

## **iPad or iFad –The Mobile Classroom**

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*Although previous technology infusion via smart phones proved that it was possible to go paperless in a college course, key weaknesses of the devices prevented them from being practical. This paper describes how new technology, in the form of tablet computers, changed that dilemma in an undergraduate Microeconomics course. We argue that technology infusion results in a diffusion of that technology across place and time.*

### **INTRODUCTION**

The advent of the notepad computer has changed a teacher's ability to infuse technology into the student's learning environment, freeing them from the constraints that typical laptop based computers have on access and interaction with other students. This paper examines the use of online texts, virtual games, electronic documents, group projects and teaching tools. We outline the tradeoffs of applications and tools such as Blackboard, Numbers, and QuickOffice.

Student perceptions of the class, along with class activities and frustrations are covered along with the instructor's perceptions of the advantages and limitations of this new technology. A comparison of a traditional Macroeconomics class with compulsory lap-top usage is made with the Microeconomics notebook class. We use Blackboard access to compare connectivity by hour for the semester for these two classes. Analysis of these patterns reveals tradeoffs between a mobile platform such as an Apple iPad and the more fixed nature of the laptop computer.

During the Fall semester of 2010, Abilene Christian University began conducting research into the use of Apple iPads and applications that could help an instructor manage the classroom environment in a truly paperless way. The Microeconomics course was chosen to be converted to a paperless course via the newly released iPad from Apple. A paperless course required the combination of many tools that replaced or improved on existing paper based systems currently in use in the classroom.

The term "paperless" has several meanings. One of our goals was for the instructor to use no paper products at all in the classroom. This required rethinking course content, course presentation, testing, communications, and activities. The effect of going paperless was in fact an additional benefit rather than the primary benefit. The larger goal of the course was "Mobility" -the ability to access all course information from any location, at any time. This paper describes the processes and tools we used to accomplish these goals.

## THE GOALS OF ACU'S MOBILE STRATEGY

In determining the requirements for its mobile strategy, ACU's goals were to provide:

- Anytime, anywhere access to learning materials
- More open communication lines between students and faculty
- An enhanced educational experience consistent with the available technology

To do this, ACU would need to provide and support:

- Web and socially-enabled technology
- Extremely portable devices that are voluntarily carried with users at all times
- Platforms to support customization and innovation of educational technology

Two years into this strategy, our research is finding (ACU Connected 2011):

- Increased student participation, involvement, and interest in classes
- Increased contact between students and professors
- Increased positive ratings of class quality and experience
- Innovation in teaching practices

“The initiative trains students to not merely consume these vast amounts of information, but to assess information, to synthesize thoughts, to generate new ideas, and to contribute meaningfully to conversations in a global context. ACU is committed to exploring how these technologies can be used to help people learn in new ways and discovering how these tools can aid us in its mission to educate students for Christian service and leadership throughout the world.” (ACU Connected 2011)

## RELATED WORK

Moving from a textbook to an eBook provides the opportunity to rethink content delivery and even fundamental issues of learning itself. For example, the *cognitive theory of multimedia learning* (CTML) provides the overarching framework for the design of both print and electronic learning materials (Mayer, 2003).

Research in form factors of eBooks shows the use of different metaphors. One approach is to stay with the idea of a book, but broaden the functionality of the text. This approach is originally credited to Alan Kay (Kay 72). He envisioned a book-like device with computer-like functionality. Examples of this approach include Apple iBooks (Apple, 2012b), Kno (Kno, 2012), Inkling (Inkling, 2012), repositories like The California Learning Resources Network's Free Digital Textbook Initiative (California Department of Education 2012) and Rice Universities Connexions Project (Connexions, 2012).

Another approach is to abandon the book metaphor entirely and embed any desired content into a learning management system or plain video. Pearson's OpenClass (Pearson 2012) and MIT's Open CourseWare (Massachusetts Institute of Technology, 2012) and Khan Academy (Khan Academy, 2012) have taken this approach.

Our focus in this paper is on the usage patterns of students with notepad computers, rather than the structure or effectiveness of content. The unit of measure we are most interested in is the number of times per hour an online resource was accessed by students over the course of a week.

## WHY MICROECONOMICS

The typical Microeconomics class is a good choice for a mobile learning environment. Microeconomics revolves around the basic principles of:

- Productivity – Output per unit of input and
- Efficiency – Maximum output for given resources

The iPad promotes both for the student: an efficient use of time and more productive learning moments. Combining these microeconomic principles with the mobility of the iPad has made the paperless classroom a reality for Micro students.

