CERTIFICATE

QiR Yogyakarta 25-28 June 2013

THE 13TH INTERNATIONAL CONFERENCE ON QiR (QUALITY in RESEARCH)

IEEE

This is to certify that

Ig. Jaka Mulyana

attended
The 13th International Conference QiR (Quality in Research)
25-28 June 2013, Yogyakarta, Indonesia
as

Presenter

Dean of Engineering
Universitas Indonesia

Prof. Dr. Ir. Bambang Sugiarto, M.Eng

Qir 2013 Chairman

Prof. Dr. Ir. Bondan T. Sofyan, M.Si.

THE 13TH INTERNATIONAL CONFERENCE ON QiR
(QUALITY in RESEARCH)

http://qir.eng.ui.ac.id

QiR

Yogyakarta
25-28 June 2013

IEEE

IN CONJUCTION WITH :

ICCS 2013
(The 2nd International Conference on Civic Space)

ORGANIZED BY :

Faculty of Engineering
Universitas Indonesia

CO HOSTED BY:

IST AKPRIND

Universitas Gadjah Mada

PROCEEDING

ISSN 1411-1284

WELCOME FROM THE RECTOR OF UNIVERSITAS INDONESIA

It is both a pleasure and honor for me to welcome you all to the 13th International Conference on QiR (Quality in Research) 2013. In this globalization era, mankind's competitive explorations to find new and better ways to enhance their life has often resulted in sacrificing the environment for their convenience. To preserve the environment for our future generations, steps must be made to ascertain that development and innovation of mankind must be more sustainable, balancing both mankind's' effort in enhancing their quality of life and fulfilling their needs, with its harmony with nature.

Today, scientists and experts, in particular, people in engineering, architecture and design are looking to develop new environmentally friendly technologies, or eco-technologies. Innovation in eco-based multidisciplinary knowledge and skills becomes the important key, and this central issue should be encouraged for the motivation of current and future development. Eco-technology can help protect, conserve and even restore our precious shared environment. To develop this technology, we need to combine engineering, scientific or technological approaches, with ecology, economics and the social sciences and humanities. The eco-innovation field is now wide open and offers exciting new territories to explore and develop. Creative thinking by our top technical and scientific researchers is giving us a more and more treasures of new workable ideas.

However, innovations require more than just brilliant ideas. Innovations require resources, skills, technology, knowledge, tools, techniques and so much more. But most of all, innovations require people. People are the driving force behind every need of change, changes that are aimed to improve mankind's quality of life, to enhance their living conditions or to simply make life easier and more comfortable. This conference is about learning of the fundamental aspects which can transform the world and society, thinking ahead to possible challenges facing the globe, discovering innovations related to opportunities for industry, and most importantly, this conference is about bringing together interdisciplinary people to accelerate activities in many areas simultaneously. This is what makes the conference exceptional this year in terms of potential impact from this networking.

I extend my sincere thanks to the Faculty of Engineering Universitas Indonesia, supporting parties and institutions for their participation and contributions in QiR 2013. I would also thank the people of Yogyakarta for their gracious support and hospitality. Additionally, I extend a hearty thank you to the members of the organizing committees for dedicating their valuable time so that each one of us enjoys an exceptional conference program over the next several days. May we have a successful, stimulating, fruitful and rewarding conference.

Prof. Dr. Ir. Muhammad Anis M.Met.
Rector
Universitas Indonesia

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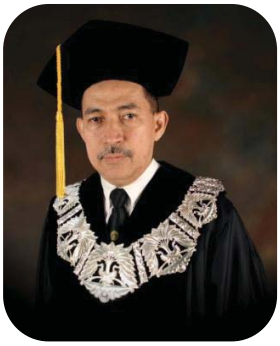
Surabaya,
Dekan Fakultas Teknik
Dean Faculty of Engineering

Prof. Suryadi Ismadji, IPM.,ASEAN Eng.
NIK. 521.93.0198

WELCOME FROM THE RECTOR OF UNIVERSITAS INDONESIA



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Prof. Dr. Ir. Muhammad Anis M.Met.
Rector
Universitas Indonesia

WELCOME FROM THE DEAN OF FACULTY OF ENGINEERING UNIVERSITAS INDONESIA

Welcome to the 13th International Conference on QiR (Quality in Research) 2013. The Faculty of Engineering Universitas Indonesia is thrilled that, together with our co-hosts IST-Akprind and Gadjah Mada University, we are able to present an international conference of this magnitude. This two-day conference speaks to the importance of fostering relationships among national and international front liners, thinkers, academics, executives, government and business officials, practitioners and leaders across the globe in an effort to share knowledge and best practices as part of a worldwide network.

