

**THE EFFECT OF EDUCATIONAL LAND USE ON TRAFFIC ISSUES**

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## ABSTRACT

The relationship between land use and transportation is incontestable. Because land use conditions affect transport activity and transport planning effect on land use development. So, it is important to understand the interaction between them, in order to integrate planning. Different factors of land use such as density affect how people travel in a community. Also, these factors effect on traffic growth. So, understanding about the effect of land use on transportation and traffic is necessary to achieve transport planning objectives. In order to know about this effect, educational land use such as university campus is a good sample, because it can be defined as a small city and there is a strong connection between transportation and land use in campuses. Also, College campuses play an important role to create traffic issues such as congestion. Because they commonly have their own communities, typical daily activities such as working, studing and business. So, they attract a large number of people to universities every day. The purpose of this research is evaluation the effect of new constructed building, belong to Faculty of Built Environment on traffic issues such as congestion and lack of parking space. I report the result of survey based on data acquired from questionnaires, interviews and collected secondary data from UTM documents. My finding is new development attract new students and staff, so, increasing the number of these persons is a certain fact. Population growth leads to increase in the number of vehicles and this is a main factor to create congestion in future. Also, this mentioned building can effect on the required parking space. So, students will face with the lack of enough parking space.

## ABSTRAK

Hubungan antara guna tanah dan pengangkutan tidak boleh dipertikaikan. Ini adalah disebabkan faktor guna tanah mempengaruhi aktiviti pengangkutan dan perancangan pengangkutan memberi kesan kepada pembangunan guna tanah. Oleh itu, adalah penting untuk memahami interaksi tersebut untuk mengintegrasikan perancangan. Faktor-faktor pelbagai seperti kepadatan mempengaruhi pergerakan dalam masyarakat. Selain itu, faktor-faktor ini memberi kesan ke atas pertumbuhan lalu lintas. Oleh itu, pemahaman tentang kesan guna tanah terhadap pengangkutan dan lalu lintas adalah perlu untuk mencapai objektif perancangan pengangkutan. Untuk mengetahui tentang kesannya, guna tanah institusi seperti universiti adalah contoh yang baik, kerana ia boleh ditakrifkan sebagai sebuah bandar kecil yang mempunyai satu hubungan yang kuat antara pengangkutan dan guna tanah di dalam kampus. Selain itu, kampus memainkan peranan yang penting untuk mewujudkan isu-isu trafik seperti kesesakan kerana ianya mempunyai komuniti tersendiri, aktiviti-aktiviti harian seperti bekerja, belajar dan perniagaan. Oleh itu, ia menarik kedatangan pengguna ke universiti setiap hari. Tujuan kajian ini adalah menilai kesan bangunan baru yang dibina di Fakulti Alam Bina mengenai isu-isu trafik seperti kesesakan dan kekurangan tempat letak kereta. Pengkaji melaporkan hasil kajian berdasarkan data yang diperolehi daripada soal selidik, temu bual dan data sekunder daripada UTM. Hasil kajian menunjukkan pembangunan baru menarik pelajar dan kakitangan baru justeru meningkatkan bilangan pengguna. Pertumbuhan penduduk yang membawa kepada peningkatan bilangan kenderaan adalah faktor utama yang mewujudkan kesesakan pada masa akan datang. Selain itu, bangunan baru ini boleh memberi kesan pada ruang letak kereta yang diperlukan. Oleh itu, pelajar akan berdepan dengan kekurangan tempat letak kereta yang mencukupi.

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## **CHAPTER 1**

### **BACKGROUND OF STUDY**

#### **1.1 Introduction**

The relationship between transportation and land use planning decisions is undeniable due to the effect of transport planning decisions on land use development and versa. So, it is important to understand the interaction between them in order to integrate planning.

Land use factors such as density, mix, connectivity and walkability affect how people travel in a community. This information can be used to help achieve transport planning objectives. Land use factors such as density, walking and cycling condition, parking supply and management, public transit service quality affect transport activity, including vehicle ownership, mode share (the portion of trips by different modes), non motorized travel (walking and cycling) and therefore impacts on planning issues such as traffic congestion, infrastructure costs and consumer costs. This information is useful for evaluating the ability of smart growth, new urbanism and access management land use policies to achieve planning objectives such as consumer savings, energy conservation and emission reductions.

