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There's an (Educational) App for That?: m-Learning Across Device Platforms

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Introduction

The mobile platform has advanced to a level of technological sophistication and availability that many educators need to begin to think about how to utilize its potential. M-Learning may be used to supplement and deliver learning content. Mobile devices are ubiquitous among all age groups of students whether the popular iPod Touch\iPad, PSP, Netbooks, etc. Smartphones have become very powerful devices, capable of performing many useful applications. The mobile device market has seen tremendous growth recently. The largest increase was in the 12-17 year old demographic. Lenhart (2009) discovered:

"Our surveys show that while 71% of teens owned cell phones in 2008:

- 77% of teens owned a game console like an Xbox or a PlayStation

- 74% of teens owned an iPod or mp3 player

- 60% of teens "owned" a desktop or laptop computer

- 55% of teens owned a portable gaming device

(Retrieved November 27, 2010 from: http://pewresearch.org/pubs/1315/teens-use-of-cell-phones).

What has made these devices so useful is that they are Wi-Fi equipped. Students are able to connect to the Internet through a simple login process to a WiFi Hotspot location, many locations are free (McDonald's for example). These devices possess great potential for educational purposes.

This study revealed that educators must seriously consider the role these devices play for helping students learn. This study also demonstrated that mobile devices\Smartphones provide an emerging platform for educators to disseminate information and connect with their students through appropriate technologically relevant educational applications. The next section of this study, a review of the literature, has demonstrated the implications of m-Learning for educational purposes.

Leveraging m-Learning

Students are already using their mobile devices\Smartphones for communicating via sms, mms, facebook, twitter, email, etc. In fact, these devices are not being used for verbal communication as much as they are for data transmission. For example, "Mobile data surpassed voice on a global basis during December of 2009, Ericsson announced today at the CTIA Wireless 2010 convention in Las Vegas. This finding is based on Ericsson (NASDAQ:ERIC) measurements from live networks covering all regions of the world." Ericsson's findings show that data traffic globally grew 280% during each of

the last two years, and is forecast to double annually over the next five years. The crossover occurred at approximately 140,000 Terabytes per month in both voice and data traffic. The data traffic increase is contributing to revenue growth for operators when more and more generating devices such as Smartphones and PCs."

(Ericsson Press Release March 23, 2010). Smith (2010) found similar results,

"The use of non-voice data applications on cell phones has grown dramatically over the last year. Compared with a similar point in 2009, cell phone owners are now more likely to use their mobile phones to:

- Take pictures-76% now do this, up from 66% in April 2009

- Send or receive text messages-72% vs. 65%

- Access the internet-38% vs. 25%

- Play games-34% vs. 27%

- Send or receive email-34% vs. 25%

- Record a video-34% vs. 19%

- Play music-33% vs. 21%

- Send or receive instant messages-30% vs. 20%

African-Americans and English-speaking Latinos continue to be among the most active users of the mobile web."

These findings reveal an obvious trend in the application of these devices, which is overwhelmingly used for uploading and downloading data. This evidence should cause educators to carefully contemplate the notion that the best technology is the one people are using. Therefore, if students are using mobile devices\Smartphones, then educators should be using mobile devices\Smartphones to help students learn. The Secretary Of Education, Arne Duncan, in a recent interview responded to the use of mobile phones by students. He asked the following question, "Why shouldn't we be thinking about how we help teach students using mobile phones, why is it just sitting in the classroom, you know in the traditional walls, the four walls of the classroom or the school?" (Duncan, 2010).

Unfortunately, the policies of many school districts prohibit the use of these devices during school and punish students for using them. These policies will likely change over time. Some historical examples may provide some perspective.

An educator and Internet blogger, Karl Fisch, cited David Thornburg's book Edutrends 2010: Restructuring, Technology, and the Future of Education to demonstrate the opposition by educational leaders to implementing the advancements made by technology in education:

"Students today can't prepare bark to calculate their problems. They depend on their slates which are more expensive. What will they do when their slate is dropped and it breaks? They will be unable to write!"

