

## Augmented Learning for Decision Sciences Basic Quantitative MBA Course

### Summary

Augmented learning is defined as value-added learning rather than just blended or hybrid or just completely online. Value-added elements include online quizzes with time-delayed feedback, asynchronous feedback and grading of homework and posting of answer key, talking Excel templates and video lectures and online homework sessions. I have found that by augmenting a traditional course, I can increase learning, convenience, and allow personalized attention better than traditional class structure, and also keep the personal touch which has been a hallmark of our classes.

### Introduction

For the 15 years I have been at the Graziadio School of Business and Management (GSBM) of Pepperdine University, I have been privileged to teach fully-employed MBA (FEMBA) students (a blessing) but once a week from 6-10 PM (a curse). Four hours is long enough for classes that lend themselves to discussions that don't require skill learning, but for Decision Sciences, this makes four hours seem extremely long, both for student and professor.

For the past five years, GSBM has been offering faculty several tools for our classroom, including Camtasia, Jing, Join.me, Sakai, and so forth.

### Different Modes of Learning

Let me contrast some different styles or modes of learning that we have been investigating: Traditional, Blended, Hybrid, and Online.

**Traditional.** This is the current modality, which is face to face. Pepperdine is known for small classes (30 or less) "where everybody knows your name," and that means not only the professor but other students. Although not a cohort group, because students tend to take two courses a trimester (14 weeks), they get to know about 60-70 students at one of the 5 geographic centers around Los Angeles. Most problematical are students who have to travel for their company and miss one or two sessions. I have taken to having the PP slide available, but they miss the lecture entirely, even though covered in my electronic text. Since students are fully employed (and usually the best workers because their company is supporting them in some fashion financially) this does happen from time to time. They are able to keep up with me and teammates via email, and sometimes meet for homework using Elluminate or Join.me. I was noticing that the first hour or so of class was taken up with a short paper quiz (to make sure students were prepared for the lecture), then going over the quiz, then going over the homework that was turned in (and also posted in Sakai after 6 PM). Many students were not paying attention because they understood the homework or the quiz questions, and many did not pay attention because they didn't understand and hoped it wouldn't be on the test. Four hours is a long time to keep student attention, especially after a long day at work.

**Online.** The course is taught live online, with perhaps Camtasia Relay capture videos and Join.Me sessions once a week. Students can type in questions or unmute and ask. There may be some hyperlinks to other materials. There typically would be a face to face meeting early in the semester and perhaps one to end it. All tests would be online, resulting in multiple choice, T/F and fill-in-the-blank questions.

Tests pose the biggest problem for a skill-oriented course such as Decision Sciences (LP, forecasting, decision trees, and so forth) that deal with modeling and what-if scenarios using spreadsheets. This is not easily reduced to simplified exams. There is also the problem of test security, and because the exam is online (60, 90, 120 minutes) it is by necessity open book and open computer. This leaves the test open to problems of cheating (did the student actually take the exam, or receive professional help or from a teammate?), computer malfunctions of all varieties (operating system, Sakai, Internet connection, Excel problems, computer crashes, automatic updates interrupting the exam and shutting down the machine.)