In order to know about the effect of land use on traffic, educational land use such as university campus is a good sample to reach the best result. The reason is

University campus can be defined as a small "city" because they commonly have their own communities, typical daily activities such as working, studying, and business even possessed their own independent infrastructure facilities (roadway, water supply, electrical supply, sewerage system, etc.). Similarly, campuses also face with similar problems as major cities such as traffic congestions, noise pollutions, and also environmental problems. The trend in motorization on campuses is also quite similar with those in society where car-dependency is dominant.

“The trend in motorization on college campuses equate those experienced by society at large. In the last decade, campus planners have struggled to provide access and mobility without destroying campus qualities as distinct communities. In the United States due to federal requirements concerning air quality, increasing congestion, lack of land for parking, the high cost of constructing parking structures, pressures to reduce traffic’s impact on surrounding neighbourhoods, and constraints on financial resources, many universities are exploring a range of environmentally appealing solutions to alleviate congestion and improve safety for all campus users”.

(Poinsatte and Toor, 2001)

In order to support land use objectives by transport decisions the integration of transportation and land use planning is necessary. Als, this integration is necessary to improve land use planning that support transport objectives. For example, it can guide planners to determine the supportive role of congestion reduction strategies for strategic community development objectives and key role of this to reduce infrastructure costs, improve accessibility for non-drivers and preserve open space.

The campus administrators and planners should have a proper plan to manage affective transportation behaviour based on the campus population and to develop the environmental awareness among the students, as 'they will progress to occupy influential roles in government, companies or other organizations (Tolley, 1996). In fact, innovative transportation approaches are likely to diffuse from higher education to other parts of society. One of the problems is the campus planners and administrators have always accustomed with the dependencies of automobile and the

reluctance to accept changes attitude (Balsas, 2003; Poinatte and Toor, 2001). Nevertheless, the students have the potential to become 'movers and shakers' of powerful forces if properly motivated, to establish the bicycle and pedestrian friendly communities since they are also more open-minded (Limanond, 2011; Balsas, 2003).

Some research has been found on mass transit on college campuses (Farris and Radwan, 1989; Carter, 1996; Brown et al., 2001), also Tolley (1996) has examined bicycling on college campuses in the UK and Carlos J.L. Balsas (2002) has researched about sustainable transportation planning specifically on bicycle and pedestrian planning on American college campuses. But, there is not any published research about the effect of colleges on transportation problems specifically congestion and lack of parking space in UTM campus.

In This research, I will examine the effect of new established building belongs to faculty of built environment in the UTM (University Technology of Malaysia) on transportation. Some issues that UTM students faced with them such as congestion in the main entrance road and lack of space for car parking ,encouraged me to choose this topic. Increase the number of cars due to high rate of taxis and lack of suitable planning for public transport that encourages persons to use their private cars is the main reason to contribute this mentioned issues. So , this research tend to survey about the affection of new constructed building belongs to FAB that is beside the main road on transportation ,specifically its effect on congestion and lack of parking space as two most significant problem in the university.

## **1.2 Problem statement**

1. Students sometimes arrive late in their classes. One reason can be congestion in one of the main roads, inside the university that is important entrance road to go to other faculties and library. The observation indicates that this road sometimes face with congestion such as early mornings. Although, congestion in this road do not continue for long time, but this can

be a warning sign for future, after B12 opening and increasing the number of cars.

2. FAB students sometimes find suitable space to park their cars hardly. In general, finding enough space for car parking does not have any problem at the moment, but it can be a serious problem in the future due to increasing the number of cars.
3. The number of cars are increasing due to lack of suitable public transport to take persons outside UTM and high rate of taxis as two main encouraging factors for FAB members to use their private cars.
4. Lack of enough vacant land to construct new parking near to Faculty of Built Environment (FAB).

### **1.3 Research question**

This investigation tried to answer to this questions :

1. What's the effect of new established building as educational land use on the transportation factors such as parking space and congestion?
2. How serious is this problem and what kind of indicators can be used for evaluating this problem?
3. How we can solve the problem of congestion and lack of enough space for parking the cars in FAB parking?



