

# **Lean Six Sigma for the Improvement of Services in Higher Education Institutions**

**David Rodrigo Guerrero Moreno**  
Facultad de Ingeniería  
Universidad Santiago de Cali  
Calle 5 # 62-00 Barrio Pampalinda  
[david.guerrero01@usc.edu.co](mailto:david.guerrero01@usc.edu.co)

**Claudia Cristina Bocanegra Herrera**  
Universidad Nacional de Colombia  
[claudia.cbh@gmail.com](mailto:claudia.cbh@gmail.com)

**Jorge Silva Leal**  
Facultad de Ingeniería  
Universidad Santiago de Cali  
Calle 5 # 62-00 Barrio Pampalinda  
[claudia.bocanegra00@usc.edu.co](mailto:claudia.bocanegra00@usc.edu.co)

## **Abstract**

The institutions of higher education that aim at continuous improvement, within the framework of accreditation of high institutional quality, can complement and potentiate their quality management model on philosophies such as Six Sigma and Lean Manufacturing. These philosophies enhance the possibilities of obtaining excellent quality services and effective, efficient and economical processes, which are some of the benefits that these philosophies have obtained in different industries and sectors of the economy.

This article presents and disseminates a Lean Six Sigma model that systematically integrates these two methodologies with the DMAIC structure and establishes its own techniques and tools for the improvement of services offered by higher education institutions. The article explains in detail the steps and techniques for each phase of the DMAIC structure and how they interact each other to define clearly a problem in processes that deliver a service in a higher education institution, measure the impact of the problem presented, analyze the root causes that originates the problem, improve the process and establish controls that assure the sustainability of the improvement actions.

## **Keywords**

Lean Manufacturing, Six Sigma, Lean Six Sigma, education, higher education institution

## **Biography**

**David Rodrigo Guerrero Moreno**, received his B Eng in industrial Engineering in 2007 with a specialization in Operations Engineering in 2010, all of them from Pontificia Universidad Javeriana, Colombia, he has an MBA with an emphasis of Operations from McNeese State University. He currently works at Universidad Santiago de Cali in Cali, Colombia. His research interests include Six sigma, lean manufacturing in services industry.

**C. C. Bocanegra-Herrera**, received her B. Eng in Chemical Engineering in 2009 with a specialization in Logistics in 2011 and an M.Sc. in Engineering in 2014, all of them from the Universidad del Valle, Cali, Colombia. She currently

studies her PhD in Industrial Engineering at Universidad Nacional de Colombia. Her research interests include the following: Discrete-event Simulation; Supply Chain Optimization; and Lean Manufacturing.

**Jorge Silva Leal**, received his B Eng in biotechnology engineering in 2004 with a specialization in sanitary and environmental engineering in 2006, he has an Master of Science with an emphasis of Sanitary and Environmental Engineering in 2008, and received his PhD in sanitary and environmental Engineering in 2013. He currently works at Universidad Santiago de Cali in Cali, Colombia as dean of Engineering Faculty. His research interests include water supply, wastewater treatment and reuse of biosolids.