

School bus's level of service in Malang City

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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 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:

$$n = \frac{N}{1+N(e)^2} \quad (1)$$

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.

Table 1. Distribution of sample.

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.



Figure 1. East Java Province orientation from Indonesia Country
 Source: Badan Informasi Geospasial and Badan Pertanahan Nasional (BPN) (2010)

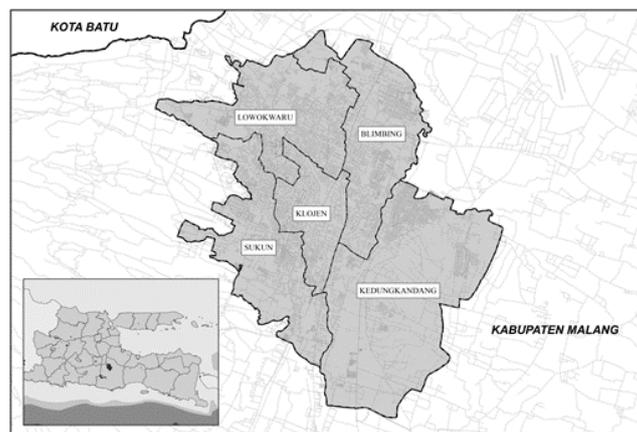


Figure 2. East Java Province orientation from Indonesia Country
 Source: Badan Informasi Geospasial and Badan Pertanahan Nasional (BPN) (2010)

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.

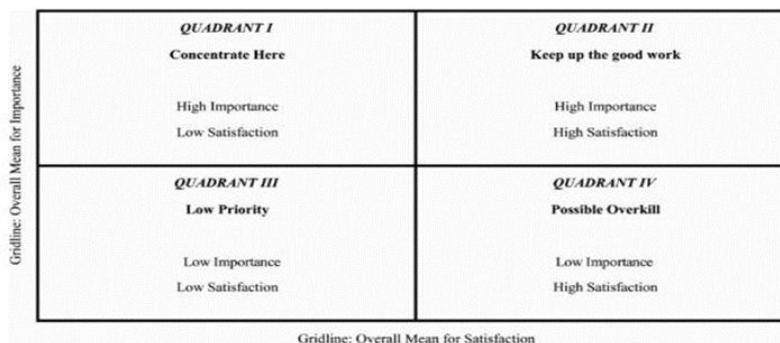


Figure 3. Importance Performance Analysis diagram.
 Source: Martilla, 1977; Supranto, 2006

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–Galunggung–Bondowoso–Jombang – Surabaya–Jakarta–Bogor–Veteran–U Turn Senior high school 8– Veteran–Bandung–Ijen– Semeru–Kahuripan–city hall	Ijen, Semeru, Gajayana stadium

No. Bus	Starting Point	Street Route	Halte/Shelter
3.	Sawojajar Madyopuro terminal	Ki Ageng Gribig–Danau Toba–AM Wiyono – Kesatrian–Hamid Rusdi– Junior high school 5– Panglima Sudirman–Dr Cipto– Cokroaminoto– Trunojoyo–Kertanegara–city hall	AM. Wiyono
4.	Sawojajar Madyopuro terminal	Ki Ageng Gribig–Mayjen Sungkono– Hamid Rusdi terminal–Block Office	-
5.	Block Office	Mayjen Sungkono–Gadang Market–PLN Satsuit Tubun–Kolonel Sugiono–RE Martadinata–under Flyover Kotalama–Comboran–Sulawesi–gas station Sawahan–Syarif Al Qodri–Kauman–KH. Hasyim Asy’ari–AR Hakim–Gereja–Mojopahit–city hall	-
6.	Samsat Kacuk	Sudanco Supriyadi–Janti–Halmahera– Tanimbar–Sulawesi–Nusakambangan–Comboran –RE Martadinata–Gatot Subroto – Trunojoyo – Kertanegara – city hall	-

