October 25, 2014
CFD Breakfast Discussion:
Supporting Large Classes using a Hybrid Pedagogy

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Learning Objectives

• Gain knowledge in the elements and decisions involving a “hybrid” pedagogy
• Understand the importance of clear goals/targeting a pedagogy
• Understand the various development problems and see how technology both assisted and detracted from the overall solution
B10 Goals

- Target incoming first-semester College of Business freshman
- Provide a “stepping stone” that can support all the College of Business degree programs and be a General Elective (GE) course for non-business majors who desire to learn about the “business thing”.

## “B10 Redesign” Project

### Fall 2012 Deployment Matrix

<table>
<thead>
<tr>
<th>Pedagogy</th>
<th>Section Number</th>
<th>Enrollment Size (Actual)</th>
<th>Instructor A</th>
<th>Instructor B</th>
<th>Instructor C</th>
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<td>41</td>
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</table>
“B10 Redesign” Project

Fall 2012 Exam #1 Results:

Hybrid Results:
- n = 181
- Ave. 33.57
- Var. 31.37

Standard Results:
- n = 205
- Ave. 31.12
- Var. 37.39
“B10 Redesign” Project

Fall 2012 Exam #1 Statistical Conclusion: The hybrid pedagogy is not different than the standard

<table>
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<th>t-Test: H = 0 in mean difference</th>
<th>Hybrid</th>
<th>Standard</th>
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B10 Goals: Student Needs

• Assist student transition from high school to college academic life
  • In-class presentations from:
    ▪ Library about ‘how to use SJSU library services’
    ▪ Career Center about ‘how to use SJSU Career Center for internships and job searching’
    ▪ SJSU Campus Life to learn about campus-approved student organizations, club sports, Greek system (fraternity and sorority houses), etc…
    ▪ SJSU Health Services to learn about personal helplines and how to use emergency systems
• “Field Trip” to SJSU ice hockey games to promote out-of-class student interaction and see college professors in a different light
B10 Goals: Student Needs

• Develop business-specific skills
  • Receive “basic training” for business courses, college and beyond.
  • Develop necessary skills using the common “tools of business” by learning Microsoft Office tools: Excel, Word and PowerPoint
  • On-line videos developing longer student attention spans to more than 12-14 minutes
  • The meaning of common business practices of: “on-time”, “do it right the first time”, “no extra credit for poor work” and “no do-overs”.
• Develop good team participation skills and in a low-stress environment make a presentation to the class (non-graded)
B10 Goals (cont.)

- Understand the basic terminology and concepts of business.
- Provide all content that is in compliance to Section 508 Standards for students with disability accessibility.
- Provide Self-Assessment/Career Planning to minimize student major changes and maximize student graduation rates.
- Help students develop the “Life Skills” necessary to be a success in college and in the business world.
- Gain visibility into SJSU campus activities, clubs and college life in general for the first-semester business students.
- Establish a baseline for future business major/minor career opportunities.
B10 Goals: Technology

• Incorporate all appropriate technology into the pedagogy to enable the scaling of the class size to 250 students and potentially beyond with no degradation in learning outcomes as compared to the traditional in-class lecture style pedagogy.

• It is hoped that the pedagogy will scale upwards to 400-500 students with the knowledge that there are physical limitations of a “brick and mortar” college classroom.
B10 Targets

• The major pedagogical foundation is the classroom. That is, the pedagogy is classroom-based with technological enhancements to allow scaling beyond the traditional 40-45 SFR.

• The instructor-to-student interaction is vital to maintain higher student outcomes.

• However, this pedagogy is not an “on-line” or MOOC where there is no physical classroom.
B10 Target Relative to other Pedagogies

- **High**
  - Traditional classroom
  - 10 Students/Instructor
  - 40-42 SFR

- **Mid**
  - Blended/Hybrid
  - 250 to ? SFR

- **Low**
  - On-line
  - MOOC

- **Student to Faculty Ratio**
Scalability Problem

The major issue for the pedagogy is how to take a class-based process and scale up to larger class sizes.

Problem: How to Scale

Solution:

• Looked at every part of the class as a series of learning processes: some processes will scale, some won’t be able to scale

• With in-class pedagogy, important aspect of leverage is to teach to self-directed student teams versus teaching to individual students.

• Team-based processes are difficult to setup and manage for unskilled first-semester freshman
Learning is a Series of Processes

- Crucial philosophical basis on pedagogy development
- Quantitative in nature: outcomes must be measured with statistical validity
- Each process is designed to optimize learning outcomes versus process exceptions
In-class Student Preparation Problem

- Hybrid Model is based on students doing work (reading text, reading PowerPoints and watching chapter videos) on-line prior to class so that when they come to class they will be prepared for the in-class work.

