An Investigation in the Impact of Mobile Learning on today’s Educational Environment

Faisal Manga, Joan Lu
Department of Informatics, University of Huddersfield, Huddersfield, West Yorkshire, United Kingdom

Abstract - Integrating mobile learning with pervasive learning may change the education environment and open new doors to possible opportunities in the coming years. This paper will consist of a literature review, mobile education, technologies used to deliver content, present findings, discussions, and an evaluation. It concludes that technology-enhanced learning encourages student engagement. However, the limitations of current mobile technologies do cause the barriers on the adoption of the new technology in a wide range of classrooms and learning environments.

Keywords: Audience Response Systems, e-Learning, m-Learning, Individual Response System, Pervasive Mobile Learning

1 Introduction

The 21st Century has seen a vast growth in technologies [20]. Introducing new technologies has transformed education in terms of learning and teaching [6]. It has transformed the way in which people are able to share and access information with the introduction of social networking sites and various sharing platforms that allow users to share the information over the Internet.

Having the latest technologies such as Smartphone and tablets allows learners to learn from any location at any given time. Web based learning tends to be an integration of e-Learning and m-Learning together. The idea of introducing mobile devices has enriched student experiences and enhances their educational environment. Various tools and technologies allow students to adapt themselves into new learning environments.

Technology has advanced over the years. New technologies are being introduced to the market on a regular basis but customers are finding it hard to stay with the current trends, because the technology market has changed rapidly with the introduction of touch screen Smartphone and tablets [17]. Having introduced these devices, they are turning out to be more popular than desktops seen as more consumers are buying tablets, as they are easy to carry around wherever you go.

The way in which lessons used to be taught before has been changed [6]. The days when staff used to educate students with text books and blackboards are possibly no longer apparent [3]. Back then the technology was limited [3], because nowadays staff are integrating technology and learning together, however some staff feel that using too much technology may have a negative impact on the students, academia and the educational environment.

This paper presents some investigation in the impact of Mobile Learning on today’s Educational Environment. Due to the rapid increase in technologies, learners are able to learn at any place at any given time as long as they have an Internet connection. With pervasive learning, the learner is able to access information based on their location, and learning materials can be accessed on their smart phone devices.

2 Background

As there is no single definition of mobile learning, IADIS [8] define mobile learning as:

“Any educational provision where the sole or dominant technologies are handheld or palmtop devices.”

The above definition states that mobile learning can be done via smartphones, tablets and other mobile technologies.

The history of mobile learning dates back to the 1990s where Apple Classrooms of Tomorrow (ACOT) were in partnership with Orange Grove Middle school, who are based in Arizona [4]. The name of the project was “Wireless Coyote”; the aim of this project was to see how staff and students would use mobile computers that were connected by Wireless Local Area Network (WLAN) and Wide Area Network (WAN) [4]. The study consisted of different people ranging from 6th grade students, teachers and research personnel who were from Apple Computer [4]. The group created their own program where real time
data was shared, as well as having voice-activated walkie-talkies so students were able to discuss their findings [4].

In the mid 2002 – 2003 there was a project where 150 teachers from 30 schools in England took part in [14]. The teachers were asked to evaluate different devices such as PDAs, laptops and mobile phones. Part of the test was to see that would help support staff in their teaching. Some of the advantages from the project were how portable the devices were, and the cost was cheaper for PDAs compared to using laptops. There were some disadvantages such as the screen was small, not enough technical support, and problems occurred when connecting with the networks [14].

Two other projects were conducted one focused on “Learning2Go” which was conducted in Wolverhampton (UK) and the other one was “Hand-e-Learning” which was carried out in Bristol (UK) [14]. Both the projects ensured that both the staff and the students carried a mobile device with them [14]. Funding and support were provided by the parents for these projects to be tested out [14]. Project was re-launched again after undergoing some changes, the study found that the students could carry the portable devices where ever they went, large amount of data could be stored such as notes from the lesson and maybe tasks which needed to be completed [14].

3 Mobile Education

There still isn’t one single definition of mobile learning that is something which will be determined in the future when mobile learning becomes more evolved and effective in everyday practice.