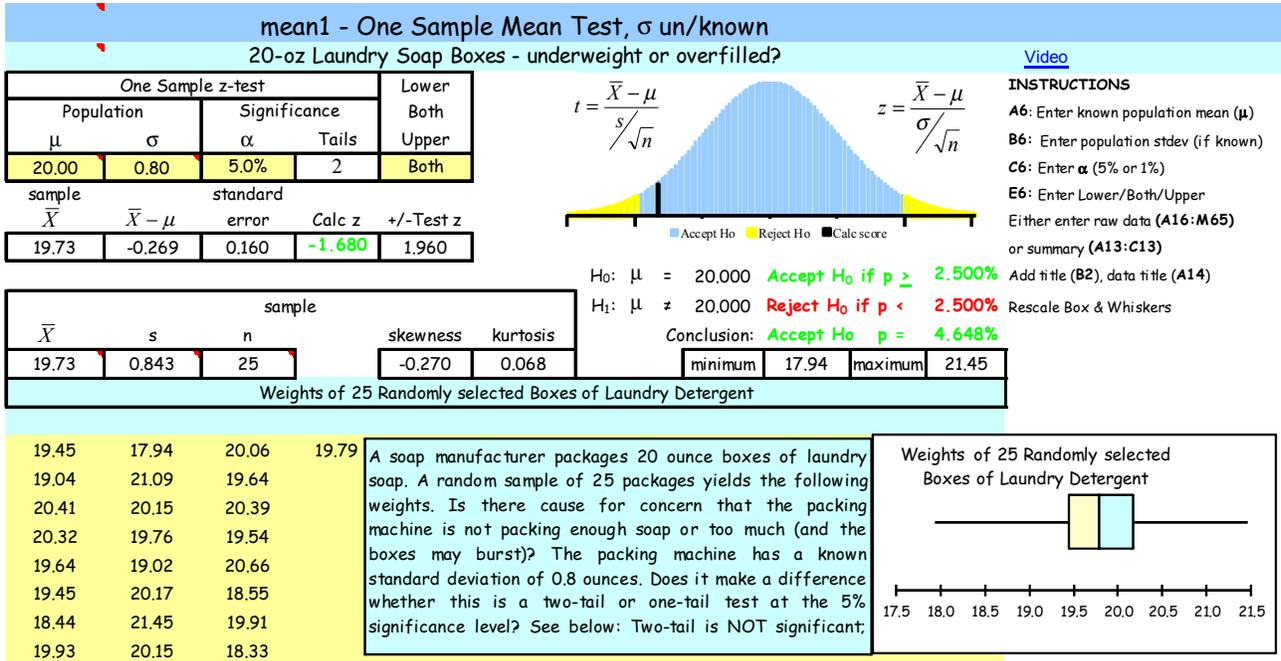
**Blended or Hybrid Learning.** This would blend the two approaches of traditional and online. Our administration wishes to alternate traditional live sessions one week and online the next. But also online and offline can relieve some of the more mundane tasks for class outside of the regularly scheduled class times. So using "baby steps" over the past three semesters, I started with in-class paper quizzes for a two weeks and then online quizzes but in class for two weeks, and finally online but within 48 hours before class started. The quizzes are designed to ask fairly straight-forward questions about the upcoming lecture so that students will be somewhat familiar with the material to be covered.

In the same way, the first few homework assignments would be handed in as hard copy at the beginning of the class, and then we would switch over to electronic submissions in the fifth week at the same time that quizzes would be done online before class. It was at that time that I would shorten the class to go from 6:30-9:30PM rather than 6-10PM. The later start time allowed some students who had difficulty navigating the LA traffic to be able to get to class on time, rather than shortening the class to be 6-9PM.