Teachers Conference, 1703

"Students today depend upon paper too much. They don't know how to write on slate without chalk dust all over themselves. They can't clean a slate properly. What will they do when they run out of paper?"
Principal's Association, 1815

"Students today depend too much upon ink. They don't know how to use a pen knife to sharpen a pencil. Pen and ink will never replace the pencil."
National Association of Teachers, 1907

"Students today depend upon store-bought ink. They don't know how to make their own. When they run out of ink they will be unable to write words of ciphers until their next trip to the settlement. This is a sad commentary on modern education."
The Rural American Teacher, 1929

"Students today depend upon these expensive fountain pens. They can no longer write with a straight pen and nib (not to mention sharpening their own quills). We parents must not allow them to wallow in such luxury to the detriment of learning how to cope in the real business world, which is not so extravagant."
PTA Gazette, 1941

"Ball point pens will be the ruin of education in our country. Students use these devices and then throw them away. The American virtues of thrift and frugality are being discarded. Business and banks will never allow such expensive luxuries."
Federal Teacher, 1950

(Retrieved November 26, 2010 from: http://thefischbowl.blogspot.com/2006/09/what-if.html.)

While some of these quotes seem humorous and others just plain ridiculous, the irony in these statements was that any challenge imposed by a technological advancement adopted by students was perceived negatively in light of the established norm. Educators have a mandate to prepare students with the skills needed to function in the world that awaits them. Banning the use of mobile devices\smarthphones will probably be looked upon with equal incredulousness by future generations.

The m-Learning platform provides an almost on demand form of learning. There no longer a need to tote around a laptop or boot up a computer. According to Brown (2010) "Mobile learning (m-learning) is a natural extension of electronic learning (e-learning) and has the potential to make learning even more widely available and accessible than we are used to in existing e-learning environments."

Bauerlein (2008) raised a significant concern related to the use of technology in the classroom, "Students can image browse and post and play, but they can't judge the materials they process, at least not in the intellectual or professional terms of college classes and the workplace." However, Banister (2010) provides an insightful observation, "Currently teachers find that students often copy/paste content directly from the Internet into their multimedia reports or papers. It is possible that if students completed Internet research using mobile devices, such as the iPod Touch, they would be more likely to take notes and consolidate the information in their own words."

A likely outcome of m-Learning is that students become more active and less participatory in the education process. Looi, Seow, Zhang, So, Chen, & Wong (2010) noted,

"The portability and versatility of mobile devices has significant potential in promoting a pedagogical shift from didactic teacher-centred to participatory student-centred learning. In this type of learning culture, teachers act as a facilitator and learning partner rather than a sole expert of knowledge. Previous research on learning with mobile technology has clearly shown that the mobility and connectivity of technological tools enable students to become an active participant, not a passive receiver in learning activities."

The m-Learning platform may provide a solution to the objections of using technology in and outside the classroom raised by Bauerlein and other critics.

Hlodan (2010) cited a recent report of an m-Learning program that used Smartphones among high school students:

"A large-scale study in the works. Project K-Nect, tracks high-school students in North Carolina who use smartphones to study math. The program's evaluation results show that using these devices as learn- ing aides has had a measurable impact on student achievement (read the report at *www.tomorrow.org/research/ ProjectKnect.html).* Interestingly, almost two-thirds of the students reported taking additional math courses as a result of smartphone use, and more than 50 percent are now considering a career in a math-related field as a result of participating in Project K-Nect."

The iPod Touch was used in a mobile learning study on the subject of math conducted at a public school in Southeastern Appalachian Ohio (Franklin & Peng, 2008). This location has been known for its combination of very rural, socio-economically depressed, small towns that have coal mining as their economic history. The school was designated as needing Continuous Improvement by the Ohio Department of Education. Two eighth grade classes participated in the study. The students developed math movies along with their teachers for playback on the iPod Touch to be viewed after formal class hours as a means of mobile learning. The primary software used was Powerpoint using the voice over feature and iMovie for playback on the iPod Touch. A few technological issues were encountered, but overall Franklin & Peng (2008) found, "The math educators in the study overwhelmingly supported the use of the iPod Touch in formal and informal settings." The researchers also noted (Ibid.) "The math educators, the students, school administrator, and university faculty were impressed by the ability of students to present difficult concepts in a visual format and then discuss them with friends."

