Diploma in

Managing Quality in Higher Education

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LEAN TOOLS FOR HIGHER EDUCATION

Most educators view teaching and learning as the most critical activities in colleges or universities. However, these activities are largely driven by financial realities and budgetary considerations. Educational programmes cost money. Therefore, sound funding and competent budgeting are necessary to operate a school. "Without good budgets, there are no schools". Because sources of funds are finite while educational needs are infinite, prioritisation of programs often becomes necessary.

It is a basic process in educational institutions to align anticipated revenue sources with planned expenditures. If revenues are inadequate, programs may need to be scaled back. Thus, static or declining revenues are a dreaded event in these institutions. Poor economies, enrollment losses, and a host of other reasons can impact institutional revenue. Thus, there is an urgent need to devise methods to balance the budget. Either additional sources of revenue must be found or planned expenditures reduced. Unfortunately, the most common response to budgetary shortfalls is reduction in personnel because they comprise a sizable chunk of the institutional budget. While in some cases there may be a basis (e.g., redundant personnel) for such an action, there are areas that can be explored to achieve real savings. A major way to cut costs would be to improve the efficiency of colleges or universities by addressing the issue of waste.

WASTE IN EDUCATIONAL INSTITUTIONS

Waste is "anything in the process that does not add value for the customer". Because educational work is a process, waste can come from many areas within this process. Educational institutions, therefore, should focus on the continual reduction of waste. Some things to consider when looking for waste are:

Inventory

Unnecessary build-up of inventory like office and food supplies costs money in terms of storage and carrying of overstocked, obsolete, or incorrect items. Excess funds tied up in inventory are funds that cannot be put into productive use somewhere else in the system.

Defects

Defects in schools can take the form of corrections, adjustments, or inaccurate or incomplete information, which can lead to scrap or rework. They lead to lost revenue, reduced process cycle time, and overproduction of the product or service. They waste labour and generate more paperwork to document the errors and actions done to correct them. Examples are missing or incomplete information on student application forms, registration forms, petition forms, financial forms, and other forms used by administrators, faculty, and staff.

Overproduction

The waste of overproduction is probably the most serious and one that costs the organisation the most in terms of time and dollars. This occurs when schools, divisions, departments, or units make "more of something earlier or faster than the next process needs it". One place where this waste can occur is the college cafeteria when they prepare more food than can be consumed during a given day. Administrative and academic offices also overproduce when they request more supplies than are actually needed for day-to-day usage. Overproduction then leads to waste of building to inventory.

Motion

The waste of motion occurs when non-value-added unproductive steps exist in a process. It generally adds labour costs to the provision of services in schools. An example of motion waste would be unnecessary walking from one point of the campus to another point due to poor design and layout of the buildings and the campus as a whole.

Waiting

Waiting to a certain extent can be considered a type of waste. It includes waiting for a decision on an enrollment application, waiting to see a financial or academic advisor, waiting for approval of a petition, waiting on a checkout line in the cafeteria or in the bookstore, and many other examples.

Transportation

In education, waste can show up when moving people, equipment, materials, and information around the campus.

Processing

Processing waste is caused by either the excess of or lack of people, materials, equipment, and other resources needed to facilitate teaching and learning in the campus. Doing more than is required from the point of view of the customer is wasteful. An example of over processing is requiring multiple signatures on a work order, on a hire order, or on an academic petition form. Under-utilising employees by failing to tap into their education, knowledge, and expertise also poses a serious waste for the institution.

Many of the process activities within any educational institution can be evaluated for waste affecting time, costs, and materials. Waste, in its various forms, can be identified, minimised or eliminated altogether by using lean techniques originally employed in manufacturing but can be applied to services like higher education.

THE PHILOSOPHY OF LEAN

Lean is based on the philosophical view of waste reduction. This view states that anything in the process that does not add value to the customer should be removed. Thus, the basic meaning of lean is the absence of waste. Its ultimate goal is to achieve the highest quality at the lowest cost. As waste increases cost without adding value, it should be the key target for elimination. Educational work, however, is mainly knowledge work because a significant component of the workforce is primarily engaged in the task of managing information. Consequently, waste is much harder to see. Waste can be dealt with indirectly by increasing value added work in schools and by reducing incidental or non-value-added work.

