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to promote “Bit Literacy”

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# On using the Apple iPad in the classroom to promote “Bit Literacy”

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## Introduction

For the past two years I have been incorporating the iPad and the iPad 2 in my ESL classrooms. I found the iPad to be extremely helpful in such daily classroom interactions including grading, attendance, translation, presentations and more.

A quick Google search of the term “iPad 1 to 1 programs” generates several million hits. The popularity of the iPad in education is no longer a question of “if it should be used” but rather “how it is to be deployed and what kinds of uses can be implemented”. As with any change in how things are done in the classroom a series of considerations must be taken in to account.

Classrooms present a wealth of information that must be processed by students and teachers on a regular and often time sensitive basis. Homework assignments, tests, daily activities, and grades are but a few examples of information transmitted between all actors in the classroom. The volume of information and activities can create barriers to learning if not managed properly. What, if anything, can be done to reduce the secondary friction, such as content creation and delivery, resource management, and basic classroom management so that classrooms can provide a better learning environment ?

## What is “Bit Literacy” ?

The term “Bit Literacy” was coined by Mark Hurst in his book, *“Bit Literacy : Productivity in the age of information and E-mail overload”*. Hurst defines it as “a set of skills for living and working bits in a healthy and productive way” (Hurst, 2007). The proliferation of digital devices and the accompanying access to a global reservoir of information has brought with it the need to manage more information than ever before.

*“Bits are heavy. Though they have no physical weight, bits-the electronic data that flows in and out of our e-mail inboxes, cell phones, web browsers, and so on- place a weight on anyone who uses them. A laptop computer weighs the same few pounds whether it holds one e-mail or a thousand, but to the person who has to deal with all those emails, there is a big difference. Appearing in large numbers as they often do, bits weigh people down, mentally and emotionally, with incessant calls for attention and engagement.”* (Hurst Pg. 18)

While Hurst describes his various techniques at a macro and general level his perspectives are salient to the micro-culture of the classroom. In this case the main issue with having so many bits is the information carried has various levels of importance for both students and teachers.

For example, grades carry heavy importance for students mainly as a way of getting the necessary points to go onto the next class or higher level of schooling. For the teacher grades are of heavy importance for proving that the students have accomplished their curricular goals and other institutional expectations. Both parties wish to transmit the various “bits” for their own purposes. With the common goal of managing the various flows of “bits” in the classroom how can the use of an iPad

better facilitate this process?

### **iPad in the Classroom**

Classrooms present a wealth of information that must be processed by students and teachers on a regular and often time sensitive basis. Grades are but a one example of this. In their study on the impact of using the iPad to promote student engagement Manuguerra and Petocz stated that :

*“Students need timely feedback, because they want to know quickly if the quality or the quantity of their study is not appropriate. In the second place, students need to know what errors they made and in what ways their entire assignment could have been improved.”* (Manuguerra and Petocz, 2011)

By utilizing the iPad in their study the teachers were able to produce, distribute and grade assignments without any additional equipment besides an active internet connection. Corrections were applied to assignments via various applications on the iPad that allowed for annotations and other markup. The iPad streamlined the transmission and engagement process.

Eugene Geist conducted a study on the impact of using the iPad in a teacher preparation course. He found four themes reoccurring in the findings; two of which are pertinent here. The first concerned the classroom change in interaction. The students were able to use the iPad to conduct research without the need for a separate computer lab or going to the library alone. Group work was easier due to the common platform and portability. The iPad reduced the need to physically travel to conduct research and removed barriers to finishing the work students needed to accomplish. The second theme involved the convenience that the iPad

provided. Students were not only able to purchase textbooks directly from the device, the textbooks on the iPad could be searchable and annotated as the student needed (Geist, 2011).

The iPad not only provides a common platform that is more portable, it also provides a series of tools right out of the box that are useful for a range of classroom tasks. The messages application allows for one to one and group communication. The built in web browser Safari and YouTube apps open the Internet with the touch of a finger.

Another feature of the iPad is its native international keyboards. Because the keyboard on the iPad is virtual it is easily changed to one of many languages including script-based languages such as Japanese or Chinese (for a full list of supported languages see <http://m10lmac.blogspot.com/2012/09/ios-6-language-features-published.html>) and provides alternative input methods such as radical lookup or drawing features. Teachers with multicultural classrooms can take advantage of this feature without having to buy separate hardware to match all of the languages represented.

