School bus’s level of service in Malang City

S Hariyani
Department of Urban and Regional Planning, Faculty of Engineering, Universitas Brawijaya, Malang, Indonesia

septianahariyani@ub.ac.id

Abstract. School Bus began operated on the 12th of January 2015. Provision of school buses is expected to reduce not only the use of vehicles by students, but it is also to reduce the number of traffic jams. Malang school bus facilities provided by the Department of Transport in cooperation with the Department of Education to serve students in elementary school, junior and senior high schools. After the service running two years, based on the preliminary observation not all students are interested in using the school bus. The research objective was to measure the school bus’s level of service. The method to measure school bus’s level of service was used Importance Performance analysis (IPA). The results showed that through IPA, it can be concluded that school bus’s level of service in Malang City have been able to serve students/customers with the mean of degree suitability (Tki) is 111. Meanwhile it must be observed and get more attention to improve by government, attributes which is lies in the first quadrant or concentrate here (attribute Adequate space, Seating capacity, Availability trash can, Passenger facility down in points, The availability of information boards in each bus stop, Availability public telephone in each bus stop, and Availability CCTV in each bus), in order to increase its performance.

1. Introduction
Basically, every human being in need the service, even in the extreme it can be said that the service cannot be separated from human life [1]. One form of public services needed by the community is a transportation service. Transport is an activity of the movement of people and goods from one place (origin) to another (destination) by means of a vehicle [2]. There are five categories of trip destination from home-based, namely: 1. The movement into the workplace, 2. Movement to school or university (the movement of the purposes of education), 3. Movement to shopping, 4. Movement for social interests, and 5. Movement for purpose recreation [3].

To go to the destination required modes of transport. Along with the development of transportation technology, users of motor vehicles is increasing, especially 2-wheel vehicles, this affects the selection and junior high school students to choose a motor vehicle as a means to get to school. This becomes problematic because in Indonesia the provision of motor vehicles has been regulated in Law No. 22 in 2009 regarding Traffic and Road Transportation [4]. Described in Article 288 paragraph 2 that any person driving a motor vehicle on the street must have a driver's license, where to get the driver’s license minimum age requirement is 17 years [4].

According to [5] the school transportation services is a transportation for students to smooth the learning process. Students will feel safe and be able to get in or get home from school with the right
timing. Organizers of school transport is the school itself or the private sector working together with schools, could also be the government.

One of the efforts undertaken by the government of Malang, namely by providing a new transport service. The transport services include the provision of school bus that is used to help students in both departing and return the mobilization of school.

The school bus is an alternative transportation for students provided by the city government for the students, where a school bus has a goal to give the ease, smoothness and comfort for students. Some students find it helpful because the school bus was comfortable. On the other hand there are things to be taken into consideration in the development of the school bus that is still a lack of number of users of the school bus because students prefer other transportation such as motorcycles and public transport for some reason, and there are also students who feel lucky with their school bus because it does not need to pay to ride [6].

Based on preliminary observations not all students are interested in using the school bus, so that is necessary to evaluate the school bus operation to improve services to students. The research objective was to measure the school bus’s level service.

2. Methods
Primary survey was conducted by researching and recording the condition of school bus’s level of service. Meanwhile, secondary survey was done by finding literatures related to the issues discussed. Furthermore, Importance Performance Analysis (IPA) was used to determine the factors that influence school bus’s level of service in the area of Malang City.

2.1. Sampling
The number of sample was determined using Slovin formula proposed by [7], with the formula:

\[ n = \frac{N}{1+N(e)^2} \] (1)

Where:
N = number of population
n = sample
e = margin of error (this study used e = 10%).