### **THE APPLE IPAD**

The Mobile Learning Initiative at ACU has been instrumental in placing tools in the students hands that provides twenty four hour a day seven days a week access to the ACU learning environment. Each student has an iPhone that allows both web access and the use of applications designed by ACU or available from the iTunes store to facilitate learning in the classroom. While the iPhone made a truly mobile learning environment possible it had its limitations. The iPad took the capabilities of the iPhone and made them practical. The large screen, light weight, functionality of the iPad, and available applications finally addressed both mobility and practical use for the student.

A class of fifty students received ACU sponsored iPads for a semester of research. The first day of class each student was advised of the research study and agreed to be a participant in the research at ACU. Students were given a contract describing the terms and conditions of the study and were given an iPad that would be theirs for the semester. At the end of the semester, students would return the iPad.

The iPad provided was wireless capable (not 3G) and one class period was spent distributing the devices, registering the devices on the wireless network, stress testing the wireless environment in the classroom, and downloading the required text and class iPad applications.

### **AN ONLINE TEXTBOOK**

The Micro Economy Today (Schiller 2010) was selected as our text for the class. Using this online text, students would have access to their text in real time 24 hours a day from any location. Benefits of the iPad include mobility (easy to carry) and functionality (music, video, calendars, pictures, and games) all of which encourage constant companionship with the user. The ability to remove the traditional text weighing up to 3 pounds and providing the student with instant access causes a change in study habits. Traditionally the student would have to carry the text or plan a situation where the text was available for study (the library, the classroom, or their dorm). The iPad freed the student from these fixed planned moments allowing random access as time became available from any location.

McGraw Hill worked with the applications software provider Inkling. The Applications team at Inkling believes the following:

“Inkling isn’t about books on a screen. It’s about redefining how you work with your learning content and improving how you learn.” (Inkling, 2011)

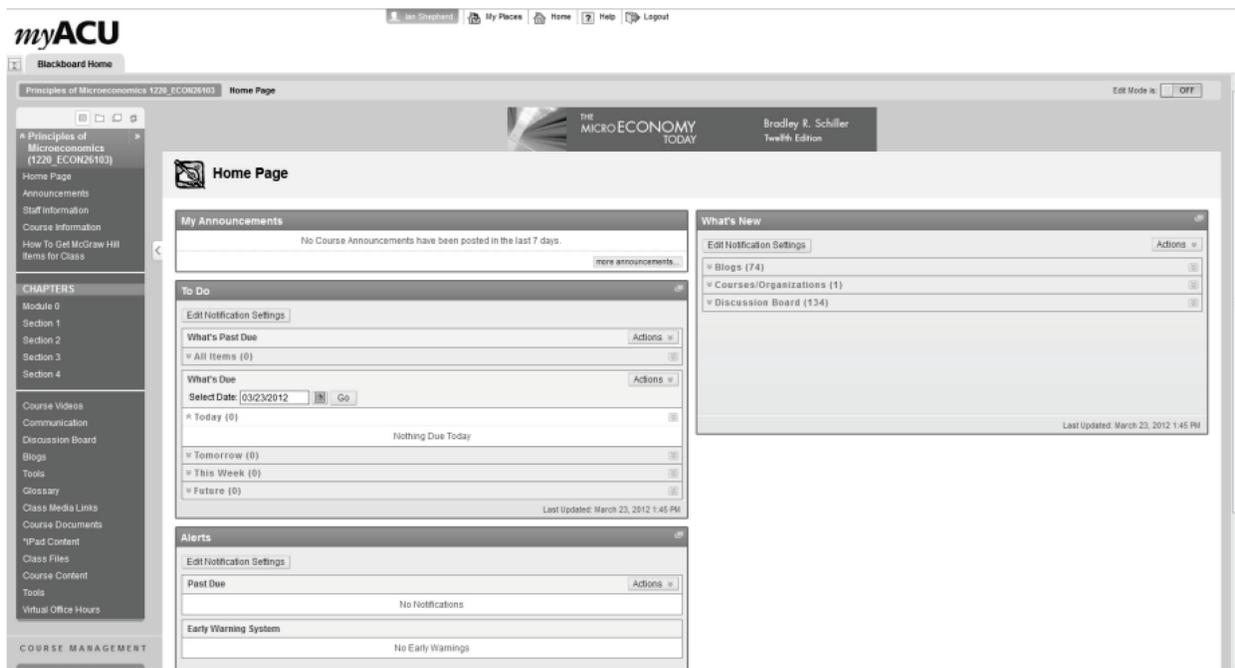
The Inkling team set out to redefine how users worked with the traditional printed text and move these texts to the iPad (a multi touch device). At a touch the user can move from the text to television, newspaper, websites, magazines and instructor provided notes and links.

