

A STUDY ON STUDENT'S SATISFACTION TOWARDS THE CAMPUS TRANSIT SYSTEM IN UNIVERSITI SAINS MALAYSIA

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ABSTRACT

This article determines the level of satisfaction among the USM bus transit system. The study is based on a survey carried out from the questionnaire that is administered involving 400 students. All data are analyzed by SPSS software. By using the descriptive analysis the level of satisfaction among the students towards the facilities provided are examined. The findings show that the levels of satisfaction among students are mixed. However, majority of students are satisfied with the facilities provided by the university. The findings of this study will help the company or organization or the university to improve their service provided to the students in achieving the student's satisfaction due to the evaluation of satisfaction level for every variables (facilities).

KEYWORDS: Public Transportation, Campus Transit, SPSS, Transit Satisfaction, Transportation Management

INTRODUCTION

Students are the direct recipients of the service provided by the university. Student's satisfaction has become an extremely important issue for universities and the management itself direct or indirectly. Hence, student satisfaction is an important issue in terms of quality of service provided in the marketing to be addressed by the university. University should focus the services to students because as a direct customer, they receive the service directly from the university program. The objective of any university is to maximize student satisfaction and minimize dissatisfaction in student transit, therefore this in turn to improve the institutions performance.

The improvement of the transit services provided by university can be achieved by getting feedbacks, comments, complaints or objections from the students as a customer. From the positive or negative feedback, the university has a better view of the strengths and weaknesses of its services so that improvement can be made wherever necessary. This can be carried out continuously to gain better relationship to the students as a whole.

Public Transportation

Transport is the back bone of urban life. It is one of the factors which determine the form and socio-economic development of a city. Mobility and accessibility provided by the transport system have been playing a major role in shaping countries, influencing the location of social and economic activity, the form and size of cities, and the style and pace of life by facilitating trade, permitting access to people and resources, and enabling greater economies of scale, worldwide and throughout history (Zuidgeest 2005).

Public Transport Efficiency Indicators

Similar to any social service, efficiency and performance measures in public transport are necessary to monitor progress toward a result or goal. Efficiency measures compare realized and optimal levels of outputs and inputs. It is also important in terms of identifying and measuring sources of successful performance and therefore can be used in policy planning and allocation of resource. Efficiency measures can be used as means of evaluating recently realized or proposed extensive changes towards increased deregulation, reorganization and privatization of public transport (Costa, et al. 1997).

The performance measure criteria's should thus be tools to evaluate system condition, level of service, and safety provided to customers based on economic, environmental and community policy goals. They should also evaluate the day-to-day performances for strategic management, analysis of options and trade-offs. Performance measures also provide information for decision on how to allocate resources and help to prioritize improvements to the neediest areas. In general performance measure indicators should be policy driven, which can be used in analysis of options and trade-offs, decision making on resource allocation, and monitoring to provide clear accountability and feedback (NCHRP, 2005). Furthermore, they can show trends, or warn problems, and will influence immediate action or long term plans.

The efficiency of public transport system has been reported in terms of operational indicators, engineering indicators, labor indicators, social indicators, resource indicators and financial indicators on literatures as shown below. The NCHRP (2005) report categorizes performance measures for general transport assets under Preservation of assets, Mobility and accessibility, Operations and maintenance, and Safety. Public Transport Authority of Western Australia (2004) in their annual report used five categories of performance measure with indicators.

This includes; Use of public transport measured by passenger per service km and Total passenger place kilometers, Service reliability, Level of overall customer satisfaction, Customer perception of safety and Level of modifiable safety incidents. In the context of developing countries Armstrong-Wright et al. (1987) listed passenger volume, fleet utilization, vehicle-km, break-down in service, fuel consumption, staff ratio, accidents and cost of bus services as operation performance indicators in addition to quality indicators. Iles (2005) grouped efficiency indicators under labor, operational, engineering, personnel and financial indicators.

The relevance and appropriateness of each measure depends on the context of analysis. Thus as Iles (2005) reckons indicators have to be clearly and unambiguously defined. In this research the different efficiency measures from literatures are grouped into five main categories based on the main operational components of public transport (i.e. network, vehicle, labor, finance and operational/system). These are; service efficiency, network operating efficiency, utilization efficiency, labor efficiency and finance efficiency as shown in the Table 1.

Anbessa organization performs monthly efficiency study. The organization conducts route and service efficiency studies. Since the company is subsidized by the municipality, and have very limited resource, gets vehicles on loan and gets vehicles from donors the concern and the need for proper assessments of efficiency is an arguable. As described from the interview, the vision of providing modern and fast service to satisfy the need of customers cannot be achieved without efficient performance. The company measures and evaluates service efficiency and route performance based on vehicle-km, passenger volume and revenue. The next section describes some of the system efficiency indicators.

