Applying Lean Thinking to Higher Education – A Strategy for Academic Excellence

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ABSTRACT *The Higher Education Sector in India is undergoing a great revolution. This is reflected by the fact that despite of an economic slowdown, the 2013-2014 budgets has proposed and increased spending by 17 percent in higher education. This pinpoints the need for new reforms in the Education Sector in areas of Education quality, affordability and accessibility. Applying Lean Thinking to Higher Education relates to application in both areas of Academic and Non -Academic activities. In lean terminology, any product not meeting customer expectations is considered defective and has to be re-worked to conform to requirements. This paper discusses the Lean thinking scenario with respect to Higher Education and the wastes which are indispensable part of various existing Information flow processes. It also discusses the outcome of applying the Lean Thinking Concept to a small academic process by building and analyzing process maps, identifying the value add and non-value add activities, and explaining the role of Faculty, Student and Industry.*

Introduction

Lean management can be applied to various aspects of academic research and related work despite the high level of variability and unpredictability in the research process overall. Integrating Lean into research-intensive activities remains a new frontier for the Education sector. The Higher Education in India is under a revolution in the present economies. There is an exigent need for appropriate measures and actions to be deployed in the Education Sector in areas of Education quality, affordability and accessibility. This is in synchronization with the views expressed by the Indian Prime Minister recently, who is in favour of developing World Class Universities in India and revamping the Educational processes. The Education processes' comprise Teaching and Learning, Research and Development, Curriculum Development, Trainings and Placements, Program and Courses Administration, Examination and Result, Award of Degrees/Diplomas, etc.

Indian universities lack far behind in competing with global universities despite the fact that India has a huge population of Private and State run universities and schools. Several factors contribute to this conclusion including disparity between rural and urban education, graduates with poor employability skills , economic slowdown ,a tough job market among several others. A recent survey by the Associated Chambers of Commerce and Industry of India (ASSOCHAM) states that over 180 management colleges had closed down in 2012, and barely 10 per cent of the students graduating from these colleges were found employable. According to a study conducted by the NAAC in 2010, over 90 percent of colleges and 62 percent of universities were average or below average. Is it feasible by proper amendments in the HE model to improve quality or is it by investment or both, in harmony with each other. All the efforts should lead to recreating the Higher Education model with the all the diverse objectives converging to the basic goal of developing employable youth, revive the higher education in the country and improve its overall quality.

The 21st century has brought the HE scenario in the desired limelight. This can be interpreted by the fact that expenditure on Higher education has increased substantially during the 11th Five Year Plan (2007-2012) and this has continued **for the 12th Plan (2012-2017) as well. This year, despite of an economic slowdown, the 2013-2014 budget has** proposed and increased spending **by 17 percent in higher education. Along with these a series of new initiatives and reforms** have been proposed and floated. In lean terminology, any product not meeting customer expectations is considered defective and has to be re-worked to conform to requirements. Mapping this concept in education it seems that new workforce is being generated without the appropriate knowledge and skills, who do not meet industry (customer) requirements. Thus there is an urgent requirement to "re-work" them so that they become useful and contribute to the nation's development. From the discussion above we can conclude that some educational institutions are conceivably delivering "defective" products by discharging under-prepared graduates into the workforce.

In terms of Higher Education Environment, we find that there are lots of wastes analogous to wastes defined in terms of lean by Toyota Production System. These wastes form an indispensable part of various Information flow processes in Education system such as Admissions, Teaching and Learning, Placements, Research and Development, Strategic Planning, Administrative Procedures etc. Toyota has identified seven types of wastes namely, Over-Production, Waiting time, Transport, Process, Inventory, Motion and Defectives. These can be adapted to a HE scenario in following categories:

Table I

Over-processing or incorrect processing	People in the process are not empowered for their tasks and hence not sure of the capacity desired and required also it can be in form of Information redundancy, manipulations, modifications which are not required.
Talent	Not utilizing the potential and core competencies of students and employees and engaging them in non-productive tasks
Motion	Disorganised structure leads to unavoidable searching efforts and movement
Time	Waiting time, where information is either not available or available only in a form which is not in proper context i.e. non-actionable and leads to delay
Process	Extra or unnecessary steps, reviews, approvals, and Requirements which lead to Information overloading.
Assets	Extra physical resources or Information Overload

Knowledge	Poor Knowledge Management effort lead to Re-Creation of all the existing knowledge which exists. People usually act in silos as they do not disclose information and consider it to be their prized possession.
Defects	these offers due to imperfections or poor efficiency, and need to be worked upon or improved again. These are shrouded and blame game persists due to lack of ownership and delegation

(source: The 9 wastes in Education, Lean Education Enterprises, Inc.)

