

Use of ICT for Enhancement of Quality Learning Outcomes

S.G. Deshmukh

Director, ABV-Indian Institute of Information Technology & Management, Gwalior

E-mail: director@iiitm.ac.in; Deshmukh.sg@gmail.com

ABSTRACT

In today's paradigm where learning has assumed a significant role, it becomes imperative that attempts be made to enhance the quality of such learning process. It is also important to define and measure the learning outcomes. ICT can act as an enabler in facilitating to realize the learning outcomes through an organized process framework using DMAIC.

It is recognized that ICT has helped immensely in establishing a good connect with both students and the subject matter. This also facilitates in a variety of outcomes such as team work, a better understanding of concepts and their applications to real life context. ICT coupled with DMAIC provides an interesting framework for enhancing the quality. An experience sharing while teaching a course on TQM with a student centric approach has provided the impetus to develop the proposed framework.

Keywords: Total Quality Management (TQM), Accreditation, ICT, Student-centric.

INTRODUCTION

Higher education Institutions have a responsibility to ensure that students acquire knowledge and develop higher-order intellectual skills appropriate to the level of the degree earned. This is especially true for institutes offering management related courses. It is imperative that such courses must ensure the development of core competencies including, good communication, analytical reasoning, and critical thinking besides a host of other skills.

A typical management programme offers an opportunity to enhance the above skills and also help develop attitudes through a variety of courses. It is expected that each such course must enable students to enlarge their experience zone from application point of view. It is also imperative that learning outcomes be measured and assessed. Accreditation templates offer an opportunity to do so. Student learning outcomes and their systematic assessment are mandatory components of such accreditation process. Quality has different perceptions, especially management related curriculum. It is envisaged that the quality of learning can be enhanced using ICT and allied tools

Good learning outcomes are not just routine administrative requirements as dictated by the accreditation process. The following are some of the advantages of articulating the learning outcomes:

1. Help clarify the thinking about what the course is aiming to achieve, thus providing a basis for a dialogue about what is taught and how it is to be taught (say in terms of its pedagogy, methodology and teacher-student interaction etc.).

2. Give clear indications to students about what the study entail, what they can be expected to do while studying on them, and how their learning will be assessed.
3. Provide a good basis for reviewing the effectiveness of the course and the teaching and learning support to promote student engagement.

It is interesting to note that the concepts of Total Quality Management (TQM) have become relevant driven by the competitive pressures and needs and aspirations of various stakeholders. [Deshmukh, 2006]. A lot of emphasis is being put on the quality and standard of education. It is being increasingly recognized that high quality of products and services are associated with customer satisfaction (in this context: students) and they are the key drivers for improvement. . Various concepts of Total Quality Management (TQM) are relevant in this context. To aid the successful implementation of enhancing the learning outcomes, ICT can be visualized as a strong enabler.

Quality in education can be visualized from various perspectives: Value addition in education; Fitness for purpose; and fitness of educational outcome and experience for use; and Conformance of education output to planned goals, specifications and requirements and defect avoidance in education process.

Sahney *et al.* [2004] define quality in education from a TQM perspective and conclude: Total quality management in education is multi-faceted - it believes in the foundation of an educational institution on a systems approach, implying a management system, a technical system and a social system. The quality of processes in the form of the learning and teaching activity; and the quality of outputs in the form of the enlightened students that move out of the system becomes important from learning outcome point of view. It may be noted that “quality” in education is a complex concept with varying perspectives and that is where the role of ICT assume significance [Thakkar, 2006a]. It is expected that the learning outcomes must be: measurable, manageable and meaningful. In each of these ICT plays an important role.

DMAIC FRAMEWORK FOR LEARNING OUTCOMES

A template can be visualized using the basic philosophy of six-sigma [Thakkar *et al.*, 2006b] to make the learning outcomes as measurable, manageable and meaningful. The application of Six Sigma starts with the recognition of a problem, and then systematically trying to understand and quantify the problem with a view to improve. The template can be developed using DMAIC, framework which stands for Define, Measure, Analyze, Improve and Control. These phases are defined further as:

1. **Define:** This phase involves the definition of the learning outcomes, using process map, application area where the subject matter is going to be used, desired improvement, likely benefits, etc. The importance lies in having the chance of a high successful delivery of better quality and enhancing the quality skill set of learners. It will help in defining the instructional process with the learning objectives and outcomes.
2. **Measure:** This phase involves the analysis of the process to determine its present state (i.e. before the delivery of the course content) and the desired future state (i.e. after the delivery of the course. Emphasis on data collection is one of the main components of this phase, various quantitative measures can be utilized for this. This phase will help in measuring the learning outcomes in quantifiable terms.

3. **Analyze:** This phase involves the data analysis for identification of parts of process which affect the quality of the learning outcomes. This may involve drawing of flow charts/cause effect diagrams and other quality improvement tools to analyze the typical learning outcomes. This phase will help in analyzing student learning by statistical process.
4. **Improve:** This phase adds value to the process to enhance the desired learning outcomes. This may involve a variety of approaches using ICT so that the engagement of students becomes meaningful and active. Student learning based on the data analysis will help in improvement.
5. **Control:** This phase involves the process of closing the cycle by putting in the right procedures, initiatives and appropriate quantifiable statistics. This phase also helps in institutionalizing the process and also transferring the know-how to other courses as well.