Student feedback during the semester shows that students do not just want to read linearly through the text. Areas of interest need to be explored and the linking capabilities of Inkling and the text allowed the students to follow areas of interest.

### **BLACKBOARD**

Blackboard is a learning management system (LMS) that allows faculty to add resources for students to access online to PowerPoint, Captivate, video, audio, animation, and other applications that are created outside of Blackboard and added into Blackboard. Refer to Figure 1 for the class entry screen and menu system.

**FIGURE 1**  
**BLACKBOARD CLASS ENTRY SCREEN**



We describe selected portions of the online content here:

### **Announcements**

Regular class announcements were entered and appeared on student screens as soon as they entered the course. Each announcement was also broadcast using an email copy as the announcement was made. Students could browse back by date to see past announcements. Announcements could be schedule to appear and email the students information on activities and situations within the class.

### **Course Information**

This section lets the student know the expectations for completion of the course. The class syllabus and schedule are provided with active links to any support areas such as Inking or McGraw Hill Connect. A detailed syllabus is contained in Appendix A for the Microeconomics course schedule and syllabus.

### **How to Get McGraw Hill Items for Class**

This section links to publisher supported textbook sites. Students can follow this link to get instructions on how to set up student accounts on the publisher's web sites that allow them to practice, study, and take online tests administered by the books publisher and instructed by the teacher.

### **Module 0**

Module 0 (zero) acts as an introductory and setup module for students to prepare for their class. Module 0 covers:

- A history and introduction to online learning.
- The objectives of online learning.
- The assigned readings talks about how the modules will be arranged and how they should be read.
- The asynchronous nature and benefit to online learning.
- Discussion board use and protocols for these types of discussions.

- Technology requirements at a minimum to support the content presentation of this class.

Module 0 asks the student to fulfill several tasks one of which is to provide an online introduction of themselves to the class. The students create a personal profile that introduces them to others.

### **Sections 1 through 4 and subsequent chapters**

This section contains the groupings of chapters into logical groups of approximately 5 chapters per section. Each section contains up to 5 chapters.

Within each chapter the student is presented with instructor notes, summaries, chapter assignments and ethical and biblical applications of each chapter topics. At the end of each Section there are two activities to finalize each section. The first is a class/group competition where students compete using a practice test and work as a collaborative group on their iPads to answer test questions using the Inkling presented text. The second activity is a Blackboard test which comprehensively covers the chapters within each section.

### **Course Videos**

There were 42 video links available to reinforce various topics in each of the chapters. Students could select relevant chapters, then follow links to download and run video on their iPad.

### **Communication Tools**

Students can access their grades and email other students using this functionality. The blackboard grade sheet is automatically updated by the student's tests allowing them immediate access to online testing results.

### **Discussion Board**

The discussion board is used for students to create and complete their online personal profile for the instructor and other students to review. This area is also used to handle instructor questions.

### **Blogs**

Group discussions are handled using the blog site. Each group has their own blog area where they work on blogs about each chapter's assignment topic. The students can add threads and attach documents for upload to their posts.

### **Class Media Links**

During the semester we found that our class was the center of attention by the media. There were many columns, reports, articles, and interviews conducted by the media that were made available to the students through this link. The students enjoyed having these links and stories available as they could showcase these to their families during home visits

### **Virtual Office Hours**

Adobe Connect was used to allow us to create virtual office hours for the students. This allowed the student to email or call and say they needed to speak with the instructor. The instructor then set a time to visit online using Adobe's Video / Audio / Text Meetings capabilities. The instructor could both share and see his and the students screen, use a whiteboard, record the meetings, and create instructional media content for his classes.

The nature of mobile learning puts undue pressure on instructors to quickly diffuse learning barriers in a timely manner. This new technology helped reduce accessibility problems to the instructor improving both the instructors and students perceptions of the course.

## THE PAPERLESS ENVIRONMENT – FACT OR FICTION?

### Classroom Connectivity

The introduction of 50 wireless devices to our already existing network presented few problems. The existing facility was already designed to carry wireless transmissions. On the day of our first class we had a wireless technology team available to monitor the wireless hub traffic. As students logged on to the system and registered their devices the wireless team made adjustments to the network to handle the additional wireless traffic load.

In designing the Blackboard course we minimized click through within each content area. As a student clicks on a chapter, most of the page content is downloaded as part of the initial click. If additional links were added it would have increased response time and lag as students wait to read the next content. Using our design, as the student reads the top of the page information is already loading below ensuring that the student minimizes wait time.

