

Re-engineering the MIS Capstone Course: Continuously Improving the Learning Process

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Abstract

Over a three year period, I applied the theories of Total Quality (TQ), specifically, Business Process Re-engineering (BPR) and Continuous Improvement (CI) to improve a course syllabus based upon my observations of the student learning process (in a MSMIS Capstone project course in which each student re-engineers a process from their workplace). In the first year, I made the observations personally. During the last two years, I have had students look back on their semester-long learning experience and submit a re-engineered syllabus (in the form of a take-home final). Rather than radically re-engineering the syllabus, student submissions exemplify recommendations of improvements. Not only does the magnitude of the input vastly improve the syllabus, but students gain experience with CI. This experience, in addition to their BPR projects, enable them to better understand the differences between BPR and CI. A sample syllabus and reference list are included with a discussion of the process.

Keywords: IS Education, BPR Training, Reengineering, Total Quality, Continuous Improvement, Collaborative Learning, Self-Directed Learning

1. PURPOSE AND CONTEXT

Organizations recognize the need to restructure their business practices to become more customer-focused. To accomplish this, two organizational development models dominate -- namely, Total Quality management (TQ) and Business Process Re-engineering (BPR). BPR can be used to radically change a company's practices, making them more innovative and improving the utilization of technology (Davenport 1995, 1992; Hammer and Champy 1993a, 1993b; Hammer 1990; Johansson 1994; Roberts 1994). TQ can then be used to continuously improve the company in years to come through best practices for continuous improvement and customer satisfaction (Jarrar, 1999; Alemi, 1996; Caudron, 1993).

Initial Goal: *Apply TQ techniques to continuously improve the quality of the MIS Course and its syllabus.*

I have been teaching the MIS Capstone course each semester since 1997. At the end of each semester I

would re-engineered the syllabus to better match my observations of the ways students learned and applied new concepts. This primarily involved adjusting the order of the required readings and incorporating new ones that I found or that students had indicated. Also, at this time, minor editorial changes were made to clarify instructions and expectations for course performance.

Subsequent Goal: *Routinely improve the MIS Capstone course/syllabus with student-driven suggestions collected at course completion, after individual projects are completed.*

Why not collect student input to strengthen the course syllabus? Aren't twenty heads better than one? Upon completion of this course everyone is quite familiar with the concepts and current literature of BPR and TQ and can offer concrete suggestions to improve the quality and order of the readings, re-apportioning grade components to align perceived effort with grade, and recommend different learning paradigms for classroom experiences.

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2. BACKGROUND OF TOTAL QUALITY (TQ)

TQ transforms the way an organization manages. It involves a managerial focus on the continuous improvement of all operations, functions and, above all, work processes. TQ includes the combination of the teachings of W. E. Deming and J. M. Juran (which focused on statistical process control and group problem-solving processes). Deming's 14-points for management emphasized the importance of striving continuously to improve how a firm operates and the quality of its goods and services as a never-ending process. Japanese manufacturers adopted and implemented Deming's and Juran's ideas on quality and continuous improvement before firms in the USA did so. Some of the basic principles of TQ are:

- It must be *customer-driven*,
- There must be total organizational *commitment* to it,
- Emphasis must be on problem prevention, not problem detection,
- Emphasis on quality improvement must be *continuous*, consistent and persistent,
- Focus must be on discrete areas of activities or processes that, when taken together, make a significant *contribution to the quality of the ultimate goods or services that the organization was created to provide, and*
- Quality *improvement* must be *measurable*.

3. WHAT IS THE MIS CAPSTONE COURSE?

As in most MIS programs, the Capstone is usually the last required course in which the student is typically challenged to apply concepts and techniques learned throughout the program. In our case, these are four technical and two managerial graduate-level prerequisite courses. This capstone experience is an individual, semester-long re-engineering project. Students choose a critical business process from their workplace. They document their recommendation in the format of a Request for Funding, targeted to the senior MIS management team. This report contains managerial analyses of the benefits, impact and opportunities along with detailed narrative descriptions and process flow diagrams (produced using Computer-Assisted Software Engineering, also known as CASE tools). We utilize this project experience to prepare our MS/MIS graduates to meet the increasing demand for MIS professionals who can influence and strategically lead the adoption of MIS in their organizations by successfully communicating their vision.

