

## Efficient Interaction Tool for M-learning Using MMOG Technology

**Mohd Firdaus Md Khalid**  
Email: firedauz@fuji.waseda.jp

**Wataru Kameyama**  
Email: wataru@waseda.jp

**Graduate School of Global Information and Telecommunication Studies,  
Waseda University  
Tokyo, Japan**

### Abstract

Many researchers believed that computer games can be used as a teaching tool as well as a motivational factor to enhance E-learning, with a lot of references made using the compelling, immersive game design of MMOG genre (Massive Multiplayer Online Gaming). Mobile learning (M-learning), widely known as the successor to E-learning, would greatly benefit from this genre's design due to the fact that their current motivational aspect on student learning is dwindling down as it had happened during its predecessor's first introduction, particularly in the sense of interaction between the students and their lecturers. This is a proposal to develop a M-learning Interaction Tool that is integrated with the design & technologies of MMOG. The core reason of this integration is for the students to be more motivated to study via M-learning using the compelling, immersive elements of MMOG.

### 1. Introduction

To date, although mobile devices have a high availability, mobile learning (M-learning) is still in its infancy. Up until now, little is known about the distinct attributes of mobile cooperative work in comparison to its stationary counterpart [1], particularly on the communication aspects between lecturers and students.

Research on mobile learning had grown considerably in the recent past as more researchers are trying new techniques of managing students with the increased enrollment in higher education institutions. Mobile learning course management such as Meridian Player [6] and GoBinder 2006 [13] offers framework in which to place learning units and courses. However, classrooms and learning still rise above infrastructure and textbooks. Thus this is making M-learning suffering one of its predecessor's (E-learning) major setback during its first introduction to the world – the lack of motivation to interact with one another during the course of M-learning sessions. This also means that the typical classroom environment, student-to-student and student-to-lecturer interactions are the principal to the higher education experience.

Massive Multiplayer Online Gaming (MMOG) at the current time is currently one of the largest businesses in the gaming industry; with one of the most popular MMOG on the planet at the moment, World of Warcraft (WoW), currently having 8 million players worldwide. The immersive design of these environments are engaging and compelling because they center on the user's experience and sense of entertaining.

Mobile Massive Multiplayer Online Gaming (3MOG), a mobile rendition of the MMOG, had also enjoyed hefty revenue due to its similarities of immersive elements as its desktop version. To date, Tibia Micro Edition [12], one of the most popular 3MOG currently, had attracted more than hundreds of mobile phone players all around the planet.

Thus we ask: how can mobile learning classroom benefits from these gaming interfaces and interactions that MMOG game engine provide? Without losing focus on the pedagogy, how can lecturers applies the best practice of MMOG technology (often on the cutting-edge of computing power in many aspects) into the mobile learning experience of the students?

First, we need to take a look at the current mobile learning practices out there in terms of academic

researches and commercial products. We start our paper by presenting the surveys on existing solutions of M-learning. Secondly, we would identify the direct interaction elements resulted from the surveys. We then will introduce our propose model and compare it with the current existing solutions. Finally, we will conclude our paper together with future works.

## 2. Surveys of Existing Solutions

Currently, there are already quite a number of systems for mobile learning in use, primarily divided into two main groups in dependence on the development organization: Research systems developed in universities, and commercial systems. We have chosen these systems due to their innovative and unique characteristics and to display the diversity approaches in implementing mobile learning solution.

The comparisons with our proposal will be elaborate after the survey section, in which they are taken into much more details than the general comparison analysis of M-learning systems [2] as we are focusing on the interaction tools between the lecturer and the students.

### 2.1 Research Systems

The essential part of these non-commercial systems is used for research of detail essences of this new educational method. Usually the development of such systems lies on the ground of research projects. This type of systems is used mainly in the frames of particular educational organization or consortium of organizations and it is not widespread.

#### 2.1.1 Mobile ELDIT [3]

Mobile ELDIT is a system under development which goal is to offer access from PDA devices to the learning materials of ELDIT – an adaptable language learning platform. The ELDIT system is actually consist of a learner’s dictionary and a text corpus, with exercises, a tandem system and a tutor module are planned. The main scope of the ELDIT project is to create an innovative electronic language learning system for the population of South Tyrol in preparation for the bilingualism exams. The dictionary function had already been design to reduce the burden of vocabulary acquisitions in foreign language learning. The text corpus contains all the texts of the exams in bilingualism. The systems had also been

implemented simple quizzes that can be generated automatically out of the existing data set, a tandem module for collaboration, and an adaptive tutor which guides the learner through an individual vocabulary acquisition process.

#### 2.1.2 WELCOME [4]

The WELCOME project (Wireless E-learning and Communication Environment) generally outlines that mobile/electronic education should not attempt to replace traditional education with tutors and instructors but support both student and teacher by providing services that facilitate teaching, learning and education-related administrative tasks. The basic approach is integrative, combining a variety of devices (mobile and non-mobile) via a variety of transmitting techniques (wired and wireless). However, the research paper had vaguely elaborated in regards to communication methods that their system offers ‘communication services’ that can be used for peer to peer contacts between students as well as group communication.