Language classes and dictionaries are common pairs. Paper dictionaries add yet another physical book that must be carried around and provided for students. Electronic dictionaries are single use devices. The iPad includes this feature that is accessible within any app. To look a word up in the dictionary all the user has to do is press and hold a word. A small pop-up appears showing “define”, and after pressing it a detailed dictionary entry appears with pronunciation, part of speech information, definitions, origins, and example sentences.

Pilgrim, Bledsoe, and Reily (2012) detail some of the uses for the standard applications provided with the iPad :

*“Many apps can be used daily by teachers as management tools. For example,*

*students can utilize a calendar, a calculator, and notes... Calendar is a useful tool to organize activities both inside and outside the classroom and can help students develop organizational skills...Teachers can add events, such as tests, to the students' calendars... the Notes app is a note-taking tool.”*

We have begun to see how the iPad has built-in tools that can help manage the flow of “bits” for teachers and students alike. By removing friction between content delivery and communication the iPad helps return the focus towards learning. There is another element to the iPad that provides additional avenues to process “bits”. The iPad connects to the iTunes Store where a catalog of hundreds of thousands of custom applications (apps) can be downloaded and installed for free or a nominal price. This extension of functionality acts like a Swiss Army knife ; there is app for almost any conceivable purpose that can be imagined.

### **There's an App For That**

The sheer quantity of apps almost returns us to the beginning. The iTunes store is a prime example of information overload ; too many “bits” to process yet our tool is supposed to help reduce the problem, not embellish it. Wading through the vast array of downloadable applications can be a daunting task. My experience with using the iPad in my classroom has generated a list of apps that students and teachers will find useful in a variety of contexts.

### **Apps for Teachers**

Probably the most important tool that the iPad takes the place of is a grade book. In many cases teachers are most comfortable with Excel and its spreadsheets.

Just because iPad is an Apple product and Excel is Microsoft has not hindered developers from creating Microsoft-like products that mimic the tried and true format beloved by teachers everywhere. Here are a few examples that I have used with pricing (In American Dollars) and ratings.

***Office 2 HD (6.7 Mb—7.99 \$ -4 star rating currently by 34 users)***

Office 2 HD acts as a portable office suite with word processing, spreadsheet, and presentation software that is fully Microsoft Office compatible. For all of my classes I have depended on this app to keep track of all of my attendances and my grades. In each class I take attendance on the iPad and after class or in my office correct class work right into the iPad where the Excel spreadsheet took care of my calculations.

***Kotoba ! (173 Mb—Free—5 star rating currently by 105 users)***

While teaching ESL to college students in a country that is not my own the need for a capable dictionary to overcome the inevitable language issues is completely transparent. The app does not require a constant internet connection in order to function making it useful to connection challenged classrooms and students to use when they are mobile. The dictionary features stroke order animations, real world examples, conjugation lists and multi-radical lookup options. This app is essential for Japanese ESL classrooms.

***My Language Translator (3.1 Mb—Free—4 star rating currently by 2,904 users-Internet required)***

Beyond just the quick and easy one word look up in the classroom for those tough to get the meaning situations, I have often needed the use of a full-featured translation program. When it comes to emails not in my native language or

situations with students or meetings where I needed more than just one word translations, the following program was very good at getting the general point across. It is important to bear in mind that translation programs are far from perfect and none can take the place of a true human understanding of the L2, but if you have an internet connection and are in need of quick translation, these types of programs can work very well.

***DropBox (9.7 Mb—free—4 star rating currently by 2,706 users—internet partially required for downloads)***

File management issues such as document storage and retrieval are prototypical “bit” management issues. DropBox provides free online storage that connects easily to the iPad. Documents and various forms of media can be easily uploaded to a DropBox account for access from any web-enabled computer. DropBox is a type of “cloud storage” program :

*“Cloud storage is a model of networked online storage where data is stored in virtualized pools of storage which are generally hosted by third parties. Hosting companies operate large data centers, and people who require their data to be hosted buy or lease storage capacity from them.” (Wikipedia)*

With a computer in the office, one at home and an iPad, you could never be too far from all the work sheets, classroom audio/video or pictures you could possibly need as teaching materials for all class work. DropBox provides for a central repository of digital content that is easy to access and manage. Used in conjunction with an iPad 2 and an HDMI cable for connection to an overhead projector or big screen TV and possibly a teacher would never need to use paper again.