4. DATA COLLECTION

In a Take-home Final Examination (to be hand delivered to class the following week):

1. **View the syllabus as a map** of the learning process for this course. (A process in which they were introduced to concepts of BPR/TQM which they applied to identify a process in their workplace to re-engineer and then to submit their proposed re-engineered process in the format of a Request For Funds.)
2. **Re-engineer the course/syllabus** to better match the order in which they applied knowledge gained from the required readings and any other readings used. Any, or all, of the deliverables of the course can be changed as can their descriptions and their weight in the calculation of the semester grade.

5. ANALYSIS OF DATA

From the student-driven suggestions, I have been able to improve the syllabus in ways that would not have been possible without their input. Improvements were realized through the broadening of the materials to be covered, and through the re-structuring of classtime to allow for students to learn from and interact with classroom visitors and for students to practice their team effectiveness skills by collaborating on a team presentation. I will address each of these areas separately.

Course Materials

At first, I was surprised that the student-driven syllabi required even more weekly reading than I had assigned (which, even I admit, is a heavy load). The vast majority of students either substituted a book they found and preferred over one of original texts, or added additional readings into the original requirements. This has become the norm. I can only cite two occasions when the student input did not offer any practical improvements. In one case, a student indicated that the syllabus needed no improvement. In the other case, the student suggested that the course (unchanged) should run for two terms. Incidentally, both these students repeated the course.

Classroom Learning Experience

I have also learned about what our students value in this course and am proud and highly respectful of these values. Among the things our students value are opportunities:

- for collaborative learning which occurs during project "round-robins" as well as in the expected

- small group and class-wide discussions
- to practice their oral presentation skills and become comfortable presenting to increasing numbers of people, first as the member of a team and ultimately independently to a panel of judges made up of the professor and several CIO's and MS/MIS program alumni.
- to practice their team building skills through team activities associated with their in-class presentation of the tools and techniques of process diagramming.

Recognizing these values, I continue to allocate additional time in class for students to collaboratively and critically analyze the course materials, to walk through each others project "in-progress", to speak up spontaneously in class and to deliver presentations they have prepared.

Classroom Visitors

Students expressed an interest in having more connections to the "real world" brought into the classroom environment and have suggested practical ways to accomplish this.

- Invite a recent MS/MIS graduate to visit our class and to present the BPR project they had completed when they took the Capstone. This visit should occur within the first three weeks of class and should be scheduled to last 45 minutes (15 for the presentation and 30 minutes of questions and answers and interaction). This would provide early clarification of the substance and quality of the final project they must deliver.
- Invite a senior-level IS Professional to discuss some of the current challenges facing "upwardly mobile" IS professionals. This visit should be scheduled for the first hour of class in mid-semester. This would not only help students to focus more realistically on their personal career goals and expectations, but may also provide an opportunity for future career networking.

Ideally, each of these visitors would serve later on the panel of judges evaluating individual performance on oral presentations of their re-engineered project. Not only would previously meeting some of the judges ease some of the building anxieties about the final presentation, but having contact with practicing professionals is a vital link to the future for these students.

In-Class Presentation

Students suggested that they would benefit from a process diagramming tools and techniques "refresher" (in-depth coverage and application is covered in pre-requisite coursework) and from analyses of

commercially available Computer-Assisted-Software-Engineering (CASE) tools used by organizations. These topics could best be introduced as team presentations or briefings with handouts (or downloadable information posted to a class Website).

Until now, classroom de-briefings were predominantly done on an individual basis. Past de-briefings have covered a variety of timely topics, including retaining and recruiting IS professionals, on-line recruiting, distance learning, using firewalls to safeguard corporate data resources. Although an awareness of these issues and how to manage them is important, the benefit of this knowledge is not immediate. In a class of 20 students even limiting the presentation to 5 minutes with a 5-10 minute discussion following, 4-5 hours of classtime can easily be used.

Classroom visits and team "refresher" presentations can more effectively use classtime previous spent listening to not-so-interesting/not-so-well-presented individual briefings. These new experiences would strengthen the students skills as they prepare for their presentation and as they collect information as participants in the audience to a presentation.