It is expected that implementation of the above template will help in enhancing the quality of learning outcomes.

ICT AS A TOOL FOR LEARNING OUTCOMES

ICT is recognized as an effective tool for learning. It offers immense opportunities to make the learning process interesting and engaging. When they are well implemented, instructional courseware, digital content and other electronic learning resources can help meet intermediary goals that can lead to improved student achievement, making technology an essential tool in teaching and learning. The DMAIC template can make use of various ICT tools for enhancing its effectiveness. ICT resources—in addition to being learner appropriate, aligned to standards as expected in an accreditation process, and built around effective pedagogy and instructional design can provide many educational benefits, including:

1. Engaging students through multi-media, interactive content;
2. Strengthening understanding and thinking skills through exploration, collaboration and creation;
3. Keeping knowledge current and information accurate;
4. Integrating testing and classroom management tools, thus allowing real-time tracking of student performance to inform instruction and provide accountability.

Table 1 helps in appreciating the role of ICT in DMAIC framework.

Table 1: Role of ICT in DMAIC

<i>pn</i>	<i>Phase</i>	<i>Brief use of ICT</i>	<i>Remarks</i>
a.	Define	Use of multi-media content(Youtubeetc,) class room engagement through case studies, field studies where IT can be used	Helps in defining sharpened learning outcomes (measurable and manageable) Collaborative social tools helped in understanding the team work group motivation
b.	Measure	Adoption of various web based or on line statistical tools., use of LMS (learning Management System)	Assists in quantifying and assessing the learning outcomes
c.	Analyze	Use of simple statistical tools	Aids in analyzing the outcomes and reviewing the same. The PDCA cycle helps in this

<i>pn</i>	<i>Phase</i>	<i>Brief use of ICT</i>	<i>Remarks</i>
d.	Improve	Use of feedback through social media	Helps in identifying direction for improvement. The change in behavior and attitude change can be noticed
e.	Control	Standardizing the outcomes ones the stability is ensured. This can be done by extensive documentation which could be IT enabled	Facilitates in transferring the process know-how to other courses

APPLICATION OF THE TEMPLATE AND INSIGHTS GAINED

The ICT as a tool using the DMAIC framework was utilized while administering the course at IIT Delhi. The course is called as “. MEL420: Total Quality Management”. An attempt was made to define the learning outcomes vis-à-vis the process of teaching-learning [Deshmukh, 2010]. It was found that:

1. Students appreciated the application part when it was linked with actual field studies,
2. Hands-on experience helped in understanding the basic tenets of the course.
3. Mere theoretical concepts such as team work, leadership, motivation found new meaning when it was actually experienced by students in settings to which they could easily connect (such as hostel, mess, academic section, library etc.)

In each of the above context, the ICT played a significant role. ICT support was provided in terms of video content (youtube, films etc.), Social media (Facebook: course pages), and through peer to peer interaction. A connect was easily established which helped in establishing a good rapport.. Typically the learning outcomes are capture through:

- Capstone projects
- Samples of student work
- Project-embedded assessment
- Observations of student behavior during the group assignment)
- Performance on a case study/problem
- Pre-and post-tests.

The following insights were gained making use of ICT:

1. The emphasis of a typical educational process is to be based on learning methodology rather than teaching-based programs. In this process, the classroom would be equipped with the ICT tools and the teacher (or rather a facilitator) is visualized to be acting as a guide for the team of students. This would enable the students to share knowledge and experience among each other and hence the quality of the learning outcomes would improve. The learning process can be evaluated by means of continuous feedback (CF) from students where again the role of ICT becomes important.
2. Various principles of TQM such as Leadership, Continuous improvement, Customer Focus, and Teamwork are closely related to one another. Continuous improvement is required to achieve higher student satisfaction, and it is most effective when driven by being student centric rather than

teacher centric. The continuous improvement transcend hierarchical, functional and organizational boundaries, therefore, teamwork is essential. These measures help in assessing the quality of outcomes.

3. The DMAIC format offers a viable template wherein the learning outcomes can be continuously mapped and measured for improvement.

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Dr. S.G. Deshmukh

Director, ABV-Indian Institute of Information Technology & Management, Gwalior



Dr. S.G. Deshmukh is currently a professor in the department of Mechanical Engineering at IIT Delhi. He earned his B Tech, M. Tech and Ph D from IIT Bombay. He has more than 16 years of teaching and research experience. He has authored/Co-authored 3 books including a book on Supply Chain Management. He has been a consultant to many leading organizations. His research interest includes operations management including modeling and analysis of supply chain and quality issues and has publications in journals of repute. He is on the editorial

board of international journals such as International Journal of Systems and Engineering, Value Chain Management, and West Indian Journal of Engineering. He has been coordinator of Applied Systems and Research Programme, and Quality Improvement Programme at IIT Delhi.

Dr. S.G. Deshmukh is affiliated with IIIE, ISME, POMS, NCQM and other professional societies.