The calculation using the above formula result to the number of the sample is 100 respondents. Where the number of population or total student in elementary school, junior high school, dan senior high school is 177,893 , and e=10%. 100 respondents divided into 5 group representing the respondents of the passenger school bus in Malang City as showed in Table 1.

| No. | District      | Sample |
|-----|--------------|--------|
| 1   | Kedungkandang| 18     |
| 2   | Sukun        | 14     |
| 3   | Klojen       | 32     |
| 4   | Blimbing     | 11     |
| 5   | Lowokwaru    | 25     |
|     | Total        | 100    |

This research is conducted in Malang City, East Java, Indonesia. The location is shown in Figure 1 and Figure 2. Figure 1 described the orientation East Java Province from Indonesia Country and Figure 2 described orientation Malang City from East Java Province.
2.2. Methods

Importance Performance Analysis (IPA) is used to analyze the importance and performance of school bus’s level of service [8,9]. The attributes that were examined were measured using a Likert scale. Likert scale is ordinal measurement scale consisting of five levels and is weighted according to its level. The relationship between the level of interest and the performance perceived by the customer illustrated in the diagram of Importance Performance Analysis as in Figure 3.
IPA is presented in a diagram consist of four quadrants which are:

1. Quadrant one meaning "Concentrate Here" (high importance and low satisfaction)
   Factors located in this quadrant is considered as very important factors for consumers, but the conditions is not satisfied. Factors located in this quadrant is a priority for improvement.

2. Quadrant two meaning "Keep up the Good Work" (high importance and high satisfaction)
   Factors located in this quadrant are considered as additional factors for customer satisfaction so that the management is obliged to ensure that the performance of the institutions under its management needs to continue to maintain the achievements.

3. Quadrant three, "Low Priority" (low importance and low satisfaction)
   Factors located in this quadrant have a low level of satisfaction and at the same time is not considered too important for the consumer, so that the management does not need to prioritize or paying much attention to these factors.

4. Quadrant Four, "Possible Overkill" (low importance and high satisfaction)
   Factors located in this quadrant are not very important that the management can allocate resources associated with these factors to other factors that have higher priority still need improvement.

To assess the school bus's level of service use 22 attributes such as Friendliness officer, Discipline of diver, Door condition, Altitude School Bus, adequate space, AC/ air conditioning, Comfort seat passenger, seating capacity, Availability trash can, Facilities for self-rescue in an emergency, Facilities for self-rescue in an emergency, security of passengers, The compliance rates for the services given, Punctuality of departure and arrival at the school bus stop point, Down facilities for passengers, Passenger facility down in points, shielded from the sun in each bus stop, The availability of information boards in each bus stop, Availability trash can in each bus stop, Availability public telephone in each bus stop, Availability chair in each bus stop, circulation, and Availability CCTV in each bus.

IPA method requires the usage weighing both for level of satisfaction and level of importance, so that each attributes above was weighted. The weighing consist of 5 values which are 5 = very satisfied / very important; 4 = satisfied / important; 3 = fairly satisfied / quite important; 2 = less satisfied / less important and 1 = not satisfied / not important.

3. Results
Malang government initiative to provide school buses to help students in both departing and return from home to school. School bus provision is for students who live in the city or on the outskirts. The number of buses provided are 7 buses, 6 used to serve five districts in Malang City, while the one buses as backup. School bus provision is expected to reduce the use of vehicles by students of elementary, junior high school or senior high school. It is also expected to reduce the number of traffic jams although there was a polemic with public transport drivers who refused and did not agree with the school bus service.

Table 2 shows route of school bus in Malang City.