Adding value is the fundamental belief that individuals and organizations exist to create value for society through their interaction with suppliers, customers, employees, stockholders and communities. It is also the ongoing effort to fully align purpose, strategy and people around the transforming nature of serving others.[233]

Lean also focuses on creating flow by identifying the most effective and efficient way of moving tangibles (products and services) as well as intangibles (information and knowledge). Employees must work together to identify and meet their customers' needs. For this to happen, leaders must be able to match the expertise of their workers to the tasks at hand, to build and nurture shared values among them, and to help them grow and develop.
Lean allows each person in the organisation to reach his or her full potential by striving for the best possible personal performance and by engaging in the process of continuous learning.

The philosophy of lean is founded on a number of principles. The first principle is that it is the customer who determines what is of value to him or her. Then those activities that do not add value to the process of satisfying the customer are removed or reduced. These have the effect of improving the speed of the process. As the process gets more streamlined, it naturally results in "less waste, less cost, less work in process (WIP), less complexity, higher quality and happier customers". The lean philosophy asserts that the people closest to the work are the ones who know it best and are therefore best qualified to improve it. However, they first need training in the techniques of problem solving and lean. Empowering workers to engage in lean helps to develop internal knowledge and skill base needed to sustain waste reduction efforts in the institution.

LEAN TOOLS

The lean institution needs to evaluate the different areas of waste described above and reduce or eliminate them to become more efficient in its provision of educational services. The approach to take is to eliminate the waste through good housekeeping and then to standardise the process steps. Some of the strategies that an institution can use to operate more efficiently and cost-effectively are described below:

5S. The five S's are derived from the following Japanese words: *seiri* – organise and get rid of unnecessary files, forms, tools, or other materials; *seiton* – straighten offices and work areas; *seiso* – clean work areas and equipment to eliminate dirt that can obscure problems; *seiketsu* – standardize locations of tools, files, equipment, and other materials using color coding or labels; *shetsuke* – maintain discipline in the first four S's. The five S's are sometimes referred to as the five steps of house cleaning. Places in the college or university that can greatly benefit from 5S are storage rooms or supply rooms found in almost all buildings on campus.

Mistake-Proofing

Mistake-proofing an institution's service process requires determining when and where errors generally occur and identifying their root causes. The final step is devising ways to prevent these errors from occurring. Mistake-proofing must account for the activities of the service provider as well as those of the service recipients. Mistake proofing can be used to prevent errors that arise in the performance of a task. For example, during student registration, a computer prompt prevents a student to go further in the process unless he or she completes certain required steps.

A computer prompt will also prevent a student from registering for a course that he or she is not qualified to take. Mistake-proofing can also be used in preventing errors that arise in the contact between the server and the customer. For example, a method that has been used by banks and which can be used by schools is encouraging service providers to maintain eye contact with customers by requiring them to record the customer's eye color on a checklist during the course of the transaction. Another example is giving servers cues on when to smile during a transaction and to observe whether the customer smiled back. Another way to prevent errors would be to focus on the physical elements of the service. An example of this would be to color code or properly label (e.g. using a bar code) student application packets to indicate clearly where they are in the process and whether additional information is needed from the student.

Mistake-proofing can be employed to prevent customer errors in preparation, during an encounter, and during the problem resolution stage. For example, it helps to provide students a list of items (e.g. update personal information; getting holds lifted) that they need to complete first before they approach their advisors for class registration. This reduces the amount of time that is needed at the advisor's office to complete the online registration process. Automatic flushing devices in restrooms help keep the urinals or the toilets bowls washed after every use. A device used to shut off office or classroom lights after a designated number of minutes helps to conserve power after occupants leave their offices or when the last student leaves the classroom. Error prevention can also take the form of survey cards or follow-up calls on customers especially in major service centers (e.g., admissions office, records office, student finance office, personnel office, cafeteria, dean's office, book store, dormitories, etc.) of the institution to obtain information that will inform service providers of possible service inadequacies so that these can be addressed quickly and appropriately.

Value Stream Mapping

A value stream map is created to document the flow of resources from the supplier to the institution and ultimately to the final service recipients. The goal is to demonstrate how activities, materials, and information are interconnected. Value stream mapping requires flowcharting processes to determine where customer value is created and to identify non-value-added process steps, which contribute to waste.

