GATEWAY AS CONNECTOR TO IMPROVE THE VISIBILITY AND CONNECTIVITY OF DUSUN UTM

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DEDICATION

This thesis is dedicated to my mother, who taught me that the best kind of knowledge to have been that which is learned for its own sake. It is also dedicated to my father, who taught me that even the largest task can be accomplished if it is done one step at a time.

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ABSTRACT

Since 1978, Universiti Teknologi Malaysia (UTM) has been based in Skudai, Johor, and has had a significant impact on the district's development. However, the presence of a sizable conservation campus community has led in segregation on Dusun UTM amongst its neighbouring communities. Although there have been numerous study studies on street connectivity, there is a literature gap on street integration with the community of Skudai, Johor using space syntax. Using space syntax as a tool, this research investigates the idea of linking and uplifting communities through the connectivity of people in developing a new gateway for the Dusun UTM. The communities studied in this study are those in the Skudai section of UTM Technovation Park. The methodology for analysing community connectivity and integration is based on a quantitative approach using space syntax. The paper's results include the amount of street integration of Jalan Pontian Lama with its surrounding neighbourhood, which will be useful to future university scholars.

ABSTRAK

Sejak 1978, Universiti Teknologi Malaysia (UTM) telah bertapak di Skudai, Johor, dan telah memberi impak yang besar kepada pembangunan daerah itu. Walau bagaimanapun, kehadiran komuniti kampus pemuliharaan yang besar telah menyebabkan pengasingan di Dusun UTM dalam kalangan komuniti jirannya. Walaupun terdapat banyak kajian kajian mengenai perhubungan jalanan, terdapat jurang literatur mengenai integrasi jalanan dengan masyarakat Skudai, Johor menggunakan sintaks ruang. Menggunakan sintaks ruang sebagai alat, penyelidikan ini menyiasat idea untuk menghubungkan dan menaikkan semangat komuniti melalui ketersambungan orang ramai dalam membangunkan pintu masuk baharu untuk Dusun UTM. Komuniti yang dikaji dalam kajian ini adalah di bahagian Skudai di UTM Technovation Park. Metodologi untuk menganalisis ketersambungan dan integrasi komuniti adalah berdasarkan pendekatan kuantitatif menggunakan sintaks ruang. Keputusan kertas itu termasuk jumlah integrasi jalanan Jalan Pontian Lama dengan kejiranan sekitarnya, yang akan berguna kepada sarjana universiti masa depan.

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LIST OF ABBREVIATIONS

ANN	**-**	Artificial Neural Network
GA	-	Genetic Algorithm
PSO	-	Particle Swarm Optimization
MTS	-	Mahalanobis Taguchi System
MD	-	Mahalanobis Distance
TM	-	Taguchi Method
UTM	-	Universiti Teknologi Malaysia
XML	-	Extensible Markup Language
ANN	-	Artificial Neural Network
GA	-	Genetic Algorithm
PSO	-	Particle Swarm Optimization
VGA	-	Visibilty Graph Analysis

LIST OF SYMBOLS

δ	-	Minimal error
D, d	-	Diameter
F	-	Force
v	-	Velocity
p	-	Pressure
I	-	Moment of Inersia
r	-	Radius
Re	-	Reynold Number

CHAPTER 1

INTRODUCTION

1.1 Background Study

UTM relocated its campus in 1978 and began construction on a new campus in Skudai, Johor, which has a loose grid and fine grain urban fabric with early settlements. As soon as it opened in 1985, the population began to rise as students and personnel from other states arrived. Highways and roads have been renovated, with the first concrete road opening on the Skudai-Pontian Highway enabling easier access into the district. By the 1990s, the district had begun to expand its Taman Universiti mix-developments for new townships. The UTM campus's position provided the district with chances for growth and value. By the year 2000, the urban fabric had become dense, thanks to the quick suburban growth of low-rise structures from Taman Universiti township as it matured, as well as the new Mutiara Rini development, which continued to grow swiftly as UTM extended its campus inhabitants and facilities. In 2010, the UTM campus developed Taman Teknologi Senai, a commercial and business park, with UTM Technopark, luring enterprises and larger possibilities near the campus. At the moment, each township's attractions are improved, with their own nodes, as each development competes for attention, resulting in a lack of synergy between them. Near the Pulai district, the urban fabric disperses and becomes more compact, encircling the Mutiara Rini area.

