Teaching Operations Management for MBAs:

Rationale of and Experiences with Online Course Delivery

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Abstract

The paper describes the author's approach to and experiences with delivering the core Operations Management course in Kelley Direct's (Indiana University) online MBA program. The emphasis is on showing ways to maintain, or even enhance, the interactive nature of traditional course deliveries of day MBA programs and provide better student feedback and evaluation than face-to-face courses. The factors of interactivity, transparency, and measurement of the students' online activities also serve as tacit factors of sustainable competitive advantage in a rapidly growing market of online MBA offerings.

Keywords: Online teaching, Operations Management, Resource-based view of organizations.

1. Introduction

In the last couple years, the landscape of higher education has changed dramatically. One of the forces behind these changes was the growing importance of the Internet and its increased and varied use in the classroom. The traditional structure of higher education and its content delivery was further challenged by new competitors who operated outside of the academic environment and presented a more business-oriented model to education and training.

The largest and most successful of these competitors is the University of Phoenix (http://www.phoenix.edu/). Founded in 1976, it is the largest private university in the United States with over 17,200 instructors, 128 campuses and Internet delivery worldwide. Since its foundation, more than 171,600 working professionals have earned degrees from the University of Phoenix. The University of Phoenix has over 8,000 instructors on their online faculty; most of them are working as CEOs, CFOs, CIOs, supervisors, managers, business owners and executives and teach online in the evenings. As the university's website puts it: "They know what it takes to manage a staff, manufacture a product, market a company, and make a profit. They can share and discuss the latest proven industry theories and techniques. Which means everything you learn in this program can be immediately applied to your career success." Their business model proved to be very successful and provided a viable alternative to the traditional universities.

Kelley School of Business, Indiana University was among the first business schools that caught up with the new wave of educational offerings. The Kelley Direct (KD) Online MBA Program (www.kd.iu.edu) was established in 1999 as one of the four MBA programs offered by the Kelley School of Business. Philosophically, KD grew out of the evening MBA program offered on the IUPUI (Indiana University Purdue University Indianapolis) campus. KD's MBA is a 48-credit hour program where 39 credits are required and nine credits are elective. The program is designed to be two-year long based on an academic quarter system. Typically, students enroll in two three-credit courses per twelve-week quarter. The academic experience for the students start with an intensive one-week In-Residence program, after which all courses are web-based. Angel from Cyber Learning Labs (http://cyberlearninglabs.com/) is used as course management system. KD offers both public (open to everyone) and corporate (sponsored by General Motors, United Technologies, and John Deere, for example) programs. Student enrollment in the public programs grew from just 15 in 2000 to 140 in 2003. The current total enrollment of KD exceeds 800 students. A typical KD student has the following profile: 640-650 GMAT score, 31-32 years of age, 8-10 years of work experience, and 3.3 undergraduate GPA.

KD's teaching pedagogy is centered on three principles: 1. High emphasis on faculty-student and student-student interactivity; 2. Mostly asynchronous instruction; 3. Use of business case analysis as the preferred teaching method. These principles reflect current thinking in designing online courses and echo the suggestions by Ehrman and Collins (2001) to enhance student interaction through computer communication.

During my two years of teaching online Operations Management in KD, I taught this course in six quarters and had about 240 students in multiple sections representing both public and corporate programs. While online teaching is perceived by many as requiring less work than traditional courses, the reality is different; these courses can easily overwhelm the uninitiated. Laird (2003) tells a story that illustrates the pressures and demands of an online course: “However, I am still troubled by the e-mail message from an online student that began, "I know you are at your father's funeral right now, but I just wondered if you got my paper." Surely, he hesitated before pushing "send," but his need for reassurance prevailed. And so it goes, all semester long. There simply isn't room in an online class for the messiness of ordinary life, the students' or mine. Nor is there room for the extraordinary -- the events of September 11, for example. As long as the server functions, the course is always on, bearing down hard on both students and instructor.”

The goal of the paper is to show the tools I used and developed to achieve KD’s pedagogical principles and provide an interactive learning environment. The paper is structured as follows: Section 2 outlines the course set-up, Section 3 focuses on success factors and their implementation in the course. Section 4 concludes the paper by linking the success factors to the resource-based view of organizations.

2. Operations Management Online: Course Set-Up

The course is a survey course in Operations Management covering diverse activities both in manufacturing and service settings and including topics of process analysis, workforce

issues, materials management, production planning, quality and productivity, technology, and strategic planning, together with relevant analytical techniques. The 12-week course is divided into six two-week segments with assigned topics, readings, exercises, and case discussions for each segment. Generally, each two-week segment starts on Sunday and the students spend the first couple days with preparation. The discussion forums are typically opened on Friday, with 2-3 cases under discussion simultaneously, and closed the next Saturday.

