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Benchmarking: Need for Quality and Continuous Process Improvement in Engineering Colleges

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Abstract— Benchmarking is a core component of continuous improvement programs. Benchmarking has a similar roadmap that with Six Sigma methodology for quality and continuous process improvement. Benchmarking has steps that are in line with the steps of Six Sigma methodology which are define, measure, analyze, improve, and control (DMAIC). Benchmarking for Engineering colleges involves measuring the quality of the Engineering colleges; the benchmarked Engineering college/s with Engineering college to be improved upon focusing by the initiator on observation and investigation of processes with a goal of identifying and observing the best practices from one or more benchmark. Institutions evaluate various aspects of their processes in relation to the best practices usually within their own campus for example, here the Engineering College. The objectives and process for quality and continuous process improvement create a good environment for the effective use of benchmarking for measuring and improving performance. The present paper discusses various aspects of benchmarking for quality and continuous process improvement of Engineering Colleges.

Keywords: Six Sigma, DMAIC, Teaching and Learning Process, Stakeholders, Metrics, Internationalization, Academic Standards.

I. INTRODUCTION

Benchmarking is an inherent part of the Round the clock Improvement Cycle shown in Figure 3.1. Measuring, comparing to competition, and identifying opportunities for improvements are the center of benchmarking. One can find several benchmarking processes generally used by organizations, the extensive appeal and acceptance of benchmarking is the cause for these several benchmarking processes. Benchmark selected ought to be the indicator of the desired standards. It has to be of the same field having the similar input and giving the outputs in terms of quality as desired. The processes may vary; the best one which ought to be adopted needs to achieve the required quality outputs. An Engineering College selected as a benchmark should have achieved the desired quality standards. Benchmarking requires an understanding of what is important to the organization (sometimes called critical success factors) and then measuring performance for these factors. The gap between actual performance and preferred achievement is typically analyzed to identify opportunities for improvement. Root cause analysis usually follows to assess the cause of unsatisfactory performance and a search for best practices may be used to help address performance problems. The commonsense approach to benchmarking draws appropriately from a mix of all these approaches and organizational learning is best done when it is carried out within a spirit of partnership and collaboration that enable both parties to learn from each other.

II. TYPES OF BENCHMARKING

The major approaches to benchmarking are:

- A. Strategic benchmarking, which used where organizations seek to improve their overall performance by focusing in on specific strategies or processes;
- B. Performance or Competitive Benchmarking, a process whereby organizations use performance measures to compare themselves against similar organizations;
- C. Process Benchmarking, which focuses on specific processes or operations, in higher education examples might be enquiry management, enrolment or timetabling.
- D. Functional and Generic Benchmarking, which involves partnerships of organizations drawn from different sectors that wish to improve some specific activity or process;
- E. External Benchmarking, which is enable the comparison of the organizations functions and key processes against good practice organizations;
- F. Internal Good Practice Benchmarking, which establishes of good practice organization wide through the comparison of internal activities or operations;

G. International Benchmarking, it can be undertaken internationally as well as nationally.

III. PROCESS OF BENCHMARKING

To get the desired output, benchmarking should be implemented as a structured, systematic process connected by a powerful feedback system. It will not be successful if applied in an ad hoc fashion on a random basis. Figure 6.1 illustrates various steps in Benchmarking that can be categorized as:

A. Plan

- 1) *What to benchmark:* Identify critical processes; Collect internal data for comparison –how measure performance; Understand strengths and weaknesses of current process
- 2) *Who to benchmark:* Internal Units -comparison within an institution; Other Colleges and Universities –comparison across institutions; Functional Comparisons-across diverse settings -higher education, corporate, industry, etc. Best in class–compare with exceptional performers.

B. Analyze

- 1) *Collect data:* Collect comparative data –qualitative/quantitative, Calls, surveys, site visits, interviews, review of websites. Systematic collection.
- 2) *Analyze data:* Gap between performance -Are others better? Why are they better? New strategies/practices for adoption; what practices could we adapt and adopt?