Figure 1 – A screen from a PDA showing information from the WELCOME project. This is a typical example of a non-commercial research system for M-learning. Picture from Reference [4].

#### 2.1.3 Pocket University [5]

The research called Pocket University is actually a project from University of Hagen in which it is aim to investigate M-learning in teaching and learning scenarios as well as dedicated M-learning tools and systems. With brief information from their website,

they stated that the project is not only about distribution of contents, but also communication and collaboration features are also their goals for their students. Under their current project status, they are working on implementation of Teachlets and Learning Cards on their prototype. Teachlets are actually a new method to teach design methods, whereby a problem would be set beforehand to be solved collaboratively and interactively by all participants of the unit. Learning Cards on the other hand, is an application which provides electronic cards showing descriptions of course relevant concepts and terms. Students can use these cards to exercise while working on the material or to refresh their mind before the examination.

## 2.2 Commercial Systems

These systems are developed by software companies and have wider spread than non-commercial systems.

### 2.2.1 Meridian Player [6]

The Meridian Player is a revolutionary desktop application that allows the lecturer to deliver content to anyone, anywhere, without connectivity to the central learning management system. This versatile tool can be used as a mobile Learning Management System (LMS) application, a remote learning solution, or a multi-user training kiosk. Its Learning Management System (LMS), which is called as the Meridian KSI Knowledge Centre, provides several important functionalities, and in regards to the focus of this paper, one that is most related is that it includes communication and collaboration resources. It basically allows instructors and learners to collaborate on specific issues; share documents and resources; communicate via email, BBS, and chat room; and schedule group events.

### 2.2.2 GoBinder 2006 [13]

The GoBinder 2006 Blackboard Backpack is a distributed learning system that claims to be able to accelerate student learning outcomes and teacher efficiency. One of its tools, the Mobilizer, seamlessly enables the creation of offline, mobile content and collaboration collections from existing courses on its academic storage. The design of the Blackboard however does not apply to mobile phones or any other small mobile devices. On stating a point, majority of commercial M-learning system, particularly for

campus purposes, only applies to PDA, and a small percentage of it falls under development for notebooks and laptops.

### 2.2.3 Mobile Customer Education System [7]

The Mobile Customer Education System is a project started by Knowledge Anywhere in an effort to debate on a much flexible learning using M-learning. The discussion is made to recognize the potential to move to granular learning experiences – a blend between E-learning, knowledge management, and performance support. The Mobile Customer Education System (MCES) is an example of integrating audio and other interactive elements into a Pocket PC platform.



Figure 2 – A screen from a PDA showing information from the Mobile Customer Education System. This is a typical example of a commercial research system for M-learning. Picture from [7].

## 3. Direct Interaction Elements in M-learning Systems

By looking at the M-learning system surveys made above from three non-commercial research development and three commercial system development, we can identify several elements that are closely related to direct interaction between one lecturer and his/her students, and students-to-students. We list down those direct interaction elements as:

- Video conferencing
- Discussion forums
- Email sessions

- Graphics / animation / simulation
- Chatting sessions
- Blackboard
- Voice and audio sessions
- Teaching tools

These are much similar to E-learning elements, except that these are on a much smaller scale due to the limited capabilities of current mobile devices in comparison to the power of a desktop. By putting lecture content and assignments on the M-learning system and present a discussion board for student to posts is not satisfactory for them to be much motivated towards learning, especially in this age of ever-increasing computational power and bandwidth [8]. Having interactive media alone is not enough; guidance and personal engagement of learners is critical [9], and students had been proven time and time again in many E-learning researches to be much better in their studies when learning courses develop community among the students [10]. Not forgetting, within the perspective of comprehensive and distance education, there is a possibility that the student-lecturer interaction might decrease (if following faculty-student percentage), we must highlight the student-student (peer) and student-tutor (mentor) interactions as a means of alternative [11].

Another important issue to be highlighted by looking at the listed elements, is that there is also a huge difference between the capabilities of a M-learning system develop for a much interactive PDAs in comparison to the M-learning system for typical mobile phones. This simply means that not all of the listed elements there can be use on lower capabilities-wise mobile devices; e.g. a simple mobile phone might not be able to have an interactive video conferencing for a M-learning class session. This would further lower the motivation to learn of students who are using those types of mobile devices.

#### 4. MMOG Technology as the Solution

Due to the problems as discussed above, we would like to introduce a solution, whereby using several Massive Multiplayer Online Gaming technologies to fill in the gaps on making the learning to be more interesting, but most importantly, for the benefit of continuing study due to its online gaming immersive effects.