### Class Activities

In addition to regular class lectures, there were five types of activities in class:

#### *PowerPoint or Keynote Presentation of Lecture Slides*

The Microeconomics class involves a multitude of data presentations. The iPad did not allow broadcasting while switching between Keynote, Quick Office, Document Camera, various web browsers, You Tube video, and Responseware for attendance and student class feedback. We had to resort to running all software for the class on the desktop PC at the presentation table. This allowed me to quickly switch between screens, keeping data flow and presentation holdups to a minimum. Now the iPad 2 enables the instructor to present all images from the tablet.

#### *Data Analysis and Creation Through Spreadsheets*

The students received a spreadsheet template for the class activity through email. Students would open it into the Quick Office application to complete the assignment.

This activity was designed to teach students how to:

- a. Upload, download and attach files to emails.
- b. Move files to a mobile device.
- c. Open files on a mobile device.
- d. Edit and create data on a mobile device.
- e. Create economic model information
- f. Visualize economic data using graphs.
- g. Save and return data files using Google mail.

One problem with this type of activity was the inexperience of the students with iPad apps. There is a small learning curve required to master the Quick Office program used in these activities. I created these activities in Microsoft Excel and moved the spreadsheet to Quick Office through Google mail.

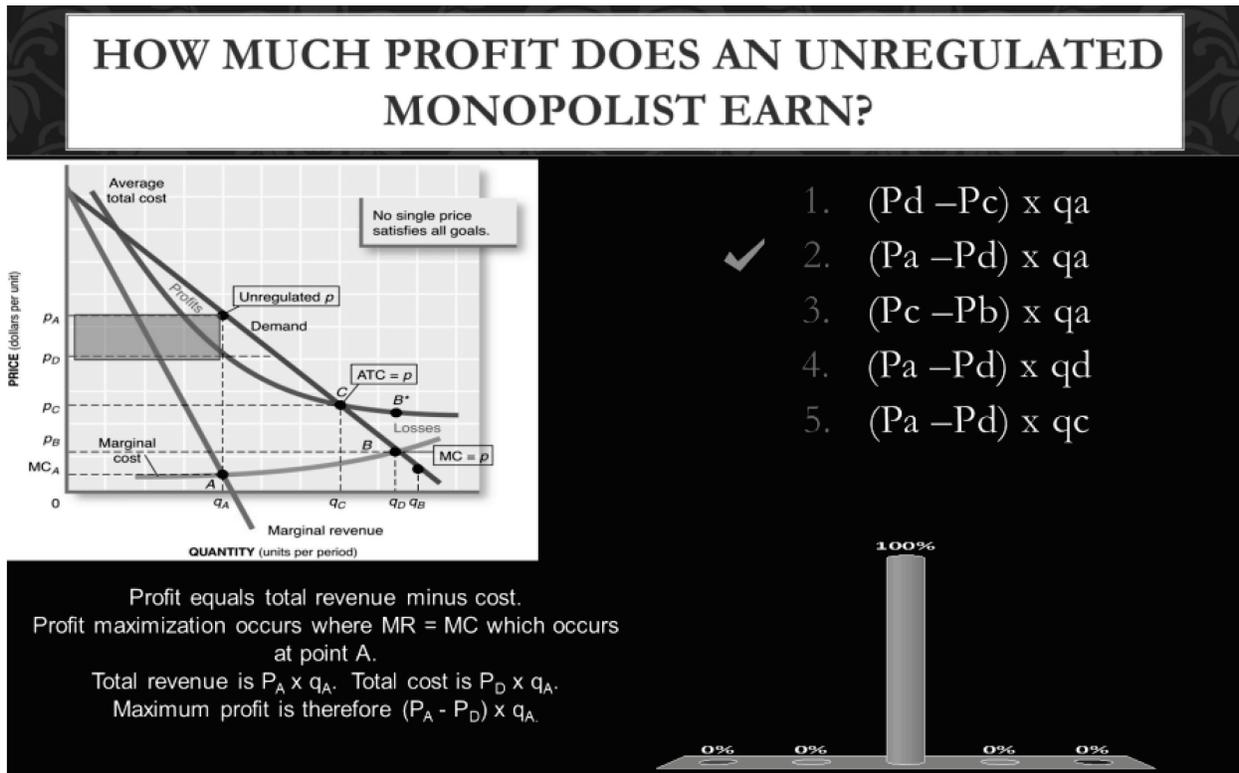
The first issue at hand is the early development phases of applications for the iPad that deal with translating Microsoft based products into Apple compatible data sheets. The Quick Office Application made the transition to the iPad possible, but was extremely cumbersome with regard to keyboard display and functions. Students had to spend a great deal of time switching between keyboard displays to create, finish, and copy spreadsheet formulas.