The quest for knowledge has been from the beginning of time but knowledge only becomes valuable when it is disseminated and applied to benefit humankind. It is hoped that QiR 2013 will be a platform to gather and disseminate the latest knowledge in engineering, architectural design and community services. Academicians, scientist, researchers and practitioners of these fields will be able to share and discuss new findings and applications of their expertise. It is envisaged that the intellectual discourse will result in future collaborations between universities, research institutions and industry both locally and internationally. In particular it is expected that focus will be given to issues on innovations for the enhancement of human life and the environment.

In accordance to this year's theme, this conference will cover a wide range of sustainable design and technology issues, especially state of the art information and knowledge of new innovations, ideas, creative methods or applications which can be implemented to enhance the human life and also our environment. The itinerary of the conference over the two days has been carefully planned to ensure a lively exchange of ideas and the development of innovative strategies and there will be many opportunities for everyone in attendance to share their expertise with, and learn from, peers from around the world.

We urge you to spend the next two days in interesting discussions and exchanging ideas among yourselves. We foresee more and more challenges in our future. Challenges in how to improve our life, how can we enhance our society, how can we make our lives and the lives or our society better? These challenges should be answered together by developing collaborations for future research in various engineering and design areas. It is our hope and aim that this conference would be able to provide an international media for exchange of the knowledge, experience and research as well as the review of progress and discussion on the state of the art and future trend of prospective collaboration and networking in broad field of eco-based technology development.

My deepest appreciation to our sponsors, supported parties and various contributors for their never ending supports of this conference. I would also like to convey my humblest thankfulness to all of our distinguished speakers for making the time to share their knowledge with us. To our fellow researchers and/or practitioners from Indonesia and overseas, welcome and enjoy your stay in this amazing historical city, Yogyakarta. I would also like to invite all participants in expressing our appreciation to all members of the QiR 2013 organizing committee for their hard work in making this conference another success.

Prof. Dr. Ir. Bambang Sugiarto, M.Eng.
Dean Faculty of Engineering
Universitas Indonesia

WELCOME FROM THE QiR 2013 ORGANIZING COMMITTEE

Welcome to the 13th International Conference on QiR (Quality in Research) 2013. It is a great pleasure for Faculty of Engineering Universitas Indonesia to be co-hosting this biennial event with IST-Akprind and Gadjah Mada University, in the spirit of strengthening of cooperation and mutual growth to be world class institution. For the first time, the QiR 2013 is held in one of the most historical city in Indonesia – Yogyakarta. It is with our utmost pleasure to hold this year's QiR 2013 in conjunction with the 2nd International Conference on Civic Space (ICCS 2013) and introducing the International Symposium on Community Development 2013 as a forum to share experience on engaging community for a better life and environment.

The aim of this International Conference with our selected theme, "Exploring Innovation for Enhancement of Human Life and Environment", is to provide an international forum for exchanging knowledge and research expertise as well as creating a prospective collaboration and networking on various fields of science, engineering and design. We hope this conference can be a kick-off for the strengthened action and partnerships on creating a platform for us; national and international thinkers, academics, government officials, business executives and practitioners, to present and discuss the pivotal role of engineers in innovative products which will reduce environmental impacts, applications in sustainable planning, manufacturing, architecture, and many more to grow and ensure the rising prosperity of our society going into the future. Under this theme, the conference focuses on the innovative contributions in science, engineering and design as well as their market perspectives to the existing and future enhancement of human life and environment quality.

Over the period of 15 years, this biennial conference has become an important place of encounter between scholars and practitioners from different countries, cultures and backgrounds discussing contemporary engineering and design issues dealt in their hometown, country or even region. Serving as a platform for an engineering and design dialogue, this conference will have 16 invited speakers and has gathered more than 500 papers from more than 20 countries all over the world:
92 papers on International Symposium on Civil and Environmental Engineering
51 papers on International Symposium on Mechanical and Maritime Engineering
97 papers on International Symposium on Electrical and Computer Engineering
111 papers on International Symposium on Materials and Metallurgy Engineering
31 papers on International Symposium on Architecture, Interior and Urban Planning
57 papers on International Symposium on Chemical and Bioprocess Engineering
71 papers on International Symposium on Industrial Engineering
25 papers on International Symposium on Community Development

My deepest gratitude to all of our speakers, participants and contributors who have given this conference their generous support. I would also like to thank all members of the Organizing Committee and our distinguished International Board of Reviewers for all of their support and advice. Our thanks to all of our sponsors, supporters, exhibitors, and professional associations for their great support and encouragement through committed funding and any other form of help and support. We also owe our success to the full support of the Rector of Universitas Indonesia and the Dean of Faculty of Engineering. Thank you to IEEE Indonesia Section that has supported QiR 2013 to be approved as IEEE Conference. Last but not least, a special thanks to our co-hosts, IST-Akprind and Gadjah Mada University for all of their immense supports in making this conference a success.