Who would have thought that technology would have moved at a rapid pace, especially if you look at the Internet which was developed in the 1960s? [12].

A quote once said by a former US President [16], was:

“You’re talking about the Internet, you’re talking about cell phones, and you’re talking about computers.”

The quote was mentioned in 2001, since then the field of technology has vastly improved. A newspaper article mentioned in the Guardian stated that mobile learning has the potential to improve education and the way it is accessed in developing countries [16]. Allowing mobile learning in developing countries allows young students to explore the life of education and face the employment challenges [16]. By introducing mobile learning it improves not only for the student but also benefits staff and the way which education is looked at from a different perspective [16] [9].

3.1 Introducing mobile education at Colleges & Universities

If mobile learning was introduced at College/Universities it would be a better opportunity due the size of some classes [19]. Especially for top Universities where there are a few hundred students. With the infrastructure and the money, which is spent at a University, compared to a College it would benefit students, seen as they would move around the campus but still be connected to the University Wi-Fi [19].

Mobile learning (m-Learning) is when a learner isn’t in a specific location, the user can be anywhere at any time. Many people nowadays carry the latest gadgets ranging from smart mobile phones to the latest tablets, whether they are using 3G networks or even the latest 4G Network [7].

In this day and age it’s possible for students to communicate through the FaceTime feature which is available on the iPhone, or even the latest form of video calling Skype [18]. As of January, statistics show that there are over 31 million users worldwide who use this service [18]. You can be at any side of the world but as long as you have an Internet connection you can talk to family and friends. You can discuss your work with your friends and have discussion on certain topics [18].

3.2 Mobile Education Frame Model

A model for framing mobile learning has been created by Koole [1] [13]. The model looks at the technical aspects of mobile devices as well as the social and the personal aspects of learning. The FRAME model looks at the learning experiences using a mobile device. Information is consumed whether it’s done individually or done collectively [1].

Below Table 1, Table 2 shows the different characteristics of mobile learning and the different suitable devices for mobile learning.
### Table 1
Characteristics of Mobile Learning

<table>
<thead>
<tr>
<th>Mobile learning characteristics</th>
<th>Implications for mobile learning design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ubiquitous</td>
<td>Content on mobile can be accessed from anywhere [5].</td>
</tr>
<tr>
<td>On demand</td>
<td>Mobiles are always on [5].</td>
</tr>
<tr>
<td>Location</td>
<td>Mobile offer the service of delivering content via Global Positioning System (GPS); also the user can allow to receive push notifications [5].</td>
</tr>
</tbody>
</table>

### Table 2
Suitable DEVICES for MOBILE LEARNING

<table>
<thead>
<tr>
<th>Devices</th>
<th>Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart phones</td>
<td>Blackberry, Microsoft phones</td>
</tr>
<tr>
<td>Digital phones</td>
<td>IPhones, Samsung, Nokia, Sony Ericsson, all available with 3G connectivity, handsets have bigger screens, has video, audio flash and java capabilities, delivering richer mobile leaning content</td>
</tr>
<tr>
<td>Non – telephone mobile devices</td>
<td>MP3 players, Applied IPod</td>
</tr>
</tbody>
</table>

In order to deliver content in mobile learning there are different technologies which are available, these can be read [5].

### 4 Impact of Mobile Learning for teachers and students

Attewell et.al [2] discusses the impact of mobile learning for teachers and students. Having mobile technologies in classrooms can be useful as they promote interactivity between the staff and the students. Attewell et.al [2] also states that having mobile devices promotes collaborative learning in classrooms. Students tend to work with one another on exercises. Also students become more alert and more interactive and willing to participate in exercises and discussions.

Mobile learning is used outside the classrooms; students can use devices such as the tablets and smart phones to conduct their work. They have e-book readers such as the kindle where they can read books.

### 4.1 From Online Survey

Below are the responses which the researcher has gained over the period when the survey was conducted online.

![Responses over time](image)

Figure 1: Online feedback numbers

Since the survey was online for a few days, the researcher received 17 feedbacks in total. The number was important to see how many users participated in the survey and on which days the survey was completed.