As the semester moved on, students became more adept at creating formulas quickly using the keyboards in Quick Office. This limitation forced me to re-evaluate spreadsheet options and finally settle on Numbers for the iPad. The keyboard functions are well designed and easy to complete for the student. The learning curve for numbers was much shorter this semester than for Quick Office last semester.

*Responseware*

Students were asked to download Responseware and create accounts required for participation in class activities. Primary uses in our Microeconomics class were taking roll and participative feedback. Certain presentations had real-time assignments included that required the students to answer a question. The instructor could hold the presentation while the students decided on their response, and then present the distribution of answers from the class for discussion. Percentages for each response were shown and then we would discuss what differences might have caused the answers to vary. Then, the students would be informed of the correct answer using feedback on the screen. Refer to Figure 2 – Responseware Feedback for an example of the class activity.

**FIGURE 2  
RESPONSEWARE FEEDBACK**



If there were a significant number of problems in understanding the concept I received immediate feedback allowing me to re-cover the concept immediately before moving on. This quick survey system was one of the most powerful tools all semester. Student positive responses to these types of classes were significant. Students indicated that they truly understood the concepts given the question, answer, discussion, solution, and review process. It is rare for students to use the terms “Extremely worthwhile” and “A positive tool for learning” as they leave the classroom.

Responseware was also used in group competition during competitive tests. After questions were asked of the group, the class could weigh in and indicate what they thought the right answer might be. The benefit as an instructor is found in the class percentage for the correct answer allowing “Just in Time” teaching on the subject at hand.

An additional benefit of using Responseware is the instructor’s ability to force free riders into action. A major problem with large classes is engagement. Responseware helps the instructor engage every student during every class. Students are informed that they must log into their Responseware account and be prepared to answer any questions that the instructor may have. These questions range from “Are you

here today?” to “What do you think the right answer is for this question?” Non-response to questions indicates that you are “not here mentally” and therefore has an impact on the participation grade.

Responseware data is downloaded daily to Excel to generate reports by user and by question so that it is easy to see who is not participating in the class activity. Vindictive users might impact the class through blatant wrong answers to group polling, but it is up to the instructor to gauge when it is appropriate to move on to another topic rather than hold up the rest of the class.

### *Discussion Board Blogs*

Each class had at least one discussion activity on Blackboard system. The system assigned a random group number to each student who would then receive an email containing a group leader and the discussion paper, question, and supporting documents.

During class the next day the students were well prepared for their group work. Each knew their group and their task. Students were then issued additional props (such as cups or materials for operations activities) and sent to locations of their choice to collaborate, complete the application, and report back their findings. These activities required that all students complete spreadsheet templates with their data findings using Quick Office. There was also a videographer assigned to the group who would video the activity using their iPhone and submit the video along with the group solution for grading. Completion of the group task required spreadsheet submissions by all students, group video submission, and a blog analysis of the situation.

The iPad has essentially freed the student from the classroom with a manageable device that is connected, mobile, and functional allowing true collaboration to begin with student learning. Selected video segments from the students demonstrated the liberating nature of the iPad and its applications in the classroom. Students could jump up, move around, and take their iPad with them to discuss data, solutions, or problems. No longer were they tied to their desks with bulky laptops that tout mobility but lack practicality. No other device to-date has provided the support, application, and ability to generate true collaborative learning in classes.

### *Testing*

The textbook provides a bank of questions which were loaded into pools for use by the class. Testing during the early portions of the semester started out using the following criteria:

- a. Random Block Test – questions pulled randomly for each student with each student getting different test questions.
- b. Single Attempt – only one attempt at the test.
- c. Force Completion – you must complete the test once you open it.
- d. Set Timer – the elapsed time for the test was 1.5 hours
- e. Feedback – Score and submitted answers were given at the completion of the test.
- f. Questions Presented One at a Time – the student was shown only the current question.
- g. Prohibit Backtracking – you cannot return to already completed questions.
- h. Randomized Questions – answers within the question can be randomized.

But by the end of the semester we had to rethink the testing methodology as we were inundated with test problems from the students. Typical problems were:

- a. The iPad had (from the user’s perspective) lost connectivity. The iPad devices given the students were not 3G enabled and if the student moved to a wireless area during a test (or if wireless was spotty) the device would lose connectivity and appear to lock up.
- b. The iPad displayed a blackboard error on test submission.

Both these conditions were caused by the nature of the iPad connection. If a student momentarily lost connectivity the Blackboard system assumed the test was over and that the student had chosen to exit the quiz or exam. Modifying the testing methods and parameters helped resolve these problems.

