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LSS DMAIC Application in Cutting Waste of Time in Examination Management

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Abstract

The Malaysian Ministry of Education's Education Transformation Plan had directly change the current Vocational School evaluation and assessment system. These changes had directly impacted the function of the Evaluation & Assessments Committee. The changes in SOPs, had given a great impact on the time management of the committee. The factors and defects will be discussed further in this journal. The purpose of this study is to find explore the factors which may affect the Evaluations & Assessments Committee to perform with the lowest number of defects by using the Lean Six Sigma (LSS) DMAIC tools. The LSS DMAIC methodology was applied to reduce the waste of time in examination management. This project is targeted to benefit all of the education sectors which apply the same feature such as the vocational colleges.

Keyword: Lean Six Sigma, DMAIC methodology, lean operation; Defect reduction, Examination.

1. Introduction

In 2012, the Malaysian Ministry of Education in its Education Transformation Plan, had initiated the transformation of 15 Vocational Schools into Vocational Colleges. This initiative was to meet the demands for technical support workforce in the private and government sector.

This transition will directly affect the way the students are assessed. The previous curriculum specification requires students to sit for internal examinations and one centralized examination called Sijil Pelajaran Malaysia (SPM) at the end of their two year study. For the new college the students will be assessed continuously through their coursework and an exam at the end of every semester / term. Their studies will assess for a period of 4years, which there will be 8 semesters / terms and a number of short semesters / terms in between.

These changes directly affect the function of the Evaluations & Assessments committee (EAC) in whole. The EAC is an independent committee formed in each school or college to cater the coordination of all examination concerned affairs. Previously the EAC's function is to coordinate the internal examination affairs. The current EAC's function will involved the

coordination of the continuous assessments, semester examinations and arrangements with the Lembaga Peperiksaan Malaysia (LPM).

The changes in job description will definitely require a different set of Standard Operating Procedures (SOPs). The Panduan Pengurusan Pusat Pentaksiran Kolej Vokasional (KPM, 2012), had clearly state the job description of all respective parties involved in this matter.

In this particular study, the discussion will revolve around the matter of applying LSS DMAIC tool and techniques to cater the waste of time and time management of handling the examination papers after the marking process has been completed till the marks presented to the LPM for further processing. This matter, cause and effects will be discussed later in this journal.

2. Literature Review

In the recent time, lean integrated with six sigma initiatives has been a focused agenda among the academicians and practitioners in the field of quality and continuous improvement in which this initiative combines the advantages of each to help the organization to reduce cost, reduce waiting time, increase the activity of continuous improvement and also gain business performance (Habidin, 2012; Habidin et al., 2015a; Habidin et al., 2016). This is because, lean strategy not only plays an important role in eliminating waste and non-value added activities throughout the organization, but also through six sigma statistical tools and techniques, they increase the organization's ability to use and to analyze data in business processes and performance.

LSS DMAIC is the core methodology used in Lean Six Sigma; both at the executive decision-making level, and within each LSS project (Habidin and Yusof, 2012; Habidin et al., 2012; Habidin and Yuosf, 2013; Kemp, 2013; Habidin et al., 2014). LSS DMAIC acronym stands for Define, Measure, Analyze, Improve and Control. The processes are implemented accordingly, in order to improve quality of services, such as fewer defects, lower expenses or costs and improved business operation performance (Habidin et al., 2015b). According to Dale et al. (2007), LSS DMAIC phases are defined as follows:

a. Define – process that involves defining the team's role, project scope and boundary, customer requirements and expectations and the goals of selected project.
b. Measure – selecting the measurement factors to be improved and providing a structure to evaluate current performance as well assessing, comparing and monitoring subsequent improvements and their capability.
c. Analyze – determining the root cause of problems, understanding why defects have taken place as well as comparing and prioritising opportunities for advance betterment.
d. Improve – the use of experimentation and statistic techniques to generate possible improvements to reduce the amount of quality problems and / or defects.
e. Control – ensure that the improvements are sustained and that ongoing performance is monitored. Process improvements are also documented and institutionalised.

