New Development: Creating a Lean University

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Many academic articles have been published in the past 20 years promoting the Lean approach in manufacturing and in service industries. Very little attention has been paid to the possibility of applying Lean Thinking to the academic institutions that these articles stem from. This article explains why the application of Lean in universities is a good idea and what needs to be done to develop an effective Lean enterprise in a university environment.

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The Lean University Project

The Lean Enterprise Research Centre (LERC), with a newly-created Lean core team in a client university, is translating the Lean value system (Hines *et al.*, 2004) to an academic environment. Lean Thinking has seldom been applied to universities and, in comparison with manufacturing environments, universities are in the early stages of improvement activities. However, there is much evidence to show that the application of Lean in public sector service environments can be extremely beneficial leading to improved processing times, improved service performance and 'achieving more with less' (Radnor *et al.*, 2006).

Methodology

A series of semi-structured interviews was undertaken with key staff at our client university and a number of reference sites for universities in the USA and UK. In addition, secondary data was collected and analysed to ascertain the extent of Lean Thinking in other universities worldwide. There are some drawbacks in this type of data collection: for example interviewees from the client university were actively engaged in the programme and so might have been overly positive in their responses. Therefore, once our approach has been fully implemented and results begin to emerge, we will be inviting external experts to critique the findings.

The implementation work in the Lean university project is driven by an action research approach (Lewin, 1946), grounded in the development of theory derived from the analysis of existing case studies. A range of research techniques, including direct observation and semi-structured interviews, has been undertaken to capture the outcomes and experiences of the Lean university project.

Why Lean?

The client university's main strategic aim is to be a 'top 50' world-leading university in the Shanghai Jiao Tong Index (http://ed.sjtu.edu.cn/ranking.htm) by 2020. In the face of increasing commercial and competitive pressures, the vice chancellor realized the university system needed to be revolutionized to become a 21st-century business capable of reacting swiftly to customer and market demand.

In addition, the university had recently merged, which caused much organizational upheaval and potential instability. Coupled with a complex committee structure, it was clear that a large-scale intervention was required in order to catalyse the major process improvements needed in order to provide a world-leading university infrastructure. The Lean university project has therefore been established in order to enable internal and external users to value services as being timely, responsive and uncomplicated. It seeks to encourage and support the creation of a vibrant working environment where people are confident to act and innovate and pursue perfection.

Lean in Other Universities

Extensive case-based primary research and secondary research has shown that while there are many examples of attempts to improve processes in universities (Rice and Taylor, 2003), there have been few examples of such an holistic, 'Lean value system' (Hines *et al.*, 2004) approach to organizational change in academic institutions.

The majority of the academic literature which specifically addresses an interventionist approach focuses on continuous improvement activities and the pursuit of quality, notably in

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the USA (Dew, 2007). The University of Wisconsin-Madison, for example, has a very well refined and defined continuous improvement process orchestrated by the Office of Quality Improvement. Their work to improve their admissions process cut admission costs by 38%, reduced the time required by 39% and eliminated the backlog of admissions work.

Early continuous improvement attempts have often been too technically bound, merely focused on the removal of 'muda' (or waste), rather than a more holistic approach drawing on the full muda, 'mura' (un-evenness), 'muri' (overburden) approach advocated by Toyota (Toyota Motor Corporation, 2006).

Some authors (for example Alp, 2001; Comm and Mathesiel, 2005 a and b) have explicitly discussed the implementation of Lean in universities but these works have largely been delivered from a theoretical, generalist perspective.

An exception to this is Emiliani (2004), who has shared his experiences of applying Lean in an academic environment with the authors. These experiences are very localized and specific, for example, Emiliani uses Lean principles to approve business course content. It is only Moore and Nash (2004) who have explicitly discussed how they plan to create a Lean university at the University of Central Oklahoma in unpublished work shared with the current authors. Interestingly, while Moore and Nash have instigated many bottom-up Lean projects, they have also included top-down Lean implementation activities. They held a strategy day with different stakeholders and key personnel in the university to work together to develop the 'vital few' key strategically-aligned actions which supported their vision and were able to be cascaded throughout the organization. While there have been notable successes as a result of their activities, they have not yet addressed fundamental, challenging aspects of a sustainable Lean value system—aspects that this research has addressed at the outset.

Implementing Lean in a University

Our aim was to provide a more concrete, holistic methodology to transformations in organizations. Improvements should be made with an awareness of the effect that these changes will have on other aspects of the organization. For real change to occur, major mental, transformational shifts need to take place at the upper levels of the institution. These shifts in thinking need to then be effectively communicated and cascaded through all levels of the organization.

It is helpful to think of the Lean process as an iceberg (see figure 1). The technology, tools and techniques that affect processes are those visible above the water. However, the vast majority of the iceberg is beneath the surface and invisible. It is this enabling, anchoring mass which makes an iceberg a powerfully strong force. Addressing all of the enabling iceberg elements is essential in order to deliver a successful, sustainable transformation. However, this forms only part of the initiating mindset required by a Lean implementation team. There needs to be an appreciation of the right mix of 'above water' and 'below water' activities. It is also important to realize that the iceberg's components are all interdependent. For example, effective strategy and alignment can only be delivered through strong leadership which, in turn, will only be successfully realized in a positive organizational culture that is receptive to learning and improvement.

Dennis (2006) has stressed the importance of getting the right balance of different implementation approaches. He categorizes Lean improvements in terms of top down and bottom up stating that bottom up approaches possess the power of the quick win, but they suffer from variable sustainability performance. Top-down Lean Thinking, he says, offers the opportunity for true culture change.