### **Applications Used on the iPads during Microeconomics**

At use during any part of the semester were the following applications:

- a) ACU Mobile: access to classes, files, NANO Tools, documents and webmail.(Access Randomly)
- b) You Version Holy Bible: access Bible verses. (Access Randomly)
- c) Inkling: Used to load and browse the online text, create notes, follow-me and follow-you notes. (Access Daily)
- d) The Optimist: Used to get up-to-date news on campus events. (Access Randomly)
- e) WSJ – Wall Street Journal: current world news and events. (Access Randomly)
- f) Calculator: non-spreadsheet based calculations. (Access Randomly)
- g) Blackboard – Mobile Learning: Used for Blackboard based class review. (Access Daily)
- h) Responseware: Class interaction software that monitors and displays feedback from the class. Used mainly in attendance, quiz taking, competitive tests, and informational feedback situations. (Access Daily)
- i) Quick Office: download, complete, save and upload completed spreadsheet activities in class. Distribution of files was done through Google mail. (Access Randomly)
- j) Safari: Used for quiz and test taking in the Blackboard System. (Access Daily)

### **Student Perceptions**

A review of feedback from the students showed that they still felt that there was a good deal of improvement to be made in the presentation of distance learning materials. Most of the student frustration dealt with problems in delivering testing where tests and quizzes would time out and cause problems with submissions. Typical student statements about the course being too hard, too easy, too strict, too lenient, too hands-off, too controlling were ignored. Technophobia didn't seem to be a problem but students did comment that some applications were less functional than they needed to be. Frustrations with different key pad formats on the screen were prevalent. Having to change through three screen displays to create formulas with text, numbers, and character sets were frustrating and caused data entry errors.

Some student did not like being forced to solve problems and submit them during class. For some it was apparent that the transition from paper to electronic format meant little. A student who did not study in a traditional classroom would also not study in a mobile classroom.

Many students enjoyed the mobility of the class. These students commented on their ability to access class work and textbooks in scattered moments that they had available throughout their day.

### **Instructor Perceptions**

Reliance on technology for activities does have a cost. The heavy media interest in this class caused us to be self-conscious that cameras were rolling and that the technology would fail. This did in fact happen during a video session with CNBC. During the class presentation both projectors quit working a few moments after the class began. A key to the success of technology is to be prepared for those moments when it fails. During the few minutes that it took to get the projectors going I was able to continue and present the class around the problems that were bring encountered.

### **STUDENT DATA ANALYSIS**

System logs were collected for Macroeconomics and Microeconomics students during the fall and spring semesters of 2010. The Macroeconomics courses had 100 students using laptops for class activities and assignments. The Microeconomics courses had 50 students using iPad, iPhone, and laptops (in their rooms) for access to the course content. The activity logs were summarized by Blackboard access showing activity by hour of day by user. If a user appeared in the system during any part of that hour (or several times in that hour) they were considered to be active during that period.

Our research during the Fall semester of 2010 compared the data use patterns for an iPad-based class to these two Laptop-based classes. iPad user patterns were more diffused when compared to the laptop

user. One possible explanation was that because iPads were truly mobile devices, they were available at any moment to work on educational content. Laptops were more “fixed” and less mobile and therefore less available for moments of study.

For our study during the Fall of 2010, only Blackboard data was analyzed. Refer to Figure 3 below for a visual comparison of the use patterns. Each cell in the table contains the average number of users accessing Blackboard during that weekday/time during the semester (Note: the laptop data contains two separate sections with a total of 100 users.) Laptop users are focused around class time and the Tuesday / Thursday class schedule while the iPad users show use patterns that are spread out. Heat mapping in Excel is achieved by the software coloring the variance from the minimum entry to the maximum entry in the data set.