3. Discussion

In order to discuss this matter in detail, let's use the LSS DMAIC approach to identify the root and cause which affect the quality of service provided by the EAC as the intermediate party between the college and the LPM. The followings are the main steps and cycle required in the process:

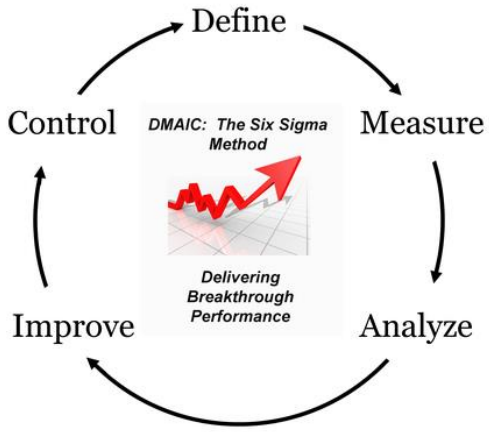

Figure 1 *LSS DMAIC methodology*

Step 1 Define the problem

The main problem faced by the EAC is meeting the due dates set by the LPM for the results of the continuous assessment, the final theory assessment and the practical assessments. The current system requires all of the continuous assessments' results be sent to the LPM not later than a week before the actual final examination. While the final theory and practical assessment within three days after the assessment held, separately. The transition of the old system to the current system requires the involvement of various parties, such as, examiners and the EAC.

At the same time, the EAC needs to maintain its credibility and integrity as an unbiased and an exclusive committee within the college administration itself. The EAC needs to establish a Quality Assurance Team (QAT) in order to continuously improve and maintain the service quality of the committee and the LPM. In order for the QAT members to further understand and gain a bigger picture on the task at hand Figure 2 will be provided to the team. This will further enhance specifically to the problem.

Step 2 Measure the current process

In this phase, the QAT will prepare the analysis on the major defects involved and requires immediate attention in order to cut down the wastage in time. Based on the finding, the major defects are as follows, late or delay in marking students' scripts (Late Marking), wrong form used or wrong students list (Improper Documentation), wrong information of datelines (Wrong Information) and mistakenly key in marks in students' list (Data Entry Mistake).

In the next step, using the Statistics Package for the Social Science (SPSS) software, all information on major defects occurrences are listed in an orderly form in the database. The

data are then analyzed by using the Pareto Charts under the Quality Control submenu. The data are then represented in the form of the following chart.