## **1.4 Objectives**

The objectives of the research are as the following:

1. To evaluate the effect of educational land use development on congestion and parking space.
2. To understand about different indicators that have more effects on the mentioned problems.
3. To formulate solutions to solve congestion and lack of enough parking for FAB members' cars.

## **1.5 Significance of the study**

This study will be a significant endeavour in understanding the effect of educational land use development on traffic. Moreover this study will be helpful to the persons in charge to enforce the best transportation planning according to the result of this survey in order to prevent from the problems that will face with them after new academic construction. Importantly, this research will educate them in deciding on dominate to the problem such as congestion and lack of parking space. It will also serve as a future reference for researchers on the subject of parking management or controlling the congestion on the campus.

## **1.6 Methodology:**

This study is about the effect of new constructed building which belong to faculty of built environment (FAB) in University Technology of Malaysia (UTM) named B12 on the issues related to traffic include lack of parking space and

congestion, involved the participation of members who study and work in this faculty.

The total number of students and staff is 1780. This include; 108 academic staff, 58 non-academic staff, 1199 undergraduate students, 415 Master and PhD students. This research will be conducted according to primary and secondary data. Methods to collect primary data will be: Questionnaire, Interview and observation. The sample size computation was done as follows; (Cochran, 1997)

$$n = \frac{Nz^2pq}{Nd^2 + z^2pq}$$

n = sample size=?

N = number of population=1780

z = value for selected alpha level of .025 in each tail (95 percent confident)

= 1.96

d= acceptable margin of error=0.1

p = Percentage of population picking a choice=0.5

q = p= 0.5

the number of questionnaire that I have to prepare is 91 and the respondents will be selected among the mentioned members. Also, I want to interview with 10 persons of them and the data will collect via questionnaires that will be distributed from November 14 to November 28 this year.

Also, in order to complete the data , I want to have direct observation and choose some different days in the week and go to the road ,count the number of cars in parking and mentioned road in different times. The information that I need to collect and understand according to primary data is: the percentage of persons who

live outside of university and campus, the percentage of persons who use from their private cars and need parking space, the percentage of persons using other modes of transportation, peak hours during the day, busy days in the week, passenger car equivalent (PCE) to assess traffic-flow rate on the main entrance road, the spaces dedicated to FAB parking and its capacity to accommodate the cars, UTM facility for students and staffs to use public transport, stimulant factors for people to shift their transportation mode from cars to other modes.

In this research, I need some information about new constructed FAB building such as the number of rooms in this building and anticipate the number of students and staffs who are F12 members. After that, understanding about the transportation mode that they use, the number of days that they come to university and their demand for parking space.

I have to find peak hours for traffic and recommend my idea to have the best planning for these hours to prevent from issues such as congestion and lack of parking spaces.

In order to assess traffic flow rate, I have to found Passenger Car Equivalent (PCE) that is essentially the impact that a mode of transport has on traffic variables (such as headway, speed, density) compared to a single car. For accounting this, I have to count the number of different mode of transport in the mentioned road, during different times. According to this survey, it's possible to manage congestion and enough parking spaces in the special times.

My secondary data will be collected from books and journals existed in UTM library and electronic resources include e-journal, internet and websites.

## 1.7 Research outline

This research include following chapters:

1.Chapter one: introduction that introduce my topic and contains :back ground of study, problem statement, research question , objective, significance of the study, methodology ,research outline and expected findings.

2.Chapter two: literature review that reviews the literature and introduces readers to the previous researches on the topic. It also helps to emphasize the significance of the research and describes briefly the previous researches on the related topics, and list the most significant of their results. Then analysis and evaluate the data which I will find according them. After that , to fix the achievements of the previous researches, and to point the direction for the future investigations. Finally, I will conclude my work and write a brief summary of my literature review.

3.Chapter three: methodology that explain the process of study and the way to conduct this research. It defines what the activity of research is, how to proceed and how to measure progress.

4. Chapter four: data analysis that consist all of the information will be gathered and analyze them according to quantitative and qualitative analysis.

5. Chapter five: discussion and conclusion that is explanation of findings and investigations that conducted during the research. After that a general conclusion from the mentioned findings.

## **1.8 Expected Findings**

The findings that is expected from this research is understanding about the negative effects of new academic function that contributes the traffic issues consist of congestion and lack of parking space. It's expected to explore the main cause of this problems and find out the suitable way to solve them.

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