FACILITIES MANAGEMENT MEASUREMENT AT THE JAKARTA ELEMENTARY PUBLIC SCHOOLS

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ABSTRACT

A new management approach is needed to improve the delivery of facilities services in elementary public school to ensure clean, safe and healthy learning environment. Facilities management important to the owner of the building or the building organizations to make sure the safety of the building and the comfortable for the building user. The objectives of study are to measurement facilities management at the Jakarta Elementary Public Schools and to identify the satisfaction of the facilities management at the Jakarta Elementary Public Schools to the building user and the management organization. Data are collected using questionnaire to the building user; it is based on quantitative approach which included the measurement of facilities management at the Jakarta Elementary Public Schools. A survey instrument was devised called "Service-On-Wheels," and data was collected from 300 elementary public schools to evaluate 24 service categories. The data will be analyzed using Statistical Package for Social Science (SPSS).

The study examined relationships between the measurement of facilities management and key building characteristics or factors including building age, area, condition and student enrollment. It was found that none of these factors affect the assessment facilities management service. The study utilised various statistical analysis methods including regression, correlation and histograms.

1.   Introduction

To develop quality society and comprehensively, it is necessary to be supported by available sufficient educational facilities. Currently, educational infrastructure provided by the Indonesian Government and private sector are very useful. This is so because quality learning environment very rely upon physical quality and facility management provided in the classroom. Nevertheless, many reports revealed that physical condition and maintenance of school buildings throughout Indonesia, particularly in Jakarta, are very poor or in other words below a safe standard to be used (DKI Jakarta Elementary Education Office, 2005). This condition is certainly unable to support interest and spirit of the students to come to school even to study hard.

Therefore, this discussion aims at survey to the problems of physical condition and managerial step of the facilities available at the State Elementary Schools, followed with explanation on factors contributed to this condition. The discussion divided into literature to form conceptual frame of school facilities management and this will be used as basis to form frame of strategic management of assets of the elementary school as proposal for overcoming the facilities managerial problem for providing quality teaching learning activities in the Elementary school.

This focus aims at the problems rise out of unbalance between improving educational infrastructures and increasing quality education in Indonesia which is seen from the output.
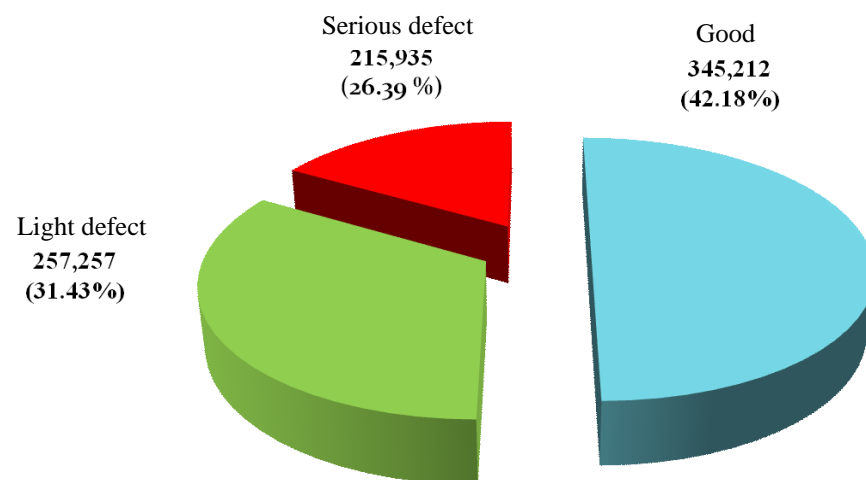
In 2005, the number of state elementary school in Indonesia was in the amount of 137,396 schools with 818,404 classrooms. 345,212 classrooms or 42.18% out of such number were in good condition, 257,257 or 31.43% were light defect, 215,935 or 26.39% were serious defect (Schedule 1). School building is one of determining factor for educational success. Poor quality building may cause poor school environment because they are unable to provide appropriate room for conducive teaching learning activities. Such trend looks equal in all state elementary schools in Indonesia which are government-owned primary education compared to private elementary school managed by reputable educational institution.