**Table 2. Route of Malang school bus.**

| No. Bus | Starting Point | Street Route | Halte/Shelter |
|---------|----------------|--------------|---------------|
| 1.      | Gas station Tlogomas or Baiduri Sepah yard | MT Haryono–Soekarno-Hatta–Bundaran Pesawat–Cultural Garden East Java Province – DI Panjaitan-Bogor–Veteran–Bandung– Ijen – Semeru – Kahuripan –City Hall | Dinoyo market/ Griyashanta/ Cultural Garden East Java Province, Ijen, Semeru, Gajayana Stadium |
| 2.      | Pisang Candi (Gas station Mergan) | Langsep–Galgungung–Bondowoso–Jombang – Surabaya–Jakarta-Bogor–Veteran–U Turn Senior high school 8– Veteran–Bandung–Ijen– Semeru–Kahuripan-city hall | Ijen, Semeru, Gajayana stadium |
The following table 3 shows that level of satisfaction for attribute number 4 is the highest (flow rate during the rainy season) meaning that respondents are satisfied in water consumption demand during rainy season. The reason for this is that probably the supply of water in rainy season is abundant so that the customers can fulfill their needs. Meanwhile, the lowest score for satisfaction is showed by attribute number 3 (flow rate during the dry season) meaning that respondents are not so satisfied compared to other attributes. It may cause by the decreasing quantity of water supply during the dry season.

Level of importance in Table 3 shows that the highest score is attribute number 22 (Availability CCTV in each bus) indicating that it is the most important attribute for the students. Meanwhile, attribute number 12 (The compliance rates for the services given) has the lowest score indicating that the compliance rates for the services given is not so important compared to other attribute for the students.

Table 3. Level of satisfaction.

| No | Attributes                                      | Level of Satisfaction | Total Score |
|----|------------------------------------------------|-----------------------|-------------|
| 1  | Friendliness officer                           | 0 0 2 37 57           | 439         |
| 2  | Discipline of diver                            | 0 0 11 34 51          | 424         |
| 3  | Door condition                                 | 1 0 28 54             | 422         |
| 4  | Altitude School Bus                            | 1 1 26 36 32          | 385         |
| 5  | adequate space                                 | 1 27 28 54            | 339         |
| 6  | AC/ air conditioning                           | 0 1 4 36 55           | 433         |
| 7  | Comfort seat passenger                         | 0 2 41 36             | 399         |
| 8  | seating capacity                               | 2 55 16 15            | 275         |
| 9  | Availability trash can                         | 28 13 21 21           | 282         |
| 10 | Facilities for self-rescue in an emergency     | 6 8 17 31 34          | 367         |
| 11 | security of passengers                         | 4 6 28 42             | 386         |
| 12 | The compliance rates for the services given    | 29 32 6 1             | 206         |
| 13 | Punctuality of departure and arrival at the school bus stop point | 3 4 16 20 53 | 404 |
Moreover, ten of the attribute were located in the "Low Priority" quadrant. Keeping up of the satisfaction (3.3) of the 22 attributes, it is showed in Table 5. Almost half (ten) of the attribute were located in the “Possible Overkill” quadrant Importance and Table 4 Level of Importance, afterward it was described in a Cartesian diagram. Mean of degree suitability (Ti) is 111, meanwhile ranged satisfaction level from 62 to 765 means that respondent are satisfied with attributes, it is showed in Table 5.

The IPA is described in a Cartesian diagram as showed in Figure 4. The four-quadrant Importance-Performance matrix was defined by the two axes based on the overall mean of importance (3.7) and satisfaction (3.3) of the 22 attribute (Figure 4). Almost half (ten) of the attribute were located in the “Keep Up Of The Good Work” quadrant, two attributes positioned in “Possible Overkill” quadrant, and three attributes are located in “Low Priority” quadrant. Moreover, seven of them appeared in the “Concentrate here” quadrant.

Table 4. Level of importance.