Allow me to wish all of you a meaningful and rewarding conference. We wish you a pleasant and memorable stay in Yogyakarta. Thank you and we hope to see you again at the QiR 2015.

Prof. Dr. Ir. Bondan T. Sofyan, M.Si.
Chairman of QiR 2013 Organizing Committee

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Proceeding of the 13th International Conference on QIR (Quality in Research)
Yogyakarta, Indonesia, 25-28 June 2013
ISSN 1411-1284

Measurement of Education Quality with KANO Model : A Case Study on Elementary School

Ig. Jaka Mulyana[a]

[a]*Industrial Engineering Department Widya Mandala Surabaya Catholic University*
Jl. Kalijudan 37 Surabaya 60114 Indonesia
e-mail :
jmulyono@mail.wima.ac.id
mulyonojoko@yahoo.co.id

ABSTRACT

Quality is the important and necessary to get serious attention of the company in running its operations strategy including in the elementary school. Measuring the quality of services is more complicated because of the is intangible that each customer has different perceptions about the quality of services. KANO's model has been widely applied in measuring service quality. The purpose of this study is to measure the level of satisfaction of expectation of parents towards education and perform the classification of the KANO model of educational service attributes. Measurement of education based on 5 dimension of services quality Zeithaml, Parasuraman, dan Berry (1990), that is tangible, reliability, responsiveness, assurance dan empathy. The result showed that there is still a gap between the level satisfaction and expectation that are the completeness of the library books, cleanliness of toilets and computer laboratory. Furthermore, the results of the classification attributes using KANO model of education services found that 25 attributes in the category of One Dimensional, 4 attributes in the category of Attractive and 1 attribute is categorized in Indifferent

Keywords

service quality, customer satisfaction, elementary school, KANO model

1. INTRODUCTION

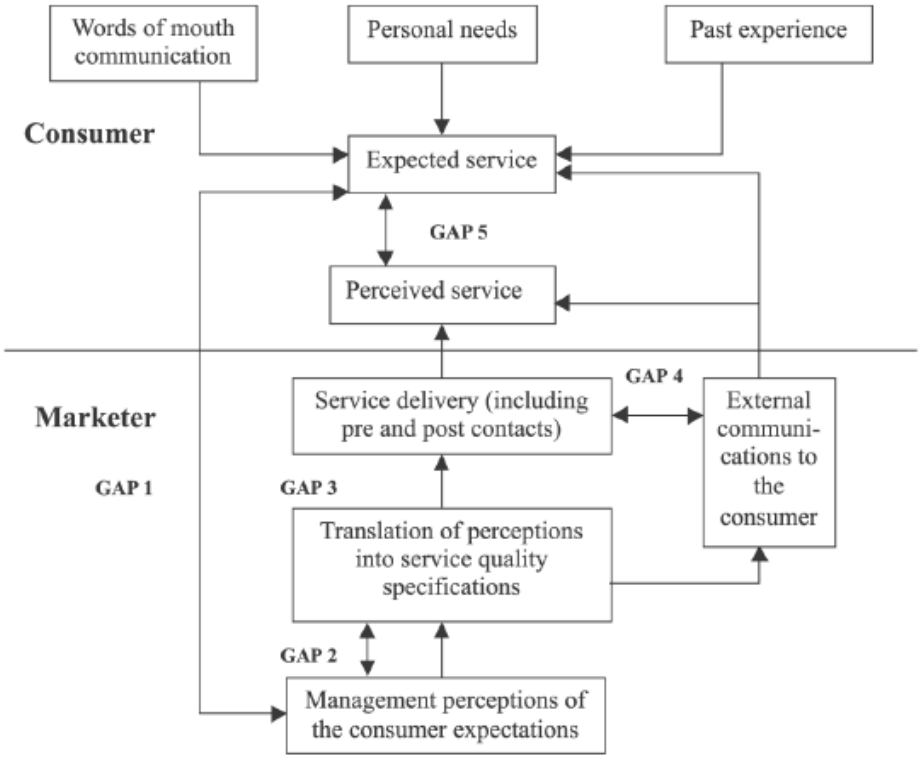
Based on Herzberg's 'Motivator-Hygiene Theory', Kano *et al.* [1] defined the product quality element of different categories that impact customer satisfaction in different ways. Which namely: attractive quality attribute, must-be quality attribute, one-dimensional quality attribute, indifferent quality attribute and reverse quality attribute. Using Kano's model, quality attributes that have the greatest influence on customer satisfaction can therefore be identified, and these can then be used to focus on priorities for product or service development and improvement [2]. With such advantage, Kano model is widely used in quality management [3], logistics services [4] product development [5-7] as well as QFD integration [8-10]. Kano model also used to evaluate quality evaluation of education [11-13]. Quality in education is as important as the quality of business. Elementary school is an important stage of education, where basic values instilled child begins. Basic education in elementary school will influence the child's subsequent development of thinking. Thus every school, including elementary schools, should improve the quality of education services. Considering on this, to understand customer satisfaction of the education institution, we need to understand the customer's need and the expectation. Improving the quality of education would have to focus on customer satisfaction. Kano et al. [1] developed a model to categorize the attributes of a product or service based on how well they are able to satisfy customer. Mostly service qualities have both poor and versatile characteristics because service quality is based on the customers' feelings. Therefore, the evaluation of service quality is more difficult than that of the product quality. Parasuraman *et al.* [14] developed the instrument SERVQUAL for measuring customers' perceptions of service quality needs. In this paper, service quality of elementary school was measured and analyzed by service gaps and classified by KANO's method.