This was just a small sample of the applications and their uses. There is



another area to look at when talking about the iPad and “Bit Literacy” and it concerns the potentials of using technology in the classroom.

## Reading

One of the many comments students have in college English courses is that textbooks are either too difficult or too easy. More often than not beginners are not true beginners and are stuck in classes where they get bored quickly and learn little because they see the material as too easy, so they do not bother participating. On the other end you have students who score very well on placement tests and are not truly advanced learners, but get put in classes that are either a little or a lot above their skill level, often times creating a dislike of the L2 or reinforcing a previous negative attitude toward it. Technology such as the iPad could lessen the learning gap for all students in L2 reading classes.

*“There are several ways in which technology can be used to improve reading ability. Most simple reading texts are also very primary in content. Older children may consider themselves too old to be reading such primary content books. Computers, however can increase the interest level for older students while keeping the text simple and easy to read. Another benefit of using computers for reading instruction is that the computer offers immediate feedback on performance. They also can provide added practice when necessary. According to Case and Truscott (1999), students have been able to improve their sight word vocabulary, fluency, and comprehension. Computer based reading instruction also allows for “increased interaction with texts, attention to individual needs, and increased independence through an ability to read texts they would not otherwise be able to read” (Case & Truscott, 1999 from Yabarra and Green 2003)*

## Vocabulary

Vocabulary can be a difficult subject when teaching students on a chalkboard or out of a book. Often students in Japan learn vocabulary with little or no context and no real way of making heads or tails of how that vocabulary can be used besides within the classroom. While electronic dictionaries do give multiple meanings and sentences for students to swim through on the search for meaning, it often just is not enough. Higher more visual forms of technology may be the answer.

*“In a study done by Kang and Dennis (1995), an investigation was conducted to determine whether or not the use of computers facilitates the vocabulary development of beginning English language learners. The study was conducted in Seoul, South Korea. The fifth grade students learning English were assigned to three different groups. The type of studies done by the three groups were: definitions, picture, and context. The group studying definitions was given the English word with the definition written in Korean. This group relied mainly on rote memorization. The group studying pictures were given the definition as well as a picture. The third group was given a situational context employing the English word first and then given the definition and picture.*

*Initially, the picture and definition groups did much better than the context group. However, after a few sessions, the context group’s scores surpassed those of the other two groups. There was also a test given at the end of the treatment sessions to test for retention. For this test, the context group scored significantly higher than the other two groups. Kang and Dennis (1995) concluded, “the Context group subjects needed a period of time to get used to their instructional treatment before they could take advantage of this more engaging type of instructional approach”. In the end, the contextual approach proved to be much more effective*

*in promoting long-term recall of vocabulary. This learning process was made possible and more effective by the use of computers.”*

This shows that even though the context group took a slower time to learn vocabulary because of the intensive nature of the information they were taking in (bits) through computer use, that eventually they did overtake the other two groups and were far better at retaining the vocabulary than the other subjects because of the use of technology with its visual enhancements to meaning and context.

### **The Future of the iPad**

We have shown how the iPad by itself can be many tools for students and teacher to use and explained some of the potential it may have on student outcomes. Like education it is constantly evolving to fit the needs of various situations. What follows are some of the directions the iPad is taking that are important to classrooms.

### **iPad and Apple TV**

While a solution exists to display the content from an iPad on to a screen in the front of a classroom, it is a tethered option and can limit mobility of the teacher. As a collaborative device pared with student-centric teaching using the iPad in this way may become problematic. The third generation Apple TV (***\$ 99 from store. apple.com***) overcomes this limitation. The Apple TV is a small set-top box with built-in wireless networking and an HDMI connection to a projector or flat-screen TV. With an iPad and an Apple TV connected to the same wireless network it is possible to share content from the iPad through the Apple TV wirelessly. For

example, if a teacher has a digital music file on their iPad that they want the students to listen to for a class project they simply need to tap the airplay button on the screen and they can broadcast that file to the speakers in the classroom from anywhere. Because of its wireless capabilities the teacher is free to move about the room interacting with students and can play the content whenever they choose. The iPad can send almost any content to be displayed on the Apple TV.

