

## EDUCATIONAL APPLICATIONS OF THE EMERGING TECHNOLOGIES AVAILABLE ON HANDHELD DEVICES SUCH AS iPad AND iPhone

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### ABSTRACT

*This article explores the unique features offered by the latest handheld devices such as iPad and iPhone for learning and teaching. The teaching capabilities of iPad and iPhone through their numerous educational application programs (widely referred to as apps) from the teacher's point of view, has been identified. A number of useful and relevant iPad and iPhone apps for learning and teaching languages have been identified as part of this research project. In particular, the more human-like interface features, offered by Apple devices such as iPad and iPhone have been investigated for educational purposes. Preliminary studies by the author have demonstrated that students have a preference for using a smart handheld device in helping them with their studies. The unique touch interface, portability low cost and readily availability of apps are amongst the favourite features of iPad and iPhone.*

**Keywords:** Education, Technology, Interface

### INTRODUCTION

The progress in the technology, its capabilities and educational applications have continued and enhanced exponentially over the recent years. A significant approach to reinforcing the learning process was the use of multimedia quizzes with sound and colour. These featured helped with learning enhancement. This way of learning on computers was only possible after the introduction of the multimedia personal computers. A very good example is Commodore 64 (C64). One may compare the popularity and innovative features of this computer during the 1980s to today's Apple products such as iPhone and iPad. According to Sam Tramiel, a later Atari president and the son of Commodore's founder, 400,000 C64s per month were being produced for about two years. That is a reasonably large figure. The competitive prices, attractive and innovative features and its availability in many established department stores made this computer a must-have for many families around the world. Almost See Schembri, T., & Boisseau, O. (2001) for details on Commodore 64.

The latest developments in technology for the purposes of education focus of and need to connection to the Internet. For further information, see Chau (2007). Although the Internet based learning plays a major role in education and its delivery, the latest hardware features promise exciting developments. These features have enabled the application developers create interesting and educationally effective applications for smart phones and advanced tablet computers such as iPhone and iPad.

### The Potential Use of the Smart Handheld Devices in Education

When Apple introduced iPad in 2010, its potential and applications in education were realized and considered by many academics around the world. In one university alone, with which the author is familiar, there are around 400 of these devices. Academics and others involved in education are eager to find ways of using these sleek devices. With the release of iPad in 2010, the Touch technology has had even more serious implications for education. Just before the formal launch of iPad in the US, Fry S (2010) had the following comment after interviewing Steve Jobs (Apple's CEO) and reviewing the product for Time Magazine:

*“When I eventually got my hands on one, I discovered that one doesn't relate to it as “tool”; the experience is closer to one's relationship with a person or an animal.”*

According to Fry (2010), Tracy Futhey, of Duke University, was quite optimistic about iPad's potential in education and commented that:

*“The iPad is going to herald a revolution in mashing up text, video, course materials, students input ... We are very excited.”*

Putting the speculations aside, the burning question, at the moment, is: What makes iPad superior to conventional notebook type computers?

iPad offers a different and more natural way of interface. For instance Apple's tap, pinch and draw capabilities using fingers on iPad, iPhone or even iPod are good examples.

The experience through the Apple's Touch technology does certainly create a more natural interface between the user and the machine. To demonstrate this capability, applications which utilize the touch features intensively may be referenced here. For instance, the painting and drawing apps for iPhone and iPad enable a user to experiment with painting in a totally innovative fashion. For instance, the painter can use the iPhone screen as a canvas and the fingers as brushes. The colours are selected by tapping and touching a colour wheel. The chosen colour is placed on the user's palette and the index finger then starts drawing and painting on the screen. iPhone is extremely responsive to strokes and the tiniest detail as desired by the painter are depicted on the canvas. The pinch and zoom feature is used to draw and paint the fine details. This way of painting experience does certainly create a much closer relationship between the painter and the subject as in a real situation. The advantage is that the painter can very easily and at no costs, start with new canvases and reinforce the learning process even with some form of what-if analysis too.

In addition to the handheld devices, one should also consider the advances which take place with regard to the latest generation of the extremely light weight portable notebooks. For instance, Macbook Air is a fully fledged computer which has features very similar to a modern tablet PC. Hence, the hardware features of iPad cannot be the sole reason and basis for its popularity of use in fields such as education.

One of the main contributory factors towards the popularity of iPad and the desire to explore its potential in learning and teaching is the availability of the apps. These apps are basically pieces of software programs (in traditional terms) which run on devices such as iPad and iPhone. They cover numerous fields such as languages, arts, music, science, mathematics and statistics. The list is continually growing. These apps are readily available at reasonably modest prices on the app store and are accessible via Apple's iTunes. According to the iTunes app store prices, the majority of the educational apps cost under the \$10 mark. A very large proportion of these sell for an amount less than five dollars (AUD and USD are almost the same at the time of writing). The apps have several distinct features and advantages over the conventional programs. Firstly, they are inexpensive. For a fraction of the price of a traditional PC software package, one can purchase an app. In terms of features, they are not too far behind their older cousins either. For instance, the author has recently investigated the suitability of an app for teaching the fundamentals of planning, execution and control in a Project Management. The outcome of this investigation was a pleasant surprise compared with the large-scale packages such as MS Project. This app (Project Planner) priced only \$3.99 satisfies the needs of teaching the basics of Plan, Execute, Control and Report quite adequately.