2. CONCEPTUAL BACKGROUND

2.1. Service Quality

A firm in order to compete successfully must have an understanding of consumer perception of the quality and the way service quality is influenced. Managing perceived service quality means that the firm has to match the expected service and perceived service to each other so that consumer satisfaction is achieved [15]. Parasuraman *et al.* [16] proposed that service quality is a function of the differences between expectation and performance along the quality dimensions. They developed a service quality model (Figure 1) based on gap analysis. The various gaps visualized in the model are:

Gap 1: Differences between consumers' expectation and management's perceptions of those expectations, for example not knowing what consumers expect.
Gap 2: Differences between management's perceptions of consumer's expectations and service quality specifications, for example improper service-quality standards.
Gap 3: Differences between service quality specifications and service actually delivered for example the service performance gap.
Gap 4: Differences between service delivery and the communications to consumers about service delivery, for example whether promises match delivery?
Gap 5: Differences between consumer's expectation and perceived service. This gap depends on size and direction of the four gaps associated with the delivery of service quality on the marketer's side.



Source : Parasuraman, et.all [16]

Figure 1: Gap Analysis Model

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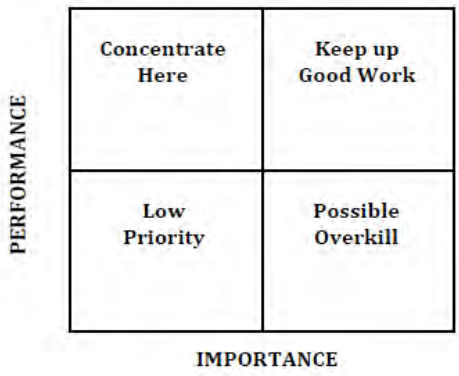
2.2. Importance-Performance Analysis and KANO Model

Importance Performance Analysis (IPA) technique is Importance-Performance analysis of the underlying conceptual multi-attribute model to analyze the organization's performance. IPA model is used to measure the importance of customer satisfaction and performance, and develop relationships based on specific product attributes. The main purpose of the IPA is as a diagnostic tool to facilitate the identification of attributes, given their importance, products or services of poor performance or over perform. For this purpose, the interpretation is presented graphically on a grid divided into four quadrants, which according to the average importance and satisfaction (performance)[17]. Four quadrants and the implications of the IPA are shown in Table 1 and Figure 2. The four quadrants are identified are *Concentrate Here*, *Keep the Good Work*, *Low Priority* and *Possible Overkill*.



Source : Haeryip Sihombing, et.all[17]

Figure 2: Importance Performance Analysis Grid

Table 1. Importance Performance Quadrant

Quadrant I *Concentrate Here*	Attributes are perceived to be very important to respondents, but performance levels are fairly low. This suggests that improvement efforts should be concentrated here.
Quadrant II *Keep up the good work*	Attributes are perceived to be very important to respondents, and at the same time, the organization seems to have high levels of performance in these activities. The message here is to keep up the good work.
Quadrant III *Lower priority*	Attributes here are rated as having low importance and low performance. Although performance levels may be low in this cell, managers should not be overly concerned, since the attributes in this cell are not perceived to be very important. Limited resources should be expended on this low priority cell.
Quadrant IV *Possible over kill*	This cell contains attributes of low importance, but where performance is relatively high. Respondents are satisfied with the performance of the organization, but managers should consider present efforts on the attributes of this cell as being superfluous/ unnecessary.