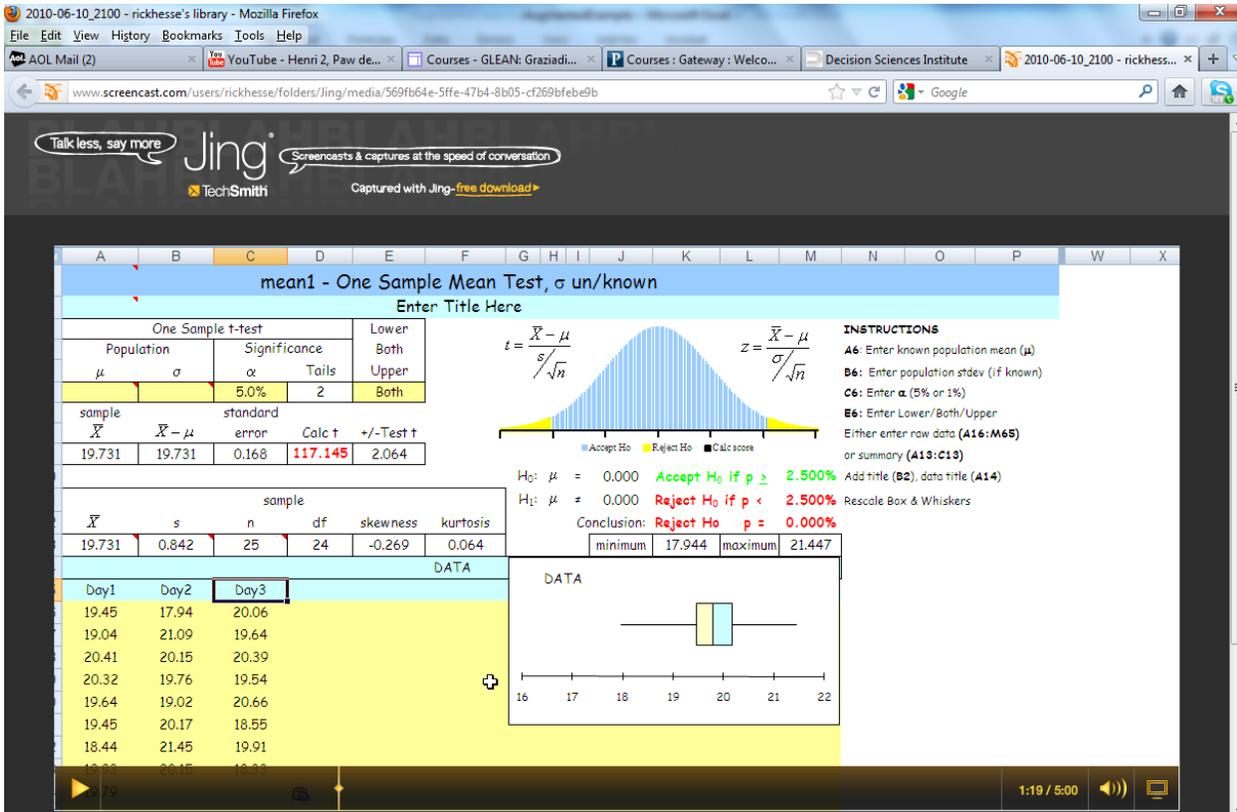
### **Augmented Learning**

In an effort to use the best of both online and blended learning, I have incorporated three additional facets to the course which I think augments the learning.

1. **Talking Templates.** I have an undergraduate business statistics course, and use several homemade templates, and for the last 3 semesters have made Jing videos (a smaller version of video capture and owned by Camtasia) which has a limit of 5 minutes, but perfect to quickly show how to use a template. Shown in **FIGURE1** is a test of a one-sample mean and in **FIGURE2** is the Camtasia video with the link to the Internet. I have nick-named these "talking templates" and was surprised at the very positive reaction from students, because to me the written instructions to the right seemed adequate. But students told me they played them several times and really understood it because of the reinforcement. (I keep forgetting as a professor that just because I've explained something once that it just doesn't automatically get learned by even the best of students). The second surprise was that because these were available, I didn't have to keep repeating myself in class, but could simply tell them to just keep playing the video with the three examples.



**FIGURE 1.** Excel template for one-sample mean



**FIGURE 2.** Jing video on the Internet showing  $\mu$  to use the template

- Video Lecture Capture.** After accomplishing the blended learning over a few semesters, I decided to try and use Camtasia Relay to make up 3 lectures per class, showing Power Point, Excel and Word to go through the material and the example(s) in Excel and provide links to the

students to use after class for review. Now that these are done, in the Fall I will have these links directly on the class outline, so that students can listen to the lectures before coming to class also. This is also extremely valuable for students who have to miss class. One professor did ask me "why do they come to class if it's all on video?" I was surprised because my students feel that "not being there" with their group and classmates to work together during the lecture as we go over the examples really diminishes the learning, but as a tool for getting a preview and reinforcing the material, it's just fine.

