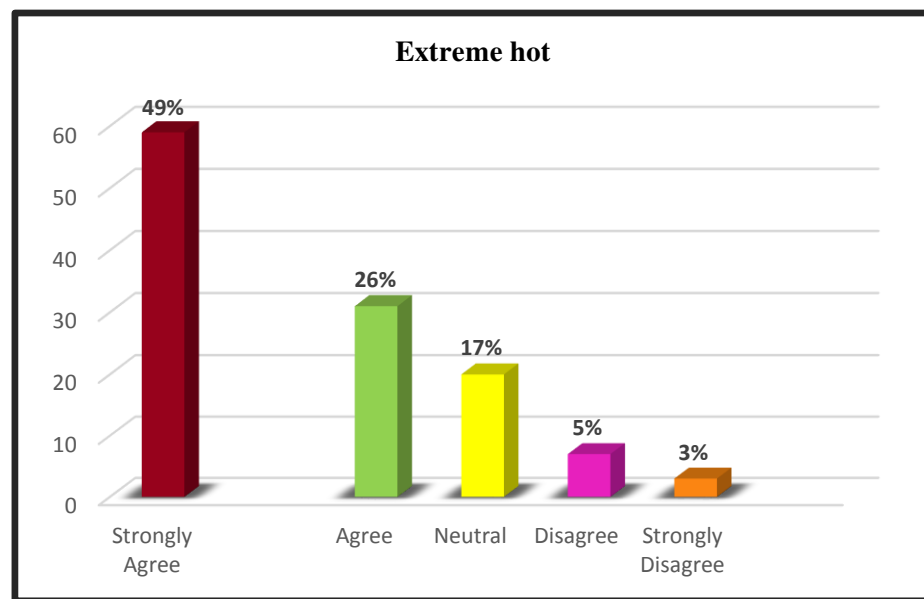
**Figure 4.12:** Number of respondent for extreme hot

Figure 4.12 above shows the number of respondent towards the level of agreement for extreme hot. As stated in the figure, more than 50 respondents strongly agreed weather that is extreme hot become a barrier for them to cycle. Only 7 respondents disagreed with this statement meanwhile 3 respondents strongly disagreed.

4.6 MOTIVATORS TO CYCLE

4.6.1 Benefits of cycling

There were many benefits of cycling. In this research, the benefits of cycling that will make the student are eager to cycle have been identified. The respondent reported that, with using a bicycle, it will reduce cost (save money on fuels and fares) which has the highest mean of 4.33. It also reported that cycling can increase exercise / fitness. Safe environment and improving traffic flow also benefits of cycling which has mean of 3.95 and 3.88. Table 4.10 shows the mean and rank related to the benefits of cycling.

Table 4.10: Mean and rank related to the benefits of cycling

Benefits of cycling	Mean	Rank
Reduce cost (save money on fuel, fares)	4.33	1
Increase exercise / fitness	4.30	2
Safe environment	3.95	3
Improving traffic flow	3.88	4

Figure 4.13 shows the number and percentage of respondent towards the level of agreement for reduce cost (save money on fuel, fares). Interestingly, most of the respondent were strongly agreed using a bicycle as a mode of transportation can reduce cost which contribute the highest percentage of 48%. Besides that none of the respondents were disagreed for this statement.