In this online course, the case discussion forums serve as classrooms; the discussions or class participation will take place in these forums. Like in face-to-face teaching, the classrooms are opened and closed at certain times and I use similar rules. Also, the forums are for discussions where everybody has to listen to (read) what the others said (wrote) and respond accordingly over a period of 9-10 days. My stated expectation for a good contribution is that a student will say/write something meaningful about each case (although not necessarily in all questions related to the case). If a student contributes, let's say, to half of the cases discussed then clearly there is not enough "quantity" to justify a "quality" grade. A meaningful contribution is when a contribution is made to the learning of everyone involved by answering the question posed, carrying out and sharing supporting calculations, suggesting alternative ways of looking at the problem, providing examples and personal stories related to the topics discussed, etc. Repeating the same facts, arguments over and over again is redundant (the class equivalent of this behavior would be monopolizing the air time) and will not help the student's grade. Also, I value brevity (one or two paragraphs per post) in forum postings very much and

encourage students to post shorter, more focused comments.

I require three course materials that each student has to buy: 1. A case packet of 14-16 business cases; 2. A textbook (Raturi, A. S., and Evans, J. R., Principles of Operations Management. Thomson/South-Western: Mason, OH. 2005.); 3. A simulation software (www.mbe-simulations.com) illustrating the difficulties and complexities of managing a fictitious small company. The business cases are structured around the major topics in the book, while the simulation serves as an integrating theme. There are four activities of learning that the students' progress is measured on: problem set (15% weight), paper (15%), simulation (35%), and case discussions (35%).

The purpose of the problem set is to reinforce some of the "arithmetics" that are useful in analyzing operational problems. It is a team activity, teams of students may turn in a single, joint assignment. In the course, all teams are self-selected and team membership is transparent; the students are signing up through the Teambuilder tool.

The paper is an individual assignment. It can be a small case or situation from real life, together with a discussion that shows a solution of the student's own to the problem posed. Here any type of operations management problem can be chosen as the intention of the paper is to go beyond the cases by covering the conceptualization phase of problem solving through presenting the context as the student sees it and then work out a solution to the problem. The cases we discuss present information and the problem context through the eyes of the author of the case. The intention of the paper assignment

is to present the context (give relevant details) and then work out a solution. The paper can be on any situation the student is familiar with; it does not have to be a "serious" one. For example, one of the best papers in the past was on redesigning the layout of the company cafeteria. The paper included the current layout, flow of people, capacities, bottlenecks, distances, time measurements (the student had lunch there every day and was upset by the long lines), and proposed a new layout.

The MERP dynamic case studies (simulation software) cover the full supply chain of a fictitious company and present problems through marketing, production, purchasing, finance, and management views of the company. Teams of students have to manage this fictitious company for a year and make a variety of decisions in the areas mentioned. The success of their management activities are measured both by their numerical results (profit, cash on hand, and reputation level) and by the actions they have taken. The profit earned (the more, the better) is the primary measure of success, while the others serve as qualifiers (at the end of the simulation, they have to have positive cash on hand and minimum 70% reputation). The "quality" of the students' decision-making is also evaluated to avoid successes based on "enronization" practices.

Based on my experience and students feedback, these activities are, conceptually, very similar to the modern pentathlon (http://www.modern-pentathlon.com/) where participants compete in five events in one grueling day. Baron Pierre de Coubertin believed that this event, above all others, "tested an athlete's moral qualities as much as their physical resources and skills, producing thereby the ideal, complete athlete."

Considering the demands on their time (most of our students are working full time), the quarter seems like one long grueling day with four, distinctly different activities. At the end of the "competition," the winners will get an "A" but even those who did not "win" learned something and they can keep Baron De Coubertin's famous saying in mind: "The important thing in life is not the victory but the contest; the essential thing is not to have won but to have fought well." The number of victors, like in the Olympic Games, is regulated: the *Kelley Direct MBA Grading Policy* specifies grading guidelines and a target grade distribution.

3. Success Factors: **Interactivity, Transparency, and Measurement**

In the course delivery, I emphasize three factors, three interrelated elements of success that are closely linked to KD's educational philosophy. These factors are *interactivity*, *transparency*, and *measurement*. I take the fourth factor, the course delivery system supporting the above factors of success, for granted but it may not always be the case.

Interactivity is fostered through the case discussion forums and team assignments. Considering the work experience our students have, I always had some resident experts on almost any topic (several General Motors students were Quality Engineers, for example) and by creating an environment where they can share their experiences contributed to everybody's learning.

Transparency is an important element of all education; the students have to know where

they stand in the class and what they can do to improve their standing. Without *measurement*, however, transparency is not worth much. Grading is the most important part of measurement but the students, in addition to the final standing/grade, should also know how they are doing during the course.