The real power of the combination of the iPad and the Apple TV is the ability of the 3<sup>rd</sup> generation iPad to mirror its screen to the Apple TV. Mirroring allows the iPad’s 10-inch display to appear on a screen. The teacher can go to YouTube and find a video that they wish the students to see and play it right from the iPad to the larger screen. For students unaware of how to use the iPad (such as the beginning of the school year) this mirroring ability allows for a simple way to train students by showing them in real time how and what to do.

The ability to mirror the iPad screen has taken a more amazing step further by allowing teachers to show various apps to students. What follows is a list of apps that could be useful to teachers that can make use of the mirroring feature.

***Paper by FiftyThree (44.4 MB—Free—4 star rating currently by 8,584 users)***

Paper by FiftyThree is a simple sketching program for the iPad. It allows users to organize their drawings in to notebooks that they can name and customize. There are 9 different colors that can be chosen and five different brush styles with an eraser although the free version only comes with one brush (the full set is available for \$6.99). The premise of this app is simple in that you can free-form draw whatever you choose on the screen. Drawing can be done with a finger but I have found that using a stylus allows for more control over the process. Notebooks can have multiple pages and it is possible to export pages to email, Facebook or Twitter, or to the photos collection on the iPad itself. The app is limited in that

you cannot import any media thereby limiting it to drawing, but as multipurpose canvas to display information it is functional for the price.

***Penultimate (37.6 MB— \$ 0.99—4 star rating currently by 10,835 users)***

Penultimate is similar to Paper by FiftyThree. You can organize your projects in to notebooks and it has rudimentary drawing tools including a 10-color pallet and adjustable line thickness. A few features do differentiate Penultimate from Paper including the ability to choose different kinds of paper such as lined, graph, music, and even game themed paper. There is a store that has other types of paper available for various prices depending on the pack. Penultimate does have the capability to import photos from the iPad's camera or photo collection to use in the notebook. A teacher could take a photo and easily import it in to Penultimate to use for the class. Penultimate's undo/redo feature allows you to move stepwise through the drawing to erase or restore a mistake without disrupting the entire notebook. Sharing features such as send by email or DropBox but the current version still lacks a direct share to social media.

***Corkulous Pro (20 MB— \$ 1.99—4 star rating currently by 703 users)***

Corkulous Pro is a virtual corkboard app that can be used to brainstorm ideas. Upon opening the app the user is presented with a full screen space that looks just like a real corkboard. It is possible to zoom in and out to see more or less of the entire corkboard. By oppressing the file cabinet icon on the bottom left of the screen a number of options become available. The labels tool allows for small text snippets. There are checklists, post-it notes, notecards, and label flags. Photos can be imported from the camera or the photo library on the iPad. Address book data can also be added making it possible to generate an email from inside the app. Items such as notecards can be color coded and resized by selecting the item.

Corkulous allows you to embed other corkboards in to an existing one allowing for more space. A search feature is included to find information quickly anywhere on the corkboard. Export options allow you to send a board via email or even share a corkboard for others to see.

***Educreations (4 MB—Free—4 and ½ star rating currently by 1,470 users)***

Educreations mimics a dry erase board on the iPad. The tools available include a drawing pen and photo import. The text tool allows for typing of information using the on-screen keyboard on the iPad. While the toolset is far from dynamic, two other features make this app stand out. You can touch the record button and start drawing the lesson. Audio from the built-in microphone records as you draw. This allows you to create a complete lesson that you can share. Similarly there are featured lessons that can be downloaded after creating an account that cover multiple subject areas.