Source: <http://mediacenter.malangkota.go.id>

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	2	3	4	5	
1	Friendliness officer	0	0	2	37	57	439
2	Discipline of diver	0	0	11	34	51	424
3	Door condition	1	0	13	28	54	422
4	Altitude School Bus	1	1	26	36	32	385
5	adequate space	1	27	13	28	54	339
6	AC/ air conditioning	0	1	4	36	55	433
7	Comfort seat passenger	0	2	17	41	36	399
8	seating capacity	2	55	8	16	15	275
9	Availability trash can	28	13	13	21	21	282
10	Facilities for self-rescue in an emergency	6	8	17	31	34	367
11	security of passengers	4	6	16	28	42	386
12	The compliance rates for the services given	29	32	28	6	1	206
13	Punctuality of departure and arrival at the school bus stop point	3	4	16	20	53	404

No	Attributes	Level of Satisfaction					Total Score
		1	2	3	4	5	
14	Down facilities for passengers	3	5	17	34	37	385
15	Passenger facility down in points	2	34	6	25	29	333
16	shielded from the sun in each bus stop	3	34	13	17	29	323
17	The availability of information boards in each bus stop	5	33	18	23	17	302
18	Availability trash can in each bus stop	6	44	17	15	14	275
19	Availability public telephone in each bus stop	9	29	19	21	18	298
20	Availability chair in each bus stop	6	7	14	20	49	387
21	circulation	1	2	11	27	55	421
22	Availability CCTV in each bus	0	3	2	6	85	461

The IPA getting from the calculation of 22 attributes selected by respondent as shown in Table 3 Level Satisfaction, and Table 4 Level of Importance, afterward it was described in a Cartesian diagram. Mean of degree suitability (Tki) 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

Table 5. IPA students who ride school bus in Malang City.

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,
2=Discipline of driver,
3=Door condition,
4=Altitude School Bus,
5=Adequate space,
6=AC/air conditioning,
7=Comfort seat passenger,
8=Seating capacity,
9=Availability trash can,
10=Facilities for self-rescue in an emergency
11=Security of passengers,

12= The compliance rates for the services given,
13=Punctuality of departure and arrival at the school bus stop point,
14=Down facilities for passengers,
15=Passenger facility down in points,
16=shielded from the sun in each bus stop,
17=The availability of information boards in each bus stop,
18=Availability trash can in each bus stop,
19=Availability public telephone in each bus stop,
20=Availability chair in each bus stop,
21=circulation,
22=Availability CCTV in each bus

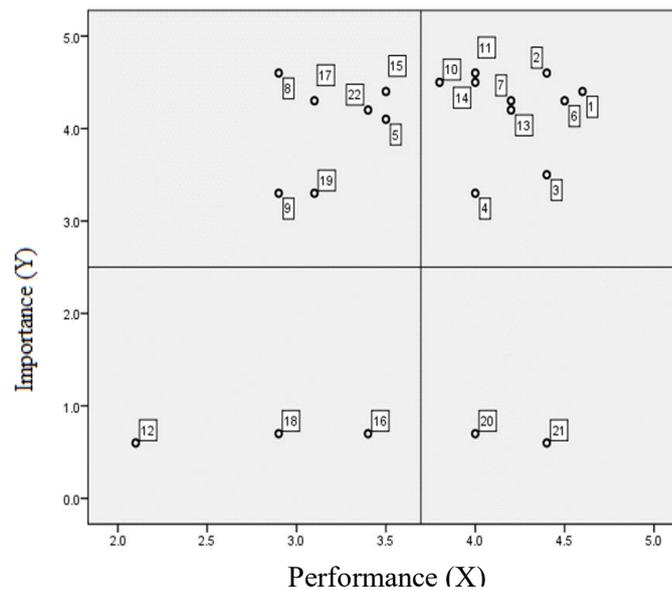


Figure 4. Importance Performance Analysis school bus services in Malang City.

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 driver, 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.

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