After each segment, I will provide a cumulative feedback on class participation. In the feedbacks, the students' postings are measured on two dimensions: the total number of messages posted and the average perceived "quality" of the posts. Considering that the class is graded on a relative scale where grades are determined by the students' relative positions, students find it useful to know "where they stand." This graph is a broad-brush picture but it also shows which dimension a student has to improve on to move to the upper right corner. In the "translation" of this two-dimensional graph into one-dimensional class participation points, the weight assigned to the quality of the participation is about twice as large as the weight given to quantity. Additionally, I consider several other factors (like contributions in all segments, low variability of the posts, upward trend, etc.).

At half-time, in Feedback 3, I will provide point values attached to the positions on the graph. The students are identified by their two-digit randomly generated code that is known only to them. The general principles behind assigning points are quite simple: 1. No contribution (that is no post) is worth zero points; 2. "Average" contributions (that is around the median posts and scores) are awarded with "average" number of points (that is about 85% of the points for class discussions); 3. Top contributions (above the upper

quartile) are given top points. Figure 1 is an illustration for a typical mid-term class contribution feedback. The dotted lines denote the lower and upper quartiles. The figure on the left shows the cumulative scores, the figure on the right is for the last segment.

Insert Figure 1 about here.

The total number of posts in a section of maximum 40 students, depending on the number of students and activity levels, ranged from 900+ to 1,800+. Handling this volume and providing meaningful feedbacks are impossible without a measurement system in place.

In the simulation, the students have to work with three scenarios that differ in customer segmentation (small individual customers and/or clients with long-term contracts), and product routings (flow shops and job shops). In the evaluation, assuming that all qualifiers are met, the profit earned is given 80% weight, while 20% of the score is based on the quality of decision-making. Figure 2 describes the relationship between profit and points for one of the scenarios. The regression line shown is a LOWESS (or LOESS) locally weighted regression (Cleveland, 1979); it is for illustration purposes only, the points calculations are based on linear functions as described below.

Insert Figure 2 about here.

The idea behind assigning points to the profit earned is as follows. First, the profit range is divided into three segments: upper, middle, and bottom. In each segment, a linear

function describes the relationship between the profit earned and points given. This function is steep in the middle and relatively flat at the tails, so the differentiation among the top/low performers is less than among those who are in the middle. However, Figure 2 also shows that submissions with the same profit received different point scores. These fluctuations are due to differences in their quality of decision-making scores.

At half-time and at the end of the course, a quantile plot is distributed that shows how the students stack up. This quantile plot also serves as a basis for grade assignment. Figure 3 shows the grade distribution of a class (different from the earlier examples) with a 3.51 grade point average.

Insert Figure 3 about here.

4. Conclusions: Strategy and Barriers to Entry

Strategies for educational offerings (what program to offer and to what market) require an external or market-based orientation; these are the changes that take place in the external environment of the company. The proliferation of online courses was, to a great extent, the result of changes in external environment that the universities adapted to by changing, modifying their strategies. Traditionally, strategic decisions were thought of as "big decisions" made by general managers or presidents. However, it turned out that big strategic decisions may not be the only source of competitive advantage for the firm. As Barney (1995: 61) wrote: "Recent work on lean manufacturing suggests that it is the

simultaneous combination of several factors that enables a manufacturing facility to be both very high quality and very low cost. ... This complicated system of numerous interrelated, mutually supporting small decisions is difficult to describe, and even more difficult to imitate, and thus a source of sustained competitive advantage." He contrasted big and small decisions further (pages 61 and 62): "Recognizing that small decisions may be more important for understanding competitive advantages than big decisions suggests that the study of strategy implementation—the process by which big decisions are translated into operational reality—may be more important for understanding competitive advantage than the study of strategy formulation."

The strategy expressed as a combination of a few "big" and hundreds of "small" decisions leads to setting up priorities for improving operational practices and consequently it leads to investments in various programs. In case of Kelley Direct, the initiative (the big idea so to speak) came from a faculty member and his idea was implemented in a remarkably short period of time. In the following years, the priorities set stayed remarkably close to the original vision and pedagogy. The decision to emphasize interaction-based learning where learning may come not only from the Instructor but from all members of the group, proves the most difficult barrier to entry in the upper echelons of online education. Those online offerings that are based on a"push" model of sending and returning assignments are relatively easy to copy because they are standardized and can be bought off-the shelf. However, if a "push-pull" model is used then interactivity and its supporting infrastructure may serve as hard-to-replicate and tacit factors of sustained competitive advantage.