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Student initially meets with academic
advisor and gathers supporting
documents.                                      ←  Waiting time

Student fills out form and attaches
supporting documents.                           ←  Scheduling and waiting time

Obtains recommendation and
signature from academic advisor                 ←  Scheduling and waiting time

Obtains recommendation and
signature from department chair                 ←  Scheduling and waiting time

Obtains approval and signature
from academic dean                              ←  Waiting time

Approved petition sent to
Records Office for filling                      ←  Waiting time

Copies of approved petition sent to
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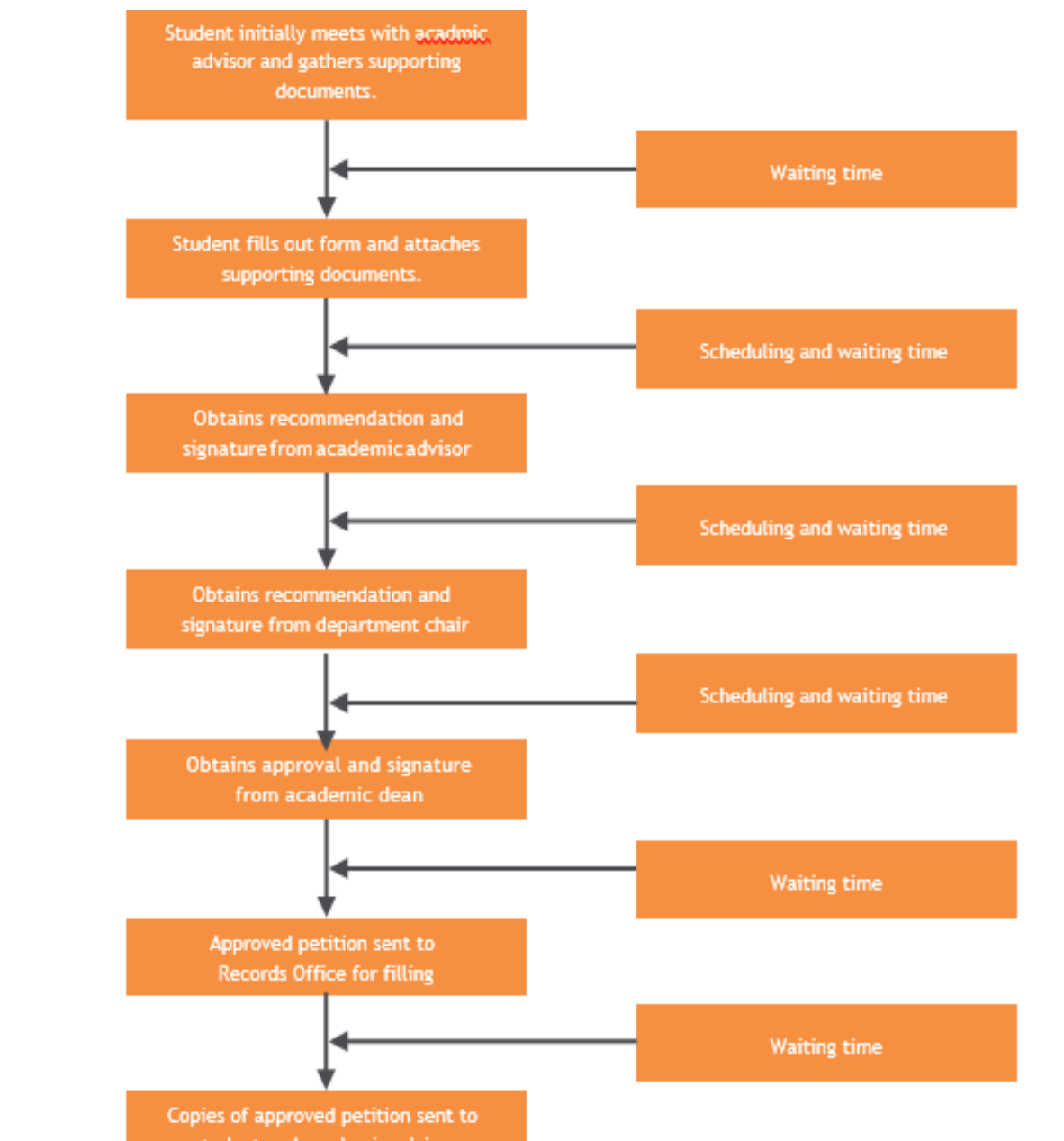
Figure 8.1 depicts some of the steps a student must go through to have his academic petition (e.g., transfer of credit from another school, permission to take a course, petition to attend another school, etc.) approved and recorded. Scheduling and waiting time do not add value to the process and should be reduced to a minimum as much possible. They make the process very lengthy which contribute to increased dissatisfaction on the part of the student. The process can be streamlined by eliminating unnecessary steps (e.g., too many signatures required) like obtaining one approval signature instead of three.