There is an abundance of powerful, useful and effective language learning apps available for devices such as iPad/iPhone. The author has used and tested the capabilities of several of these apps for different languages. Firstly there are bi and multi language dictionaries and classic phrasebook type apps. A relevant examples includes Google Translate (Company: Google Mobile, 2011) which is multi language and multi directional dictionary/translator which utilises the Internet for translations. It has a speech feature which is quite human-like. The next level includes the successful PC based programs which were distributed on CD until recently and retailed for 80-90 AUD. The same programs are now available as iPad/iPhone apps and sell for a fraction of those original costs. EuroTalk series were the very effective and successful programs. The app versions are equally comprehensive regarding the features and they are fully self contained in terms of usage without connection to the Internet.

In addition to these classic language learning apps, there are learning tools with quite advanced and easy to master features. For instance, the author has tested several apps for learning how to write the Japanese Hiragana phonemes. These apps allow the learner to write on the screen by either superimposing a character on correctly written one or writing it first and then displaying the correct one for comparison purposes. Some of these apps have even the sound option which provide the exact sound of the character as pronounced by a native Japanese speaker. Good examples of these apps include: Kana LS Touch (Company: Jan Bogner, 2011). A search, for example, for Hiragana would also yield a list of relevant apps. A very frequently used app by the author for both French and German is iSpeak (Company: John Stefanopolos, 2011) which utilises the Internet language data bases for translation. This powerful and very easy-to-use app has excellent human-like speech features. Therefore, the translations are displayed in both origin and destination languages and a click on Speak tab pronounces the screen. The learner can quickly swap between the pairs of languages. It should be noted that there are also several very effective phrasebook type apps. One of these apps which again covers several languages such as French German, Spanish, Italian and Japanese is Language for Dummies (e.g. French for Dummies - Company: Skava Inc, 2011). The apps in this series are a combination dictionary, phrasebook, flashcards with very good pronunciation. They also have features for creating favorites for

words/phrases and word of the day. It should be noted that the app does not require connection to the Internet for translation or pronunciation.

### **An Innovative Approach**

Recently, the introduction of Apple's ios5 and the latest hardware and software available on iPhone 4s has certainly added another very interesting dimension to learning. We can mention Apple iPhone's intelligent personal assistant SIRI as a specific example of innovation which can have amazing potential uses in education. This system has been introduced and promoted as an intelligent personal assistant which allows the user to set alarms, organize meetings, search the web and display the emails. Its, very applications can certainly go beyond those features. The author has recently experimented with SIRI for language learning purposes by switching the language option of SIRI from English to French and German. The author, as an experiment, tried pronouncing "Que pouvez-vous faire pour moi" (What can you do for me). It was a pleasant surprise when the system responded by displaying all possible options in French. The author then asked, in French, "What is the temperature in Paris" (Quelle est la température à Paris en ce moment)? The system responded in French what exactly the temperature was for that time in paris. After a few more attempts, it was realised that the system could only comprehend the exact pronunciation as by the native speakers of French. This was in fact a positive challenge. It forced the the author to try and experiment with ways of pronouncing certain words. For instances the inflections were altered. After several attempts, the system could understand many words and phrases uttered by the author. This was very encouraging. The beauty of all this that the system responds to the question or statement. Hence, one can establish a limited but quite natural conversation with the system. The experiment with German was also very similar. It should be noted the SIRI is is still in its Alpha phase. The future for the educational applications of this kind of technology is certainly very promising.

Another innovative technology in handheld device which certainly has a place in the modern approaches to learning is the Amazon Kindle. Kindle is a specially developed hardware and software packaged into a very compact and attractive tablet. Kindle has free international electronic book, magazine or document download capabilities via 3G and wireless connection. Kindle with its whispernet synchronization between the user's different devices, is a very good example of seamless technology for learning. For further information on seamless learning, see Looi (2010). Hence the user can download numerous items of interest from the Amazon's Kindle Store. In addition to its very useful features such as an active dictionary and free 3G access to Wikipedia and the Internet, it is equipped with an experimental text to speech function. When switched on, this function allows the reader to listen to the text on the page. The author has experimented with this feature for the purposes of speed reading training. This experiment was carried out by setting the speech pace to fast and the text on the screen was scanned at the same speed by the author. It was observed that the need for sub-vocalization was removed from the process. Although sub-vocalization is an important factor in comprehension, it is also an inhibitor in achieving higher speeds. The author has comfortably achieved speeds above 250 words per minute with a close to full comprehension outcome.