Problem: lazy students who don’t do the pre-work and are not prepared fully for in-class activities

Solution:
- Use LMS “lock-step” process to force students to be prepared.
- Use ‘small stakes’ quizzes to encourage students to participate (if no points attached students won’t do assignment).
- Time limit with randomized questions for Quiz to minimize ‘cheating’ (students sitting next to each other)
In-class Student Preparation Problem

“Locked-Linked” Flow:

Desire-2-Learn (D2L) and Canvas LMS supports locked-linked flow control of content
Content Sourcing Problem

• On-line pedagogies have used multiple sources for course content. Many approaches were considered with the understanding that the lifetime of any content must be 5-10 years to minimize any forced ‘content revision’ in the future.

Problem: How to source the course content

Solution:

• Chose current publisher texts over ‘stitching’ together online content.
• Did not accept ‘3rd party’ content from open-sourced or other Universities as strategic decision
• Customized presentations using Nickels book as standard since book content was nearly identical (in different order)
Student Learning Problem

- Many pedagogies consider the “way students learn” as part of the process to deliver course content and assignments.

Problem: Is there a requirement to tailor course content to maximize student learning outcomes?

Solution:
- Don’t customize, use multiple styles.
- Extensive literature research from the Netherlands and North Carolina State University revealed two main factors correlate to student learning success: student attitude and the first exam results (aptitude).
- Chose “Index of Learning Styles” survey with 10 years of use/data in STEM courses at NCSU (Felder)
Instructor Load Problem

- The course has 21 quizzes, 2 mid-term exams, one final exam, ILS survey and Self-Reflection Paper, Career Management Plan and Business team materials.

Problem: Instructor time to grade assignments is not scalable in some assignments

Solution:

- Use “mass customization” principles to “template” assignments as much as possible
- Use on-line grading and automatic gradebook entry for all quizzes.
- Templated MS Office tools Excel and Word exams
Student Load Problem

- The course has 21 quizzes, 2 mid-term exams, one final exam, ILS survey and Self-Reflection Paper, Career Management Plan and Business team materials.

Problem: Hybrid pedagogies require additional time for on-line videos and quizzes versus traditional in-class presentation style pedagogies. 1/3 of SJSU students work part-time and 1/3 work full-time in addition to full-time education.

Solution:

- Allow students to complete on-line work ahead of time and at their own 24/7 schedule.
Technology Solves All Problems Fallacy

Technology provides a useful platform to scale many educational processes in a uniform and controllable manner. However, there are many “hidden costs” that rarely get addressed by developers, instructors and college administrators. And, not all processes are scalable in the first place.

Problem: Identify and circumvent, as best a possible, the downside of using a technology-based pedagogy

Solution:

- Lots of planning on the best use of technology and links between the various technologies is required.
- A systems approach is required to gain overall system efficiency and up time performance.
Technology Solves All Problems Fallacy

Problem 1: no LMS system is a perfect fit for any single pedagogy.

Solution:

• Every aspect of the course must be mapped into the current LMS capabilities starting at least one quarter before the start of the semester to allow for the identification and development of workarounds by the instructor/LMS support team. The time/resources taken to identify the problems and develop the workarounds is a hidden cost.

• Different LMS vendors require different custom solution sets for the hybrid course due to functional differences and different content flow-control mechanisms.
Technology Solves All Problems Fallacy

Problem 2: any link that breaks or slows down in the student’s internet access path between their computer and Canvas services. When this happens during the semester the instructor can receive hundreds of Emails and text’s from students. Then, the instructor has to take the role of a first-line “network support” contact to help identify ‘where’ it is broken, then contact the appropriate SJSU person (24/7) to find problem and fix.

Solution:
• Trains students to use SJSU “eTicket” process
• Need highly-skilled, technology-experienced instructors to be able to support, in real-time, internet access problems.
Technology Solves All Problems Fallacy

Problem 3: Departments with responsibility for technologies and platforms rarely communicate with each other to solve problems for individual courses/students.

Solution:

• “eTicket” triage?
• Get everyone to agree on what is the definition of “real-time, high-speed, reliable internet access”
• Work with various departments on ‘next-generation’ requirements to get ahead of problems.
• Remind everyone that we cannot contract using “average usage” – must use “peak usage”.
Problem 4: The increasing use of pedagogies requiring real-time, high-speed in more classes with larger sizes *does not scale the total resource demand linearly*. The demand is exponentially increasing. And example: the LMS system went down during the SP14 finals as a result of student overload.

