

# *Studies on customer service quality management in schools using the DMAIC*

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**Abstract—** Customer satisfaction is important and critical issue not only in industry but also in all educational institutions. Parents, students and community members who act as a client to a school has their own requirements to be met by the school management. The purpose of this study is to examine the extent of customer satisfaction improved in schools capable of using a variety of DMAIC tools. A variety of services are offered by the school to its customers. The scope of the study is more geared to the services offered to students who are experiencing health problems. There are numerous of DMAIC tools used by researchers to speed up the delivery process in schools as SIPOC, flowchart, Fishbone diagrams and so on.

## INTRODUCTION (HEADING 1)

Each user is identified to be involved in the services sector. No matter where, one might have experienced dissatisfaction with services offered by the providers. This is because the quality and standards set by an individual are different from each other. Customer satisfaction is the key to a business (Mustafa *et al.*, 2007) which is in receipt of a service satisfaction will be evaluated by the customer. School organization is no exception in providing the best quality service to its customers which consist of pupils, parents and the surrounding community.

According to Ashraf and Ibrahim (2009), the quality of education is difficult to measure and is defined where it covers the learning outcomes accepted by students which given by educators and institutional environment itself. Therefore, assessment of the quality of higher education customers need to be done thoroughly in an educational institution (Haque, 2004) and not only confined to certain areas. At school, educational content is a key aspect that determine customer satisfaction. Excellent results in public examinations can be used as an indicator by public around the services offered by the staff (teacher) of the school.

Customer satisfaction can be defined as a condition in which the desires, expectations and customer requirements are met (MAMPU, 2009). For an institution or organization emphasis and customer satisfaction measurement is an important element in providing better services, efficient and effective (Yaacob, 2009). Therefore, the school urged to provide the best service that can give satisfaction to the customer of the services offered.

## LITERATURE REVIEW

Organizations involved in the services delivery context such as law firms, libraries and schools have made DMAIC as an approach to make the services offered are better and more effective. For example, librarians always providing services to students regardless of the school or educational institution should always evaluate the services provided. Various response and customer feedback can be tools of improvement so that the quality of services is constantly increasing.

Saludin *et al.* (2010) states that the library plays a vital role in supporting teaching, learning, research and development programs so that every educational organization's vision can be achieved. Therefore, the library should provide extensive resources either in handout so that the method that students can access the information collection and resource extensive teaching and learning. Free and ease access of books and printed materials will easily help customers to complete their tasks and information search. Therefore, an efficient library need to create an efficient customer service counter so that customers can refer any problem to the counter staff. This will give maximum satisfaction to the customers of the service rendered. Thus, six sigma is used as one of the measurement tools used by the organization to produce output per unit or product to achieve zero defects (Saludin *et al.*, 2010).

Ramli *et al.* (2009) states that there exists a significant correlation between performance in customer satisfaction and service. Performance refers to the quality of service offered by service providers to customers. Various methods have been used to measure the quality of service. The choice of this method is included in the second process in the implementation of measure DMAIC process. SERVQUAL measurement can identify potential gaps between expectations and perceptions of both internal and external service delivery. SERVQUAL concept can identify five dimensions perceived by the customer during the service evaluation reliability, assurance, tangibles, empathy and responsiveness (Hernon, 1999). While for the DMAIC process control, other instrument is used to control the quality of services LibQUAL+™. Four factors are examined in this instrument of accessing information, the effectiveness of the library as a place, and control information.

Another study on the quality of library services that use the DMAIC and its implementation has been successful in helping

to reduce the time for a unit order book (Susan Kumi *et al.*, 2006). Several tools were used such as Fishbone diagrams to identify cause and effect on quality hosting service counter. In addition, the library has a formal Develop fault reporting procedure and monitor incidents and downtime. E-mail has been used as a tool to identify the effective downtime. All faults with the units would be reported via e-mail. All staff were encouraged to report faults as soon as they were noticed. If they did not have access to PC, they were to report it to a senior member of staff who would then e-mail the fault.

For services such as health care, DMAIC be applied even if it does not involve the use of machines. Sehwail (2003) stated that there are four groups of metrics or response variables in health care may define a delivery system's performance such as service level, service cost, customer satisfaction and clinical excellence. Most health care organizations measure performance using some combination from these four groups, but such analysis can be misleading since the metrics often represents an average. Customers rarely experience the average of a system. Instead, customers tend to experience the variability.