Eliminating the wastes, respecting the human workforce and Continuous improvement efforts are the key principles to go Lean. These could be practiced by 1) refining the systems, such that re-work is not required and desired information is available, 2) training the academic and non-academic workforce so that they practice lean thinking and imbibe them in their methods and procedures and 3) collaborate with peers to develop iterative procedures for continuous improvement in Education system procedures and finally 4) and most importantly training our students in Lean principles and practices. Students are the future and their understanding of the lean terminology such as waste, value stream mapping, kaizen, respect for people, balance, etc., would lead to better lean practices by them in the future. Another idea that comes is that we can also consider KM implementation which up to an extent facilitates an organization turning Lean. After studying the KM implementation approaches in various organizations, it was found that results have been very positive in organizations that have started to implement Knowledge Management techniques. Research information and best practices are shared, experts are identified and cost savings are realized as employees spend less time locating or reinventing knowledge and more time being productive. Overall, these organizations are more competitive and more effective as they integrate Knowledge Management practices into the structure of their organization - they realize higher value from the assets and capital they have used to obtain knowledge (Sinha,P.,etal, 2012). So endeavors of Practicing Knowledge Management techniques in Higher Education can also help them become lean.

From being a faculty myself I have observed, that teaching people the "least-waste way" to think, behave, and work are not yet highly regarded by accreditation bodies. Also, the stakeholder demand in Higher Education for Lean education Practices is weak at the present time, mainly because the need, understanding, and the benefits are not foreseen. But there also exists a need among faculty and staff for improvement in the Academic activities such as formation and delivery of programs and non-academic activities such as Institute administration, student services etc. But these concepts and thoughts need to be transformed into an action plan. According to Emiliani, B.(2004,2005), People who identify the need for Lean, have a desire to participate in drive for continual improvement of academic and non-academic tasks .This will lead to holistic development of the Institution and differentiate it from the rest. For implementing Lean in an academic setup, we need to first notice that value-added activity is something that adds value to a product or service and is valued by a customer and waste, is the opposite of value-added task in a process and comprises of the non-value adding activities. Identifying the waste/ muda (Toyota Process System) is a critical first step in the Lean journey. Focusing on the key principles practiced by Toyota production system study from HBR article "Decoding the DNA of the Toyota production system" (Spear and Bowen, 1999).

We have to study any Education process or activity keeping three issues as main focus, Refer Figure I.
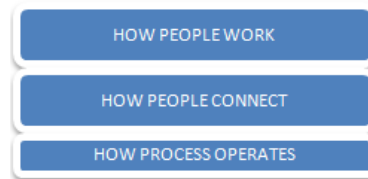

Figure I: Key Issues to consider for going Lean

- How people work – This highlights the significant features of the work people undertake in terms of its content, sequence, timing and outcome. The non-adherence will be observable and actionable.
- How people connect – This would highlight the sequence of activities, and the flow of information.
- How process operates – This would highlight the actual execution of tasks.

Lean in Higher Education

As we know that Education is a service organization with the supply and demand for Information that is useful and actionable. Hence the concerns here relate to availability and flow of information, the sources of information, the barriers that may exist, then the future consequences of Information sharing and availability, and finally the benefits. The implementation of lean practices in a university can be evolved using five steps. First step includes lean efforts in the non-academic departments where processes are usually defined and identification of value added and non-value added (waste) task is easy. The second step asserts the need for training, and development of documentation to support and share the lean philosophy. The third step talks about the distributed yet the centralized efforts of lean implementation. Both are carried out along with continuous improvement activities. The fourth step discusses the implementation of Lean in various departments, which is again sub divided into smaller steps, with each step growing from the previous step .The fifth and the last step is about learning from implementation in one department and replicating it to the other departments. Overall Implementing and practicing lean processes is an iterative and long term journey. It starts with smaller steps and grows or evolves to cover larger perspective (S.,Alisa).