C. Act

- 1) *Implement improvements. Action plan for change; Implement changes; Measure results for effectiveness.*

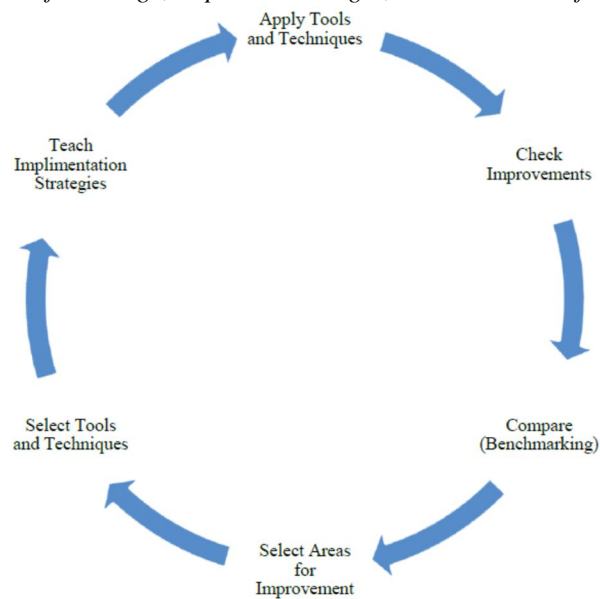


Fig. 3.1 Round the clock Improvement Cycle

IV. APPLICATION OF BENCHMARKING IN ENGINEERING COLLEGES

Benchmarking exercise can be carried in number of areas in an Engineering college such as governance, planning and management; Industry/social relationships; financial and physical infrastructure; teaching and learning; student support; research; library and information services; internationalization; and staffing. This will definitely lead to a high-quality learning experience and moving the rankings of the college as well.

Traditionally, educational institutions are developed for spreading and sharing of knowledge, collaboration in research and, assistance to each other. Several writers advocated that benchmarking is more suitable in higher education than in industry, due to

its collegial environment, which encourages easily collaborating and cooperating. Despite increasing market pressures on engineering colleges, engineering education remains an essentially collaborative activity with institutions/business houses having a strong tradition of mutual support. Due to its reliance on hard data and research methodology benchmarking is especially suited for institutions of engineering education in which these types of studies are very common to faculty and administrators.

It is the requirement of the current scenario that a new quality assurance agency should “work with institutions to establish small, expert teams to benchmark information on academic standards”. Now a day’s lot of literature is available in market, helping organizations in their drive towards being more competitive and productive.

Many of the private Engineering colleges faces problems related with finance hence they sought to find alternative ways of finance, and at same time they bothered to maintain the efficiency and quality, and to satisfy the stakeholders.

Some may find the practice of benchmarking have two objectives first, as a means for assessing the quality and cost performance of an organization’s practices and processes in the context of industry-wide or function-specific ‘best practice’ comparisons, and the second, benchmarking can be used as an ongoing diagnostic management tool focused on learning, collaboration and leadership to achieve continuous improvement in the organization over time. It is a general conclusion which emerges out from some of the research carried in engineering colleges on Benchmarking as:

- A. Management support is vital to success, but even with this support, generating enthusiasm is difficult.
- B. Department- and program-level champions are essential.
- C. Even though projects may be unique, the processes are very similar.
- D. A high code of ethics is essential.
- E. Benchmarking will be successful only if made an integral part of the project process.
- F. Commonly accepted, effective metrics for assessing project performance are necessary to assess the extent to which best practices are used. Input, process, output, and outcome performance measures are necessary, and it is possible to implement them.
- G. Performance measures should be applied through a structured benchmarking process.
- H. Cost-effective, value-added benchmarking can be implemented through standardization of definitions and application of computer-based technologies.

V. STEPS INVOLVED IN BENCHMARKING

In industry it is observed that Six Sigma practitioners have a thorough understanding of their own company’s guidelines before undertaking a benchmarking opportunity. The following is a list of the vital few steps involved in benchmarking when applied to an Engineering College. These steps should be tailored based on college’s requirement, availability of facilities and the academic or other processes one is dealing with:

- A. Understand the college’s current process performance gaps. This will help decide what needs benchmarking.
- B. Obtain support and approval from the Management, Senior staff and administration. That approval and support will assist with eliminating roadblocks, providing adequate resources and expediting the benchmark-gathering process.
- C. Document benchmarking objectives and scope. This is a necessity for any project.
- D. Document the current process. Without up-to-date knowledge of the current process:
 - 1) Time and resources can be wasted collecting process documentation and data that already exists.
 - 2) The project may lack focus, purpose and/or depth.
 - 3) Benchmarking visits may appear to be random exercises in information-gathering.
 - 4) The team could select a partner whose performance is actually worse than that of its own institution.
 - 5) Collected benchmarking data will be difficult to compare “apples to apples” in terms of process requirements.
- E. *Agree on the primary metrics. Benchmarking measurements are used as the basis of many comparisons:*
 - 1) To determine the gap between current performance and that of partner organizations.
 - 2) To track progress from the present (with the current process) into the future.
 - 3) To track partners’ progress toward their goals.
 - 4) To determine superior performance with process improvements.
 - 5) Check your measurement system for efficacy:
 - a) These comparisons will be valid only if everyone participating in the study measures performance in exactly the same way – every time.

