FUTURISTIC TRENDS IN LEAN SIX SIGMA HIGHER EDUCATION INSTITUTES PROSPECTIVE

Abstract

Six Sigma was first developed as a technique to problem-solving with the goal of reducing variation in a production and manufacturing setting. A process is said to exhibit variation if its output is not consistent from one iteration to the next. It is important to keep in mind that the principles of Six Sigma are not about quality in the conventional sense. The objective of lean thinking is to provide a steady flow of work that adds value in the least amount of time and with the least amount of wastage of resources possible. The Six Sigma technique and toolset are utilized to improve business processes. This is accomplished by reducing errors and faults, eliminating variance, and increasing both efficiency and quality. Lean Six Sigma (LSS) is a methodology that combines the principles of Lean with those of Six Sigma in order to improve business operations by cutting down on waste and basing choices on empirical evidence.

Keywords: Six Sigma technique, Lean Six Sigma, Educational Sector

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I. INTRODUCTION

Six Sigma is not a completely new way to manage an enterprise, but it is a very different way. In essence, the concepts of Six Sigma require change to take place in a methodical manner. Conformity to specifications established within an organization is the standard definition of quality. This has little bearing on the Six Sigma initiative. The purpose of the Six Sigma methodology is to teach businesses how to increase their profits by maximizing the value they provide to their customers and reducing waste. In order to establish a connection between this aim of the Six Sigma principles and quality, we willneed to examine a different definition of quality. Within the framework of the Six Sigma principles, the term "quality" refers to "the value added by a productive endeavor."

In the context of the Six Sigma methodology, an input is defined as anything that is introduced into a process or used up throughout its execution in order to generate an output or a result. The output is the completed good or service that has been supplied to either an internal or external client. Additionally, the results of one process can be used as inputs in a subsequent process.

There is a process that exists in the middle of the inputs and the outputs, and it is responsible for converting the inputs into the outputs. It's possible that a procedure will include numerous steps. It's possible that an inefficient procedure has stages that are exactly the same as others. A process that is inefficient may involve steps that lead to the production of a product or output that is flawed. The use of the Six Sigma principles has two primary goals: first, to minimize any stages that do not provide value to the customer, and second, to reduce the number of faults in the output as a whole. It's possible to get the same end result using a whole bunch of various methods. It's possible that you'll get three completely different explanations if you ask three different people how they prepare brunette. There will be a wide range of efficiencies and effectiveness across these procedures. One individual may have a quicker method of making coffee that does not always provide the same results, whilst another person may have a slower method of brewing coffee that creates better brunet more consistently. The first individual is able to produce high-quality brunet with more consistency, while the second person is able to produce brunet of the same high quality more quickly thanks to the principles of Six Sigma.

The ideas of Six Sigma were developed for use in resolving issues that arise in a production setting; nevertheless, it is not difficult to adapt these strategies for use in a transactional setting. Imagine a call center that is responsible for generating sales. It's possible that the client, or in this case the company, wants 60% of calls to result in a sale, but the call center only achieves a 40% sales rate today. The principles of Six Sigma can be utilized to analyze the situation and establish the primary source of the issue, as well as formulate solutions that will allow one to meet the specified objective.

II. LEAN SIX SIGMA IN HIGHER EDUCATION INSTITUTIONS (HEIS)

The Lean and Six Sigma principles are combined in the business improvement methodology known as Lean Six Sigma (LSS) to help decrease waste, increase process quality, and reduce variation. Higher education institutions (HEIs) use LSS to improve their operations, effectiveness, and efficiency in various areas, including administration, finance,

human resources, information technology, library services, and academic processes. LSS has been utilized in Higher Education (HE) to improve quality, effectiveness, stakeholder satisfaction, and value creation. The LSS benefitsin HEIs

- In reducing errors, delays, and service delivery flaws to increase student satisfaction and retention.
- Improved quality of instruction and learning through the streamlined processes of curriculum development, evaluation, and feedback.
- Enhanced operational effectiveness and cost savings through the elimination of non-value-added operations, resource utilization optimization, and rework minimization.
- Increased reputation and competitive advantage by exceeding stakeholder, accreditation, and rating agency expectations.

