

LEAN SIX SIGMA APPLIED TO QUALITY AND PRODUCTIVITY IMPROVEMENT IN THE MANAGEMENT CYCLE – PLANNING AND CONTROL – OF AN EDUCATION, TRAINING AND SOCIAL INTEGRATION INSTITUTION

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Abstract: This paper aims to contribute with some insights on the use of Lean Six Sigma as an improvement tool in an educational environment, in order to improve the efficiency of the network based structure for the provision of social and educational services at the bicentennial institution: Casa Pia de Lisboa (CPL). We suggest to combine management methodologies and Quality tools in order to build and implement continuous improvement programs. The selection of Lean and Six-Sigma as improvement tools for Casa Pia is based on the fact that organizations whose management is focused on processes, are currently incorporating LSS methodologies in their continuous improvement programmes. The planning process is already designed, with the goals and objectives of the various CPL units already defined and properly registered (Planning Process). The implementation of the Control process was initiated in January 2011 and three months of monitoring have already been secured. The expectations in the use of Lean Six Sigma to improve the Control Process are high. If succeeded this project will allow CPL to better monitor and control progress towards its goals, better support the top management and operational decision making processes. Although the use of LSS in an educational context has been recommended by several authors, reality shows that, in general, educational institutions are not aware of the benefits resulting from the application of these methodologies.

1 INTRODUCTION

In a global market, an organization that wants to be market leader or compete to become one, increasingly needs to find ways of management that can enable it to respond fast and adequately to new challenges and changing environments. Quality management, and the set of tools and methodologies that it comprises, are essential in resolving this problem.

Casa Pia de Lisboa, a bicentennial institution serving the educational and social solidarity in Portugal, has used and implemented several organizational and management models, all of them with important and conclusive results in the educational and social context but also in the

management and administrative background.

Recently Casa Pia de Lisboa defined a new strategy to modernize the institution, bringing it to new and innovative management practices. The new management model focuses on quality and process-oriented procedures and on a network based structure for the provision of social and educational services. The main objectives are to increase institutional cohesion and to become a reference organization regarding quality management system implementation.

The use of Lean Six Sigma (LSS) as the main motto of the work, results of the strategy-related need and opportunity to implement continuous improvement programs (George, 2002). The specific selection of Lean and Six-Sigma as improvement

tools for Casa Pia is based on the following factors:

- Organizations whose management is based on processes are currently incorporating LSS methodologies in their continuous improvement programmes;
- Although the use of LSS in an educational context has been recommended by several authors, reality shows that, in general, educational institutions are not aware of the benefits resulting from the application of these methodologies;
- Bandyopadhyay and Lichtman (2007) recommend the use of Six Sigma in the improvement of Strategic Planning processes in Education Institutions;
- There are no studies on the use of LSS in Strategic Planning process improvement in an institution with the educational and social mission such as the Casa Pia de Lisboa.

2 SIX SIGMA APPLIED TO THE EDUCATIONAL ENVIRONMENT

There are several examples of process improvements in educational environment that inspire us for this project.

Bane (2002), in the article "Leading edge quality approaches in non-manufacturing organizations" presents several cases where Lean, Six Sigma and similar approaches to continuous improvement, have been successfully applied in non-industrial areas, giving concrete examples of improvement projects in three educational institutions:

In Clarkson University, New York, the author refers that Six Sigma was applied to reduce errors in the schedules preparation. The process sigma increased from an initial value of 3.1 (approximately 93% effectiveness) to 4.5 (over 99% effectiveness). The application of DMAIC and Six Sigma related tools resulted in a faster and more accurate scheduling system for students and a significant reduction in the work effort for academic and programme coordinators;

Bane also refers Loyola University, New Orleans, an institution that won the Louisiana award quality, which implemented a project for the improvement of the admissions process. With LSS the Loyola University was able to raise both the number of candidates and the admission criteria;

Finally he presents the use of Lean tools in the improvement of payroll processes in a secondary

school. Within this project several non-value added activities were identified and eliminated resulting in a faster, more agile process reducing payroll lead time and effort needed from the teachers (the process clients).