As a result, the opening of the UTM campus had a significant impact on population and development growth. The community has been divided into two primary divisions as the population has grown: the university community and the public community. The townships surrounding the campus have grown and developed their own attractions, while the UTM campus is gradually opening up its area to commercial and, eventually, the publics by establishing the Edutourism Campus. Through Edutourism Campus, it may not only help promote the UTM campus itself,

but it also can help connect the university community with the surrounding community.

1.1.1 About UTM Edutourism

In 2009, Edutourism Campus was established under the management and administration of the Office of Real Estate, UTM (PHB). On 14 December 2017, in line with global developments and current requirements of the University, the UTM Campus Edutourism Office has now been structured and transferred to the Sports, Recreation & Edutourism Cluster, Business Development Division, Office of the Deputy Vice Chancellor (Development). The goal of establishing the Edutourism Campus at UTM is to research and revitalise the field of edutourism on campus so that visitors, whether students or public, can get a closer look at the UTM Johor Bahru campus and develop an interest in continuing their studies to a higher level. All of the areas that offer attractions on the UTM campus are centralised and administered by this office with more emphasis and direction through the Edutourism Campus agenda, which is separated into two sectors: environment (ecotourism) and knowledge (edutourism). In UTM campus, Edutourism campus provides 19 interesting places that consist of 3 lakes, 9 facilities that can be used by the visitor, 4 UTM trails and 10 activities that visitor can explore and experience as shown in Figure 1.0.1. Dusun UTM is one of the resources that can be commercialize, it can benefit both parties (scholar's community and the surrounding community) by sharing the resources that available in Dusun (Orchard) UTM.

Figure 1.1.1: UTM Edutourism Campus Map (source: UTM Edutourism facebook page)

1.1.2 Orchard in UTM

UTM has an orchard of 22 hectares (54.36 acres) which has been managed under the management of Edutorusim campus. The orchard is located next to the Pontian-Skudai Highway and behind the University Health Care Center, which can entice tourists with its diverse collection of herbaceous plants, fruit trees, farms and thriving horticultural nurseries.

The orchard acquires 10 types of seasonal fruit trees which are spread village, spread, durian, rambutan, rose apple, jackfruit, mangos teen, *duku langsat*, mango and

duku. Horticulture nursery sits on a 5-acre plot of land. This nursery also includes 6000 different varieties of plants, including tree and potted flower species such as puddings, palms, etc. Apart from having fruit and flower trees, UTM orchard also has a sheep farm and 3 Red Tilapia fish ponds that are farmed by UTM itself. According to the official web page of UTM edutourism campus, Dusun (Orchard) UTM also provided activities to the visitor such as fruit tasting, fishing in a 2 acres fish pond and barbecue station.

By opening the doors of Dusun UTM to the public, it is in line with the strategic priorities as stated in UTM envision 2025, which is in strategic 6 stated provide a sustainable campus experience to UTM's scholars, staff and surrounding community as shown in Figure 1.0.2.

Figure 1.1.2: UTM Envision 2025 (source: UTM official website)

1.2 Problem Statement

Over time, increased understanding of the spatial structure of street networks and the location of economic activities has been supported by street connection (Hillier et al., 1993). The directness and availability of alternate paths connecting locations, which can attract or dissuade pedestrian traffic, is referred to as street connectivity. The social/spatial interaction that connects one space to another in an urban system is the foundation of accessibility (Koh & Wong, 2013). In other words, a pedestrian-friendly region with more integrated streets that are likely to be more accessible from other places will attract more people. The current street design connecting to Dusun UTM and nearby neighbourhoods such as Taman Universiti, Sri Pulai, Mutiara Rini, and others is not well connected with other streets. Due to its segregated location from the neighbourhood, Dusun UTM has been unable to effectively promote itself to the surrounding communities.

1.3 Research Aim

To enhance on the potential of Dusun UTM within UTM Campus as new gateway to the UTM by exploring spatial connectivity and visibility between public and university community.