Source : Haeryip Sihombing, et.all[17]

Parasuraman *et al* [14] defined the 5 attributes dimensions of service quality (SERVQUAL) as the method used to measure the quality of service as follows:
(i) Reliability: ability to perform the promised service, dependably and accurately.
(ii) Responsiveness: willingness to help customers and provide prompt service.
(iii) Assurance: knowledge and courtesy of employees as well as their ability to inspire trust and confidence.
(iv) Empathy: caring, individualized attention the firm provides its customers.
(v) Tangibles: appearance of physical facilities, equipment, personnel, and communication materials

Kano *et al.* [1] developed a model to categorize the attributes of a product or service based on how well they are able to satisfy customer needs. The Kano model is a theory of product development and customer satisfaction developed in the 80s by Professor Noriaki Kano which classifies customer preferences into five categories: (i) Attractive, (ii)One-Dimensional, (ii)Must-be, (iv) Indifferent,(v) Reverse. The one-dimension quality model focuses on one quality element. It states that if the quality element is of sufficiency then the customer is satisfied, otherwise the customer is not satisfied. Two-dimension quality model argued that quality elements sufficiency may not enough to satisfy the customers' quality expectation. Sometimes it may result in un satisfaction or no feeling for the customer. This is the core concept of the two-dimension quality model. The concept of the two-dimension quality is proposed by Herzberg in 1987. Kano called the Herzberg's Motivator-Hygiene theory as the quality's (Motivator-Hygiene) M-H theory. Due to this terminology is too complicate to use it. Kano redefines the

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quality's M-H theory as attractive quality and must-be quality, and distinguishes the service quality in terms of attractive quality elements, one-dimension quality elements, must-be quality elements, indifferent quality elements and reverse quality elements. The following are the quality elements categories:

These categories have been translated into English using various different names (delighters/exciters, satisfiers, disatisfiers, etc.), but all refer to the original articles written by Kano (see Figure 3)[18].

1. Attractive Quality: These attributes provide satisfaction when achieved fully, but do not cause dissatisfaction when not fulfilled. These are attributes that are not normally expected for example, a thermometer on a package of milk showing the temperature of the milk. Since these types of attributes of quality unexpectedly delight customers, they are often unspoken.
2. One-dimensional Quality: These attributes result in satisfaction when fulfilled and dissatisfaction when not fulfilled. These are attributes that are spoken of and ones which companies compete for. An example of this would be a milk package that is said to have ten percent more milk for the same price will result in customer satisfaction, but if it only contains six percent then the customer will feel misled and it will lead to dissatisfaction.
3. Must-be Quality: These attributes are taken for granted when fulfilled but result in dissatisfaction when not fulfilled. An example of this would be package of milk that leaks. Customers are dissatisfied when the package leaks, but when it does not leak the result is not increased customer satisfaction. Since customers expect these attributes and view them as basic, then it is unlikely that they are going to tell the company about them when asked about quality attributes.
4. Indifferent Quality: These attributes refer to aspects that are neither good nor bad, and they do not result in either customer satisfaction or customer dissatisfaction.
5. Reverse Quality: These attributes refer to a high degree of achievement resulting in dissatisfaction and to the fact that not all customers are alike. For example, some customers prefer high-tech products, while others prefer the basic model of a product and will be dissatisfied if a product has too many extra features