There is another study on the quality of the healthcare services industry conducted by Taner *et al.* (2007). In their study, they have used of DMAIC tools such as flowcharts and diagrams Fishbone. Use Fishbone diagrams performed to analyze the Cause and effect of unnecessary repeat laboratory test and image quality. Based on the resulting diagram, there are a number of factors were identified which resulted in unnecessary laboratory tests such as healthcare personnel, motivation, environment and tools, performance feedback, methods and organizational support. While the flowchart used to manage the infection catherer reduction. Flowchart can explain how the process to reduce catherer infection that began with the arrival of the patient in the waiting room. Next the process will run until the patients identified for surgery or not. Through this chart, patients and healthcare management more organized because each party knows that the process must be done in sequence.

Celano *et al.* (2010) also use DMAIC to improve the quality of patient care in the health services sector. Among the advantages of using DMAIC is to be adopted as a toolbox into specific projects for improvement with a particular focus to problem solving. The use of tools such as DMAIC flowchart used as a demonstration in the emergency department for care of patients suffering from vertigo symptoms. Through the use of this flowchart, traveling patients requiring urgent treatment to be more organized with getting immediate attention from the medical. Urgency treat patients can improve perceptions of quality healthcare services. With this, the number of deaths can be considered irrelevant to the negligence committed by a medical officer as a result there is no appropriate tools while performing the task.

## DISCUSSION

Malaysian government requires every citizen to learn in school since the age of 7 years. Therefore, all parents will be involved with the school services either directly or indirectly. Typically, the front counter in the school office will conduct transactions with outsiders such as suppliers, parents and the surrounding community. Therefore, people in the school office must have good interpersonal skills. It is because of society's perception of school starting from the front counter located in the school office. DMAIC application in measuring the quality of customer service involves five phases namely: Define, Measure, Analyze, Improve and Control.

### i) First phase : Define

Define include the opportunity derive from both customer and business perspective. In this phase, the administrators need to accomplish school mission that is to treat the school client by using the best way. Therefore, all parties, including the management of the school office must play their respective roles. For starters, SIPOC map can help to identify the stakeholders of school.

SIPOC, an acronym standing for suppliers, inputs, process, output, and customers, refers to the technique of analyzing a process relative to these parameters to fully understand its impact ( Keller, 2011). For example, school have to follow few procedures if the parents want to bring back their sick children. This directly affect the parents or guardians satisfaction in meeting their needs. They have to follow the rules and regulations stated by the ministry. Here is the SIPOC map related to the above situation:

Suppliers	Input	Process	Output	Customer s
Office workers	Authori zation form	Student treatmen t	Authorized form by the Principal	Parents or guardian
Management team ie. Principal, Senior Teachers	Transpo rtation	Bring the student to the hospital	Students have been diagnosed by the doctor	Education Departme nt and District officer
Teachers	Parents or guardian ID card	Call the student parents	Medication	Goods supplier
General workers ie. sweepers, gardener			Medication leave	

Figure 3.1 : SIPOC map

Based SIPOC map above, it appears that there are some people who act as suppliers to the satisfaction of the school client. Among them are the front line office desk, school administrators, teachers and indirectly involved parties such as the sweeper and gardener. They need to satisfy school clients consisting of parents or guardians, district education officer or department, and school suppliers. Everyone in the school need to comply with SOP service set by the ministry.

Therefore, some consent form must be completed before begin this sick student management procedures. Forms can be obtained at the school office and must be completed by a parent or guardian of a pupil. If an emergency situation, the teacher must fill out the form and ask the principal to sign it. Then, the transportation can be required to bring children to the clinic or hospital so that students can receive immediate treatment. If children are taken by their parents or guardians, ID card must be presented to the school administrator. This is to prevent the occurrence of fraud or kidnapping. Students are going to get medicine and if his health is not in good condition, students will be given sick leave by the doctor. MCs must be kept by the class teacher for recording purposes.

More detailed procedures contained in the process column. This can be shown through the flowchart diagram in the second phase of DMAIC that is Measure.

ii) Second phase : Measure

In the measure stage of the define, measure, analyze, improve and control problem-solving methodology, a detailed process-level map of the current process is developed ( Keller, 2011). A process consists of the repeatable tasks carried out in a specific order. Process personnel responsible for implementing the process on a daily basis should be enlisted to develop the detailed process map. The main concern at this phase is to develop a realistic picture of the as-is process.

A flowchart is a simple graphic tool for documenting the series of steps necessary for the activities in a process. Each task is presented by a symbol. The American Standards Institute (ANSI) provides a list of symbols that are intended primarily for computing processes but the most practitioners find useful.