1. **Research on Lean Six Sigma:** Lean Six Sigma (LSS) at higher education institutions (HEIs) is a subject that has drawn some interest from scholars and practitioners who are interested in enhancing the caliber and effectiveness of HEIs in India. The use, advantages, difficulties, and best practices of LSS at HEI have been examined in some research and courses.

   Lean Six Sigma (LSS) research in higher education is a developing subject that intends to investigate the possibilities and difficulties of using LSS principles and technologies to enhance the caliber and effectiveness of higher education institutions (HEIs). More empirical research and case studies are necessary to show the viability and effectiveness of LSS in HEIs because the area of LSS research in higher education is still young and developing. The following issues are yet to be addressed in research.

   - Creating a thorough plan or roadmap for the deployment of LSS in HEIs
   - Evaluating the effectiveness of HEIs both before and after the deployment of LSS
   - Studying the effects of LSS on the performance and satisfaction of student learners
   - Examining the impact of organizational culture and leadership styles on the adoption of LSS
   - Identifying the key success elements and obstacles to the long-term viability of LSS in HEIs
   - Create fresh tools and methods that are suited to HE procedures.

   The studies indicate that LSS can be utilized in HEIs across various functions, including instruction and learning, curriculum development, student services, administrative procedures, research management, and library services.

2. **Tools of Lean Six Sigma:** Some of the approaches and procedures that can be used to evaluate and enhance the effectiveness of higher education institutions' processes include Lean Six Sigma (LSS) tools. Among the LSS instruments in HEI are:

   - **Statistical Process Control (SPC):** which is a tool that uses control charts and statistical techniques to monitor and manage the variance and stability of a process. SPC can assist HEIs in making sure that their procedures, including instruction, evaluation, research, etc., are reliable and consistent.

- **Failure Mode and Effects Analysis (FMEA):** a technique, uses a structured methodology to identify and rank the risks and potential failures of a process or product. In areas like curriculum design, student admission, enrollment management, etc., FMEA can assist HEIs in preventing or reducing the negative effects of failures.

- **Voice of the Customer (VOC) Analysis:** this is a tool that uses multiple techniques, such as surveys, interviews, focus groups, etc., to gather and analyze the needs and expectations of the customers or stakeholders of a process or product. VOC analysis can assist HEIs in comprehending and satisfying the needs and preferences of their clients, including students, employees, companies, accreditation organizations, etc.

- **Value Stream Mapping (VSM):** By identifying the value-added and non- value-added operations, cycle time, waiting time, inventory, etc., which is a tool that visualises and analyses the current condition of a process. HEIs can improve the flow and value of their processes, such as student services, research management, etc. by identifying and eliminating waste with the aid of VSM.

- **Cause-and-Effect Analysis:** which employs a diagram or matrix to identify and investigate the underlying causes of a problem or issue. By identifying the underlying causes and relationships that have an impact on the issue, cause-and-effect analysis can assist HEIs in finding solutions to complicated problems in their processes.

- **Pareto Analysis:** which is a tool that, via the use of a chart or diagram, prioritizes the most important problems or causes of a problem. Pareto analysis can assist HEIs in concentrating on the key issues that make up the majority of the issue and in allocating their resources appropriately.