## **iBooks Author**

Fraser Spears, an Apple Distinguished Educator, said

*“Curation : educated people choosing what to collect, how to store it, how to present it and how to interpret the body of work.”*

The move from analog textbooks to digital content introduced a dynamic element in to the classroom. Printed books were fixed at the onset and updates required buying another copy at a (usually significantly) later date. Digital content allows for almost instant revision and delivery. The idea of buying the book remained the same even as the analog to digital transition happened. Digital

textbooks closely followed their real world counterparts in that they were fixed albeit in a different format. What then would be the advantages of using digital content ?

Constructivism as a teaching method is beyond the scope of this paper (see Fox, 2001) save that working with students to increase their roles in curating the content for their learning is an increasingly dominant idea in teaching. Returning to the analog and digital issue one could say that digital content provides different avenues in which students could guide their own learning. How could the iPad fit in to the idea of guiding a student's learning and/or increasing their Bit Literacy ?

The answer could be found in iBooks Author (<http://www.apple.com/ibooks-author/>), a tool provided by Apple to create digital textbooks for use on the iPad. IBooks Author allows anyone to create a textbook to view on the iPad. This free software can create text and graphics that can be easily updated. It comes with a library of built-in widgets (small programs) that can be used to attach photos or movies and even provides for review and quizzes. For those with programming experience iBooks Author can embed custom programs to perform whatever function the class might need.

A project for the class could be to create their own textbook to be distributed to everyone's iPad. Although an Apple computer is necessary for iBooks Author, the iPad can be used to create and organize the information for the book. Student involvement in the curation of their own learning materials using the iPad leads to a more learner centered classroom along with increasing Bit Literacy for all parties involved.

## iTunes U

What if it was possible to go beyond creating a textbook for a class to creating an entire class ? With the advent of the iPad a number of schools have embraced

the technologies available and created a whole new kind of class. Schools produce the content for the class including assignments, quizzes, audio and video, and more. In conjunction with the iTunes U app it is possible to create an entire course without ever seeing a physical classroom.

One school that has embraced iTunes U is Duke University. Core Concepts in Chemistry is a full class produced by Duke University for iTunes U. Upon subscribing to the class through the app users are taken to a virtual notebook planner. On the left is a list of each of the topics that will be covered within the course. Indicator badges list how many new items there are for each topic. On the far right of the notebook are tabs listing information about the course, total posts (more on that shortly), a notes area that users can add and organize notes taken in the app, and a complete materials list for the course. Materials come in various formats including documents, web links, and audio and video files that can be downloaded directly from the app. Duke University provides a textbook for the course in the form of web links to textbooks available freely online. The center section appears as a checklist. The main topic is listed at the top of the list, followed by a sub topic and explanation. Below the subtopics are the tasks that are required for each section. Users can tap the task, download any materials that are necessary to accomplish it, and tap the checkbox when they are finished. Due dates can be placed within each task to keep students motivated. Following the course is intuitive and the information is presented in a very easy to follow format. At the end of sections Duke provides a quiz students can take to test their knowledge.

Lisa Germany from the Swinburne University of Technology, Hawthorn, Australia detailed a paper about the creative opportunities of using iTunes U for students. While the Duke University chemistry project presented a class produced



by the school the Swinburne University project sought to make the students the creators of their own iTunes U class. Students were tasked to submit their own work as examples of the expectations for the course. Audio and video content was created by the students in conjunction with relevant departments within the university. This allowed for real world creative experiences for the students to engage in. Finally it allowed the students to have material to showcase their talents to potential employers (Germany, 2011).

Using iTunes U in this way is a prototype of teaching “Bit Literacy”. Rather than passive consumers of classroom knowledge students at Swinburne University became the directors of the flow of information. They created the “Bits”, organized them, and ultimately turned them in to a product for other students to use.

Still in its early stages, iTunes U provides an opportunity for learning on the iPad in ways never before available to students and teachers. As more schools embrace the ability to create courses available to anyone the future holds great promise for the iPad in education.

## Conclusion

With the pervasiveness of technology in the modern world the need to deal with all the information set upon us becomes more important each day. Mark Hurst suggests we need “Bit Literacy” to better process the flow of information. We have shown how the iPad can be a tool to assist us in dealing with that information. The potential of the iPad is just becoming known to teachers and could hold a very important place in the classroom in the future. As developers create new apps that allow for learning interactions and schools tailor their content for use on the iPad the possibilities are only limited by our imaginations.

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