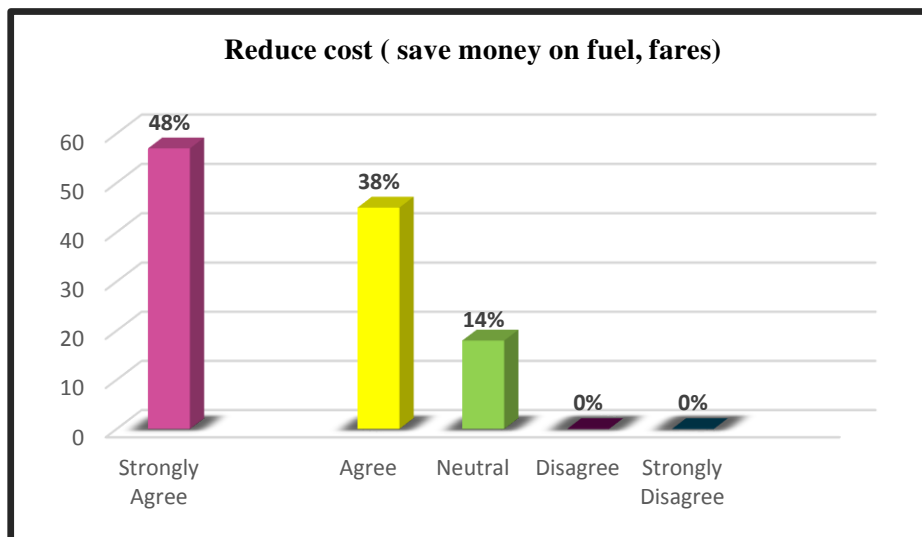


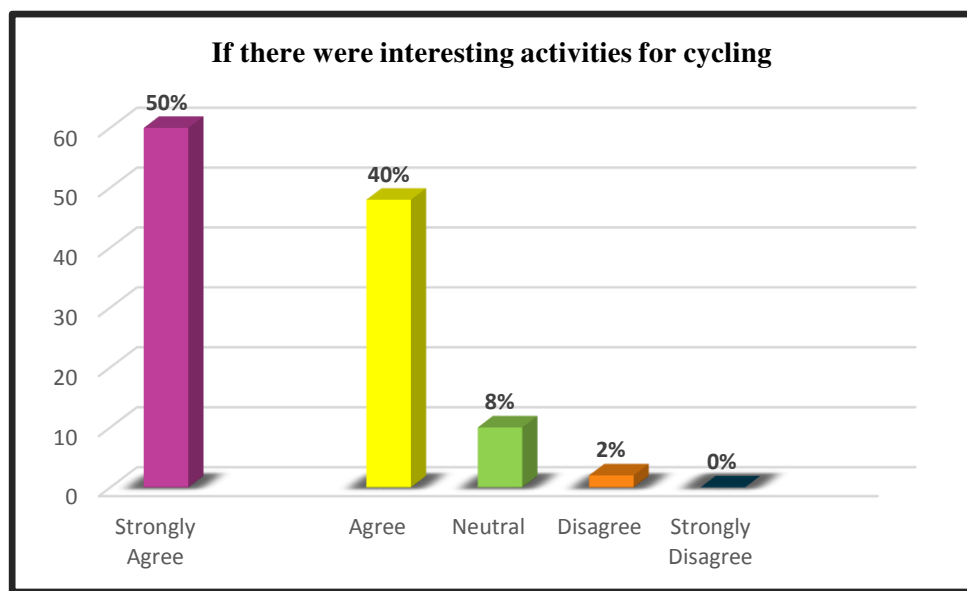
Figure 4.13: Number of respondents for reduce cost (save money on fuel, fares)

4.6.2 Initiative that will influence to cycle

The initiative that would influence student to cycle has been listed. Table 4.11 shows the mean and rank of initiative that would influence to cycle. From the data collected, most of the respondent agree that they will be interested to cycle if there were interesting activities for cycling organized in the campus. This initiative got the highest mean which is 4.38. Besides that, respondent also reported that, if there were bicycle lane in the campus, it will become a motivators for them to cycle. This is because, as stated in the previous discussion, the main barriers to cycle is driver is not educated in safety for cyclist. So with providing a bicycle lane in the campus, this problem could be solved and the barriers will be decrease. Figure 4.14 shows the number and percentage of respondent towards the level of agreement if there were interesting activities for cycling.

Table 4.11: The mean and rank of initiative that would influence to cycle more

Initiative that would influence to cycle	Mean	Rank
If there were bicycle lane	4.22	2
If facilities for securing the bicycle were available	4.16	3
If there were interesting activities for cycling	4.38	1

**Figure 4.14:** The number of respondent if there were interesting activities for cycling

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

An overall conclusion was making to attain the aim of the objective and this chapter will discuss the finalized of the data analysis. Before the information gathered, the objective was established earlier by analysis through the literature reviewed and questionnaire survey. The purpose of the research was first to identify barriers and motivators to bike riding among UMP community. Apart from that, the second objective for this research is to determine the potential cyclist and current cyclist among UMP community. Last but not least, some recommendation are given for further research and reading in the future.

5.2 CONCLUSION

This study is intend to identify barriers and motivators to bike riding among UMP community. There were some main barriers that was reviewed in this study such as safety issues, health / ability to ride issues, time issues, and weather issues. The result of the study have shown that drivers who are not educated in safety for cyclist / unaware of cyclist is the main barrier under the safety issues for them to cycle. As already known, the number of motorized in the campus increased as the student are allowed to bring their own transportation to the campus. During the peak hour, the road are busy with the staff and student that rushing to the office and class. In this time, the cyclist are in the unsafe condition because drivers not aware for them since there were no specific cycle lane for

the cyclist. Through the previous case, some accident was occurred in the campus that involve bicycle and the car.

For the health/ability to ride issues, respondent reported that they were lazy/tired and no motivation to cycle. Since the bicycle is the sustainable mode of transportation, it did not need any fuel consumption but need a human energy to move it. So student nowadays took an easy ways to commute to the place of study by choosing other mode of transportation such as motorcycle or car. Lack of time to cycle also contribute to the barriers in bike riding among UMP community. Besides that, under the time issues, respondents were agreed that bicycle takes more time than alternative commutes making them felt lazy to cycle. Apart from that, they will arrive at campus late. It can be conclude that student must have a good time management if they were truly interested to cycle. Furthermore, the weather that is extreme hot is the most prevalent barriers for them to cycle. This situation will make the student arrived at the campus sweaty. Hence, all the female respondent are walking to the campus because they can bring umbrella along with them. These findings are similar to Rose and Marfurt (2007), which revealed that distances and other aspects like weather conditions, physical abilities, and safety issues are often influenced by individual perception.