2.   METHODOLOGY

The main objective of this study is to develop a performance measurement tool of facilities management. The work included collection of data from a large customer base of 300 customers, the data was analyzed to obtain performance measures that may be used to create a continuous improvement culture. This research examines the development and implementation of a facility management measurement called "Service on Wheels." (Kiffah W.Jayyousi, 2001)

On a broader scale, this work aims to develop a performance evaluation instrument for customer service in facilities management accomplished through the mentioned instrument, collection of data from a real setting at Jakarta Elementary Public Schools, and analyzing the data to develop a system that promotes continuous improvement and measures customer service. A survey form was used as a data collection instrument and an evaluation measurement tool.

Category of Service (C): Customer feedback varies depending on the type of service delivered. Principals evaluated various types of services differently. Twenty-four (24) service categories were identified in the study. The intent was to identify the most critical services that represent the facilities department mission and function, and those services that require performance measurement and evaluation. This study does not suggest that a typical facilities department would have only 24 service categories, but the methodology followed is what needs emphasis in terms of involving a stakeholder group in developing the list of services to be measured.

Later a number of customers were asked to check the list and give feedback as to its completeness. The focus was to ensure that the resulting measurement system would be useful for both the facilities employees and the customers. Table (1) shows the categories with the corresponding identification number.

Table (1) : Service Categories of Facilities Management

	Service	Description
C1	Plumbing	Drainage and waste piping repairs
C2	Building	Walls, Windows, Doors
C3	Elektrical	Power, lighting and communication repairs
C4	Roofing	Slate, shingle, built up, metal and rubber
C5	Playground	Play sets, swings and safety mats
C6	Fencing	Metal and iron fence, security gates
C7	Green Area	Grass, Trees
C8	Pest Control	Rodent, pest and animal control
C9	Work Orders	Customer work request and service center
C10	Trash	Waste removal, dumpsters
C11	Watter	Watter Tank, Watter supply
C12	Maintenance Tools	Delivery, Control
C13	Cleaning Servise	Cleaning the Schools area
C14	Class Rooms	Cleaning, dusting, mopping
C15	Floor Tile	Ceramic tile
C16	Restrooms	Disinfecting, sanitizing, scrubbing, upkeep
C17	Technician	Facilities customer service representatives
C18	Furniture	Tables, Chairs, Cabinetry, Black Board
C19	Lighting	Lamp, Windows
C20	Air supply	Windows
C21	Gard	Safety Guard
C22	Capital Projects	Planning, design, construction, renovation
C23	Emergencies	Fire, flooding, disaster recovery
C24	Safety Office	Environmental health and safety services

3. Results of the survey

The table shows the standard deviation, a, the coefficient of variation, CV, the median, MED, the mode, MOD, the range, RAN, the maximum value, MAX, the minimum value, MIN, and the sum of all values, SUM. It is observed that due to the large size of the sample, the range, minimum and maximum are comparable across service categories. Additionally, the mean and the median are also close for the same reason displaying centrality of ratings. The MRC is a good performance measure for individual service departments. It could also serve as a comparison tool between different areas in facilities services where a good performing area may serve as a model.

Table 2: MRCj with *Descriptive Statistics*

ID	MRCj	σ	σ^2	CV	median	mode	min	max	Range	Sum
C1	5.68	1.35	1.82	0.24	6	6	3	9	6	1705
C2	5.59	1.54	2.36	0.27	5	5	1	9	8	1676
C3	5.85	1.48	2.20	0.25	6	7	3	10	7	1755
C4	5.33	1.55	2.39	0.29	5	5	1	10	9	1600
C5	4.16	2.72	7.41	0.65	5	6	0	10	10	1249
C6	5.14	1.59	2.52	0.31	5	5	0	10	10	1543
C7	5.51	1.54	2.37	0.28	6	6	1	10	9	1652
C8	5.03	1.38	1.91	0.28	5	5	2	9	7	1508
C9	4.84	1.33	1.76	0.27	5	5	1	9	8	1453
C10	5.07	1.43	2.06	0.28	5	5	1	10	9	1520
C11	5.86	1.48	2.19	0.25	6	5	2	10	8	1758
C12	4.68	1.25	1.56	0.27	5	5	1	9	8	1403
C13	5.21	1.49	2.22	0.29	5	5	3	10	7	1562
C14	5.43	1.35	1.81	0.25	5	5	1	10	9	1628
C15	5.21	1.40	1.97	0.27	5	4	1	9	8	1563
C16	5.00	1.42	2.01	0.28	5	4	1	10	9	1501
C17	4.51	1.30	1.68	0.29	4	4	0	9	9	1353
C18	5.44	1.44	2.06	0.26	5	5	1	10	9	1632
C19	6.42	1.15	1.32	0.18	6	6	3	10	7	1926
C20	6.46	1.12	1.25	0.17	6	6	4	10	6	1938
C21	5.07	1.55	2.41	0.31	5	5	0	10	10	1521
C22	5.39	1.10	1.21	0.20	5	5	1	9	8	1617
C23	5.41	1.32	1.74	0.24	5	5	1	9	8	1622
C24	5.95	1.33	1.78	0.22	6	6	1	10	9	1786

