LEAN Process in Producing Training Materials

Kolej Kemahiran Tinggi MARA Petaling Jaya (KKTMPJ) was established in 1972. It was formerly known as Institut Kemahiran MARA, Petaling Jaya. Prior to this, courses offered were tailoring and fashion design. Electronic course started in 1986 where courses such as Industrial Electronics and Electronics Instrument were introduced. In 1995, IKM Petaling Jaya started to run the Higher National Diploma (HND) in Electronics through a joint venture twinning programme with the United Kingdom.

IKM Petaling Jaya changed its name to Kolej Kemahiran Tinggi MARA (KKTM) Petaling Jaya in 2005 to the present day and only offers QCF BTEC level 5 HND Diploma in Electronic Engineering (QCF) programme. The programme was recognised by the Recognition of Qualification in England and was awarded with a grade A by PEARSON International United Kingdom.

The programme aims to prepare graduates with a command of engineering knowledge and hands-on skills required to undertake supervision of a team and troubleshooting in both operation and maintenance within the industrial context as well as the potential to be entrepreneurs in the technical field.

Minimising time spent on collecting of teaching materials

In KKTMPJ, teaching plays an in integral part of a lecturer's life. Gone are the days of theoretical and experimental approach in the teaching line. The change from traditional to online system is needed to provide high impact deliverables to their staff. Unlike in traditional teaching methods, before class time, lecturers are required to prepare teaching materials for students and they also have to do manual clerical jobs. This is a waste of time taken for obtaining teaching materials.

In the past practices, process of producing training materials started from filling up request forms to obtaining approvals from directors. The approvals were then submitted to the clerks for materials preparation which required 485 minutes of time taken. The final step of delivering the materials to the respective lecturers took about 485 minutes. It was found that technicians took 26 minutes of total cycle time to produce materials and 960 minutes of total delay time before lecturers had obtained their teaching materials. This contributed 986 minutes of total lead time. Thus, all these wastages gave rise to the low performance of Process Efficiency ratio to 2.6 percent.

Online application of LEAN Initiative

LEAN approach has open more doors of opportunities in the teaching line and LEAN thinking management is highly recognised as

a standard practice in any organisation. Thus, LEAN management activities are incorporated within KKTMPJ.

A dedicated LEAN team had studied on the possibilities of eliminating wastages that arose from the starting point of requesting training materials up to the delivery using the Spaghetti diagram approach. Their aims were to shorten the waiting time and to speed up the delivery of training materials to lecturers. Brainstorming sessions were conducted to generate creative ideas for improvement. There are five Kaizen initiatives introduced to foster the process of producing and delivering the training materials as shown below:

KAIZEN THEME	KAIZEN IMPROVEMENT
To shorten waiting time	1. Developed online Sub Store Operation System to upgrade manual procedure on filling up application form. 2. Unnecessary approvals from directors are not required to eliminate time wastage of about 485 minutes in waiting time. 3. Need approvals from the administrative officer in charge only.
To reduce delay time in delivery	4. Applicants able to find out training materials in the store from the online Sub Store Operation system before submitting their applications. 5. Applicants could check the progress via the online system and would only pick required materials once ready.

Analysis of LEAN project in KKTMPJ

Enhancement on producing training materials in KKTMPJ is necessary to improve the overall percentage of educational excellence. Many improvements have been achieved by KKTMPJ in their cycle time of collecting materials.