There is a great potential for encouraging students to cycle. Respondent agreed that they will be in interested to cycle if there were interesting activities for cycling organized in the campus. Besides that, respondent also reported that, if there were bicycle lane in the campus, it will become a motivator for them to cycle. Furthermore, respondent also were asked about the benefits of cycling that makes them feel motivated and eager to cycle. The respondent stated that, with using a bicycle, it will reduce cost (save money on fuels and fares). It also reported that cycling can increase exercise / fitness.

The second objective of this research is to determine current cyclist and potential cyclist in the UMP community. So, this objective was achieved by obtaining the frequency of the students in cycling which are to commute to the place of study, for recreation / exercise and for social interaction. The result have shown that only a small part of student

can be categorized as a current cyclist. It can be proved by only 25 % of male respondent are frequently cycling to the place of study. Most of the respondent reported that they were never cycle to the campus. Besides that, the potential cyclist also has been identified. Male and female respondent who are bike a bicycle for recreation/ exercise in a certain time can be classified as a potential cyclist. It can be said that this group of respondent have awareness about the benefits of cycling and some of them can be upgrade to be a current cyclist if they were exposed more to the motivators of cycling and barriers to cycle can be overcome.

5.3 RECOMMENDATION

In this research it found that overall, people who are interested in cycling have several motivations that encouraging them to cycle but they have to overcome obvious barriers such as distance between their place of residence and the place of study. Apart from that, there are three major barriers that have been identified before they starting to cycle: drivers not educated in safety for cyclist / unaware of cyclist, lazy/tired / no motivation and the weather is extreme hot. These three barriers should be the primary focus of policies to encourage student for cycling. Furthermore, there are also many minor barriers for potential cyclists.

5.3.1 Provide a bicycle lane

Bicycle lanes were found to be one of the initiative that would encourage students to cycle and that would relieve some of their current discomfort using this mode of transportation. This is because bicycle lanes help define road space for bikes and cars, promoting a more orderly flow of traffic. Besides that, bicycle lanes also will encourage bicyclist to ride in the correct direction, hence increase the comfort level for bicyclists in traffic.

5.3.2 Publicize and campaign on bicycle use in campus

These operations include creating posters which provide knowledge about cycling, organizing university cycling clubs, motivating students to ride by decreasing tuition fees, and etc. These methods will lead students to have a positive attitude towards cycling and help to create a new attitude towards the bicycle as a burden for its user. Moreover, educating young people is an important factor to promote the effective road safety (Iamtrakul and Jantawon, 2012).

5.3.3 Organize interesting activities for cycling

Sport complex or other organization can organize activities for cycling to encourage student interested to cycle. For example, cycling club organize a competition or make a cycling activities once in a month and open it to all of the students. Besides that, for the annual event such as expo-convocation, activities for cycling can be organize through this event because this is the biggest event in the university and most of the student will joint activities that have been organized.

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APPENDIX

QUESTIONNAIRE

Gender : _____

Level of education : _____

Age : _____

Residential place : _____

For each of the following questions, would you please indicate your answer by ticking at the suitable box.

Q1. How far is it from your residential to your main place of study?

Less than 1 km

About 1 – 4 km

About 5 – 7 km

8 km and above

Q2. How do you usually travel to your place of study?

Walk

By car or motorcycle

By bus

Bicycle

Q3. Of the following reason for cycling, which applies to you?

	Frequently	Often	Sometimes	Rarely	Never
To commute to the place of study					
For recreation / exercise					
To excess services e.g. shop, libraries					

Please check () and rate based on your level of agreement on the given statement using the

following scale:

Strongly agree (1)	Agree (2)	Neutral (3)	Strongly disagree (4)	Disagree (5)
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Section	Factors	1	2	3	4	5
PART (A) BARRIERS TO CYCLE	Safety issues					
	1. Safety Reasons/Roads too Dangerous					
	2. Lacks of place to cycle					
	3. Safety concerns in traffic					
	4. Drivers not educated in safety for cyclists/ unaware of cyclist					
	Health / Ability to ride issues					
	1. Medical reasons/Physically unable to ride					
	2. Lazy / tired / no motivation					
	3. Lack of time					
	4. Not organized to cycle					
	Time issues					
	1.Takes more time than alternative commutes					
	2. Arrive at campus sweaty					
	3. Weather issues					

PART (B) MOTIVATORS TO CYCLE	Cycling is one of the sustainable mode of transport which serve to provide...					
	1. Economy (save money on fuel, fares)					
	2. Increase exercise / fitness					
	3. Safe environment					
	4. Improving traffic flow					
	What initiative would influence you to cycle more?					
	1. If there were cycle paths along the route					
	2. If facilities for securing your bicycle were available					
	3. If there were interesting events by Sports Complex that organizes cycling campaign promotion.					