For example, satisfaction of students who are sick and need treatment immediately to be met in accordance with the SOP set. Compliance with the SOP is to avoid such undesirable cases negligence teacher. Some of the parents do not understand that teachers are burdened with work instructions and procedures are rigid. Therefore, any problems that arise can be overcome with the SOP. Teachers also survived negligence in compliance with SOPs.

Here is an example flowchart showing the process of sick students management that is to bring the student to the hospital.

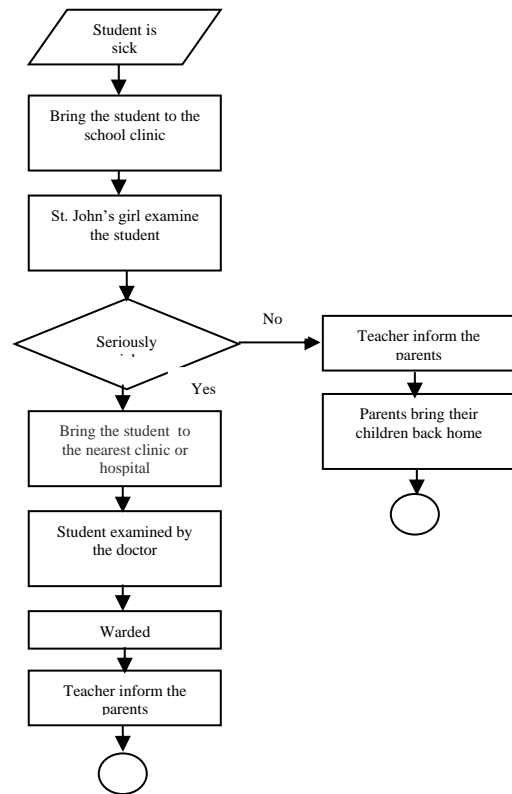


Figure 3.2 : Flowchart

Based on the flowchart above, it is clear that if a teacher can take action promptly and properly, the satisfaction can be achieved. In the above situations, parents and students are satisfied with the action with the teacher if they understand the work flow to be observed by the teacher. Thus, both parties can achieve satisfaction with the services provided.

iii) Third phase : Analyze

Keller (2011) stated that the objectives within the analyze stage of DMAIC problem-solving methodology include :

- Analysis of the value stream, the necessary steps that produce value for the customer
- Analysis of the sources of variation
- Determination of the process drivers, that correlate with the stakeholder requirements and significantly influence the process output

In the analysis phase, the school management should identify determinants that influence the quality of service to customers. There are five main factors of manpower, machines, methods, materials, measurement and environment. Manpower factor composed of non-management staff and school management staff. While computer systems and SOPs be a machines and method factors. All kinds of forms, the power of principals and school office location be a factor for the material, measurement and environment. The combination of these five

factors is creating easy access for customers dealing school, especially parents and education departments district officers.

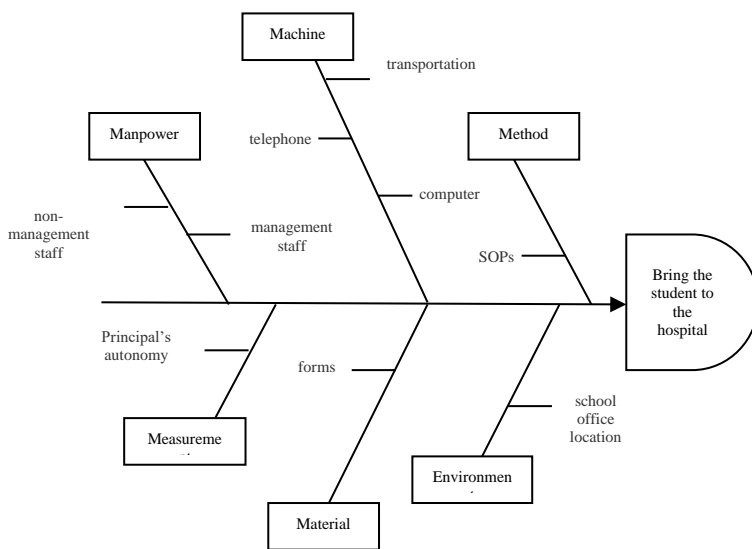


Figure 3.3 : Fishbone Diagram

iv) Forth phase : Improve

Improve stage of DMAIC begins with define and implement changes necessary for process improvement. At this stage, the team have to strive for new levels of performance and become true agents of change. Management support at this level is critical. The team must work closely with its sponsor to seek direction, authority, and approval before change can be implemented.

