APPLICATION OF LEAN TO HIGHER EDUCATION

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Abstract: The basic philosophies, concepts and tools of waste identification and elimination have been and can be applied to all organizations. In this paper, we demonstrate how lean philosophies and tools can be successfully applied in a higher education/university environment. Specific applications along with examples are presented.

Keywords: application, higher education. lean, student lifecycle, university

Introduction: Over the past few decades, continuous improvement methods such as Lean, Six-Sigma, Lean Sigma, etc. have aided manufacturing organizations to improve their productivity and quality levels significantly by focusing on data, systematic elimination of waste, process improvement, and improvement of flow. Today many service organizations are successfully applying the powerful process improvement methods and tools employed with Lean techniques. Organizations in healthcare, government, hospitality, and several other service sectors are applying the improvement tools with growing levels of accomplishment.

Educational institutions, on the other hand, have also join the bandwagon, and are looking at applying lean at all levels. Though education leaders have witnessed transformations in non-educational areas, yet they have not fully engaged or embraced the use of Lean tools in their processes. In fact, we've heard several disturbing comments from educators such as "Lean won't work in our area, we educate people; we don't make widgets." While this is true, they could not be more wrong. The basic philosophies, concepts and tools of waste identification and elimination, if applied appropriately, are applicable in higher education institutes.

In this paper, we demonstrate how some of the lean philosophies and tools can be applied in a university/application setting. Specifically, we will show how lean tools can be applied to the student life cycle process.

Higher Education is Different: It is critical for the readers to clearly understand the differences that exist between the manufacturing sector and higher education and the applicability of lean principles to higher education prior to the application of lean concepts and tools.

The fundamental difference between manufacturing and higher education are similar to that of manufacturing and the service sector [1]. The first major difference is the identification of who the customer really is. In a manufacturing environment, goods are produced and delivered to customers who pay for them. On the other hand, there is a big debate as to who is the real customer of the higher education institution; is it the student, the parent, the employer, the state, or some other entity. Manufacturers produce goods that are tangible in nature. Educational institutes instill knowledge and skills and therefore the output is intangible. Next, higher educational institutions recruit faculty and staff to deliver the service and the service delivery process is extremely labor intensive and difficult to automate; however you do see some knowledge capture and sharing occurring. Lastly, administrators of educational institutions tend to make consensus based decisions and use inter-disciplinary committees to recommend them. This process tends to be very cumbersome and time consuming. On the other hand, decisions in corporate world are made by key individuals and are usually made at a much faster pace.

Lean Principles Applicability in Higher Education

Womack and Jones [2] developed the following Five Lean Principles that illustrate the concept of lean thinking today. They are:

- Principle 1: Specify what customers **Value**
- Principle 2: Understand the **Value Stream**
- Principle 3: Improve the **Flow**
- Principle 4: **Pull**
- Principle 5: **Perfection**

These 5 principles can be implemented in the higher educational setting as follows:

- Identifying who the customer is and identifying the need of the customer is the main challenge encountered when applying Principle 1.
- Higher education institutions are implementing Value Stream to better identify the processes, measures, and best practices that enable and hinder the delivery of services. The main goal when applying this principle is to detect the sources of different kinds of waste.
- Based on our experience, we believe that applying Principle 3 is a very big challenge for higher education institutions as they are structured in silos. As a result of these silos, departments and

colleges within the institutions tend to have a variation in the operational processes and how they interact with each other and the customer. Standardization of communication, enforcement of common operational procedures and collaboration are critical for satisfying this principle.

- Majority of higher educational organizations implement the push system and therefore, a pull system is the contradictory of what is currently being implemented. A pull thinking mentality, moving backwards from what the customer expects all the way to the first interaction with the customer, is essential for successfully satisfying this principle.
- Perfection is the eventual goal of any lean organization or higher education institution. Leaders of these institutions need to be aware understand that application of lean may require a cultural change and that continuous modification will need to become deep-rooted in the mission and values of their institution.

A Student Life Cycle Application of Lean: In this section, we discuss how the lean principles and process for applied to the student life cycle process at a private university in the southern part of the United States which was facing severe funding problems and customer complaints. The main intention for applying the lean principles was to reduce redundancy in process, shorten the length of the process, eliminate waste and duplication of resources, and make the process more value-added. We used the following steps in applying lean principles to the student life cycle process from beginning to end.