We believe that a combination of both approaches should initiate a Lean transformation programme positively, while also providing long-term sustainability. In a

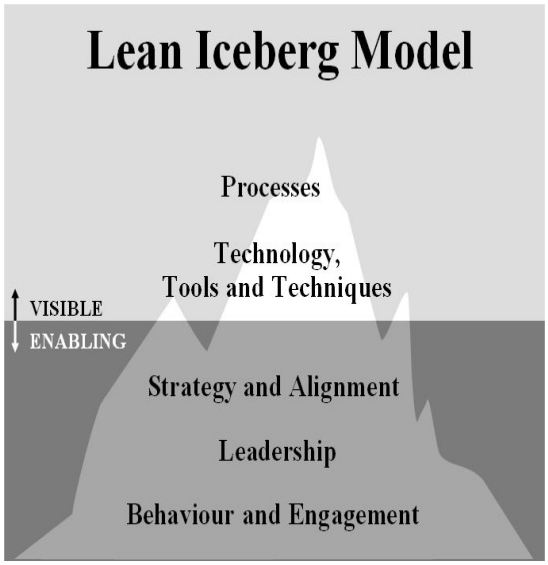

Figure 1. The Lean Iceberg Model (adapted from Hines *et al.*, 2008).

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professional service environment at first it is more appropriate to focus more broadly and initially, especially on muri, in order to engage staff in a Lean transformation. The reason for this is that a large part of a university's activities are of a support nature and hence would, in a traditional Lean Thinking approach, be regarded as non-value-adding. However, the clear implication that many staff may gain of applying Lean would be that their jobs are at risk. Hence, starting with a muri (removing overburden) approach of Lean, seen as making their job easier, is far more likely to be engaging and result in sustainable benefits.

Our Approach

The Lean university project commenced in September 2006 and is due to 'end' in September 2009, although it is hoped that the project will be sufficiently integrated into the organization by that point so as to be sustainable. A steering committee was established to supervise the activities of the two main change facilitators: LERC and a central lean support team. The introduction of two change agent teams poses opportunities and challenges. LERC's experience of applying Lean in a variety of different sectors enables the introduction of new improvement techniques at the forefront of the field. The central support team provides a constant source of expertise and support to drive all initiatives. Communication between the two teams is crucial to ensure consistency of approach.

A university house of sustainable Lean was introduced to ensure that all aspects of a Lean value system would be addressed in the improvement programme. The first phase of the implementation plan addresses the most critical aspect of a Lean transformation, which is to ensure that the strategic mission of the organization is clearly defined, concise and excellently communicated to all. Clear gaps which exist in the strategic structure of the university have been identified in our initial work. It is important to address these gaps in order for any Lean project to be successful.

The second phase concentrates on understanding and improving three key processes:

- The purchasing methodology for low cash, high volume goods.
- The provision of programmes.
- Support to research projects.

These themes involve all of the schools in the university and aspects of the current process are owned by a variety of directorates, such as public relations, finance and human resources. The themes are true 'value streams' and therefore an excellent opportunity to develop the first Lean 'platforms' (Bateman *et al.*, 2008).

It was originally intended to start the Lean university project in a very low key way, to spend the first year trying new techniques and learning about the most appropriate approach. However, news of the Lean project began to spread across the organization. Some viewed the project with suspicion, others, however, were excited about the prospect of improved processes which added greater value. It was very important to act on the enthusiasm shown from several individuals and organizations. Consequently, a number of smaller 'point kaizen' continuous improvement projects in schools and directorates have been initiated.

The client university has commissioned two other projects in order to achieve its strategic aim. The 'modern working environment' is a large-scale project designed to revolutionize the university's technology infrastructure to facilitate better processes. The 'positive working environment' project has been created to ensure that the organization is healthy, happy and enterprising. The Lean university project is working closely with these projects to ensure that there is minimal duplication of effort and also that each element of the Lean university Implementation model is addressed.

Discussion

Becoming truly Lean requires a considerable amount of time and effort. While many institutions pursue continuous improvement, and many experience considerable resource savings as a consequence, incidences of the attempted application of an holistic Lean value system are limited, particularly in the 'below the water level' enabling area of the iceberg.

Much has been written of the difficulties in affecting change in academic institutions. Indeed, early project work has been fraught with obstacles. Staff seem frustrated by the inner workings of the organization and yet feel powerless to change it. Improvements are emerging, but slowly. Since the project's inception, the approach taken by the Lean university team has adapted to meet the needs of the unconventional system. For example, the Lean team now recognizes the need to work with project teams in small, regular bursts to ensure that improvements progress.

The university also finds it difficult to deal with some Lean concepts. For example many staff members are not comfortable with the

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term 'customer'. This has been overcome by helping teams to acknowledge different levels of customer. Manufacturing and even some service examples of successful Lean implementations are met with suspicion and proclamations of organizational 'difference'. Lean university examples are the best advertisement of Lean, and in common with all endeavours in this regard, enthusiasm and momentum will hopefully increase as the project progresses.

Conclusions

There is much potential to improve customer value and eliminate waste in universities. While there are many staff members in the project who have welcomed Lean and are enthusiastic about the various project themes, it is increasingly evident that the academic environment is harder to change than many conventional Lean environments. In common with many older universities, the strategic structures are unaccustomed to rapid change. Much work remains to be done to encourage the engagement of all employees in the university. ■

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