Table 1: Summary of Efficiency Indicators (From Iles, 2005)

Efficiency Category	Description	Indicators	
System efficiency	System efficiency is a ratio of output to the input consumed in transportation process; it depends on labor, financial, network and utilization efficiency.	Accessibility	
		Mobility	
		Equity	
		Productivity	Passenger-volume Vehicle-km
		Infrastructure Availability	
		Safety	
		Quality, Comfort, convenience	
Network operating efficiency	Network efficiency measures the ability of network to support direct services between areas, short distance, flexibility and coverage.	Continuity and balancing of lines	
		Operating flexibility	
		Integrating with other modes	
		Cost of the system	
Labor efficiency	Labor efficiency relate to the amount of the labor required to the produce unit system output.	Operating employee per vehicle-km	
		Passenger carried per day per total number of employee	
		Number of worker employed in maintenance shop per vehicle serviced in it	
		Administrative staff employed per operating bus	
Utilization efficiency	This compares the rate of resource (vehicle, labor, lines) utilization to the available capacity.	Vehicle utilization	
		Vehicle break down in service	
		Line capacity utilization	
		Labor utilization	
Finance efficiency	Finance efficiency refers to the amount of investment required an/or gained to/from produce unit system output	Operating cost per vehicle-km	
		Operating cost per passenger trip	
		Revenue per vehicle-km	
		Revenue per vehicle-hr	
		Total revenue per total operating costs	

Public Transport Infrastructure Availability

The first determining factor of quality and level of service is the availability of adequate infrastructure. Infrastructure refers to road and vehicle infrastructure. The road surface, total road area, road width and symbols have direct effect on the speed of the service, quality of ride, reliability and accident rate (Vasconcellos, 2001). In most developing countries, bus road infrastructures are very limited in extent and width. The shortage of bus route supply is attributed to the general low supply of road infrastructure.

Average Spacing between Stops and Routes

The average spacing between stops needs a trade-off between cost and journey time. Usually simple roadside stops incur very low cost for bus. The spacing for such case should emphasize on minimizing passenger journey time which includes; walking time, waiting time, boarding time, in vehicle time, alighting time and walking to destinations time. It should be noted that for very small spacing, total trip time would be high, since each passengers journey on the major mode would be interrupted by numerous intermediate stops. On the other hand, if the stops spacing are very wide, feeder trip times would lengthen, outweighing the benefits of a faster 'line-haul' section. In conditions of fairly uniform population density along the whole route, with some concentration around stops, the feeder trip length is equal to about one-quarter of the average spacing between stops (White, 2002).

Area Coverage

Area coverage which can be computed as the area within a certain distance, for e.g.400m, or five minute walk circles from bus stops. Network area coverage is the total area within these distances from stops, excluding overlapping areas. Percent of area covered is the area covered divided by the total bus service areas expressed as percent. Percent of population served is the population in the covered area as percent of the population in the bus service area.

Vehicle Availability

The vehicle infrastructure determines the capacity and speed of the bus and operating and maintenance costs. Number of spaces/ vehicles offered on the line at a given time, such as peak-or off-peak hours, represents service offered at any one time, and it may be given for peak- and off-peak hours, or on different days. Vehicle availability, which shows the extent to which the vehicle fleet is available, indicates the effectiveness of maintenance. With effective preventive maintenance it should be possible to obtain average availability figures of 90% of fleet; 85% is reasonably good figure in most circumstances, although 75%is more typical in developing countries (Iles, 2005).

Frequency

According to these parameters to encourage people to use public transportation Technical University of Denmark had done a quantitative method of evaluating public transportation systems in areas in which the frequencies of transportation services were low. The starting point of the evaluation was an overall view of the interaction between public transportation and private transportation and the area with its physical and socio-economic variables. In the present paper the problem was concerning the evaluation of the public transportation system is treated. A behavioral approach to travelling patterns is utilized to describe the benefit to the users of public transportation leading to the formulation of a measure for transportation service-from an individual point of view. It is emphasized that the social point of view is taken into account in a total model and finally the methods set up were discussed.

Quality of Service

The quality of service refers to the level of comfort the service offer during travel/ ride. Some of the performance indicators are: Average network speed, waiting time, walking distance to bus stop, journey times and reliability.