6. RESULTS OF ANALYSIS

Using the information gathered using this approach, I have been able to continuously improve the quality and relevancy of the Capstone course by incorporating additional references suggested by students found either in print or on the World Wide Web. Also, I have been able to better balance the workload with grade components, to clarify the terminology used to describe course requirements, and to editorially correct the syllabus. An up-to-date list of references and resources is attached and will be updated on my Home Page.

But the efficiencies-of-scale are realized when the student-driven suggestions for improving the syllabus are incorporated into a new course syllabus for the upcoming term. Providing students with more connections to the "real world" will be brought into the classroom environment. Presentations can certainly focus on process diagramming techniques and CASE tools and can be prepared and presented as team rather than individual efforts. A sample syllabus is attached. My Home Page will contain the evolving versions of this syllabus.

7. DISCUSSION/FINDINGS

This paper shows how theories of Total Quality and, specifically, Process Re-engineering and Continuous Improvement can be applied to student learning and the

design of course syllabi. Furthermore, student suggestions can be collected and combined with those of the instructor to continuously improve the relevancy and quality of a leading-edge course and its associated classroom activities.

From the perspective of the student learning experience, there are two positive outcomes:

1. Students gain personal experience with Continuous Improvement by looking back at their personal learning experiences and re-designing a course syllabus. Having used both BPR and CI in this course, students now understand the differences between them.
2. Students are empowered to transition to a more autonomous learning style required of them (D. Lieberman, 1991). Having applied the TQ mindset to their learning process, each student considers how they learned something new and applied this knowledge (i.e., meta-knowledge) to solve a workplace problem. In so doing, they become more aware of how learning occurs. In the MIS profession, technology managers must keep abreast of ever-changing technologies and ways to manage them. The attitude of a lifetime, self-led learner is required. This is especially important for those earning an MS degree, the receipt of which is very likely to mark an end to their formal, instructor-led education.

Generalizability of Results Whether and to what extent the approach discussed in this paper can be generalized to different learning environments remains the subject of future research. My observations lead me to conclude that MIS professors and trainers can personally improve the quality of a BPR/TQ course by applying the TQ mindset, such as I did in the first year that I taught the Capstone course. I also believe that anyone can improve the quality and relevance of any course they teach if they are familiar with and apply the Process Mapping techniques of TQ. However, the general utilization of the student-driven portion of this approach may be limited to this cohort of uniquely trained, highly motivated, mature graduate-level students. The student cohort in this paper is special in many ways:

1. The concepts of BPR and TQ are the focus and substance of this course. Therefore, no additional course content needs to be introduced for the students to view the processes they used to learn and apply the course material and to develop a re-engineered syllabus.
2. They are mature, graduate level students. They are completing a thirty-credit interdisciplinary MS in MIS. The vast majority have a minimum of two years of work experience (many have more) and many are already doing MIS-related work.
3. This course is their last scholastic hurdle before the awarding of the degree. Knowing that the quality and timeliness of their assignments will determine

whether or not they will pass creates a highly "motivated" performer.

4. The student data was collected in the format of a take-home Final Examination which was considered part of the course grade.
5. Class size is limited to 20 students. This enables extensive classroom interaction and student bonding (for future networking situations). It also allows for the formation of four 5-member teams.

The absence of any of these factors can conceptually limit the ability to add the student-driven component to this approach. Whether MIS faculty teaching undergraduate MIS majors can apply this approach after a limited in-class "briefing" of the TQ process of Continuous Improvement is one area for future consideration. How to collect student-driven improvements for a BPR training course, offered by a corporation to their employees without performance grading, appears very challenging and problematic.

8. CONCLUSIONS

This paper shows how theories of Total Quality and, specifically, Process Re-engineering and Continuous Improvement can be applied to student learning and the design of course syllabi. Using the information gathered using this approach, I have been able to continue to improve the quality and relevancy of the Capstone course by incorporating additional references suggested by students found either in print or on the World Wide Web. Also, I have been able to better balance the workload with grade components, to clarify the terminology used to describe course requirements and my expectations of performance, and to editorially correct the syllabus.