3. **E2B.** In my traditional structure of the course, I give 10% for weekly homework (80 points are group problems and 20 points to be done only individually, 15 points for the individual quiz), 10% for 3 cases that have different data sets (forecasting, LP/IP scheduling model for operators at a call center, and a simulation Excel model they build and test if the outputs are significantly better), and two in-class exams (35% for their worst, 45% for their best).

So for Spring 2012 semester, I was intrigued to attempt our first E2B (Education to Business) class project for the FEMBA Quantitative course with our Santa Barbara cohort instead of the 3 cases and changed the weight of the project to 40% and decreased the two exams to 25% and 35%. For the last 10 years Graziadio has done over 400 E2B projects, mostly with our basic marketing class for both Full-time MBA and Fully Employed MBA. The students develop a marketing plan for a business in the Los Angeles area and after 7 weeks, the teams (working independently) present their ideas to the client and get feedback. The other teams do not see those presentations. Then at the end of 14 weeks all teams present to the client with all the students in the room. This has been a very successful program and ended up two years ago on the Top Ten Courses You Should Take in College by US News & World Report. When the director offered me a chance to try one for Quant, I had been hesitant because most MBA students could barely do a Quantitative Analysis E2B after having had the course, much less during it. But this client (in the Bay Area) first needed to investigate alternative energy sources because being a manufacturing company using thermal forming, energy was 65% of their costs, and secondly, wanted to see five years out where the company should relocate given the collapse of California. Both these projects could be investigated using Multi-Attribute Analysis, requiring minimal quantitative skills but combining data gathering, interviewing people, quantitative and qualitative factors, and deciding how much sales people were lying to them.

Because it was a real project, it was full of ambiguities, uncertainties, and caused extreme anxiety for the students, who handled it well. The only problem with taking on a E2B project was that we really needed extra class time for me to meet individually with each group and get feedback, give guidance, pose questions, and so forth. But because I had reduced the amount of lecture time and off-loaded the homework review and quizzes to offline, I expanded class time back to 4 hours but saved the last 45 minutes for meeting with the groups and also took a 15 minute break around 7:45. Although I deem this value-added aspect to the class a success, I'm not sure I want to do this again.

The client was quite pleased with both studies (energy the first 7 weeks and relocation the second 7) with the director of marketing (a Pepperdine MBA alumna from 4 years ago) and the CEO/Founder/Owner.

## Feedback

Although early in the process of definitive evaluation, it has been interesting to read comments from students as different elements of the class have been executed.

### Positives:

- Maybe more online classes or blended learning segments.
- Stay with the online quiz before the class.
- Shortening the class so there wasn't so much information in one night
- The videos that re-explained the material.
- Online course and homework conducive to schedule
- Enjoyed Dr. X's blended learning style and the variety of topics covered and mediums utilized (Word, PowerPoint, Excel, etc.). I also like that he stresses group work and promotes collaboration. The games (Millionaire, etc.) were fun & the opportunities for bonus points were numerous, which I appreciated. Tests were fair and the re-takes are educational. Email availability is exceptional
- Emailing in assignments for quick feedback made it easier to complete the assignments.

### Negatives:

- Student: I also think the instructor needs to do a better job of becoming proficient in online teaching. He was unable to assist us or give us credit for problems with the online quizzes. Even if all of this is not the professor's fault, I think the school should do something to fix this problem immediately.
- No online class - didn't like at all.

## Technical Assistance

One of the most important element of using all this technology is the absolute necessity of having immediate technical help for both professor and student. Among the various problems encountered by students were:

- Computer crashes when taking timed quizzes
- Automatic Windows updates seizing the computer during timed quizzes
- Paying for Internet access at a coffee shop and running out of time during timed quizzes
- A fellow professor is doing 2-hour exams online and gives a week to finish by 12:00 PM. Two students didn't know the difference between noon and midnight, and thinking that the exam was available until midnight, waited until the last afternoon only to find that the exam was closed and received a 0. They petitioned the Chair (me) and I threw it out.
- Computer ignorance, especially among Mac owners (they either are really good with PCs and Macs or just hopelessly lost).
- Sakai Quizzes have many bugs and learning how to include pix in the quiz without students being to access them before the quiz is problematical. Also, multiple choice questions have no option for scoring +1 for correct answers and 0 for wrong ones. So all of these quizzes have to be manually checked for errors in grading. Also difficult to use fill-in-the-blank questions and anticipate all the possible answers that could be correct, so again, manual checking is necessary.