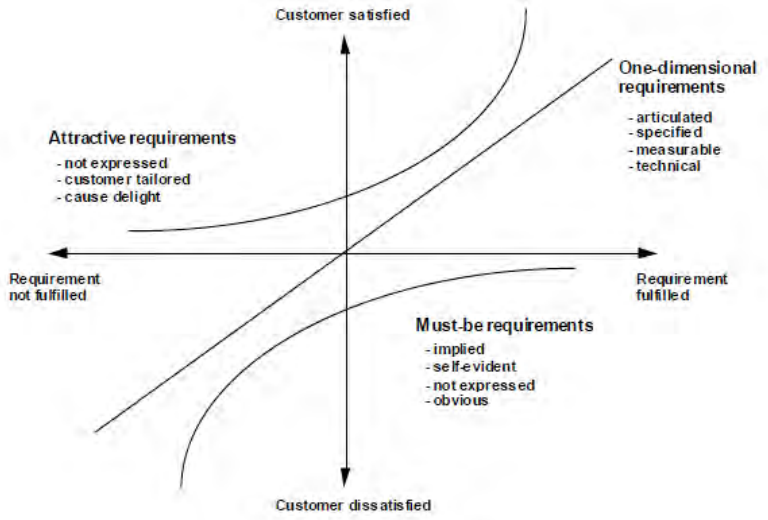

Figure 3: KANO's Model Customer Satisfaction

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3. METODHOLOGY

The framework of this study can be seen on figure 4.

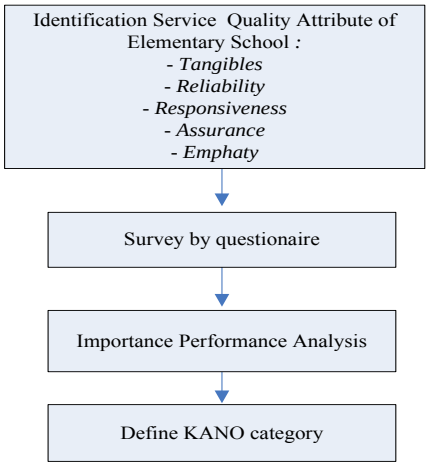


Figure 4. Framework of study

Service quality attribute of elementary school as in table 2 below :

Table 2. Service Quality Attribute of Elementary School

Dimension	Attribute	Code
Tangibles	Academic calendar availability	A1
	Academic calendar implemented as planned	A2
	Teacher have a good capability	A3
	Teachers teach subjects according to educational background	A4
	Teaching are always conducted as scheduled	A5
	Availability of the agenda book	A6
Reliability	Classrooms are clean and comfortable	B1
	Facilities and modern teaching equipment	B2
	A completely of library	B3
	Sports facilities	B4
	Availability of student activity	B5
	Cleanliness of toilets	B6
	Computer laboratory	B7
	Completed and updated school's website	B8
	Cleanliness school environment	B9
	Teachers and staff dressed	B10
	Parking area	B11
	School location is easy to access	B12
Responsiveness	Teachers respond to questions and complaints of parents well	C1
	Teachers are willing to talk to parents about child's problem	C2
Assurance	Number of teacher	D1
	The use of teaching methods	D2
	Availability of textbooks	D3
	The number of students in one class	D4
	Education about manners, responsibility and honesty	D5
Empathy	Communication between teachers and parents	E1
	Regular meetings between teachers and parents	E2
	Parent organization	E3

The survey was carried out through two type of questionnaire to analyze parent satisfaction. The first one is used for analyzing importance and performance. On the first questionnaire, respondents give rank of importance and performance for every

attribute by Likert scale between 1 and 5. The second questionnaire is used to categorize service quality attribute by KANO Model. To apply the Kano classifications to divide the quality elements into attractive, one-dimensional, must-be, indifferent, and reverse quality elements is used by table 3 [19]

Table 3. KANO Evaluation Table
Source : Matzler & Hinterhuber (1998)

Product requirement → / Functional form of the question ↓		Dysfunctional form of the question				
		I like that way	It must be that way	I am neutral	I can live with it that way	I dislike that way
	I like that way	Q	A	A	A	O
	It must be that way	R	I	I	I	M
	I am neutral	R	I	I	I	M
	I can live with it that way	R	I	I	I	M
	I dislike that way	R	R	R	R	Q

Where : Q= questionable, A = attractive, O = one dimentional, R=reverse, I = indifferent, M =must be

To classify attribute we used Blauth's formulas :

- If (one dimensional + attractive + must be) > (indifferent + reverse + questionable) then the category is maximum [one dimensional; attractive; must be]
- if (one dimensional + attractive + must be) < (indifferent + reverse + questionable) then the category maximum [indifferent; reverse; questionable]

4. RESULTS AND DISCUSSION

This study includes 150 respondents. The respondents are parents of elementary school. Summary of respondent can be seen at table 4.