- **Average Network Speed** v_{av} (km/h) must be computed as a weighted average by the volume of service provided on different lines.

$$v_{av} = \frac{\sum_i W_i V_i}{\sum_i W_i} \left| \frac{V}{km/h} \right| \left| \frac{W}{veh - km} \right| \text{ [Vuchic, 2005]}$$

- **Waiting Time** is the time passengers have to wait at bus stops for busses. Longer waiting times indicate poor adequacy. In developing countries to achieve a reasonable level of service, the average waiting time should be in the range of 5 to 10min, with a maximum waiting time of 10 to 20min under the prevailing conditions (Armstrong-Wright, et al.1987).

- **Walking Distance to Bus Stops** is the distance that passengers have to walk to and from bus stops. It is an indicator of the coverage. For well-served urban areas it should be in the range of 300 to 500m from home or work place. Distance in excess of 500m may be acceptable in low-density area but the maximum should not exceed 1000m (Armstrong-Wright, et al.1987).
- **Journey Time** is the total time spent to reach a destination from a given origin. It includes the walking time, waiting time, on vehicle time and walking to the destination. It should not be more than two to three hours per day. Excessive journey time reflects inadequate bus supply or poor scheduling or routing (Armstrong-Wright, et al.1987).
- **Headways on Lines** represent another important element of service quality.
- **The Reliability** depends heavily on the actual conditions of buses while they are circulating. Indicators: average speed, volume-capacity ratio, number of signals per kilometer and number of bus stops per kilometer. Bus stop spacing needs tradeoff between travel time and walking distance. Too closely spaced stops will increase the delay and thereby the total travel time. Widely spaced stops increase the walking distance and the inconvenience.

Schedule reliability can be computed as the percent of TU arrivals with 0-4 minute delays [vuchic, 2005]:

$$R = \frac{\text{number of arrival 0 - 4 min late}}{\text{total arrivals}}$$

The punctuality is affected by level of congestion. In a very congested city a greater variance from schedule may be tolerated than in a city where traffic congestion is not a problem. A reasonable target in most operation is for 90% of journey to operate on time, where this may be defined up to five minutes late for service with frequencies up to fifteen minute, up to ten minutes late for services with frequencies between fifteen minutes and two hours, up to thirty minutes late for services with frequencies of more than two hours (Iles, 2005).

Customer Satisfaction and Service Quality

In recent times all organization has increasingly come to understand the importance of customer satisfaction. It is widely understood that it is far less costly to keep existing customers than it is to wind new ones. For many organizations in the public sector, customer satisfaction will itself be the measure of success. According to Oliver (1997), satisfaction is defined as the customer's fulfillment. It is a judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment, including levels of under-or over-fulfillment. Need fulfillment is a comparative processes giving rise to the satisfaction responses. Any gaps lead to disconfirmation; i.e., Positive disconfirmations increases or maintain satisfaction and negative disconfirmation create dissatisfaction. Service quality (Parasuraman et al. 1988; Gronroos 1984) is defined as a comparison between customer expectation and perception of service. Service quality in general consists of five distinct dimensions: tangibles (Physical facilities, equipment, and appearance of personnel), reliability (ability to perform the promised service dependably and accurately), responsiveness (willingness to help customer and provide prompt service), assurance (knowledge and courtesy of employees and their ability to inspire trust and confidence), and empathy (caring, individualized attention the firm provide its customer).

GENERAL OBJECTIVES

Keeping customers satisfied is what leads to customer loyalty. Research conducted by Jones and Sasser Jr (1995) into thirty organizations from five different markets found that where customers have choices the link between satisfaction and loyalty is linear, as satisfaction rises, so does loyalty. Translating this into university services, this study intend to obtain the perception of students after that used facilities in USM such as transportation.

In other words, the contribution for this study is as follows:

- To create the standard public transportation services quality provided by the university to the students.
- As a guide for the university to improve their services.
- To enhance the capability of the staff in terms of providing the public transportation service based on the students complains.
- To allow the university or institutions to benchmark and to provide indicators that will contribute to the reputation of the university in the market place.
- To improve the quality of service and facilities in order to provide conducive of university environment for the students that will help them to obtain good academic performance.

METHODOLOGY

Research Design

This study is an exploratory in nature where the purpose is to describe the level of Student's satisfaction on public transportation service. Since this study is a descriptive study, no hypothesis was developed and the analysis conducted was only the descriptive type.

Sampling Design

Samplings are the process of selecting a sufficient number of elements from the population, to generalize the characteristics of the population elements. Sampling is done due to the large amount of the USM's students. Besides that, by using sampling it can save time and cost involved compare than if the researcher needs to gather information from the whole customers (students).