1.4 Research Objectives

The objective of the study: -

(a) To understand the spatial and visual connectivity pattern on pedestrian movement in the UTM campus using the Space Syntax approach.

(b) To observe the frequency of people and their activities in order to identify the potential accessibility for the local pedestrians to the location of proposed gateway.

(c) To synthesize the above analysis in order to recommend the spatial configurational of the gateway to connect with Dusun UTM.

1.5 Research Question

Based on the studies, research questions that arise are:

(a) How Space Syntax method can be applied to analyze the spatial and visual connectivity pattern in UTM campus?

(b) How to identify the potential accessibility for the local pedestrians to the location of proposed gateway?

(c) What are the suitable configurational layouts of the gateway to connect with the Dusun UTM?

1.6 Significance of Research

The aim of the study is to study the capability of the gateway as connector to Dusun UTM through a review of relevant literature, a discussion of valuable results, and an up-to-date overview of the topic. Thus, identification of the connectivity pattern of the pedestrian movement in the studies area is very important in improvising the visibility and connectivity of Dusun UTM.

1.7 Theoretical Framework

The theoretical framework outlines the study's problems as well as its goals and aims in order to better align the research with the goal of producing useful results. While the study's overall framework specifies the research methods that will be used and have been successful in achieving that goal.

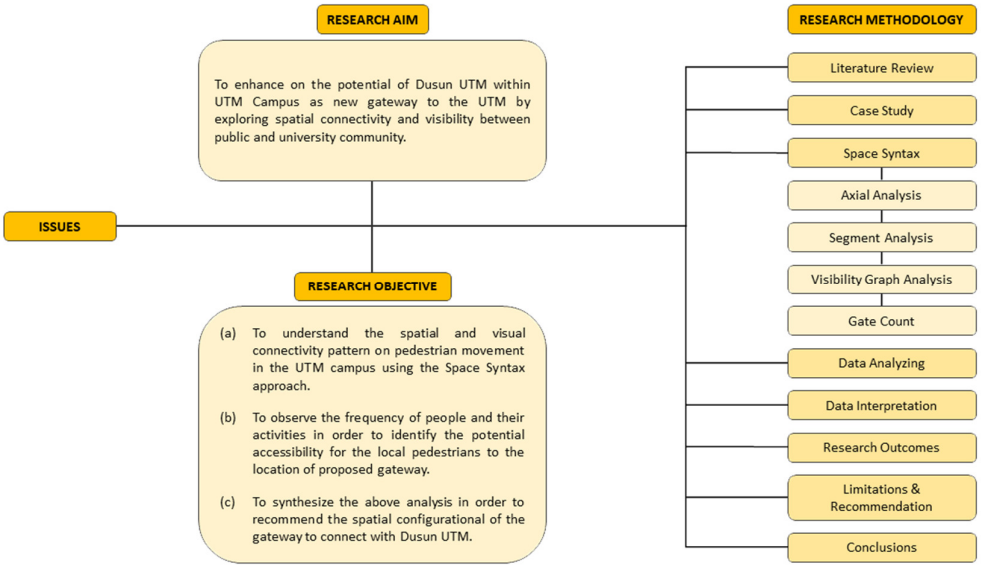

Figure 1.7.1: Theoretical Framework (source: Author)

1.8 Research Scope

This research is focusing on the visibility (visual) of spatial layout from the current situation which is Dusun UTM located next to the Pontian-Skudai Highway and behind the University Health Care Center

On the UTM campus, there are numerous points of interest. Some are hidden, while others are visible and accessible. This study investigates pedestrian movement patterns, particularly on the UTM campus. Dusun UTM, on the other hand, appears to have been neglected and lacks architectural features due to poor street design in UTM

campus. The potential of sky garden as gateways is the topic of this research. This type of social interaction takes place in informal areas, and visibility studies at various levels of analysis can be used as design determinants in Design Thesis or even in urban planning as one of the guidelines for the interweaving of research and practice. In addition, as stated in enVision 2025, UTM's own identity should be redesigned to fit the concept of an open campus. These experiments and research studies are concentrated around the UTM campus area.

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