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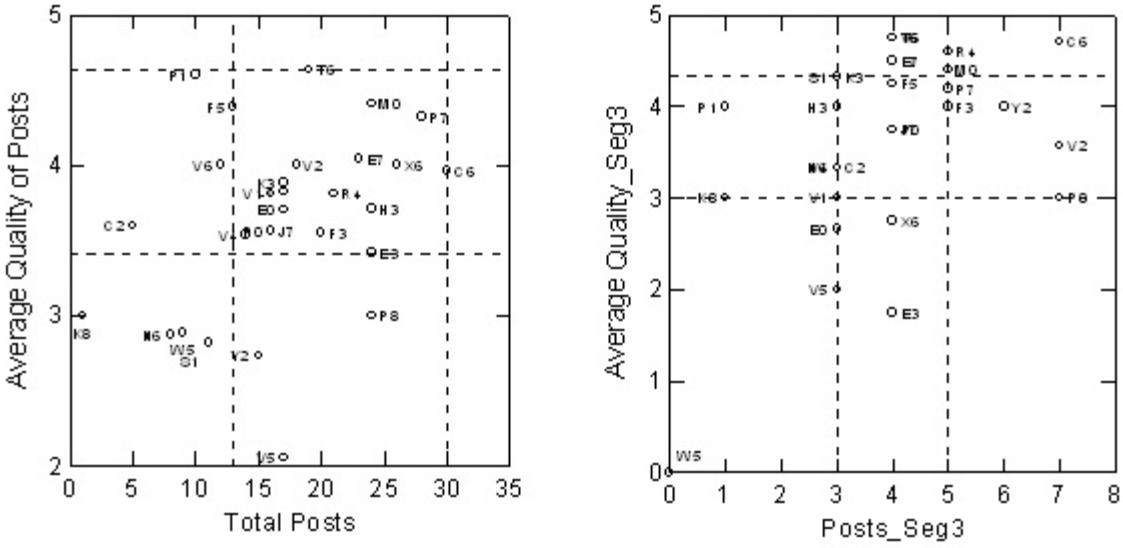
Figure 1. Case Discussion Feedback



Code	Points	Score	Points
C2	265	P0	295
C6	350	P1	335
E0	305	P7	350
E3	300	P8	285
E7	340	R4	325
F3	300	S1	235
F5	335	T6	350
H3	320	V1	305
J7	295	V2	325
K3	315	V4	285
K8	180	V5	215
L7	315	V6	310
M0	350	W5	230
N6	230	X6	345
--	--	Y2	245

Figure 2. MERP TS100 Simulation Results

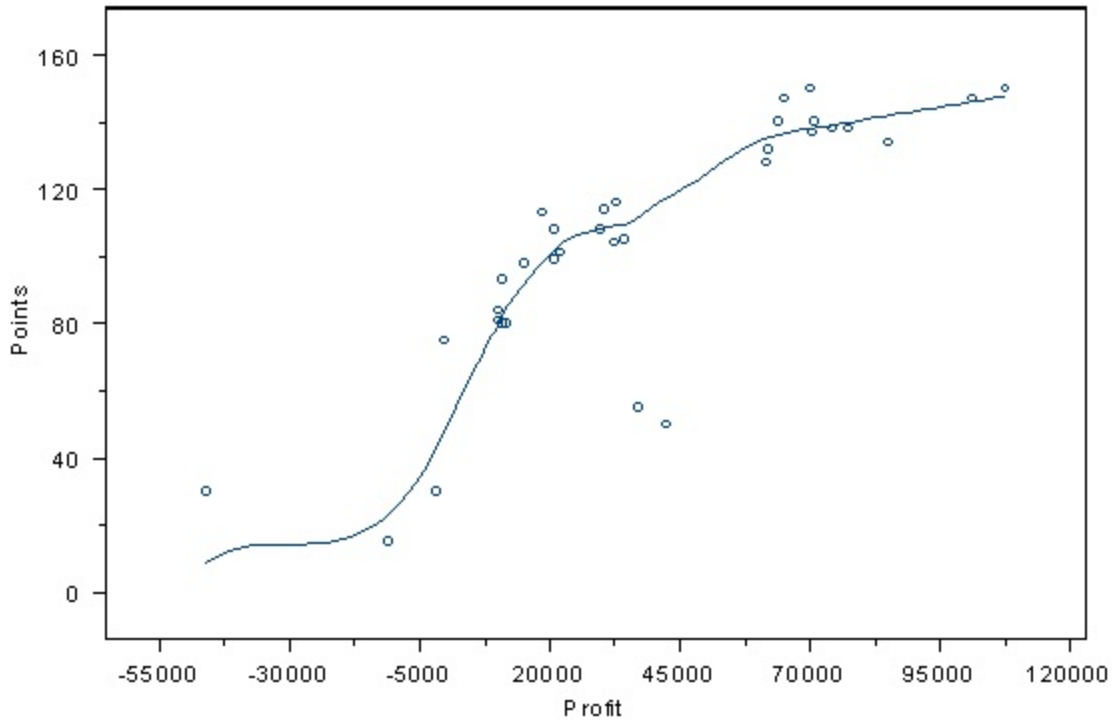


Figure 3. Point and Grade Distribution