### 4.2 Highest Level of Education

![What is the highest level of education you have completed?](image)

Figure 2: The results show various level of education which the participants have

The results show that majority of people who participated in the survey were postgraduate students. 9 out of the 17 were postgraduate students, 4 were undergraduate students, 2 were from college, and 1 from high school and 1 had a teaching degree as their highest qualification.
4.3 Access to Wi-Fi on your phone

This question focused on whether the participants had a Wi-Fi connection on their mobile phones. If they said no to having a cellular network with data enabled, they could access materials if they had Wi-Fi on their mobile and were within range of a free Wi-Fi hotspot. However, 2 people (11.8%) stated that they didn’t have Wi-Fi on their phones which would mean that they have basic mobile phones, not the smart new ones which have so many features. Some people are old fashioned and like to keep it simple, they may only use mobile phones for calling and texting purposes.

4.4 University of Huddersfield Project

The University of Huddersfield are working on a large scale project which is led by Professor Joan Lu. The project is focused on Student Response Systems [10-11][15] and funded by the European Commission (EC). The group have created a Wireless Response System (WRS) shown in Figure 4. The application can be used on smartphones as long as the user is connected to the Wi-Fi. The system is designed to be user friendly and doesn’t require you to be an expert in the field.

The SRS work by the tutor initiating the question, the student responds, results can be viewed by the tutor instantly [10, 15]. Other functionalities on the program include audio, timer and pause.

5 Discussion and Analysis

To summarise on this section it can be said that from the responses which people have given on this survey, mainly it has been positive. People like the idea of introducing mobile learning into classrooms as they believe it will transform the way which tutors teach and the way which students learn. Especially for people who have learning difficulties it can be useful for them to introduce such technologies which can help them. It doesn’t have to apply to University students, it can be useful small kids as they begin to interact while using the tablets and using the education apps to learn.

Some negative feedback surround mobile learning would be security, some people are worried how secure will it be seen as people would be logging in and registering their details. Will there be some secure features which will relax the minds of those who are worried.
Another issue which was gathered from the feedback was that if you are going to be introducing mobile learning in classrooms, the students would be distracted with the technology and they wouldn’t pay attention in classes as they would be constantly distracted on their tablets and other gadgets. Therefore some views were to stick with the traditional methods and learn that way.

6 Conclusion

The paper focused at looking at mobile learning and the different technologies associated with mobile learning. The paper looked at the characteristics of mobile learning, along with suitable devices for mobile learning. The paper discussed how introducing mobile learning at Colleges and Universities would have a positive impact with regards to their education and how their acquire information and learn new skills.

It would be ideal to have mobile learning at schools from an early age, in this day and age technology is vastly improving and new technologies are introduced on a regular basis. Having children engaged in technologies at early would allow them to acquire knowledge in a fun and interactive way whilst using tablets and other suitable devices.

Tutors will find it easy by using different form of technologies and integrating them into their teaching. It will allow them to plan their lessons out more effectively and ensure that students are engaged in classrooms. This will ensure that the students receive a high level of education, and hopefully learn more and enjoy their lessons.

The paper discussed the benefits of how mobile learning allows you to learn at any location as long as you are connected to a WI-FI, you can learn at your own space in your own time. As mentioned in the paper the interactivity between the staff and students improves as the students are more engaged in classrooms and are willing to take part, rather than shying away, it brings a new element of interaction but at the same time focuses on learning.

The studies show that people are willing to try new things and willing to accept the form of mobile learning in their day to day activities. They are willing to do their exams on mobile devices and embrace the fact that the future of education is all down to mobile learning. Overall the results from the study are positive and they would like to see mobile learning introduced into their classrooms on a regular basis.

There are some issues which need to be taken into consideration such as the cost of the devices, the huge amount of bandwidth which will be required in Schools/Colleges/Universities to run Internet on these devices, some other concerns are also mentioned below:

- Connection and power required due to battery performance issues
- Concerns that it will be too practical and not the way it used to be
- Security

Therefore careful consideration is required before making a decision whether it’s the right move to introduce mobile learning into classrooms or whether to stick with the traditional method.

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7 References