**FIGURE 3  
IPAD VS. LAPTOP HEAT MAP COMPARISON**

<i>iPad Class</i>								<i>Laptop Class</i>							
<i>Hour</i>	<i>Sunday</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>	<i>Hour</i>	<i>Sunday</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>
6	0.1	0.1	0.2	0.0	0.1	0.0	0.0	6	0.0	0.1	0.1	0.1	0.1	0.2	0.0
7	0.1	0.2	0.4	0.2	0.3	0.3	0.2	7	0.0	0.1	3.6	0.5	3.4	0.6	0.1
8	0.2	0.4	0.9	0.5	0.9	1.1	0.2	8	0.4	0.6	10.2	0.9	10.1	1.1	0.1
9	0.3	0.9	1.6	1.5	1.6	1.0	0.5	9	0.4	1.5	14.2	1.1	11.6	1.4	0.3
10	0.2	1.3	1.4	1.4	1.0	0.9	0.6	10	0.8	1.6	6.6	1.7	5.4	1.9	0.4
11	0.2	1.0	2.2	0.5	1.7	0.7	0.7	11	0.6	1.1	2.1	1.5	2.4	1.4	0.7
12	0.5	1.1	3.3	0.9	2.8	1.1	0.9	12	0.9	2.3	4.5	2.1	4.2	1.3	1.1
13	0.9	1.9	11.3	1.3	16.3	0.8	0.6	13	1.8	2.5	3.9	3.1	4.8	1.6	0.9
14	1.0	1.8	5.4	1.9	5.6	0.7	0.6	14	2.5	2.9	3.7	3.1	4.0	2.0	1.4
15	1.1	2.1	4.0	2.5	3.1	1.1	0.9	15	2.8	3.4	4.8	3.5	5.8	1.7	1.3
16	1.1	2.3	2.7	1.6	3.1	0.7	0.8	16	3.2	3.6	4.8	3.7	6.6	2.6	1.6
17	1.1	1.9	1.9	1.4	2.1	0.6	0.8	17	2.8	3.9	5.6	3.7	5.2	1.9	1.5
18	0.9	2.2	1.8	1.4	2.5	0.4	0.6	18	2.5	3.5	4.4	2.3	4.4	1.7	0.8
19	1.1	2.1	2.2	1.3	2.2	0.3	0.5	19	3.1	4.4	5.5	2.9	4.7	1.2	1.1
20	1.2	2.4	3.1	1.4	2.0	0.8	0.4	20	3.2	4.9	7.3	3.7	5.8	1.5	0.9
21	2.0	2.5	3.1	1.7	2.4	0.8	0.7	21	2.9	4.8	8.5	3.8	5.3	1.2	1.1
22	1.6	2.0	2.9	1.8	2.8	0.5	0.6	22	2.5	4.3	8.6	4.2	6.8	1.3	1.0
23	1.3	2.2	3.5	2.0	2.4	0.8	0.6	23	3.1	3.5	7.1	3.4	6.8	1.0	0.5
0	0.4	1.1	1.5	1.4	0.9	1.2	0.5	0	1.0	1.7	1.8	2.4	2.6	1.9	0.5
1	0.3	0.6	0.8	0.5	0.6	0.7	0.2	1	0.4	0.7	0.8	0.7	1.0	0.9	0.3
2	0.1	0.2	0.2	0.3	0.2	0.3	0.2	2	0.2	0.1	0.8	0.3	0.6	0.3	0.1
3	0.0	0.1	0.0	0.2	0.2	0.1	0.1	3	0.1	0.1	0.3	0.1	0.3	0.1	0.1
4	0.1	0.1	0.0	0.1	0.3	0.1	0.0	4	0.0	0.0	0.2	0.0	0.1	0.1	0.0
5	0.2	0.1	0.4	0.0	0.1	0.2	0.0	5	0.1	0.0	0.2	0.0	0.0	0.1	0.1

The iPad allows a more “diffused” pattern of use than a typical desktop, laptop and textbook. It allows for those moments of learning away from traditional locations such as dorm room, classroom, and library.

**iPAD AND PAPERLESS PROS**

After four semesters comparing laptops and iPads, the iPad shows several strengths:

- a. It is a true mobile learning device. The students are more likely to carry this device rather than a heavy textbook or laptop computer.
- b. Increases student engagement in the classroom. Smart phones allow simple polls, but iPads allow real work to be done and submitted during class.
- c. Enables collaborative learning on a scale previously not available to teachers. The nature of mobility is to free up classes from a room environment to enable students to experience learning on the go. As students experience this new phenomena they are able to move, share, question, and compare information which generates discussion around the topic at hand.
- d. Improves student technology competency. The act of using these devices forces the user to accept and become comfortable with productivity tools that will keep them current in the workplace and build skills sought after by employers.

- e. Reduces faculty back end effort. As faculty move towards mobile devices we have to rethink the process of learning. By creating systematic assignments we cause work for ourselves the first time, but minimize our work later on. Spending 20% more time creating good activities and assignments can reduce back end grading effort by almost 90% (Shepherd / Reeves, 2006).

## **iPAD AND PAPERLESS CONS**

As with anything we do, there are often some down sides to going paperless:

- a. Technology reliance requires preparation in advance for possible failure. Instructors must have backup paperwork that will allow them to go “low tech” when needed i.e. a paper backup of slides and worksheets.
- b. There has to be a motivation to change on the part of the faculty. Faculty must see a long term gain to engage in this strenuous process.
- c. There is increased faculty effort involved in preparing to use these technologies. Rethinking assignments and reworking classes to use new technologies is time consuming.
- d. You must understand the device you are using in the classroom and work through limitations in the devices software.