Quick Changeover

This is the ability to convert something very rapidly. This tool can be used in areas such as classrooms. Typically, schools allocate about ten to fifteen minutes between the time a class ends and another begins. It usually takes time for a teacher to pack up his or her belongings and teaching equipment (e.g. personal computer) after class and for another teacher to set up his or her equipment to prepare for the next class. Being able to prepare a classroom from one class to another in a short time allows teachers to devote more time towards actual teaching of their classes. This may require installation of ready-to-use computers and accessories in every classroom so teachers do not need to take their own computers, cables, and remotes whenever they go to their respective classes.

Self-Inspection

All workers are responsible for their own work and perform needed inspections at each stage of the process making sure that no errors are passed along to the next stage. Identifying and correcting errors early in the process costs much less than when they are discovered and corrected at later stages. Of course, this is possible only when administration trusts and trains its workers properly.

Total Productive Maintenance

Also known as preventive maintenance, total productive maintenance is designed to make sure that equipment and machines are operational and available when needed. The philosophy behind preventive maintenance is that "the worst condition a machine should ever be in is on the day you purchase the machine". If equipment is maintained very well, it can actually improve with age. While major maintenance and unscheduled repairs are still done by trained technicians, people who operate the machinery are the ones who perform regular cleaning, lubrication, and light maintenance.

Kaizen

Kaizen is the Japanese word for continuous improvement. Kaizen improvements can be categorized as either innovations or incremental improvements. Innovations are new ways of doing things using new approaches or new machinery. Incremental improvements are small positive changes made to the existing condition and implemented by the school over a long period of time. Kaizen uses Shewhart's plan-do-check-act (PDCA) approach to problem solving.

The PDCA approach is used to identify areas of improvement in the process and then to develop and implement action plans to improve them. The results are then verified to determine whether or not these improvements should become a permanent part of the process. After the cycle is completed, it begins again. To make lean work, different sub-components of the school must get to the root causes of the problems and permanently remove them. The kaizen journey never ends because institutional and market conditions continuously change.

Teamwork Environment

A team consists of two or more people working together in a common purpose. Well-led teams often lead to improved employee morale. Teamwork is an essential component of continuous improvement in lean environments. Using quality improvement teams, workers identify sources of waste or non-value-added activities using quality tools and find ways to eliminate them. This human side of lean is critical because educational institutions in most cases deal with the hearts and minds of students who must be transformed not only into knowledgeable workers but also into responsible citizens of society.

MAKING LEAN WORK IN HIGHER EDUCATION

Budgetary issues will probably dominate any decision process in schools in the foreseeable future. Finding sources of additional revenue will continue to be a challenge, therefore educational institutions will be compelled to do more with less. Under the best conditions, the preferred way to cut costs would be to improve the efficiency of their operation. This is where lean ideas become valuable. The application of lean techniques will be a start in improving the effectiveness of institutions in achieving their mission. 5S is probably one of the first tools that all institutions can use to organise their storage or supply rooms, followed by value stream mapping to streamline their processes to eliminate non-value- added activities. Other lean tools described above can also be employed. Administrators and supervisors must ensure that everyone involved in a work area is informed about upcoming lean projects and that some if not all of them are invited as members of the team. School leaders must never underestimate the value of communication as they manage change in the organisation. They must help their workers understand why change is needed and how it is going to affect them. If the leadership allows workers who are closest to the work to be involved in the change process, the final output will be better.

By focusing on value (waste reduction) and people, lean will help workers to understand their central role in the organisation's success making it easier for them to support the overall goals of the institution. A problem-solving mindset pervades the whole organisation as processes are improved and aligned with the overall mission of the institution. The key is to sustain the change process and use lean techniques so that waste elimination and quality improvement become the normal way of doing business. This integral step requires the involvement of all workers in the school. This also compels top administration to participate regularly and visibly in the implementation process and to provide guidance.

Quality improvement occurs as a job is repeated for it is true that "the more you do something, the better you become at doing it"[237]. It is learning that allows lean activities to produce extraordinary results in organisations. Educational institutions and people in them must learn how to learn before undertaking improvement activities in their campuses. In the long run, superior performance depends on superior learning.[238] Profound organisational learning takes place as the entire workforce discovers the causes of wastes (errors, defects, and other non-value-added activities) in schools. Once the causes of wastes are discovered, systems are then put in place to reduce them or to eliminate them altogether. The changes made are documented and communicated to the rest of the organisation so that individual and organisational learning occurs. It is important for institutional administrators to actively share best practices and knowledge about improvements with other parts of the institution. If knowledge is not widely shared, it can easily be lost. This is perhaps one of the major reasons many college-based improvement initiatives fail.