The next section examined and assessed some of the most useful mobile applications for educational purposes across mobile platforms.

m-Learning Across Platforms

All of the apps analyzed in this study were either downloaded free or came pre-loaded on the mobile device or Smartphone. There are some nice apps that may be purchased that allow for editing of documents and other file types on these devices, but these were outside the focus of this study.

One of the main problems encountered in this study was the lack of cross platform compatibility of some apps on mobile learning devices. One of the most noteworthy obstacles is related to the inability

to view videos created to play using Adobe Flash Player (flv) on the iPhone\iPod Touch\iPad and other Smartphone manufacturers. Adobe Flash Player is used on nearly 75% of websites. Wagner (2008) noted, "The current challenge is that Flash content created for use on PCs may not necessarily play seamlessly on a TV screen, a mobile phone screen, and a car's GPS display screen; the form factors among screen types make it hard to design content once and produce it one time." Therefore, educators should produce their content in a format that may be played across platforms other than Flash.

YouTube provides a solution to this problem for educators. Educators may use the YouTube server to host the videos they produce which in turn can be viewed on most, if not all, mobile devices/Smartphones. The YouTube app is pre-loaded on most mobile devices/Smartphones and the service is free to the user. Once educators produce a video, it should be saved in a media format like MP4 that can be uploaded to YouTube. YouTube converts the MP4 file to the HTML 5 format that in turn will play across mobile device\Smartphone platforms along with the traditional eLearning platforms of laptops and PC\Mac computers. HTML 5 promises to resolve the issue of video playback across the mobile device and Smartphone platform, but it is still a few years away. Older YouTube videos used the Adobe Flash Player format. These do not play on the iPhone\iPod Touch\iPad. The Math videos created in the study conducted by Franklin & Peng (2008) discussed above could be uploaded to YouTube for playback across mobile device and Smartphone platforms.

An exciting feature of YouTube is the ability to embed videos into a course management system. YouTube allows up to fifteen minutes per video to be uploaded to its server. This is adequate for most presentations or lectures. The attention span of the intended audience should be a major consideration when creating videos. A good practice is to create a series of short videos into a chapter format, rather than one long video. A YouTube account may be established for free through a simple sign up process. The edit feature gives the account holder several options for sharing a video that has been uploaded. The options include: share with everyone, private only – YouTube members who have an account, and linked – only those who have the url may view the video. This last option is particularly useful for teachers who provide audio/video capture feedback on student assignments (cf. Lumadue, Fish 2010).

Another useful feature of YouTube is to create video tutorials for common questions students may have on assignments and other course requirements.

The mobile device\Smartphone platform allows for YouTube videos to be played on a projector or television via a media cable. Most devices have a composite cable (i.e.; audio/video output) but the newer devices are equipped with HDMI output. An Internet connection (Wi-Fi, some devices offer a data plan through a service provider) is needed to view YouTube videos on an iPod Touch/iPad or similar mobile device. Smartphones are equipped with Wi-Fi capability, but are able to access the Internet through most data plans.

Although YouTube videos may be played via a media cable, presentations created using PowerPoint and the like have to be converted to individual image files for each slide. Any audio that was added to a presentation will not play since only the images of each slide are captured. The slides need to be loaded into the picture viewer of the mobile device\Smartphone (usually the gallery), which may then be displayed using the media cable onto a projector or television screen. This feature is especially useful for giving presentations at conferences and workshops or even in the classroom.

The popular social networking site, i.e.; Facebook, Twitter, etc. have free apps available for download across the m-Learning platform. These social networking sites provide students, who have an account on the site, the opportunity to connect outside of class time to work on group projects, share ideas\findings, and to keep in touch with each other. Most Institutions of higher education have a Facebook page where Student Services information and the like are posted. This is helpful to keep current students informed and for recruitment of new students.

Bump is a cross platform app that allows users to share limited file types like contacts and pictures with each other.   Opening the app on both devices at the same time and gently "bumping" them together hitting the hands, not the devices against each other, allows users to share files. This is especially useful for students who have prepared a presentation and saved it in individual the gallery as individual picture images.