**Solution:**

- Work with upper management to look at “macro” demand issues with advancement of learning pedagogies to “right size with scalability” the investment in the technological infrastructure.
MS Office Training Problem

As part of the “Business Boot Camp” strategy MS Office was chosen as a student training need.

Problem: how to find cost-effective solution for MS Office training in Excel, Word and PowerPoint

Solution:

• Evaluated multiple 3rd-party solutions that were costly ($30-250 per student)

• Developed in-house solution to minimize $’s to student (or College) based on current SJSU MS Office course (BUS4-91L)

• In later semesters switched to 3rd-party $30/student training from CustomGuide since hand-developed version had high SJSU overhead/resource costs to grade/enter into gradebook.
In-class Application Lab Problem

With the “flipped” model, in-class work to deepen the learning outcomes need to be developed and sourced

Problem: Where to find in-class work and is it relevant and actually goes up Blooms Taxonomy model levels

Solution:

• Evaluated and decided to use publisher “mini-cases” versus custom development of ‘application labs’ for pilot FA12 semester

• Developed to work within and support class team structure and goals

• Found that publisher mini-case approach wasn’t an effective in-class learning deepening tool and adopted a different approach and called “Top 5”
Improve In-Class Lab Problem

The in-class assessment of the publisher mini-cases were found to be ineffective (too few cases, too simple for team activity, etc...)

Problem: How to ‘upgrade’ in-class activities

Solution:

• Looked at current SJSU in-class student activities and found instructor Roy Blitzer’s (3rd FA12 night class B10 instructor) “Top 5” process was working, according to FA13 class results.
• Developed 21 chapter lists of terms and concepts and put into Qualtrics quiz timed for in-class (only)
• Setup Qualtrics to allow each team to discuss and choose “Top 5” most important concepts and terms in the chapter out of the list (20-30 total)
• Instructor reviewed Qualtrics histogram in-class and led in-class Q&A session with students about the results
Student Team Problem

Team-based work is fundamental to high-performing companies to solve problems. Putting students ‘in charge’ of their own work output (not the processes) is important to support course higher level learning objectives (Bloom: analyzing, evaluating and creating). Also, as part of SJSU’s strategic focus on Silicon Valley companies, a high premium is placed on students with ‘entrepreneurial’ experiences.

Course needed an ‘integrating’ project for material.

Problem: How to set up a proper team-based activities

Solution:

• Evaluated several approaches for team-based, semester-long projects including stock-market picking or a startup/business plan
Student Team Problem

Solution (cont.):

• Chose startup/business plan for simple reason: we want students to learn how to “earn money”, not “make money” as part of an ethical basis of doing business. That is, a business plan project will teach students the value of creating new products and services versus being a ‘day trader’ which provides no real social value (in capitalism).

• Developed a templated, highly-scripted with specific team roles business plan Pro-forma Spreadsheet (in Excel) and Presentation (in PowerPoint) that was the basis for the end-of-semester team presentations.

• Materials based from RK’s personal startup business plan experiences
Student Team Formation Problem

Forming the teams can be a challenge with large class sizes. There are physical constraints for teams that need to be considered: e.g. can team members use common work surfaces? How can students – every class – be on the same team (sometimes students move around)

Problem: how to form and manage teams in-class

Solution:

• Form teams after 2\textsuperscript{nd} class (roster firm)
• Students self-select into teams of 5-6 students. Ideally, all teams are 6 students.
• Canvas LMS can have students automatically pick a team and join for grading/management purposes
• Use seating chart for teams. They stay in place all semester
Since business plan is a very large project and most college freshman aren’t ready for a team project. There needs to be in-class team activities that supports Tuckman’s team model of “Forming-Storming-Norming-Performing”. Student teams need to be given in-class work to progress through the forming, storming and norming team process before being able to perform the business plan project.

Problem: How to assist teams in getting to “performing” team level and be ready for end-of-semester Business Plan project

Solutions:
• The first team assignment is for students write their own team “rules” and sign a “Code of Conduct” that explicitly details how the agree to work with others
• Top 5 assignments in almost every class to work together
• In-class business “team time” with instructor mentoring
• Draft Pro-forma and Presentation due 4 weeks prior to end of class with 1-hour team business plan review meeting the instructor after submission
Student Team “Slacker” Problem

In practice and in the course, team members do not know each other, come from a variety of cultural and social backgrounds and may not even speak the same native language. These problems can be overcome with proper student team attitudes, good team processes and good instructor mentorship. However, there can be ‘slacklers’ in teams – those members who do not participate fully in activities, are not meeting the team material, quality or deadlines.