Table 4. Summary of respondent

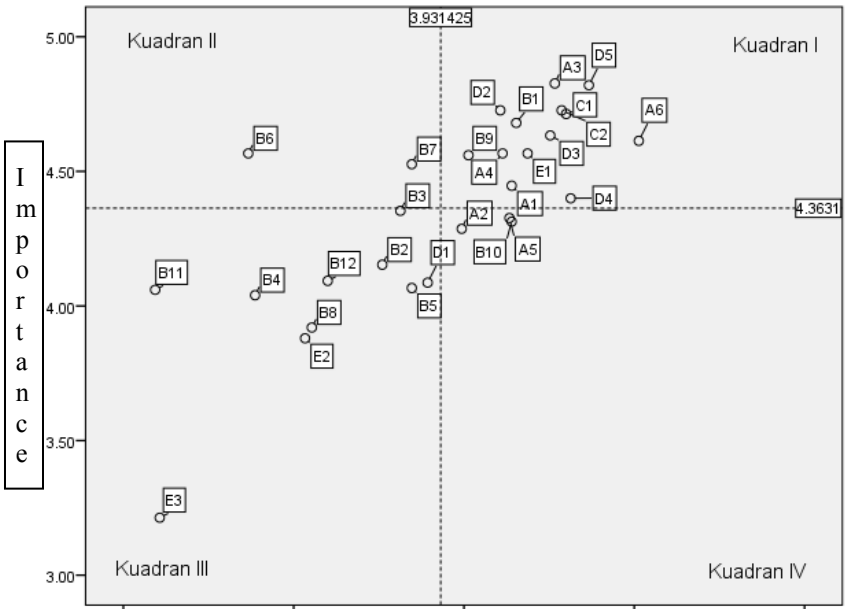
Item	Category	Amount	Percentage
Age	< 25 year	0	0.00
	25 – 30	5	3.33
	30 - 35	34	22.67
	35 - 40	47	31.33
	40 - 45	43	28.67
	>45	21	14.00
Occupation	Gov. Officer	13	8.67
	Private Officer	58	38.67
	Entrepreuner	26	17.33
	Military	13	8.67
	Doctor	1	0.67
	Teacher/Lecturer	10	6.67
	Others	29	19.33
Eductaion	High School	50	33.33
	Diploma	19	12.67
	Undergraduate	67	44.67
	Master	9	6.00
	Doctoral	0	0.00
	Military	2	1.33
	Others	3	2.00

Gap analysis conduct to analyze whether there are differences in the level of importance and performance of each service attribute. Summary of importance and performance of each service attribute can be seen in Table 5. The mean level of assessment and the level of interest then made Cartesian diagram as shown in figure 5.

Table 5. Average of Importance and Performance

Item	Average of Importance	Average of Performance

A1	4.4467	4.1400
A2	4.2867	3.9933
A3	4.8267	4.2667
A4	4.5667	4.1133
A5	4.3267	4.1333
A6	4.6133	4.5133
B1	4.6800	4.1533
B2	4.1533	3.7600
B3	4.3533	3.8133
B4	4.0400	3.3867
B5	4.0667	3.8467
B6	4.5667	3.3667
B7	4.5267	3.8467
B8	3.9200	3.5533
B9	4.5600	4.0133
B10	4.3133	4.1400
B11	4.0600	3.0933
B12	4.0933	3.6000
C1	4.7133	4.3000
C2	4.7267	4.2867
D1	4.0867	3.8933
D2	4.7267	4.1067
D3	4.6333	4.2533
D4	4.4000	4.3133
D5	4.8200	4.3667
E1	4.5667	4.1867
E2	3.8800	3.5333
E3	3.2133	3.1067



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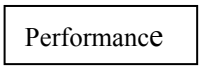

Figure 5: Cartesian Diagram

From Cartesian diagram, grouping each attribute in each quadrant is shown in Table 6.

Table 6. Grouping attribute to Cartesian Diagram

Quadrant	Code	Attribute
Quadrant I	A1	Academic calendar availability
	A3	Teacher have a good capability
	A4	Teachers teach subjects according to educational
	A6	Availability of the agenda book
	B1	Classrooms are clean and comfortable
	B9	Cleanliness school environment
	C1	Teachers respond to questions and complaints of parents well
	C2	Teachers are willing to talk to parents about child's problem
	D2	The use of teaching methods
	D3	Availability of textbooks
	D4	The number of students in one class
	D5	Education about manners, responsibility and honesty
	E1	Communication between teachers and parents
Quadrant II	B3	A completely of library
	B6	Cleanliness of toilets
	B7	Computer laboratory
Quadrant III	B2	Facilities and modern teaching equipment
	B4	Sports facilities
	B5	Availability of student activity
	B8	Completed and updated school's website
	B11	Parking area
	B12	School location is easy to access
	D1	Number of teacher
	E2	Regular meetings between teachers and parents
	E3	Parent organization
Quadrant IV	A2	Academic calendar implemented as planned
	A5	Teaching are always conducted as scheduled
	B10	Teachers and staff dressed

To categorize service quality attribute by KANO Model is based on answers to questions functional and dysfunctional each attribute. According to KANO evaluation table 3, sum of KANO category for every attribute can be seen on table 7.