Table (2) shows a striking trend concerning the relationship between a, CV and MRC_S; when the mean, MRC_S, is high, then values of a and CV are low, and vice versa. This is an indication of rating consistency; in other words, if a service category is rated high, then there is less variability of ratings among customers. This is one result of better service to customers; it will translate to consistency of ratings among most customers. The values of CV are listed as fraction of 1 rather than percentages.
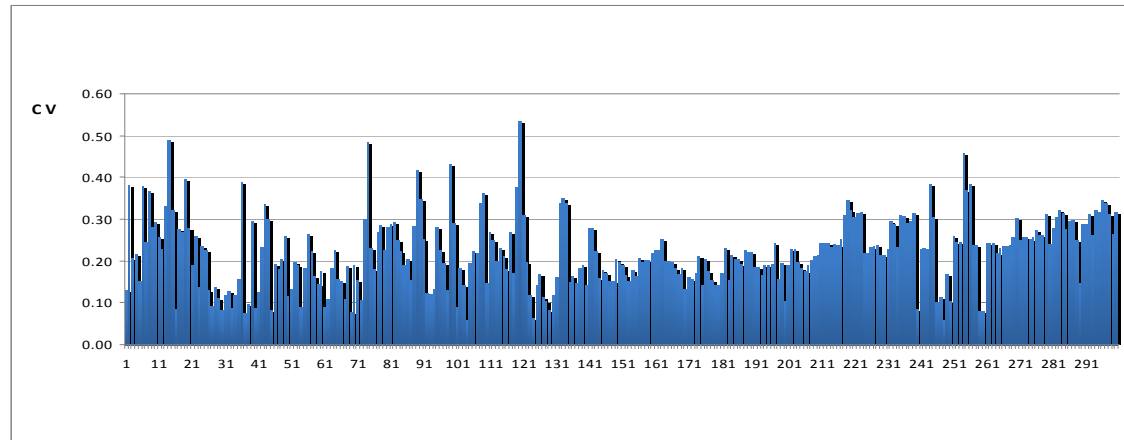

Fig 1: CV Values of MRSi

School 120 shows the largest CV value of about 54%. Three other schools show a high CV value above 50%, those are school 14 (49%), school 74 (48%), and school 254 (46%). The facility manager can benefit from the CV plot by examining

these schools. Consulting Table (1) we notice that those schools with the high CV values have low MRSi ratings (all less than 4), those are school 120 (3.21), school 14 (2.38), school 74 (3.50) and school 254 (3.92). This may be an indication that low variation in customer rating may be a measure of customer satisfaction. Customers who are tough graders of service appear to provide varying ratings or ratings exhibiting high variation. This may also be related to customer perception of the overall quality received from the facilities department basic education office of Jakarta.