| No | Attributes | Level of Importance | Total Score |
|----|------------|---------------------|-------------|
|    |            | 1 2 3 4 5          |             |
| 1  | Friendliness officer | 1 0 5 34 55 | 427          |
| 2  | Discipline of diver   | 0 1 7 24 64 | 439          |
| 3  | Door condition        | 0 38 9 16 33 | 332          |
| 4  | Altitude School Bus   | 1 37 13 21 24 | 318          |
| 5  | adequate space        | 0 27 0 7 62 | 392          |
| 6  | AC/ air conditioning  | 2 1 12 35 46 | 410          |
| 7  | Comfort seat passenger| 1 1 11 36 47 | 415          |
| 8  | seating capacity      | 0 9 3 4 80 | 443          |
| 9  | Availability trash can | 6 35 7 19 29 | 318          |
| 10 | Facilities for self-rescue in an emergency | 1 2 4 22 65 | 432 |
| 11 | security of passengers| 0 3 4 19 70 | 444          |
| 12 | The compliance rates for the services given | 1 18 8 12 57 | 394          |
| 13 | Punctuality of departure and arrival at the school bus stop point | 4 4 13 26 49 | 400          |
| 14 | Down facilities for passengers | 1 2 7 25 61 | 431          |
| 15 | Passenger facility down in points | 0 14 4 8 70 | 422          |
| 16 | shielded from the sun in each bus stop | 0 2 8 18 68 | 440          |
| 17 | The availability of information boards in each bus stop | 2 12 6 15 61 | 409          |
| 18 | Availability trash can in each bus stop | 0 9 4 15 68 | 430          |
| 19 | Availability public telephone in each bus stop | 2 40 8 18 28 | 318          |
| 20 | Availability chair in each bus stop | 1 5 7 19 64 | 428          |
| 21 | Circulation | 0 2 8 31 55 | 427          |
| 22 | Availability CCTV in each bus | 0 5 5 25 61 | 430          |
| No. Attributes | Level of Satisfaction | Level of Importance | Degree of suitability (Tki) (%) | Mean $\bar{X}$ | Mean $\bar{Y}$ |
|----------------|-----------------------|---------------------|-------------------------------|---------------|---------------|
| 1              | 439                   | 427                 | 103 %                         | 4.6           | 4.4           |
| 2              | 424                   | 439                 | 97 %                          | 4.4           | 4.6           |
| 3              | 422                   | 332                 | 127 %                         | 4.4           | 3.5           |
| 4              | 385                   | 318                 | 121 %                         | 4.0           | 3.3           |
| 5              | 339                   | 392                 | 86 %                          | 3.5           | 4.1           |
| 6              | 433                   | 410                 | 106 %                         | 4.5           | 4.3           |
| 7              | 399                   | 415                 | 96 %                          | 4.2           | 4.3           |
| 8              | 275                   | 443                 | 62 %                          | 2.9           | 4.6           |
| 9              | 282                   | 318                 | 89 %                          | 2.9           | 3.3           |
| 10             | 367                   | 432                 | 85 %                          | 3.8           | 4.5           |
| 11             | 386                   | 444                 | 87 %                          | 4.0           | 4.6           |
| 12             | 206                   | 57                  | 361 %                         | 2.1           | 0.6           |
| 13             | 404                   | 400                 | 101 %                         | 4.2           | 4.2           |
| 14             | 385                   | 431                 | 89 %                          | 4.0           | 4.5           |
| 15             | 333                   | 422                 | 79 %                          | 3.5           | 4.4           |
| 16             | 323                   | 68                  | 475 %                         | 3.4           | 0.7           |
| 17             | 302                   | 409                 | 74 %                          | 3.1           | 4.3           |
| 18             | 275                   | 68                  | 404 %                         | 2.9           | 0.7           |
| 19             | 298                   | 318                 | 94 %                          | 3.1           | 3.3           |
| 20             | 387                   | 64                  | 605 %                         | 4.0           | 0.7           |
| 21             | 421                   | 55                  | 765 %                         | 4.4           | 0.6           |
| 22             | 331                   | 405                 | 82 %                          | 3.4           | 4.2           |
| Total          | 7816                  | 7067                | 4188 %                        | 81.4          | 73.6          |
| Average        | 355.27                | 321.23              | 111 %                         | 3.7           | 3.3           |