Google provides seamless cross platform use of its apps such as Google Docs & Google Calendar for viewing and editing. Some Smartphones (i.e.; the Droid, HTC Evo) did not have the actual Google Docs app available when this study was conducted. However, the user may navigate to a Google Docs account through the Internet browser on these Smartphones. Any document type, i.e.; Word, Powerpoint and Excel Spreadsheet, that has been uploaded to a user's Google Doc account may be viewed on the mobile device\Smartphone platform. Until recently, the only file type that could be edited was the .xls spreadsheet. During this study, all of the file extensions could be viewed and edited on these mobile devices\Smartphones. In fact, the user was also given the option to create files in Google Docs on these devices. According to a statement released on Google's official blog, "With Google Docs, we're always trying to make you more productive-and part of that means making it possible for you to get things done from anywhere, at anytime. That's why we're excited that the new documents editor now supports editing on your mobile browser" (retrieved on November 23, 2010 from http://googleblog.blogspot.com/. *Editing Your Google Docs on the Go.* November 17, 2010).   Google docs has provided educators and students a tremendous resource for the m-Learning platform. This latest development promises to be a significant factor in the adoption of m-Learning.
One of the most significant, yet basic apps for m-Learning discovered in this study was the pre-installed Internet browser on mobile devices\Smartphones. Students have the information superhighway at their disposal almost anywhere they find themselves in range of a Wi-Fi Hotspot or service provider network. Many Internet sites have mobile versions that display nicely on these devices. With the copy and paste function students have the ability to create reports and presentations right on the device using a pre-installed text editor or Google Docs. Cloud technology such as Google Docs and the like give students and educators the ability to share, view and edit documents and presentations with a shared link rather than attaching large files to an email.

Almost all of the mobile devices\Smartphones are equipped with cameras capable of uploading content to Internet sites like YouTube, Flicker, Picasa, Facebook, etc. Students have the ability to create a video presentation for a course project to share with the teacher and classmates, literally anywhere in the world. The camera function also gives students and teachers an option to collaborate in a video chat environment. Fring was tested in this study and worked well between different platforms (the HTC EVO and iPhone). Skype currently allows only audio chat on the mobile platform.

E-book reader apps (i.e.; Amazon's Kindle or Barnes & Noble's Nook) may be downloaded free for

reading electronic textbooks. These readers have highlight and note functions students can use while reading a text. Thousands of titles (many classics) may be downloaded free. Most e-books are discounted 20% – 40% over print editions.

The next area where growth can be expected in the app market across platforms is among the Course\Learning Management System providers. The Blackboard Course Management System was the only one that was analyzed for this study. Others are in the development stage. Institutions were found to be reluctant to support the mobile platform because of the added cost for the service and support. The Blackboard app is a free download for mobile devices. However, users of this app must be enrolled at an institution that supports both the Blackboard Course Management System and mobile app.

Conclusions

This study revealed the ubiquitous presence of mobile devices and Smartphones among students of all ages and the potential of using these devices in an educationally relevant way to engage students. A second lesson learned raised awareness of the potential of a loophole for mobile devices in classrooms where applications such as YouTube and the like have been banned by firewalls on school computers connected to the Internet. School districts may not be liable for what students view on their personal mobile devices, thus giving teachers freedom to think creatively on how to use mobile devices for educational purposes. The strategies for m-Learning can be implemented when educators begin to adopt and implement some basic technological skills to enhance the learning activities of those they teach and train using mobile devices and Smartphones. This study was undertaken because the global digital revolution in education is underway and American public schools are in jeopardy of becoming 3rd world classrooms if educators continue under existing pedagogical paradigms and reject the m-Learning platform. There is no doubt that m-Learning has a significant role to play in education. The development of the m-Learning platform will continue to improve and new apps for educational purposes will continue to be developed. The important point for educators to grasp is to adapt to the changes in technology and harness its ability to engage students in the learning process to prepare them with the skills needed to function in the world. The best technology is the one people are using.

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