The author ends the article stating that companies and organizations must be aware and sensible on how they apply methodologies for continuous improvement, within or outside our industry, including Lean and Six Sigma.

Moreover, Bandyopadhyay and Lichtman (2007), report the existence of a pressure to reduce the financing of educational institutions (recurrent phenomena in the developed countries), which results from the loss of political priority (due to the need of reducing the tax burden on taxpayers), but also from the need for greater efficiency.

Thus, according to the authors, it is up to educational institutions to operate two management fronts: a front-oriented enhancement of their role in the country's competitiveness in order to ensure adequate funding for its activities, and a second front, aimed at efficiency and effectiveness gains in its operation.

They conclude that it is imperative that educational institutions incorporate the methodologies of Six Sigma in their strategic planning process, given the overall focus on cost savings, productivity gains, quality and profitability: "it is imperative that institutions for education take a good look at Six Sigma approach and incorporate it into their strategic-planning process".

3 PROCESS MANAGEMENT AT CASA PIA DE LISBOA

The Casa Pia de Lisboa has been, throughout history, an example of innovation in the areas of social work, education, training and socio-professional integration (Carneiro, 2005). Its capacity for innovation and change comes, once again, reinforced by the recent commitment of a new process-oriented management (Smith, 2003), resulting in benefits in the short, medium and long term.

Manage, innovate and participate is the Casa Pia slogan of change towards the vision of this bicentennial institution to ensure the "rights promotion and protection of children and young people, especially those who are in danger or at risk of exclusion."

3.1 General Objectives

Under the implementation of its management oriented processes, CPL defined the following objectives:

- Define and detail the necessary processes for the activity of an organization of socio-educational intervention;
- Implement adequate core and support processes and proper support tools to manage, regulate and control strategy deployment, overall management activity and service delivery efficiency and effectiveness.

The application of this model-based approach seeks among other things, to gradually adequate CPL skills to its new management needs and to ensure the standardization of its operations and support processes.

3.2 Specific Objectives

The project aims to improve the Planning and Control Process in Casa Pia de Lisboa by applying Lean Six Sigma methodologies and related tools. The aim is thus to achieve the following specific objectives:

- Improve the overall performance of the Planning and Control process;
- Ensure timely and concise management information;
- Ensure the availability of all management indicators of month n until the last day of month n +1;
- Ensure the collection of valid, objective and relevant information;
- Ensure proper analysis of the information collected (correction of deviations) in order to improve decision making processes;
- Ensure that relevant information from other processes is reported to "control" in the defined frequency (management indicators).

3.3 Control Process

This process comprises the gathering and compilation of operational and diverse management information, and subsequent analysis and control of that information in order to evaluate the performance of all units and departments of CPL. It aims to determine the progress towards fulfilling predefined targets set within the strategic and operational planning process (Pereira, 2008).

The activities within a planning and control process

due to the fact that they relate to other entities (Ishii, 2004), necessarily include the definition of performance indicators, implementation of control mechanisms to be used to produce management information on a regular basis (management reports), analysis of this information identifying trends and progress, and suggestion of appropriate remedial action in case of deviation from predefined targets.

3.4 Design of the Planning and Control Process

The design of the Planning and Control Process began with an high level characterization of the necessary steps to provide management control of CPL activity which included the design of the

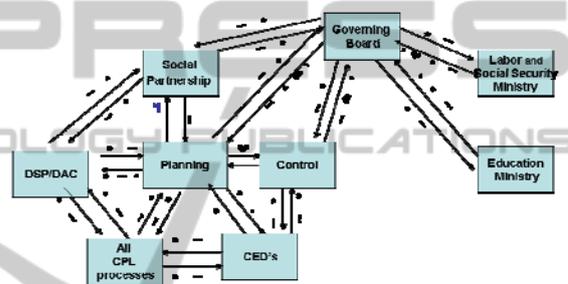


Figure 1: CVCA involved in the process of planning and control.