Fig (2) shows a bar chart of MRCj. It emphasizes service categories, and shows that C 20 (Air Supply) was rated the highest and C 5 (Play Ground) was rated the lowest by customers. The CV values are also listed here as a fraction of one rather than a percentage.
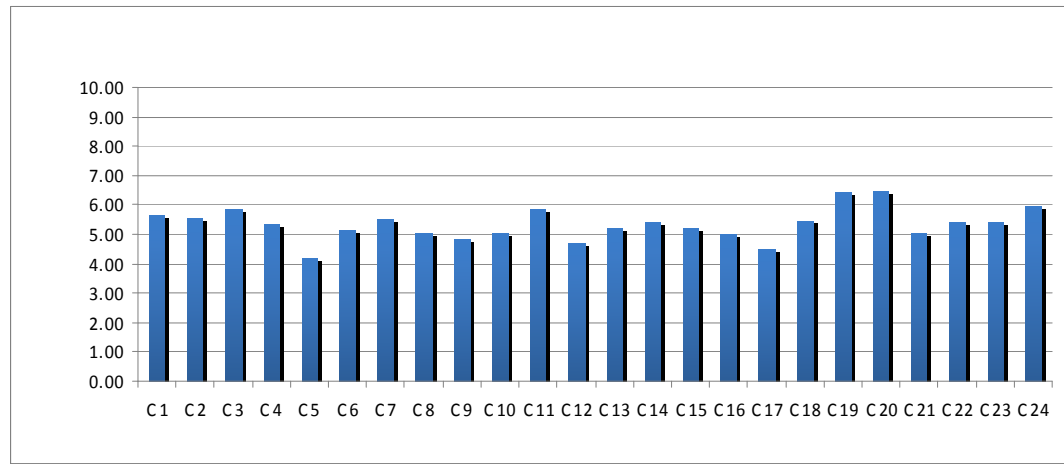
Fig (2): Mean of Service Category Rating (MRC$_j$)

Fig (3) displays a bar chart of the coefficient of variation, CV, of MRC$_j$.. The chart shows that C20, the lowest rated service, is also the category with the highest CV value. This is pointing to the large variation among customers in evaluating this service category. C5, on the other hand, shows the lowest variation among customers, as if to say that customers across the board are consistently satisfied with it.
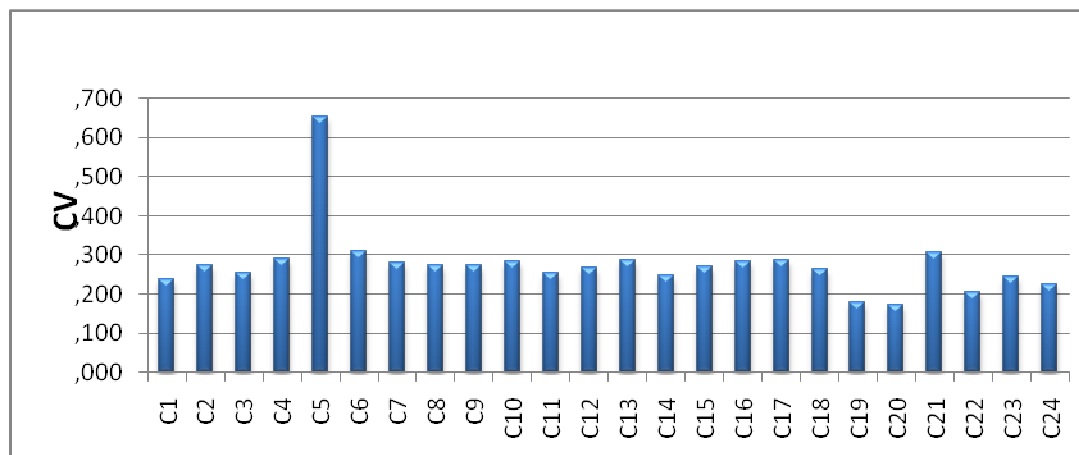

Fig (3): Coefficient of Variation, CV, of MRC$_j$

The relationship between building variables was also studied using correlation and regression analysis. Table (3) summarizes the results:

Table 3: Correlation Between Building FactorsValues of Correlation Coefficient, r

Correlations		MRSi	Years	Class Room	Building Area	No.of Students	FCI
MRSi	Pearson Correlation	1	0.07	0.15	0.02	0.16	0.01
	Sig. (2-tailed)		0.21	0.01	0.75	0.01	0.85
	N	300	300	300	300	300	300
Years	Pearson Correlation	0.07	1	0.18	0.10	0.13	-0.08
	Sig. (2-tailed)	0.21		0.00	0.08	0.03	0.18
	N	300	300	300	300	300	300
Class Room	Pearson Correlation	0.15	0.18	1	0.27	0.88	0.04
	Sig. (2-tailed)	0.01	0.00		0.00	0.00	0.54
	N	300	300	300	300	300	300
Building Area	Pearson Correlation	0.02	0.10	0.27	1	0.16	-0.04
	Sig. (2-tailed)	0.75	0.08	0.00		0.00	0.48
	N	300	300	300	300	300	300
No.of Students	Pearson Correlation	0.16	0.13	0.88	0.16	1	0.05
	Sig. (2-tailed)	0.01	0.03	0.00	0.00		0.43
	N	300	300	300	300	300	300
FCI	Pearson Correlation	0.01	-0.08	0.04	-0.04	0.05	1
	Sig. (2-tailed)	0.85	0.18	0.54	0.48	0.43	
	N	300	300	300	300	300	300