Population

Population refers to the entire group of people or element sharing some common set of characteristics or interest the researcher wishes to investigate. USM has a large population of students. For this study, the population refers to the USM students who are living in the Students Residential Hall including undergraduates and postgraduates students.

Sampling Frame

The sampling Frame is equal and there are 400 populations or even a substantial portion to achieve reliable results. In the ideal case, the sampling frame should coincide with the population of interest.

Our research choose to use simple random sampling, we selected 400 students from USM everywhere regardless of gender, age, race, religion and nationality. So every student has the same chance of being included in the research.

100 questionnaires were being distributed to these students. So this research is based on 400 respondents which we choose in from USM.

Data Collection Methods

There are several methods to get the information we need, for example survey, observation, interviews, and questionnaire.

We did a questionnaire to collect the information from the question and analysis the 400 questionnaire after we gather it. It was distributed within the campus grounds and collected immediately after they finish it.

First we discuss about the main part about the questionnaire, and then divide the main question to four sections. And we design a suitable question which the student easy to choose and we convenient to analysis. And the ranging from five scales, which is strongly disagree, disagree, neutral, agree and strongly agree. They only need to circle the answer which they think is suitable.

Questionnaire Design and Development

The survey questionnaire is composed of two parts: student's profile and questions about student's satisfaction toward services provided by USM. There are 20 questions totally that comprise dependent and independent variables. Respondents who participated in the survey are required to select one of the scale that accord with their real feeling. Each of the questions has five scales, which is 1-strongly disagree, 2-disagree, 3-neutral, 4-agree and 5-strongly agree.

DATA COLLECTION

Appropriate Bus Schedule

Hypothesis Testing

H₀: The population mean is at least 4, $\mu \geq 4$

H₁: The population mean is less than 4, $\mu < 4$

We decided on the 0,025 significance level because it is a one-tailed test. In this case, the number of observation in the sample is 400, so there are 99 degrees of freedom. We get the critical value -1.984, because this is a one-sided test and the rejection region is in the left tail, the critical value is negative. Thus, the computed t value is -9.636 and it is rejected at the 0.025 significance level because it is smaller than the critical value of -1.984 as shown in Table 2.

Table 2: Bus Schedule One-Sample Test

	Test Value = 4					
	t	df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
The bus schedule is appropriate for the students	-9.636	99	.000	-0.88	-1.06	-0.7

We conclude that H₀ is not accepted. This is because students are not really satisfied with the bus schedule of USM, and the schedule need to adjust to meet the needs of the students.

On-Time Bus Arrival

H0: The population mean is at least 4, $\mu \geq 4$

H1: The population mean is less than 4, $\mu < 4$

Since it is a one-tailed test, we determine significance level as 0.025. In this case, we also have 400 observations, so degree freedom is 99 accordingly. We have calculated that the critical value is -1.984. From the table above, the computed value is -13.764 which is far less than -1.984, so it is rejected at the 0.025 significance level as shown in Table 3. According to the above description, we can conclude that the H0 is rejected. It reacts that respondents think that the bus cannot always arrive on time. So our suggestion is that school buses can improve their punctuality and ensure students can arrive the class in time.

Table 3: On-Time Bus Arrival One-Sample Test

	Test Value = 4					
	t	df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
The buses always arrive on time.	-13.764	99	0	-1.18	-1.35	-1.01

Quick Response for Complain Regarding the Bus Services

Hypothesis Testing

H0: The population mean is equal 4, $\mu = 4$

H1: The population mean is not equal 4, $\mu \neq 4$

We have chosen the 0.05 level of significance, because alternate hypothesis does not state a direction, this is a two-tailed test. To use the 0.05 level of significance with 99 degrees of freedom, we get the critical value -1.984 or 1.984. The computed t value -14.423 lies in the region to the left of the critical value of -1.984; the null hypothesis is not accepted as shown in Table 4. We conclude that H0 is rejected. It indicates that students are not very satisfied with the quick response for any complain regarding the bus service, the certain part in the bus services should be improve to make it better and satisfy the students.

Table 4: Complain Response One-Sample Test

	Test Value = 4					
	T	df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
There is always a quick response for any complain regarding the bus services.	-14.423	99	0	-1.19	-1.35	-1.03

Clean and Tidy Bus

Hypothesis Testing

H0: The population mean is at least 4, $\mu \geq 4$

H1: The population mean is less than 4, $\mu < 4$

We selected 0.025 as significance level with 99 degrees of freedom, so the critical value of the one-tailed test is -1.984. The computed t of -12.569 lies in the area to the left of -1.984, so we reject the null hypothesis as shown in Table 5. We conclude that H0 is rejected. It shows that bus environment is not good enough and students are not really agreed with the service provided, so the school bus needs to clean more frequently. 5.2.5 Overall, the bus services in USM are good enough.