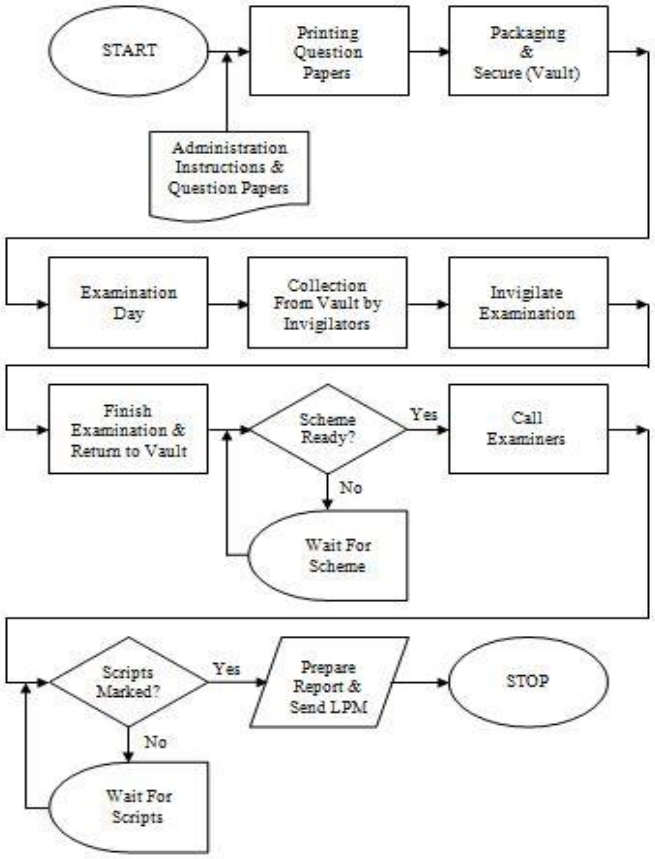

Figure 2 *EAC Flowchart*

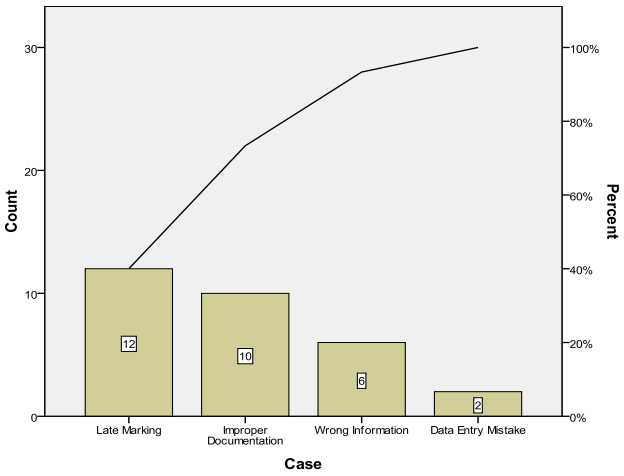

Figure 3 *Pareto Chart (Before Solution)*

According to the chart, the QAT finds that the main defect was caused by late marking. The QAT will now prioritise and focus its attention in order to reduce the defects caused.

Step 3 Analyze the cause of the problem

In this stage, the QAT will review the flowchart and find the main causes or probable causes that contributed to the defect. After long discussion and brainstorming sessions, the QAT finally summarised the following are the causes contributed to the problem.

No proper briefings were done to establish the severity of all of the processes involved. A proper briefing is required prior to the examination week. This is very important to properly brief all the respective parties involved on the flow of all of the processes and due dates concerned.

Step 4 Improve and implement the solution

After determining the causes involved, the QAT again trough a brainstorming and suggestion method, provided the following solutions to be implemented:

a. A log book on time of each action been taken by respective parties. Signed when collecting or surrendering documents to the EAC Vault.
b. A list of head examiners involved with the marking process inclusive with individual contact number.
c. A briefing before the examination week, explaining all the respective parties function, SOPs and important dates.
d. A time frame of T+2 (date of examination plus two days) given to the examiners to produce the marked scripts and fill up the students' final marks list to the EAC in the form of e-mail.

After implementing the solutions on the problem, the QAT found out that the total number of defects decreased as much as 76.67% compared to the previous analysis. However, the QAT felt that the rate could decrease at a greater scale in the next cycle of solution implementation. As a comparison the following chart displays the number of defects after the solutions were implemented.

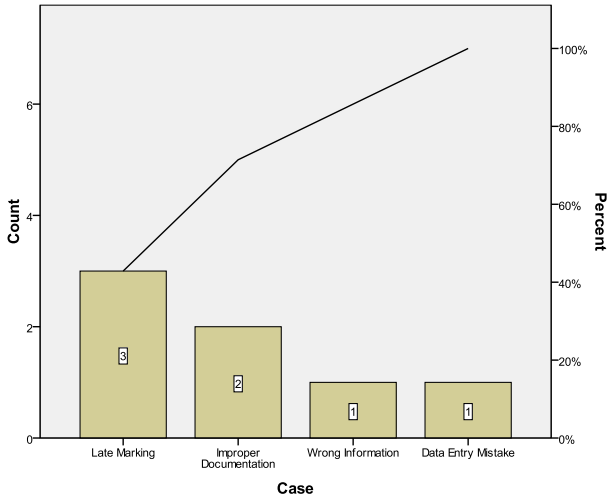

Figure 4 *Pareto Chart (After Solution)*

Step 5 Control and maintain the solution

A periodically scheduled monitoring is required in order to maintain the defects at a very minimum level. The QAT decided that their target will be zero defects. This might seem to be ridiculous, but a standard should be set in order to maintain the continuous improvement measures. This cycle does not end here. After this stage, the QAT should review their findings in order to find out any other defects in various processes involved.

4. Recommendation

As the result, the QAT found out that the EAC could perform better by continuous improvement being done periodically. It is clear that the application helped to cut down the number of defects and hence decrease the number of wastage in time management. This will in the future be continued and maintained to ensure the all defects are set to a minimum number or even to a level of zero defects. It is recommended that the application of LSS DMAIC be further made available thru trainings nationwide.

5. Conclusion

To others, the application of LSS DMAIC in this particular case might not be significant, but after understanding the bases of the application, this could generate a better understanding for the public on the importance of LSS DMAIC in daily life situation. I personally recommend that a further study being done in a bigger population, in order to get a clearer picture on the effectiveness of LSS DMAIC tools in school based problem.

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After the main body of paper please insert acknowledgement of all those (personals or institutions) that have helped in conducting this study.

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