The highest correlation coefficient value, 0.88, is that between class room and number of students, which is probably an expected result given student and class assignment in buildings based on available spac

4.   Conclusions

Analysis results and the outcome of the trend charts pointed to key findings. Based on these results and the potential application of this research, the following conclusions are presented:

1. Regression and correlation analysis found no significant relationship between facilities services performance in urban public schools and building factors; such as building age, condition, area. utilization, adequacy or student enrollment. This indicated that service quality was related to organizational effectiveness and management practices resulting from the institution of several process improvement initiatives at all levels of the facilities department. Continuous improvement requires changing the structure of facilities operations and change the way facilities employees conduct their daily business. In other words, service quality is not a function of the building; it is rather a function of leadership and operational performance. Consequently, no excuses should be given to poor service.

2. A number of complex factors were identified to affect facilities management operations at all levels of the organization. Most of these factors are not quantifiable. Weak relationships, based on low correlation coefficients, were found between quantifiable building factors.

3. Service categories and schools with high service quality rating showed relatively low variability, while services and schools with lower ratings displayed a spread through a higher standard deviation and coefficient of variation. This is pointing that satisfied customers are consistent in their rating of all services. Generally, the study related the higher variation or spread of evaluation data to lower rating values.

4. A facilities management continuous improvement culture requires the establishment of a performance measurement tool or survey instrument, a customer service evaluation system and a department wide Total Quality Management framework. The system can be used as a facilities management decision-support tool.

5. Trend charts showed continuous improvement in almost all service categories during the four quarterly periods of the study. All services showed improvements after one year. Trend charts showed a varying rate of improvement in service quality rating pointing to the fact that different services improve at different rates, and some services may need longer time for improvement to mature. Service categories and schools with high service quality rating showed relatively low variability, while services and schools with lower ratings displayed a spread through a higher standard deviation and coefficient of variation. This is pointing that satisfied customers are consistent in their rating of all services. Generally, the study related the higher variation or spread of evaluation data to lower rating values.

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Quantitative data analysis through facility management instrument. Result of evaluation through facility management evaluation instrument concluded 24 types of facility management. Types of management of related facility which have been known certainly problematic and bring down in evaluation should be focused, and reviewed comprehensively to allow reasonable act for reaching improvement stage of facility management at elementary school in DKI Jakarta.

In accordance with analysis range, it can be concluded that answer of the respondents to facility management at DKI Jakarta Basic Education Office stayed at unsatisfactory level. The respondents chosen randomly are the principal of the elementary school in DKI Jakarta.

REFERENCES

Alexander, K. (1996). "Facilities Management-Theory and Practice". (Edited) E & FN Spon. London. UK. hlm. 173.

Amaratunga, D. dan Baldry, D. (2002). "Performance Measurement in Facilities Management And Its Relationships With Management Theory And Motivation." *Facilities.* 20 (10), hlm. 327-336.

Amaratunga, *et al.* (2002). "Quantitative And Qualitative Research In The Built Environment: Application Of Mixed Research Approach." Work Study Journal, 51(1), hlm.17-31

CFM (1993)."Facilities Management: The Professional Guide to the State of the Art in International Facilities Management." (Edited by Alexander, K). University of Strathclyde, Bleinhem.

Chua, Y. P. (2006a). " Kaedah Penyelidikan - Kaedah dan Statistik Penyelidikan- Buku 1". Kuala Lumpur: McGraw Hill Education.

Jayyousi, K. W., PE (2001) "Development and Implementation of a Service Quality Rating System for Facilities Management in Urban Public School Districts" Wayne State University, Detroit, Michigan. Tesis Ph.D

USAID – U.S. Agency for International Develop. 2008. Quality Assessment. http : www.qaproject.org [26 Ogos 2009]