In a Take-home Final Examination, students are required to re-engineer the course/syllabus to better match the order in which they applied knowledge

gained from the required readings and any other readings used.

From the student-driven suggestions, I have been able to improve the syllabus in ways that would not have been possible without their input. Improvements were realized through the broadening of the materials to be covered, and through the re-structuring of classtime to allow for students to learn from and interact with classroom visitors and for students to practice their team effectiveness skills by collaborating on a team presented "refresher". These new experiences more actively engage students and, at the same time, strengthen their skills as they prepare for their presentation and as they

collect information as participant in the audience to a presentation.

9. REFERENCES

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SAMPLE SYLLABUS

MIS CAPSTONE (MIS 5305)

KEAN UNIVERSITY,NJ

FALL SEMESTER

REQUIRED TEXTS:

- (W) Wysocki, Robert and Robert DeMichiell, Managing Information Across the Enterprise.

- Wiley, 1997 (ISBN 0-471-12719-1).
 (R) Roberts, Lon. Process Reengineering: The Key to Achieving Breakthrough Success.
 ASQC Press, 1994 (ISBN 0-873-89274-7).

REQUIRED HANDOUTS

- (J) Johansson, et al. Business Process Reengineering (on reserve in Kean library).
 Chapter 5 (Searching for Breakpoints) and Appendix (Process Mapping).
 (SM) Journal of Systems Management articles by Fischer and by May.
 (HBR) Harvard Business Review by Hammer (1990) and by Kotter (1995)

REFERENCE MATERIALS (on reserve in Kean library)

- (M) Manganelli, Raymond et al., The Reengineering Handbook: A Step-by-Step Guide to Business
 Transformation, AMACOM, 1994,(ISBN 0-8144-7923-5)
 (WBD) Whitten, Bentley and Dittman. Systems Analysis and
 Design Methods, Fourth edition. Chapter 10 (Physical Data Flows) and Chapter 6 (Process Mapping).

<u>Due Date</u>	<u>Topic</u>	<u>Assignment/Readings</u>
Week 1	Introduction	
Week 2	Enabling the Enterprise Process Reengineering	W1,W2,<W3,W-Epilog> Hammer, SM-Fischer NOTATION: W1 means chapter 1 of Wysocki text, see listing of textbooks for other book abbreviations. Chapters grouped inside <>, are treated as one collective reading.
Week 3	Re-Designing Bus. Processes <i>Guest Speaker -- MS/MIS Alumni presenting their Capstone Project (Business attire recommended for Weeks 3, 9, and 12 when we have guests)</i>	<R1-R4>,W7(149-165),W8
Week 4	Teams 1 & 2 Presentations – Process Diagramming Techniques (Refresher) Process Mapping	R8, <WBD,J-App> *** Submit initial version Level 0 & 1 Process Flow Diagrams of CURRENT Processes Suggested symbol set: Gane and Sarson. Suggested Diagramming tool: System Architect Bring copies for your teammates to review during mini “round-robins”.
Week 5	Teams 3 & 4 Presentations – Analyses of commercially-available CASE tools used by organizations *** Submit corrected version Level 0 & 1 Process Flow Diagrams of CURRENT Processes Bring (20) copies for your classmates to review during “round-robins” .	
Week 6	Breakpoints and other strategies ***Submit a summary of Breakpoints as in J5(Fig.5-5)	W4,R10,J5
Week 7	***Submit and Level 0 & 1 Process Flow Diagrams of RE-ENGINEERED Processes. Again, bring copies for “round-robins”.	
Week 8	The Human-side and Transitions Creating the New Work Environment	<Kotter,R11,W9> SM-May
Week 9	Service Role of IT <i>Guest Speaker – Senior-level IS Executive . (Business attire recommended)</i>	W10
Week 10	IT, the End-user and Support	W13,W14
Week 11	Work on projects and presentations with classmates	
Week 12	*** Written BPR Analysis term Projects due. Bring two transparencies for a <i>five-minute in-class briefing to a panel of Senior IS Executives and MS/MIS Alumni.</i> (Business attire is expected.)	
Week 13	In-class critique/de-briefing of last week’s presentations. *** Pick up Take-home Comprehensive Final	
Week 14	***Deliver your completed Final to me in class.	