Learning & Teaching Applications on Mobile Devices

CS 556

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Mobile devices are everywhere. Children have them. Adults have them. Seniors have them. Wherever you look, you will find someone talking, texting, or browsing the web on their phone. This ubiquity makes mobile devices an ideal platform for learning applications. Throughout this paper, we will take a look at why the mobile is so ubiquitous, what learning applications already exist, and finally what the future might have in store.

One of the driving forces behind the mobile device's pervasiveness is their ease of use. They are designed to be used by the young, the old, and everyone in between. One such device, Apple's iPhone, is designed with a single touch screen. This makes the handset less intimidating than one of its multi-button, full qwerty competitors. In fact, the iPhone's ease of use has led it to be used as a learning tool for autistic children [1].

The other big reason for the ubiquity of mobile devices is the drop in cost that the mobile market has seen. When the iPhone was initially released in 2007, it was accompanied with a price tag that fell somewhere between $499 and $599 [2]. It is 2009 now, and they can be had for as little as $99 [3].

Data plan prices have also fallen dramatically. Unlimited data plans can be added for $30 a month [3]. These data pipes feature 24/7 availability and transfer rates as high as 5.8 Mbits/s [4]. They are also not affected by power outages, which can make them more reliable than home broadband connections.

Due to these devices being found everywhere, there has been quite a number of educational

applications released already. The majority of these applications were developed for Apple's iPhone, so that is where this paper will focus its attention.

The iPhone store (iTunes) features over three hundred pages (with about twenty entries per page) of education applications [5]. They range in price from free to roughly $50, and cover subjects such as science, mathematics, foreign language, and even sailing. Two other categories of applications include exam training guides for GRE, SAT, etc. and text book reference applications, which act as a supplement for various college text books on anatomy, law, etc.

The applications run from being very simple to being very complex. One such simple application is LeapFrog's Number Rumble. This app teaches the basic addition, subtraction, multiplication, and division. User's can answer random problems, take custom quizzes, and take random quizzes [6]. It also makes use of the iPhone's accelerometer, by allowing the user to shake the phone for a new problem.

While Number Rumble is useful, it could be improved. For example, the problems could scale in difficulty based on the users performance. It could also use previous answers to determine problem areas. Finally, connectivity could be added to allow users to play with friends or receive questions from their teachers.

Another interesting educational app is the NASA app for iPhone. This application allows the user to view NASA mission details and objectives, view mission multimedia, view current orbit paths for shuttles and satellites, and access NASA press feeds [7]. It also includes the ability to share any content with friends via e-mail.

The NASA app for iPhone could also be improved. For example, it could make use of the iPhone's GPS capabilities to show the users position relative to satellites, etc. It could also use the GPS

coordinates to show visible stars and planets.

Blackboard Learn was an interesting app that I found. This application allows the user to access all Blackboard, which is used by most higher educational institutions, material from their iPhone, in real-time. Users can see take quizzes, see grades, and participate in class discussions [8]. This allows the user to extend their learning environment to any place they are.

This app could be improved in many ways. Parental controls could be implemented, which could allow/disallow use of the phone's web browser, etc. based on grades. Features could be added to make different recommendations based on the phone's web browser's history.

The final application that I will review is Smart.fm. Smart.fm is social networking learning application, where users can learn about any topic that interests them. Users create lists of facts, which are then shared with all other users. Tests and exercises are generated from these lists, and performance data is monitored on a short and long term bases. The recorded data is used to plan a study curriculum and dynamically adjust tests and exercises. It also features built-in lessons for learning English, Japaneses, and Korean.

This application is very robust, but improvements could be made. For one, the application is list based. There are certain topics that don't fit nicely into lists (Math & Engineering concepts, programming, etc.). The app could be improved to allow these things to be learned. It could also use GPS data to give assignments about nearby languages or attractions. Finally, voice recognition functionality could be added. This would allow the app to actually listen to the person speak, which would improve the language lessons.

As you can see, there is a plethora of educational applications available. After reviewing what is out there, I have come up with that I think the future holds.

The biggest change I see happening is moving towards a very dynamic teaching style. Mobile devices would allow custom tailored assignments based on each student's interests. For example, the teacher could assign a visit to a museum. The mobile device could use GPS to determine which museum the student visited and then make an assignment or quiz based on that. This would improve learning, since students would be pursing topics that really interested them.

I also predict that as wireless data speeds increase, more “on the job” learning could be done. Mobile phones exist with cameras up to five megapixels. This could be used by a photography student, and he could upload his high-resolution photographs directly to the teacher. The same thing could be done with video or audio recording.

Wireless access is also increasing geographically. This will allow for more remote learning. A Peruvian farmer could take Calculus or an inner-city student could visit the Louvre, all from their phone. Online classes were just the beginning.

I think that peer-to-peer learning will become increasingly popular as well. Smart.fm already allows this, and will only continue to grow with social networking being as popular as it is. Learning would not stop when the bell rings.

Finally, as mobile devices increase in speed and capabilities, more can be done on them. More and more phones support OpenGL, so computer graphics concepts can be taught. Also, better mobile operating systems (Windows Mobile, Android, OS X) will allow for OS concepts to be taught.

As mobile devices continue to grow, so will their potential for being learning environments. Devices will become cheaper and easier to use, so anyone from a toddler to a senior could learn something new. A lot of progress has already been done, but there is much room for improvement. Only time will tell, but I predict that mobile devices will play a huge part in learning in the future.

References

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