In matters involving the school, the customer always face problems related to time. Too many procedures that must be followed by the teacher and these procedures will take into time consideration. For example, to bring sick students to the hospital, teachers need to get permission from the authorities before leaving the school grounds. This will take teacher's time and energy. Students who are in pain also have to wait for the teacher to complete the procedure. However, if the student really needs immediate attention, the teacher can directly call an ambulance. Temporary treatment from the hospital in an ambulance could prevent the deaths.

Therefore, to improve the quality of service in the school for customer satisfaction, a tool has been identified for improvement actions, namely E-downtime. Among the advantages of e-downtime is able to improve the planning process for each action can be expected. This is because the application of this tool, every person involved in the process will be known by other colleagues. In the event of negligence, anyone can learn the error stems from certain quarters. Therefore, any party will try to do a good job without making mistakes and planning goals can be expected to be more accurate. In addition, this tool can increase of general process knowledge. This allows people are more inclined to think about

the root Causes and Possible solutions as soon as problems are firmly established and the main goal is clear.

PROCESS	PIC	E-	D	O	W	N	T	I	M	E	SUM	R	IMP
School clinic	Class rep.	0	1	0	1	4	0	0	4	0	10	4	
Examination 1	St. John's student	0	1	0	3	3	0	2	1	1	10	3	
Serious condition	St. John's teacher	0	0	0	3	2	0	2	2	0	9	5	
Hospital	Teacher on duty	1	1	0	3	3	1	0	3	0	12	1	
Examination 2	Doctor	1	0	0	3	1	0	1	2	0	8	6	
Warded	Doctor	0	0	0	4	3	0	0	4	0	11	2	
Inform parents	Teacher on duty	0	1	0	3	1	0	0	2	0	7	7	
<b>TOTAL</b>	-	2	4	0	20	#	1	5	18	1	67		

Guidance :

- 0 No waste
- 1 Very little waste
- 2 Little waste
- 3 Considerable waste
- 4 A lot of waste

- E Environmental healthy
- D Defect
- O Overproduction
- W Waiting
- N No utilized people
- T Transportation
- I Inventory
- M Movement
- E Access Processing

Figure 3.4 : E-downtime

Based on the diagram above, there is a column of improvement action to be performed for each process. Thus, the parties involved in a particular process should plan for correction in each defect done in order to maintain customer satisfaction with services given.

v) Fifth phase : Control

The final stage of define, measure, analyze, improve and control is the control stage. At this stage, a few objective must be completed such as the predicted impact of improvements must be continually verified and all the lessons obtained must be documented. All action should be taken so that the same mistakes do not happen in the future. All staff need to learn from mistakes made. Any repetition of the same mistakes deemed irrelevant because all improvement actions already specified in the improved phase.

**RECOMMENDATION**

Six Sigma has set a new direction for quality and productivity management. Six Sigma shifts the paradigm quality as the cause of good services performance and not the effect. Earlier all process and services improvement techniques were aimed at continuous improvement of quality. Six Sigma proves to be an effective strategy of finding solutions to eliminate the root causes (critical Xs) of performance problems in processes that already exist in the concern and thereby

eliminating the unwanted defects (Ys) produced by the process. Six Sigma propagates that all-round quality performance is bound to result in the attainment of the desired service excellence in terms of maximization of productivity and customers' (external as well as internal) satisfaction by continuous process improvement, reduction and elimination of wastages, rework and excess consumption of resources ( Desai et. al, 2008).

Meanwhile, there are many other tools that can be used for future research. Five DMAIC phases contained in need of variety and the use of appropriate tools. Among the suitable tool is as follows :

#### 1. 5S (Sort, Straighten, Shine, Standardize and Sustain)

Future studies that use can apply every S in this tool. 5S is intended to be used in improved phase. This is because every customer satisfaction for the services rendered is obtained as a result of the efficiency of the officers. Every process is important to go through a simple and quick process to achieve objectives. Then a process has to get rid of what does not need to be done, organize whatever remains, clean the work area, regular cleaning and maintenance schedule and make 5S a way of life.

#### 2. Nominal Group Technique

This tool is suitable to use in the define stage to reduce a large number of potential projects into a workable number of key projects. Service delivery to the customer has to go through a long process and sometimes takes too long to wait. Thus, the step that is not relevant or less important can be consolidated in a major step without compromising service processes. Less waiting time will give good satisfaction to customers.