Lean in HE can be applied in a similar manner to Lean in other sectors. This is due to the fact that teaching and administration also consist of repeatable transactional processes, partially or wholly. Although this can be argued that teaching, learning and Research are processes which need to be highly Innovative and hence are not repeatable transactional wholly. But still they follow certain norms and procedures. All lean efforts pivot around Customer, and this concept of being customer-centric is gaining acceptance in Education Industry also. Students and their parents have several options to pursue in terms of Institutes and Courses, and hence look for value for money in context of Education also. Also in accordance to Lean management principles, value is defined from the customer's perspective which can differ from a student to parent to their prospective employer. From literature review (L.,Tobias,2011),(Parasmal,Y.,R, 2009), (Radnor, Z., Bucci, G.,2011), the impact of Lean in HE is found to be very encouraging. It is found that much more significant gains are achievable if improvement is continuous. The benefits include reduction in cost, lesser cycle time, increased satisfaction level for student and faculty, etc. To implement the lean principles successfully in Education, the challenge is Change Management. This applies in Higher Education by Students, faculty, and staff accepting the need for and benefits of process improvement by Continuous Improvement and Respect for People. It is also found that Lean Processes have been used at School levels and lead to improvement of teaching and learning processes. In return they also facilitated cost saving, better employee performance, job satisfaction and overall organization's process improvement. Lean processes

help in identifying value-add and non-value (waste) add activities or processes, eliminating wastes which may be a burden or hindrance to excellence, empower and develop the workforce and hence restructure the work processes .Lean based approach categorically defines each process and role of each personnel , and hence identifies their role in the success of the organization. Lean approach also strongly follows the continuous improvement or kaizen method (Plan-Do-Check-Act), which is a never ending iterative method for excellence. This method questions and evaluates the processes and procedures followed at each step in a cyclic form and follows the prevention is better than cure principle.

Course Review Using Lean Principles:

We all agree that that review of each course that has been taught in a programme is a necessary and critical academic process. It is an ongoing assessment of 1)What we intended to deliver- mapping with the curriculum plan,2) How we are delivering,3)What needs to be changed.To achieve this objective, we need to incorporate the Lean principles in the following manner. Firstly empower each faculty designing or developing the course to take ownership of the course, Secondly assign them the task of Identifying the tasks, the value add and waste ones, Thirdly to review the processes for continuous improvement. This can be fulfilled if each of them carries out the following activities:1)All courses or modules to be reviewed on an ongoing basis,2)Documentation of midterm correction and feedback needs to be made,3)Course Meetings to be conducted and feedback and action points(in terms of any issues :Student feedback on faculty and course, industry suggestions on Content , Assessment feedback from students or faculty, Alignment of learning goals & program level goals with expected outcomes, etc) to be shared with faculty colleagues,4) When next time a course is offered the last/previous course review must be carefully read for actions,5). The final course reviews must be completed within 4 weeks of the last teaching day, 6) the course plan and reviews that have been approved are available in the library and Program/Admin office for records and information,7) A copy of all assessments must be submitted with the course review and finally 8)The review report should end with a detailed comment on the course which may include comment on the delivery of the course ,examinations , guest lectures, industry visits ,co- teaching and any other new thing introduced/attempted in the course .The strategic goal and objective of the Course Review is to have a Better course content and delivery which is facilitated if we , learn from last delivery of course , eliminate non value add activities, manage faculty and time well and develop a strive for continuous improvement .This is shown in Figure II.
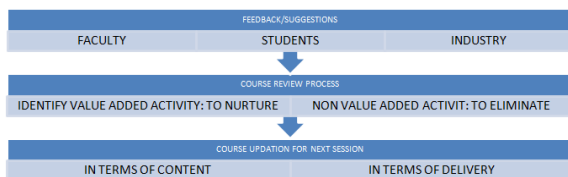

Figure II: Purpose of Course Review

This was practiced by us during the Course Review or Module Review process of which we were a part. In this   whole Review process of a course/subject/module was studied according to the key principles to go lean as HOW PEOPLE WORK,HOW PEOPLE CONNECT and HOW PROCESS OPERATES. The following process maps were developed which define two states, refer Figure III: Current State and Figure IV: Future State. Figure III explains the steps of Course Review before applying Lean Principles. Figure IV explains the steps of Course Review after applying Lean Principles. These Process maps are similar to value stream maps which shows all the actions, both value added and non- value added, currently required to complete a product or service from beginning to end.