Process Improvement Steps

- **Step 1** - Map the current state value stream
- **Step 2** - Identify and prioritize major issues to resolve and opportunities for improvement
- **Step 3** - Assign grass roots improvement action items and team improvement projects
- **Step 4** - Facilitate and monitor improvement teams

The first thing we did was to undertake a brainstorming storming session with the key administrators and individuals who were directly responsible for the success of the student life process. In this session, we created a value stream map to identify the very nature of how an organization provides value, and to whom. Value stream mapping is a diagnostic and data structuring tool in the Lean toolbox used to help improvement teams identify, prioritize and align improvement initiatives. The value stream mapping tool helped the team to identify the waste in the system, and to to identify improvement opportunities, and initiate improvement teams to reduce and eliminate wastes.

We then as a group mapped the entire student life cycle from beginning to end. This allowed the brainstorming team to address the entire organization while narrowing in on the key areas or opportunities for improvement.

We then created agreed on a "macro" student life cycle map which is depicted in Figure 1.

Figure 1: Macro student life cycle map

We looked at each of the three major activities/processes identified in Figure 1 and began to break down the value stream into smaller, more manageable pieces. The next level breakdown for mapping of the student life cycle process is shown in Figure 2.

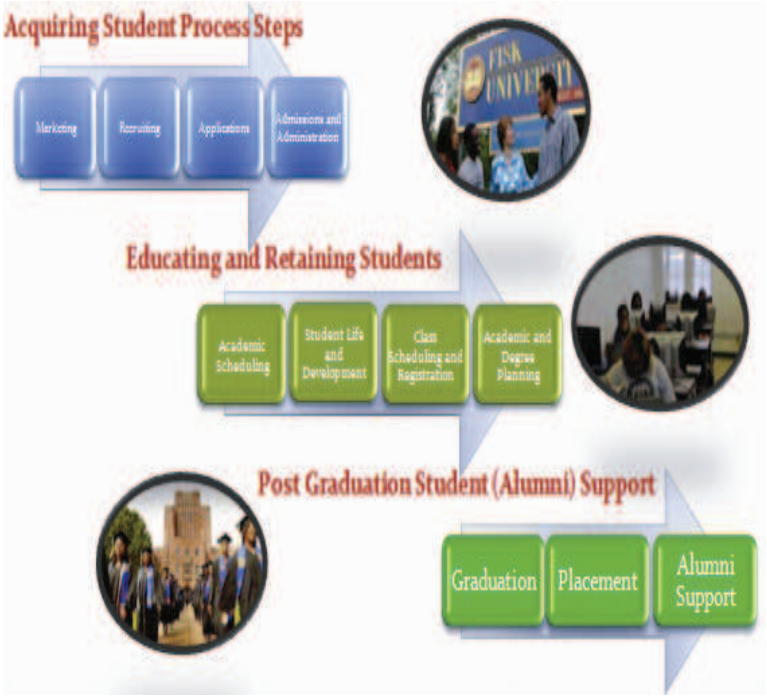

Figure 2: Breakdown of key processes

Improvement teams use the tool of value stream mapping to continue to "drill down" to process level issues and improvement opportunities; so that they can all "see" the waste, opportunities and priorities in a common way. This alignment is crucial to the success of an improvement initiative.

The mapping process and the value maps helped illuminate the wasteful activities and improvement opportunities and priorities for the institution. After completing steps 1 and 2 successfully, we broke the team into 3 smaller groups and each group was asked to develop an improvement plan for each of the sub process using the Plan-Do-Check-Act (PDCA) improvement cycle tool. After each group had identified waste or an improvement opportunity, they proposed and developed a Plan (P) for improvement. The team later executes the plan in the Do (D) phase, and then Checked (C) the results. If the new method actually reduced waste and improved performance, the team was asked to Act (A) to standardize the new method or process. If the improvement action did not have a potential to improve performance or reduce wastes, the group was asked to Act (A) or to go back to the drawing board to identify and implement another improvement idea. All 3 groups generated excellent improvement ideas and a plan of action to work together to achieve these improvements in the next 2 months. We also showed each of the groups how to use the A-3 tool to illustrate and document the impact of the improvements. When we met after three months, we asked each of the sub-groups to make a presentation using the A-3 template. We were extremely impressed with how these subgroups employed these powerful improvement tools and came up with impressive results. The short term benefits achieved were:

- Reduced operating costs
- Less waste, redundancy, and confusion
- Clearer communications
- Total employee involvement
- Clear accountability for improvement results

The expected long term benefits were:

- Increased enrollment
- Greater student, alumni, faculty, staff and community satisfaction
- Increased donations, and
- A systematic and sustainable approach to leadership and improvement

Conclusion: Clearly the concepts and philosophies of Lean or waste elimination apply in any environment, and have been found to be especially relevant to higher education institutions. Lean tools are, in their most basic sense, process improvement tools. By studying lean, educational leaders can begin to understand how these methods and tools can be applied in their organization. The process and transformational steps that worked for this university will work for all educational institutions such as primary and secondary schools, prepare schools, training centers colleges, and universities world-wide.

References

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