#### 3. Quality Function Deployment

Quality function deployment (QFD) is a detailed methodology for linking customer requirements with internal process and product requirements. Analyze phase would be suitable to use this tool because the researcher could understand how customer requirements are translated into internal process and product requirements. As the school client satisfaction need to be the priority for the person in charge. The main client requirements need to be synchronize with the SOPs stated by ministry and at the same time could provide the best services for them.

#### 4. U Chart

U Charts are one of a set control charts specifically designed for attributes data. The U chart monitors the percent of samples having the condition, when each sample can have more than one instance of the condition. For example, we might choose to look at all the transaction in the month or a set of number of

samples. From this example, we might track the total number of errors in each month.

### CONCLUSION

Customer satisfaction is the main aspect to be taken care of by the party offering the service. Therefore, the use of DMAIC tools to help ensure a smooth delivery of services to customers. Every aspect of the service is taken into account and analyzed in order to use appropriate tools according to the needs. In addition, the process can be removed if the tools will not affecting the process. Thus, customers can enjoy the service without incurring long time use.

The implementation of DMAIC Six Sigma methodology can be further improved and new performance standards can be realized. DMAIC tools expect that the new learning will be validated and evaluated with practice. It can be integrated effectively in the community of company employees for maintaining and further improving the improved performances

### REFERENCES

- [1] Ashraf. A. M and Ibrahim. Y, (2009), "Quality Education Management At Private Universities In Bangladesh: An Exploratory Study", *Jurnal Pendidik dan Pendidikan*, Vol. 24, pp.17-23.
- [2] Celano. G, Costa. A and Fichera. S, (2013), "Linking Six Sigma To Simulation: A New Roadmap To Improve The Quality Of Patient Care", *International Journal Of Health Care Quality Assurance*, Vol. 25 No 4, pp. 254-273.
- [3] Desai. T. N and Shrivastava. R. L, (2008), "Six Sigma-A New Direction To Quality And Productivity Management", *The World Congress On Engineering And Computer Science*, pp. 22-24.
- [4] Haque. A, (2004), "Perception Of WAP Towards Malaysian Customer Perspective", *Asian Journal Of Information Technology*, Vol. 3 No. 2, pp. 82-87.
- [5] Herson. P, Nitecki. D.A and Ahmad. E, (1999), *Service Quality And Customer Satisfaction: An Assessment And Future Directions*", *The Journal Of Academic Librarianship*, Vol. 25, pp. 9-17.
- [6] Keller. P, (2011), " Six Sigma Demystified", New York: McGraw-Hill.
- [7] Kumi. S and Morrow. J, (2006), "Improving Self Services The Six Sigma Way At Newcastle University Library", *Electronic Library And Information System*, Vol. 40 No. 2, pp. 123-136.
- [8] MAMPU, (2009), " Laporan Analisis Kajian Kepuasan Pelanggan Mampu 2009", (Online), Available: <http://www.mampu.gov.my/pdf/analisa/laporan.pdf>, April 2013.
- [9] Mustafa. Z, (2007), "Pengelasan Atribut Kualiti Bagi Meningkatkan Kepuasan Pelanggan", *Jurnal Pengukuran Kualiti Dan Analisis*, Vol. 3 No. 1, pp. 149-159 .
- [10] Ramli. N, Fun. C. S and Idris. F, (2009), "Kajian Pelanggan Terhadap Perkhidmatan Perpustakaan Universiti Awam Di Malaysia", *Journal Of Management*, Vol. 28, pp. 23-43.
- [11] Saludin. M. N and Kian. T. P, (2010), "The Importance Of Customer Satisfaction And Customer Complaint Towards A Better Quality Service Using Six Sigma: An Academic Perspective", *Jurnal Teknologi*, Vol. 53 (Sains Sosial), pp. 107-126.

- [12] Shwail. L and Yong. C. D, (2003), “ Six Sigma In Health Care”, International Journal Of Health Care Quality Assurance Incorporating Leadership In Health Services.
- [13] Taner. M.T and Sezen. B, (2007), “ An Overview Of Six Sigma Application In Healthcare Industry, International Journal Of Health Care Quality Assurance, Vol. 20 No 4, pp. 254-273.
- [14] Yaakob. A. R. (2007), “Mengenali Tahap Kepuasan Pelajar Terhadap Kemudahan Dan Perkhidmatan Yang Disediakan Di Pusat Sumber Politeknik Tuanku Syed Sirajuddin”, Perlis: Politeknik Syed Sirajuddin.