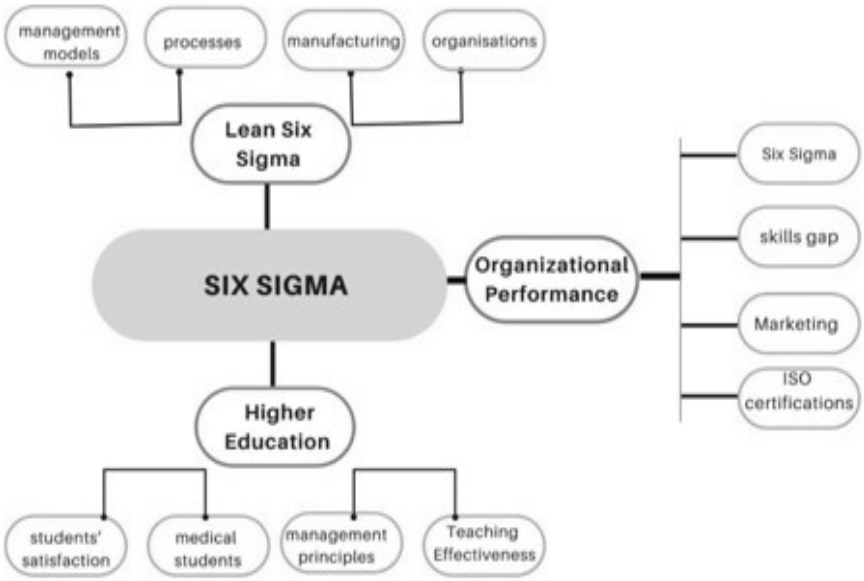
- **Design of Experiments (DOE):** which is a tool that employs a methodical approach to optimise the process parameters or components. DOE can assist HEIs in experimenting with various combinations of variables and levels to identify the ideal conditions that produce the highest performance or outcome.

- **Benchmarking:** which is a tool that, via the use of various metrics or indicators, compares a process or product's performance or operating procedures with those of other comparable or best-in-class processes or products. Benchmarking can assist HEIs in discovering areas for improvement and gaining knowledge from industry best practices.

Organizational performance researchers in India are placing a significant emphasis on the use of Six Sigma in order to increase the efficiency of crucial quality management processes. Utilizing quality-engineering methodologies while working within a defined central issue framework (Lazreg, 2011), its primary focus is on locating and eradicating particular issues, as well as improving yield, productivity, and internal controls, as well as the satisfaction of customers. In spite of this, the researchers in India's higher education institutions are moving closer and closer to implementing the Lean Six Sigma methodology. LSS is an essential educational operation that aims to boost the value of teachers, students, and educational institutes

by increasing the effectiveness, satisfaction, and expenses of educational operations. This is accomplished by combining the methodologies and ideas behind Lean Six Sigma. It is widely used in a variety of higher education settings. Higher education institutions (HEIs) in Saudi Arabia have become increasingly aware of the need for excellence in knowledge delivery as a result of the growing number of students attending educational institutions in Saudi Arabia (KSA). The process of enhancing the quality of higher education is an ongoing one, and educational institutions are required to continuously enhance their teaching in response to feedback received from students.

Flow chart of Six-Sigma Methodology to Achieve a Competitive Edge



3. **LSS success in HEI:** Studies suggest some success factors and best practices for LSS in HEIs, such as top management support, clear vision and strategy, effective communication and stakeholder engagement, training and education of staff, selection of appropriate projects and teams, integration of LSS with already-existing quality systems and frameworks, continuous monitoring, and evaluation of outcomes.

- Top management support and commitment
- Clear vision and strategy for LSS
- Effective communication and stakeholder engagement
- Training and education of HE staff on LSS
- Selection of suitable projects and teams
- Integration of LSS with existing quality systems and frameworks
- Continuous monitoring and evaluation of LSS outcomes

4. **Challenges of Lean Six Sigma in Higher Education Institutions:** To successfully implement and sustain LSS in HEIs, several obstacles must be overcome, including lack of awareness, resistance to change, cultural issues, complexity and diversity of processes,

difficulty defining and measuring quality indicators, resource limitations, and ethical and legal concerns.

- Lack of awareness and understanding of LSS among HE staff and stakeholders
- Resistance to change and cultural issues
- Complexity and diversity of HE processes and services
- Difficulty in defining and measuring quality and performance indicators
- Resource constraints and competing priorities
- Ethical and legal issues

LSS can be a potent business improvement methodology for increasing the effectiveness and efficiency of HEIs, but it necessitates a systematic and comprehensive approach that takes into account the unique characteristics and problems of the HE sectors.

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