CVCA (Customer Value Chain Analysis), Figure 1, assessment of specific process requirements, preparation of the affinity diagram based on this survey, construction of the SIPOC diagrams, design mapping, definition of process indicators, development of risk analysis and controls and strategy implementation, among others, as depicted in the flow diagram shown in Figure 2.

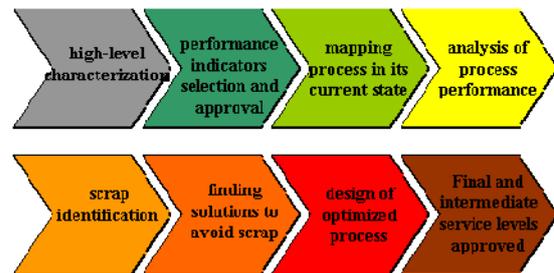


Figure 2: Flow of activities to construction of a process at Casa Pia de Lisboa.

3.5 Macro-View Process Control

A high level design of the process control activities (flowchart) is presented in Figure 3 and identifies

objectives);

d) Definition of project team and respective roles;

e) Definition of project plan and project charter.

This initial phase of the DMAIC requires a focused approach on the requirements of the clients. In order to properly gather client needs we will be deploying a questionnaire and conducting interviews with top management and unit participants (i.e. performing the Voice of The Customer). This questionnaire will be focused amongst other things on the identification of client needs regarding:

- Reporting requirements (e.g. report content, report frequency, report structure);
- Technology and system related requirements;
- Process related issues (timings, flow of activities, responsibilities);
- People and other organizational requirements (e.g. competencies, training, etc).

The questionnaire will also be designed in order to gather information on the effort/ time spent by each participant unit with the control process (either filling in information or analyzing reports).

5 SYNTESIS

Aligned with the vision and strategy defined for Casa Pia de Lisboa we believe that a serious and focused quality improvement in the Planning and Control Process will accelerate this institution towards the achievement of its goals and objectives. The ownership and the commitment of people from the various units has been an important asset of the project so far. The Planning and Control process is now properly mapped, documented and implemented. Improving it to a higher standard is one of the next management challenges of this institution.

The expectations in the use of Lean Six Sigma in this project are high. This methodology has proven to be a robust tool to achieve relevant improvements in other organizations, even in educational institutions. This project will allow CPL to better monitor and control progress towards its goals, better support the top management and operational decision making processes and pursue the fulfillment of its educational and social mission.

REFERENCES

Bandhyopadhyay, J e Lichtman, R., 2007. *Six Sigma Approach to Quality and Productivity Improvement in*

an Institution for Higher Education in the United States", International Journal of Management, Vol 24 No.4, ABI/INFORM Global.

Bane, R., 2002. *Leading edge quality approaches in non-manufacturing organizations*", Annual Quality Congress Proceedings; ABI/INFORM Global, p.245.

Carneiro, R., 2005. *A project of hope*, Principia, ISBN: 972-8818-43-2.

George, M. (2002), *Lean Six Sigma*, McGraw-Hill, ISBN: 0-07-141821-0.

Ishii, K., 2004. *Customer value chain analysis (CVCA)*, ME317 dfM: product definition coursebook. Stanford Bookstore, Stanford University, pp 1.3.1–1.3.8

Pereira, Z. L, Requeijo, J. G., 2008. *Qualidade: Planeamento e Controlo Estatístico de Processos*, FCT-UNL e Prefácio, Lisboa

Pyzdek, R., 2003. *The Six Sigma Handbook – revised and expanded*, McGraw-Hill, ISBN: 0-17-141015-5.

Smith, H., Fingar, P., 2003. *Business Process Management: The third wave*, Meghan-Kiffer Press, ISBN: 0929652339.