Problem: How to minimize “slacklers” in teams

Solutions:
• Develop both team-based and individual-based grading system based from personal experience and current “state-of-the-art” methods
• Educated students at beginning of team formation the grading process and review grading rubrics
Student Team “Slacker” Problem

Solutions (cont.):

• During Top 5 – *use Manage By Walking Around (MBWA) approach* by walking around class and talking with and answering student questions.

• If team member is absent Ask teams why a ‘member is absent’? If they don’t know… a sign of a potential problem.

• And, then, remind the teams that it is THEIR JOB to get all of their team members to class (not the instructors) as it will impact their team performance for the business plan project. Instructor question to team (with missing member): will a person who doesn’t show up for a class actually show up for your team business plan when it’s your grade that is on the line?
In-Class Environment Problem

A normal class flow includes an introduction by the instructor on a review of past assignments/exams, review of future assignments, general administrative items and answering the many LMS-related assignment questions. But, once in team activities, what is the best environment?

Problem: What is best in-class team work environment?

Solutions:

• MBWA by the instructor to mentor/assist teams
• Common workspace for students to look at single computer
• Use of music since students are used to ambient/background music. After some experimentation, found “Thievery Corporation” channel using Pandora was best as it has a mixture of beat with minimal words that can distract the team working processes.
Student Computer Problem

As part of any college level class, many students bring their own computers (laptops, tablets, iPad’s and PDA’s) to class. Many SJSU students come from low-income families and may not have the financial resources or experience with technology.

Problem: Can we utilize students own computers to run the in-class portion of team assignment and will all students have computers at home with a fast and reliable internet connection to do work?

Solutions:
• Beginning of class surveys showed everyone has a computer with an internet connection.
Solutions (cont.):

• SJSU offers several computer centers with high-speed internet connections across campus for all students to use.

• In-class use of computers is common, but places a heavy load on in-class WiFi resources.
In-class WiFi Problem

As more students bring WiFi-enabled devices into the classroom, there is more traffic to be handled and sometimes the network simply cannot support the load.

Problem: WiFi overload and degradation of access

Solutions:

• Request students to turn off ALL WiFi devices except one person in their team.
• Found cell phone “hotspots” create severe shortages of WiFi channels for everyone else
• Can’t ‘turn off’ cell phone coverage in class as it is not part of SJSU network and potential risk
• SJSU Networking group upgrading WiFi capabilities in classrooms
Internet Access Problem

The hybrid pedagogy relies on the assumption of a “high-speed, reliable” internet connection for every student no matter what platform they use no matter where they live (on campus or at home). The accessibility for a reliable, real-time internet connection involves a series of networks between the student and Canvas servers. Any one of several networks could experience problems that will affect the time-based student activities (e.g. quizzes).
Internet Access Problem

Problem: Loss of internet access or significant slowing of internet access for students at home, at SJSU campus or in class

Solutions:
• Not much.
• Worked with eCampus on what is current Service Level Agreement (SLA) with our internet provider (Yahoo).
• Worked with eCampus on what is Instructure/Canvas SLA
• Worked with SJSU Networking team on specifying ‘next-generation’ room WiFi requirements for Cisco upgrade project across campus
Internet Access Problem

Generalized Network Architecture:

- Home
- ISP
- On Campus
- Classroom
- SJSU Network
- AT Servers
- COB Servers
- The Cloud
- Canvas Servers
LMS Scaling Problem

As the pedagogy scales up in size, the amount of traffic required to support – in real-time – 100% of the students on a 24/7 basis gets more difficult. Many ISP’s or cloud-based service providers sell on ‘average’ usage, not ‘peak’ demand.

Problem: Loss of internet access or significant slowing of internet access for students at home, at SJSU campus or in class. During SP14 finals week the Canvas LMS crashed.
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Servers Problem

The original chapter videos was hosted by Academic Technology (AT) department. The funding for these servers was from the SJSU provost, and ran out.

Problem: Loss of server support for chapter videos from Provost/SJSU.

Solutions:
- Transferred and consolidated all 21 chapter video’s (~ 21 hours) to College of Business servers.
Current Pedagogy Updates

- In-class, on-line exams
  - Pilot run in BUS3-10 120-student FA14
  - Deploy in SP15 with 250-student in MD101

- The development of a student application that will allow students (not instructor) to self-diagnose any problems encountered during the course
Review and Discussion

• What did you learn from today’s workshop?
• What was the most useful information from today’s workshop?
• What was the least useful?
• What can you apply to your current situation?