COURSE REVIEW PROCESS- AS IS

COURSE REVIEW PROCESS- TO BE
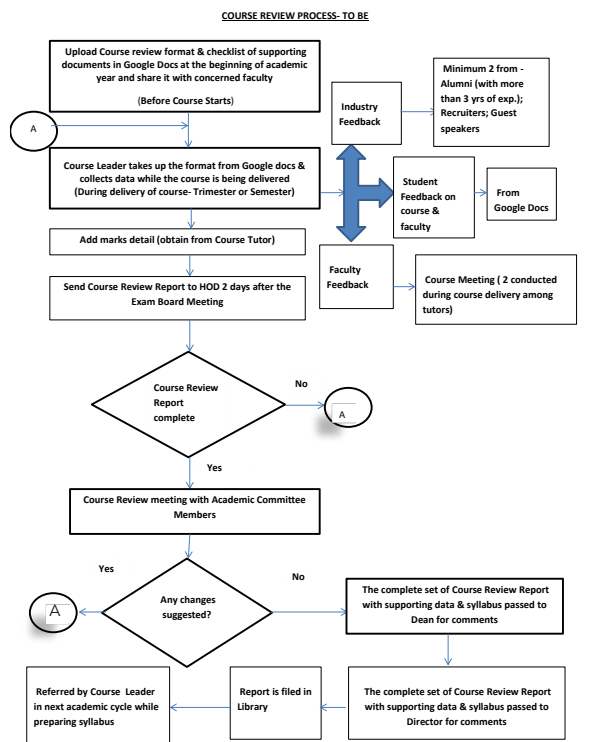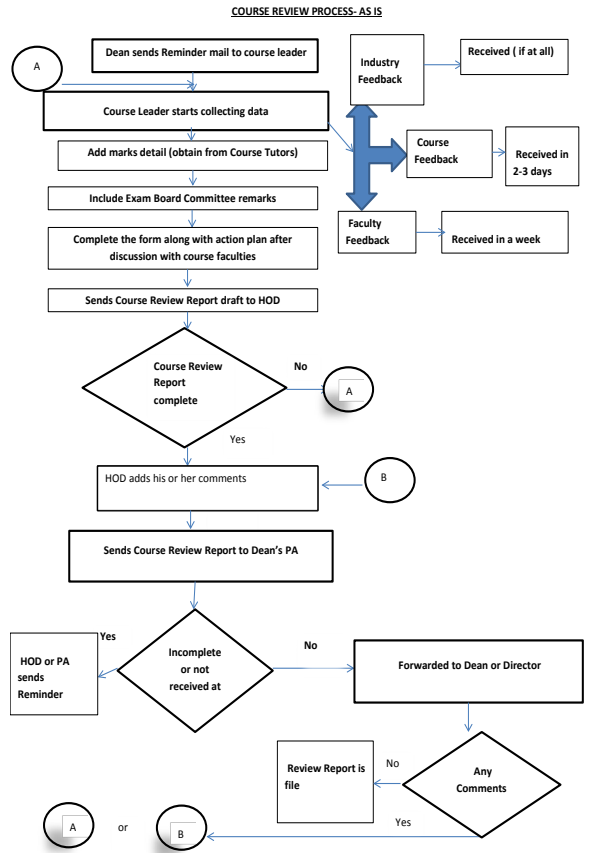
The second process map was prepared after the first process map was brainstormed among faculty members and the wastes were identifies in terms of resources, time, capacity, delay, Over-processing or incorrect processing, Talent, Motion, Assets, Knowledge and Defects. Some specific issues were also discussed for eg., like sources of industry feedback

must also be mentioned, as this was a major bottleneck.

However some Observations from the Process were that 1) Both the As-Is or To-Be Process mentions the Course Review Meetings which is the main part as a part of the whole process. The Course Review Meeting is a subset of the whole process and discusses the outcome of the course and a lot time is saved and coordination involved in it was improved by applying Lean Principles.2.) The course starts with the course leader taking ownership for the course. Course leader should have access to the last Review Report with the action plan. These can be made available from Library or Program Office. 3.) The Course leader should follow the same activities again each time course is taught and hence practice continuous improvement.

Conclusion:
It can be easily concluded from the paper that it is the right time to start practicing the lean methods in Higher Education in India. There Lessons can be learnt from the Industry and imbibed in good sense so that we can learn from their experiences. Lean process improvement is a long-term journey which involves sustenance and patience. This can be achieved with short term goals leading to long term goals.

The success of small goals brings the confidence to make a longer-term commitment to the lean method. The main learnings from the study are that Lean Implementation is in its nascent stage in Education Sector. There exists ample opportunities for improvement and sufficient learnings are present which can be derived from other sectors to the education sector. It should be inculcated as an ongoing self-improvement process, where each stage evolves and improvises from the next stage. The facilitators for this process are the staff, the infrastructure and mainly the vision and mission of the organization. All the efforts should be closely monitored and controlled. Although Lean Practices help organizations to eliminate waste, they also involve lot of hard work by empowering people with responsibility and ownership. But in return it will bring several benefits including a no blame environment, lesser errors, availability of information, opportunities, growth, learning and development, and improved customer satisfaction. A small example of a course review process is also explained. The paper states how the process future state has improved compared to the current state after applying lean thinking. The overall goal is to overcome the various types of education wastes and have an Ideal setting where everybody is involved with continuous improvement every day.

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