- b) It is important to make sure metrics are being established that potential benchmarking partners are probably already tracking or that can be easily derived from existing measurements.

F. The metrics should be put in writing. In particular:

- 1) What is being measured?
- 2) How the units of measure will be classified?
- 3) What should be included in the measurement?
- 4) What should not be included?
- 5) How to make any necessary calculations.
- 6) Examples of typical measurements.

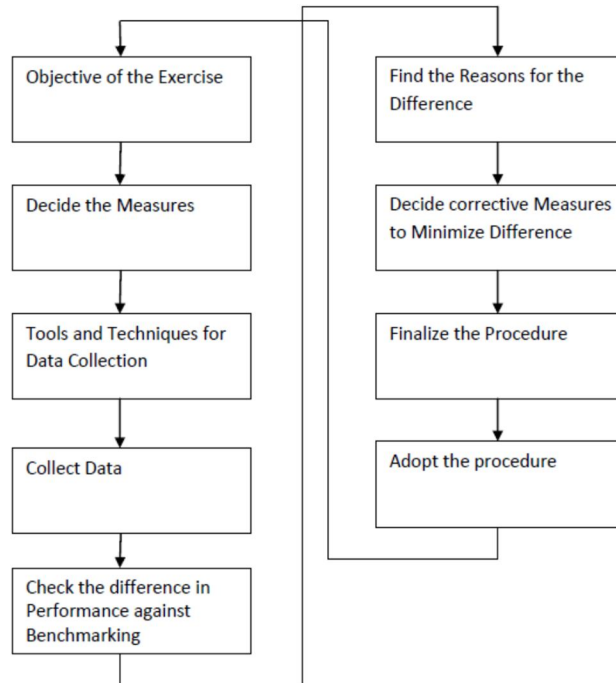


Fig. 6.1 Steps in Benchmarking

G. Agree on what to benchmark. Everyone must be in agreement on what to benchmark prior to any benchmark gathering initiative in order to:

- 1) Understand gaps of low performers.
- 2) Understand impact to students, staff, associates and shareholders.
- 3) Prioritize and select one to three metrics to benchmark.

H. Develop a data collection plan.

I. Identify research sources and initiate data gathering.

J. Design a screening survey to assist with partner selection. Characteristics of the survey are important:

- 1) Crisp focus on indicators of excellence
- 2) communicates the plans, objectives and resource requirements for the study
- 3) Reflects focus areas for subsequent in-depth questionnaires

K. Determine how to contact and screen other institutes.

L. Design a detailed survey to gather information.

M. Decide if gathered information meets original objectives.

N. Conduct a campus visit with the team.

- O. Apply the learning to performance gaps.
- P. Communicate to the top management to ensure continued support.
- Q. Develop a recommended implementation plan with process owner.
- R. Know when to update and recalibrate

VI. CONCLUSION

The primary recommendation within this paper is to apply the benchmarking against best practices in universities and colleges. Internal and External as well, benchmarking seems the suitable one for a Engineering college because it is about the self-improvement organization development, regardless of other institutions in the world. Many Engineering Colleges underlines a similar set of contextual factors that have affected the commercial sector, and which are increasingly likely to encourage more attention to the opportunities that benchmarking provides: interest in quality management continues to grow, often fuelled by governmental-and public concerns about graduate standards and value for money; financial pressures constantly require institutions to seek new ways of utilizing valuable resources; and in many countries new private universities or distance learning providers may stimulate competition with state funded institutions. However, the difficulties that many universities have experienced in attempting to use current output and input based statistical performance indicators should serve as a warning that the implementation of benchmarking will be anything but easy. Engineering colleges which are striving to be more competitive and world class, benchmarking remains as a useful support to get to know the status quo and to monitor the quality.

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