Table 5: Clean and Tidy Bus One-Sample Test

	Test Value = 4					
	T	df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
The bus is always in clean and tidy	-12.56	99	0	-0.96	-1.11	-0.81

DISCUSSIONS

Within the research we went through for 100 students within USM related to bus transit servis, we reveal a great deal of information which has assisted our assignment. In this discussion we would stressing on chi-square, one sample test and how they act towards the question. The chi-square statistic we used is used to assess the comparison between observed observation and expected observation. Whereas one-sample test we used to see either the bus schedule is appropriate for the students. In this research we have 2 type of variable that is male and female that consists of 58% for male and 42% for female. Most of students USM using bus service consists of age from 19-25 years old the percentage of it is 89% which is fulltime students. The major race is Malay, Chinese and India with the percentage 95%.

One sample test variable is which represents the value being influenced or change; which simply means it makes other variables change. For one sample test, we consider the bus schedule is appropriate for student an example; it shows that most students comfortable with the bus schedule. The percentages show that the highest in this problem is 38% are neutral followed by 33% are agree and the smallest percentage is 2% or strongly disagree. We can conclude that, even the highest percentage is neutral but we different between agree and strongly disagree is about 31% so it means that student are comfortable with the bus schedule. Overall, the bus services in USM are good enough represents with t value -10.687. Chi-square frequencies for overall the bus services in USM are good enough. Most of user of bus service is student age 19-25 years old shows that they satisfied with the bus schedule is appropriate for student. This will help them to go class on time with a lot of bus provided with the efficiency bus schedule. Even the bus services are satisfied. The department of bus should reinforcement their services to give the perfect services.

CONCLUSIONS

In conclusion, conducting this study is not an easy process but it worth completing. The results from it is reasonable and reliable data for us to analyze the student satisfaction towards services provided by USM, based on their gender, age, race, religion, hometown. The diversity of students that consist of local and international student ensures this study is persuasive and reliable. The question had divided into four sections which are to study about student satisfaction towards accommodation, transportation. For instance, we can find the main student satisfaction in each section that we had

label as strongly agree, agree, neutral, disagree and strongly disagree. Analyzing and comparing the findings of this study stimulates us to make some useful conclusions about how to improve transportation services provided by USM.

REFERENCES

1. Armstrong-Wright and Sebastian, 1987, "Bus services: reducing cost, raising standards", Urban transport series, The World Bank.
2. Baradaran and Ramjerdi, (2001), "Performance of Accessibility Measures in Europe", Bureau of Transportation Statistics, journal of transportation and statistics.
http://www.bts.gov/publications/journal_of_transportation_and_statistics/volume_04_number_23/paper_03/
accessed in November/2006.
3. Black, 1995, "Urban Mass Transportation Planning", Singapore, McGraw-Hill Book Co.
4. Costa and Markellos, 1997, "Evaluating Public Transport Efficiency with Neural Network Models", Transport Research-C, 5, 5: 301-312.
5. Gronroos, C. (1984). A Service Quality Model and its Marketing Implications. *European Journal of Marketing*, 18 (4), 36.
6. Iles, 2005, "Public Transport in Developing Countries", Elsevier Ltd.
7. NCHRP, 1997, "Quantifying congestion, NCHRP report 398, National Highway Research Program (NCHRP)", NAP, Washington D.C., USA.
8. NCHRP, 2005, "Performance Measures and Targets for Transportation Asset Management": 181.
9. Oliver, R.L. (1980). A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions. *Journal of Marketing Research (JMR)*, 17 (4), 460-469.
10. Parasuraman, A., Zeithaml, V.A. & Berry, L.L. (1988). SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality. *Journal of Retailing*, 64 (1), 5-6.
11. Vasconcellos, 2001, "Urban Transport, Environment and Equity; The case for developing countries", UK and USA, Earthscan publications Ltd.
12. Vuchic, V.R. (2005). *Urban Transit: Operations, Planning, and Economics*. Hoboken, New Jersey: John Wiley & Sons, Inc.
13. White, 2002, "Public Transport: Its planning, Management and Operation", London New York, Spon Press.
14. Zuidgeest, 2005, "Sustainable urban transport Development; A Dynamic Optimisation Approach", Department of Civil Engineering, Center for Transport Studies, Enschede, The Netherlands, University of Twente, Ph.D: 290.