Note No. Attribute:
1=Friendliness officer, 12=The compliance rates for the services given,
2=Discipline of diver, 13=Punctuality of departure and arrival at the school bus stop point,
3=Door condition, 14=Down facilities for passengers,
4=Altitude School Bus, 15=Passenger facility down in points,
5=Adequate space, 16=Shielded from the sun in each bus stop,
6=AC/air conditioning, 17=The availability of information boards in each bus stop,
7=Comfort seat passenger, 18=Availability trash can in each bus stop,
8=Seating capacity, 19=Availability public telephone in each bus stop,
9=Availability trash can, 20=Availability chair in each bus stop,
10=Facilities for self-rescue in an emergency, 21= Circulation,
11=Security of passengers, 22=Availability CCTV in each bus
The first quadrant (concentrate here) was considered as high important for students, but in fact these attributes is lower than expected (level of satisfaction is still very low). Therefore, the Adequate space, Seating capacity, Availability trash can, Passenger facility down in points, The availability of information boards in each bus stop, Availability public telephone in each bus stop, and Availability CCTV in each bus should get more attention or be improved so that the performance will increase. In the second quadrant (keep up the good work) attributes are considered to be high important by respondents and high levels of satisfaction. Therefore, the attribute Friendliness officer, Discipline of diver, Door condition, Altitude School Bus, Comfort seat passenger, Facilities for self-rescue in an emergency, Security of passengers, Punctuality of departure and arrival at the school bus stop point, and Down facilities for passengers should be maintain because the respondent think that this attribute is important and has had a good performance.

In the fourth quadrant (possible overkill) attribute number 20, 21 is considered low important by the respondents and high satisfaction. Attributes 20, 21 is maintained as in existing condition.

4. Conclusion
Through IPA, it can be concluded that school bus’s level of service in Malang City have been able to serve customers with the mean of degree suitability (Tki) is 111 means that respondent are satisfied with 10 attribute. Meanwhile it must be observed and get more attention to improve by government in these case is the Department of Transport and Department of Education attributes which is lies in the first quadrant or concentrate here (attribute Adequate space, Seating capacity, Availability trash can, Passenger facility down in points, The availability of information boards in each bus stop, Availability public telephone in each bus stop, and Availability CCTV in each bus), in order to increase its performance.

5. Acknowledgments
I would like to express my special thanks to undergraduate students Atika Naggi, Suseno S, Kiki Agustina, Anggrina Merry, Satrio DU, Lusi Hana F, Iresa Lucky, Oase M and Novi Pujiana in Urban and Regional Planning Faculty of Engineering, Universitas Brawijaya (PWK FT UB) for data survey and data compilation in the interest of this paper.
References

[1] Sinambela, Lijan Poltak, dkk. Reformasi Pelayanan Publik: Teori, Kebijakan, dan Implementasi. Jakarta: PT. Bumi Aksara. 2014.
[2] Warpani, Suwardjoko P. Pengelolaan lalulintas dan angkutan jalan. Bandung: Penerbit ITB 2002.
[3] Tamin, OZ. Perencanaan dan Pemodelan Transportasi – Edisi Kedua. Bandung: Penerbit ITB. 2000.
[4] Undang-Undang No. 22 Tahun 2009 tentang Lalu Lintas dan Angkutan Jalan.
[5] Kusmintardjo. Pengelolaan Layanan Khusus di Sekolah (Jilid II). Malang: IKIP Malang. 1992.
[6] Nugraha, et al. Kajian Efektivitas Pengoperasian Bus Sekolah di Jakarta. Depok: Universitas Brawijaya. 2013.
[7] Sevilla, C.G., Jesus A.O., Twila G.P., Bella P.R., Gabriel G.U. Research Methods, Rex Printing Co. Inc., Quezon City. 1993.
[8] John A. Martilla and John C. James, “Importance-Performance Analysis” (Journal of Marketing, January, 1977) pp. 77 – 79.
[9] Supranto, J. Pengukuran Tingkat Kepuasan Pelanggan untuk Menaikan Pangsa Pasar. Jakarta: Rineka Cipta. 2006.