## SUMMARY TABLE

FIGURE3A and FIGURE3B summarizes results so far, which are encouraging enough to proceed with what I call "Augmented Learning".

Topic	Traditional	Augmented	Savings	Technique
Class time	4 hours: 6-10 PM	3 hours: 6:30-9:30	1 hour	Face to face lecture
Quizzes (20 min)	Paper, in class (20 min) and 10 min review of answers	Online (20 min) Answers available at 6 PM	student convenience	Sakai Quizzes
Homework Review	Students would email me their Excel file for help to reach the Check Figure, but seldom the Word file	Students now email the Word file and I write comment on it (NOT using Word Edit, but just write comments in red and HINTS). Seldom do they email the Excel file.	I think I spend a LOT more time answering email questions and reviewing Homework each week than before. I had to institute a "two review" policy.	email with Word and Excel attachments
Homework Graded	Hard copy in Word, handed in at 6 PM and returned a week later. Go over answers in class (30 minutes). PDF file of the Word copy of the homework is posted at 6PM the day of class for review by students.	Group Homework due at Noon of class day, Individual by 6PM, by email in Word. A PDF file of the Group Homework is in Sakai at 1 PM of class day, and the Individual by 6 PM for review by students.	<div style="text-align: center;">+1</div> Grading goes very quickly and I paste points on them. <div style="text-align: center;">-1</div>	I open group email and grade and rename the HMWK as Group XYZ-Graded.
Lecture	3 parts in 3 hours remaining and work on 3 homework problems and a 15 minute break	3 parts in 3 hours remaining and work on 3 homework problems and a 15 minute break	I generate 3 lectures which are about 25-40 minutes and students can review them or preview them.	All parts are recorded using Camtasia Relay
Review	Limited to making sure that their Excel spreadsheet is working properly.	Anytime, anywhere with Internet connection; also helps students with reviewing how to work each template.	Reinforcement of lecture and/or hands on work on Excel templates.	
Homework Groups	Meet physically once or twice a week to go over homework. Email is used and sometimes 1:1 phone calls.	Now they can use Skype or Join.me to look at homework rather than physically have to drive somewhere and meet.		

FIGURE3A Summary and Contrast of both Methods

Topic	Traditional	Augmented	Savings	Technique
Flipping the Classroom	After every 30-40 minute lecture, we begin partial work on a homework problem for that material.	After every 30-40 minute lecture, we begin partial work on a homework problem for that material.	With the videos available, students say now that they can review how I did the example when they get stuck on the homework when out of the classroom. They also mention how the "pause" me when working on the Example template so they don't have to hurry so fast.	Internet connection (hyperlinks) on the class outline get them to the lecture they need. They can also click along the time line to find the exact coverage they need.
Missed Classes	Typically a student on a business trip can at least look at the Word/Excel/PP material on their USB.	Also available are the 3 video lectures so that the student can be more engaged in the learning and then can ask questions by email asynchronously. Also doesn't have to be online during class, but at anytime.	For both student and professor, saves a lot of time "catching up" on what was missed and the student becomes an active member of the homework group.	Camtasia Relay is used for video capture.
Value-Added	Realistic Cases w/different data sets	E2B client with multi-attribute analysis or forecasting.	Takes back the one-hour to extend class to 4 hours, but the last 45 minutes each week is to meet with each group about the progress of their analysis of the E2B.	Working with the director of E2B, a Case is chosen by the prof that fits and meets with the client a few weeks before class begins.

**FIGURE3B** Summary and Contrast of both Methods

### Conclusion

As different aspects of online, offline, blended and augmented opportunities are explored, I see the course growing and changing to become more accessible to different modes of learning and feedback.