One of the main features of the Amazon Kindle is its ability to access several hundreds of thousands of books from the Kindle Store. There are also several major international magazines, periodicals and newspapers available on the site. The book collection includes a comprehensive coverage of topics in mathematics and science. The list of these books, in size and coverage, is growing all the time. It must be mentioned that Amazon has also developed and provided a Kindle eReader app for iPad and iPhone which is free to download and use. The app contains most of the features and functionalities of the very successful Kindle eReader. The eReader capabilities of iPad, in general, are certainly a preferred feature amongst the learners. According to the feedback collected from the author's students in three different classes, this feature is definitely amongst the top three. Although text is a traditional learning mode, it continues to remain one of the most effective forms of media. With the technological advancement in the tablet computers such as iPad, text can become even more powerful in terms of learning and also an appealing way of fully immersing in the topic. The features such as quick access to books, reasonable prices of eBooks, portability of a large collection and text to speech capabilities will certainly help this popularity. Currently, only English text to speech is available. Addition of other languages will definitely have potential uses in language learning.

These and similar technologies are very likely to become readily available on various brands of handheld device in the near future. It is noteworthy to mention that the expansion can even reach different devices such as smart pens. For instance, the smart pen by LiveScribe is a very good example. Although limited in choice, there are also apps available for this smart pen. They include a number of language learning applications in Spanish, French, German and Japanese. One of the main features of using such a pen is the power of combining the traditional ways with the latest technologies. That is physically and actually (as opposed to virtually) writing on paper and at the same time utilising the computing power of the device. So, the learner can write a word on the special dot paper (which looks and feels just like an ordinary paper) and then the pen will translate, display and pronounce the word. Therefore, the learner uses the read/write mode of learning, in a traditional manner and combines it with the aural and visual modalities. This effective combination can certainly have very effective outcomes.

These emerging technologies have a great potential for education in many fields. They can even build on the immersive and real-time engagement as in Virtual Reality in online courses. For challenges of using virtual reality in online courses, see Stewart et al (2010). In order to test the technology's acceptance and perceptions about its suitability and effectiveness, a series of surveys were conducted by the author in the past two years. As a challenge to determine these technologies' serious uses in education, the author set himself the task of undertaking the research and writing this paper utilizing several apps on an iPhone. Some examples included apps on communication (text and voice mail), data collection and Statistics, MS Word, document scanning and PDF converter and image cropping. The statistical analysis was also carried out using an iPhone app. The next section presents the results of an ongoing work on the learners' preferences in terms of technology..

### **Learners' Perceptions and Preferences**

In 2010, the author conducted an investigation into the educational applications of the latest developments in modern computing. The main purpose was to determine the learners' needs and

preferences in terms of the latest developments. In other words, how the learners perceive the usefulness of the emerging technologies and the new products.

The participants of this investigation were people who were either directly involved in some form of learning for themselves or closely related to others such as their children or spouses. Adults of both genders from totally different walks of life and backgrounds were selected and contacted for the survey and data collection in this study. These people included college and university students, professionals such as nurses, dentists, technicians and teachers. The study included respondents with varying cultural, linguistic and geographical characteristics too. An aspect of this investigation was to study and compare the levels of interaction-enjoyment for both computer and human teacher. The respondents were asked to rate their perception of the level of enjoyment on a 1 to 5 scale. An initial analysis of the responses determined that the interaction in terms of enjoyment for human teacher has a much larger mean (4.1) than computer teacher (2.8).

The respondents appear to have preferences very close to 4 (3 and 5). A t-test even at 1% level of significance indicated that indeed the null hypothesis of identical population means (for computer and human teachers) ought to be rejected. Therefore, it can be concluded that learners, in general, perceive that the learning process with an actual (human) teacher is more enjoyable than with a virtual (computer) teacher.

The respondents' very positive response to the following question is demonstrative of their belief in future technologies for learning and teaching.

Please rate the effectiveness of the following scenario which may take place in the future:

You buy/borrow a book on a topic of your choice, take it home and open it. You then ask the book in your language of choice some questions. The book starts talking and explaining to you by showing you 3 dimensional images. It then invites you to physically (but virtually) interact with them. So, it helps you to learn your topic (e.g. a craft or a skill) by letting you experiment; and it gives you feedback all the time! 1 (Low) 2 3 4 5 (High).

Hence, the innovative approaches offered by iPad and the available apps is, without a doubt, embraced by the users but education, in its traditional format, is definitely preferred.

## CONCLUSIONS

This paper has explored how the advanced features and emerging technologies available on smart handheld devices such as iPad and iPhone can assist with learning. A number of applications, with an emphasis on language learning, were presented and discussed.

App developers are continuously producing new applications and updating the existing apps. It was concluded that the handheld devices' sleek and contemporary design should not be the sole contributing factor to a desire to explore the educational applications for it. There are other reasons which should be considered. For instance, due to their special features such as portability, software (app) cost effectiveness and easy access, smart handheld devices such as iPad and iPhone offer a great deal to learning and teaching in general.



Although there seems to be a positive belief in the future of iPad/iPhone-like devices in learning and teaching, the learners still have a preference for having a human teacher. The outcome of the investigation conducted by the author, regarding the effectiveness and level of enjoyment with an actual teacher supports this finding. The respondents, however, are certainly in favour of an advanced and intelligent system which can respond to learners' needs. Hence, the emerging technologies available on handheld devices are very likely to have a place in education.

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