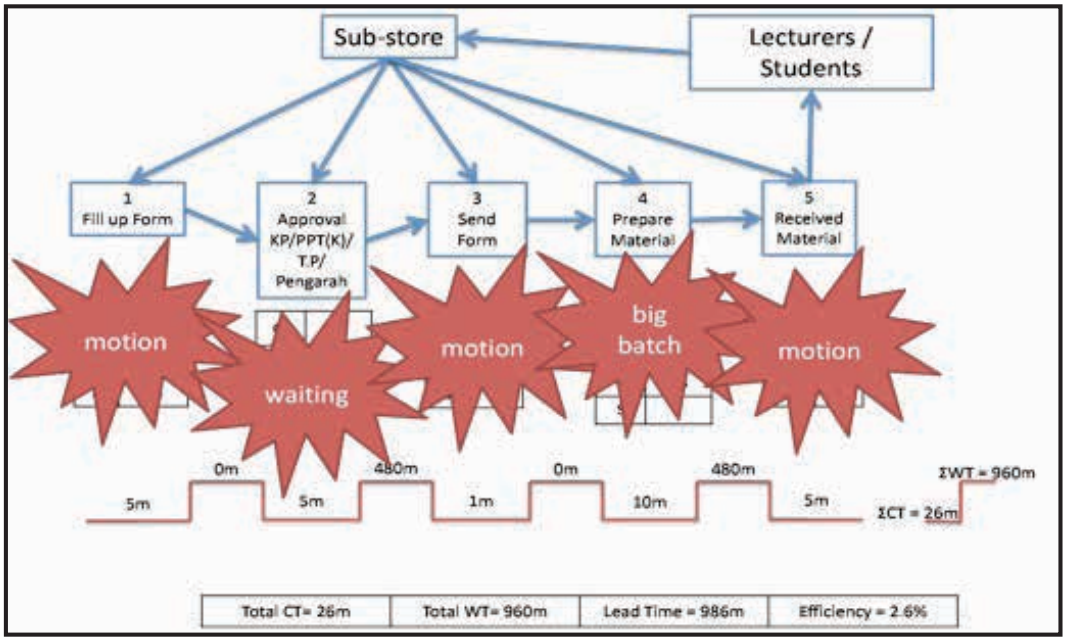
It is noted that the total cycle time took 26 minutes before LEAN usage and 20 minutes of improved time in producing teaching materials. The total delay time of obtaining training materials improves from 960 minutes to 240 minutes. Thus, the lead time taken has improved from 986 minutes to 260 minutes simultaneously. Lecturers save six minutes of cycle time, 720 minutes (75 percent) of delay time and 726 minutes (75 percent) of lead time in obtaining the materials.

From the table below, it is noted that there is a reduction in the number of workers from four to two. The remaining two workers could be assigned to perform other skilled activities and focus on value added tasks. The overall performance of LEAN initiatives has created positive impact to KKTMPJ process. Lecturers are able to focus more on teaching students to meet KKTMPJ expectations. From these initiatives, KKTMPJ are able to produce highly skilled workers.

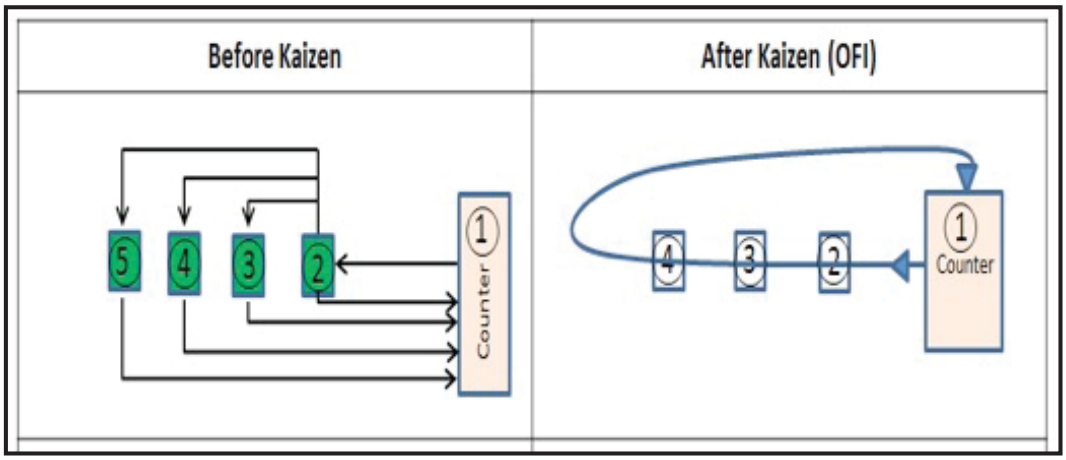
Matrix before and after LEAN project:

DESCRIPTION	BEFORE	AFTER
1. Total cycle time (minutes)	26	20
2. Total delay time (minutes)	960	240
3. Lead time (minutes)	986	260
4. Number of processes	5	4
5. Number of workers	4	2

Visual Stream Mapping 'before' LEAN implementation



Comparison of distance 'before' and 'after' Kaizen



1. Submission of application forms manually
2. Forms handed to director needing approval
3. For clerical records, the forms were submitted to staff in charge
4. Materials preparation
5. Collection of training materials

1. Submission of applications through online sub store operation system
2. The applications are then approved by administrative officers in charge
3. Materials preparation
4. Collection of training materials