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Table 7. Sum of KANO Category

Code	Attribute	Sum of KANO Category					
		O	A	M	I	R	Q
A1	Academic calendar availability	81	35	7	15	0	0
A2	Academic calendar implemented as planned	65	36	14	21	1	1
A3	Teacher have a good capability	112	13	9	4	0	0
A4	Teachers teach subjects according to educational background	65	44	9	19	0	1
A5	Teaching are always conducted as scheduled	104	12	17	5	0	0
A6	Availability of the agenda book	99	19	7	13	0	0
B1	Classrooms are clean and comfortable	115	9	8	5	0	1
B2	Facilities and modern teaching equipment	42	55	6	35	0	0
B3	A completely of library	44	68	5	21	0	0
B4	Sports facilities	46	50	6	36	0	0
B5	Availability of student activity	27	74	3	34	0	0
B6	Cleanliness of toilets	123	7	7	1	0	0
B7	Computer laboratory	70	45	8	15	0	0
B8	Completed and updated school's website	53	42	7	36	0	0
B9	Cleanliness school environment	117	11	7	3	0	0
B10	Teachers and staff dressed	76	37	12	13	0	0
B11	Parking area	49	48	11	30	0	0
B12	School location is easy to access	74	36	10	18	0	0
C1	Teachers respond to questions and complaints of parents well	96	26	8	8	0	0
C2	Teachers are willing to talk to parents about child's problem	96	17	16	9	0	0
D1	Number of teacher	70	41	10	17	0	0
D2	The use of teaching methods	104	24	8	2	0	0
D3	Availability of textbooks	96	30	7	5	0	0
D4	The number of students in one class	75	33	5	24	1	0
D5	Education about manners, responsibility and honesty	123	9	4	2	0	0
E1	Communication between teachers and parents	101	15	16	6	0	0
E2	Regular meetings between teachers and parents	39	26	23	49	1	0
E3	Parent organization	15	28	2	89	4	0

Based on the results in Table 7, the determination of KANO categories for each attribute using Blauth's formula can be seen on table 8.

Table 8. KANO Category

Code	Attribute	KANO Category
A1	Academic calendar availability	O
A2	Academic calendar implemented as planned	O
A3	Teacher have a good capability	O
A4	Teachers teach subjects according to educational background	O
A5	Teaching are always conducted as scheduled	O
A6	Availability of the agenda book	O
B1	Classrooms are clean and comfortable	O
B2	Facilities and modern teaching equipment	A
B3	A completely of library	A
B4	Sports facilities	A
B5	Availability of student activity	A
B6	Cleanliness of toilets	O
B7	Computer laboratory	O
B8	Completed and updated school's website	O
B9	Cleanliness school environment	O
B10	Teachers and staff dressed	O
B11	Parking area	O
B12	School location is easy to access	O
C1	Teachers respond to questions and complaints of parents well	O

C2	Teachers are willing to talk to parents about child's problem	O
D1	Number of teacher	O
D2	The use of teaching methods	O
D3	Availability of textbooks	O
D4	The number of students in one class	O
D5	Education about manners, responsibility and honesty	O
E1	Communication between teachers and parents	O
E2	Regular meetings between teachers and parents	O
E3	Parent organization	I

From the results of respondents' answers to the level of importance and performance of each service attribute as can be seen in Table 5, it can be seen that the average rate of importance of all attributes greater than the performance. However, to give priority to improve attribute can be seen from the Cartesian diagram in Figure 5. Attributes that need serious attention to be improved are the attributes that in quadrant II that is completeness of library, Cleanliness of toilets and computer laboratory, because these attributes are considered bad perform but it is important for parents. This causes the parents disappointed.
From the categorization of KANO model in Table 8, most of the attributes as category O (One Dimensional) means the rate of satisfaction is linear-related with performance that mean if performance attributes high will result in higher satisfaction parents. In other words, if we want to increase the satisfaction of the parents is by increasing the performance its attribute.

5. CONCLUSION

According to Gap Analysis we can conclude that in general there is gap between expectation and satisfaction of service in elementary school. The attribute that should be improved immediately are completeness of library, cleanliness of toilets and computer laboratory. Based on KANO analysis, 23 attribute are as One-Dimensional, 4 as Attractive and 1 as Indifferent.

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