## **APPLICATION ISSUES WITH BLACKBOARD MOBILE**

Some problems we found in our classes are listed below along with efforts taken to correct these problems.

- a) Attachments set to open in a new window did not work. After discussions with Blackboard we changed to open attachments in the same window
- b) Discussion Board reply problems were presented to Blackboard and Blackboard updates were pushed back to ACU to solve our problem
- c) Blackboard Testing was not supported from Mobile Applications

### **Other Application Issues**

We experienced Responseware response time issues as well as issues with Quickoffice not having graph capability. Students did not like the keyboard structure of Quickoffice as it was not intuitive and required switching between several keyboard screens to enter a formula.

### **Problem Solutions**

We opened problem tickets and followed-up with software vendors as soon as issues arose. Most vendors are interested in resolving user problems quickly when dealing with new devices and new applications. Connectivity problems crop up and flexibility is required in deadlines.

There are considerable overlaps between digital texts, Blackboard, and other content providers on the web. The use of any and all of these applications requires the instructor to sometimes duplicate effort which can be time consuming and frustrating.

## **THE STUDENT PERSPECTIVE**

Student Lilly Assaad remarked about iPad activities:

“We could do it anywhere from campus. We weren’t limited to the classroom and we weren’t limited to being together...we could collaborate and corroborate regardless of where we were and regardless of what time it was as long as we have the iPad, which basically modeled the professional life...and so it really helps us be prepared for the professional world.”

Lilly Assaad also discovered, learning with a mobile device is very different than...

“...a traditional class, where you have to either take a big fat textbook or you’re not going to get any work done. You realize that you can get your homework done and your reading done and interact with other students very easily. It’s just a whole different mindset.”

There is a new level of student engagement and involvement in course participation, because with the use of Mobile devices within the classroom, students have new levels of responsibility to actively participate in real-time polls, discussions, blogs, and other course activity.

## **CONCLUSION - iPad OR iFAD – THE REALITY OF A PAPERLESS CLASSROOM?**

The notebook computer, in our case, the Apple iPad, finally makes good on the promise of technology to enable the paperless classroom. The notebook form factor, along with the latest versions of apps, provides a platform that not only supports the paperless classroom, but also changes student’s usage pattern. Students become more efficient at capturing study and learning opportunities throughout their busy week.

## **CITATIONS AND REFERENCES**

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## **APPENDIX A - MICROECONOMICS SPRING 2011 SYLLABUS**

### **INTRODUCTION**

Economics of the firm and industry; supply and demand; revenue and costs; profits; consumer behavior; markets; the price system; the role of government; inequality; comparative economic systems, as well as selected concepts of business ethics.

### **GOALS FOR STUDENT COMPETENCY**

At the conclusion of this course, the student should be skilled in:

- Discussing the basic theory and use of economic principles and terms.
- Using simple charts and diagrams to illustrate economic principles.
- Discussing the effects that changes in the market have on supply-and-demand curves.
- Explaining the principles of increasing and diminishing returns.
- Illustrating and discussing the economic models of competition.
- Discussing the free enterprise system.
- Analyzing the market distribution of income to each of the four factors of production.
- Testing our Christian view of the world and our responsibilities towards others against accepted economic practices.

### **CLASS FORMAT**

- This course will consist of:
- Self-directed study.
- Multiple Choice and True-False Quiz Question research.
- Group Discussion.
- Class Participation.
- Examinations.

## GRADING SYSTEM

Description	Points	Total
Syllabus Acknowledgement	5	0
Attendance (-5 for unexcused absences)	25	0
Section Exams (4 at 100 Points)	100	400
Class and Activity Participation	100	100
<b>Total</b>		<b>500</b>
Grade A is 90% to 100% or 450 points to 500 points		
Grade B is 80% to 89% or 400 points to 449 points		
Grade C is 70% to 79% or 350 points to 349 points		
Grade D is 60% to 69% or 300 points to 299 points		
Grade F is less than 60% or 0 points to 299 points		

## SECTION EXAMS

- Section Exams cover groupings of at most 5 chapters.
- Each of these exams will be comprehensive.
- You must complete these exams online.
- These exams are uniquely generated for each student.
- Missed exams will receive a grade of zero.

## PARTICIPATION

Participation will be graded on class participation and group discussion through the online Blackboard system.

## TEXTBOOK

- Title: The Micro Economy Today
- Digital Copy
- Publisher: McGraw Hill Irwin
- Language: English
- ISBN-13: 978-0-07-724741-6
- DO NOT PURCHASE THIS TEXT - Refer to in-class instructions on how to obtain the text.