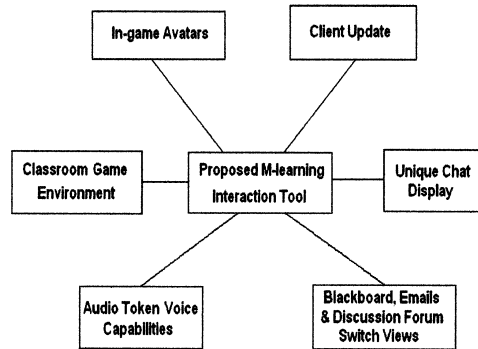


Figure 3 – The Proposed M-learning Interaction Tool using MMOG Technology

#### 4.1 Logging in the Classroom

Starting from the top, as students/lecturers begins by logging into the M-learning system; they are immediately connected to the servers that store their character information (displayed as in-game avatars). The server will update any new information to the connected clients, whether they are new learning materials or the continuous in-game status (such as character movements, object operations, etc). Bandwidth usage would be low due to only a few updates send out to those connected clients. Take for example the 3MOG named Tibia Micro Edition [12]; the game is optimized for mobile communication over GPRS and transmits per playing hour on average of only 400kbytes of data. For this Interaction Tool, it should be lower than that extend with further optimization.

Speaking of bandwidth and memory size, Interaction Tools using in-game avatars needs a much lower capacity then a video conference on a mobile device. Added to the point, a video conference would normally be able to fit one small screen of the lecturer, with perhaps up to a limit of 3 students in one small screens – but by using in-game avatars of MMOG, the screen is able to fit as much students as a real classroom due to its small sizes and low power usage.



Figure 4 – An example of a 3MOG called Tibia Micro Edition. Picture from [14].

#### 4.2 Chatting

Furthermore, interaction of conversing between one another can be done by either typing in the chat bar, in which the same message will be sent above the character itself after it had been posted. This will add in a little more interesting tweaks than the usual chat bars. In common desktop MMOG, these messages will normally appear in a text bubble image, to somewhat replicate to a dialogue box in comics.

#### 4.3 Voice Capabilities

The usage of actual voice as a mean of conversing in the Interaction Tool will definitely increase the enthusiasm for continuous learning because not only will it almost resemble like a real classroom, but it also would feel like immerse in a game world where the students can actually speak. As for this, we would like to apply the Audio Token technique [8] that would certainly be fitting for a mobile classroom. In an actual classroom, the lecturer will continue to speak unless a student decides to ask a question (would be very much interesting to develop this ‘permission to speak’ as an animation of raising a hand). Using this method, the lecturer will just need to pass the Audio Token to the selected student and the student will ask away, until the lecturer take back the token from them once they are done. This, of course, will first be experimented by a prototype to determine whether it can be applicable according to the audio bandwidth.

#### 4.4 Classroom Environment

To further add in the depth of continuous immersion in the Interaction Tool, certain areas/objects of the classroom environment itself should be able to be interacted with the users. For example, simple interactions with objects such as tables and chairs would certainly add in the fun factors, as long as the interactions are limited to the point of not disturbing a class sessions.

Interaction inside a classroom should not just be limited to just static objects; users should be able to interact with one another as well such as simple smiling gestures or handshakes. This will certainly help in a peer interactions and develop a friendship relationship between students. This is to be most important as it will develop a sense of trust between classmates for any future works that needs collaborations among them.

#### 4.5 Blackboard, Discussion Forums and Emails

As shown in Figure 5, it is another example from Tibia Micro Edition, whereby due to the small screen size of mobile phones, the only possible way to view the blackboard is by totally changing the view of the screen.



Figure 5 – With one button press, the screen can be switch to different views. Picture from [14].

This can also be applied to discussion forums, email sessions and any other tools or materials that are related to the class. This ability should be given independence to the student themselves, meaning that they are in control of changing the views with a press

of a button, not the lecturer. By common, students might be doing something else like typing a message, raising a hand, or perhaps typing an email, just like in a normal classroom.

## 5. Conclusion and Future Work

With these methodologies, we believe that the integration of MMOG technology as a part of M-learning's Interaction Tool would be a giant leap into the on-going research on issues surrounding motivational factors of mobile learning. Our next step is to further use these methodologies to develop our prototype interaction tool for mobile devices and re-evaluate again for a possible campus/university development.

## 6. References

- [1] Holzinger, A., Nischelwitzer, A. & Meisenberger, M. (2005b). Mobile Phones as a Challenge for m-Learning: Examples for Mobile Interactive Learning Objects (MILOs). 3rd IEEE PerCom, Kauai Island (HI),
- [2] Georgieva, E., A Comparison Analysis of Mobile Learning Systems, International Conference on Computer Systems and Technologies (CompSysTech'2006)
- [3] Trifonova, A., Knapp J., Ronchetti M., Gamper J. Mobile ELDT: Transition from an e-Learning to an m-Learning System. Proceedings of the World Conference on Educational Multimedia, Hypermedia and Telecommunications (ED-MEDIA 2004), June 21-26, 2004, Lugano, Switzerland, pp188-193.
- [4] Lehner, F., H. Nösekabel, et al. Wireless E-Learning and Communication Environment - WELCOME at the University of Regensburg, Workshop on M-Services, 2002, Lyon, France
- [5] Bomsdorf, B., B. Feldmann, G. Schlageter, Pocket University - Mobile Learning in Distance Education. Learning Technology Newsletter, 2003, Vol. 5, Issue 2, April. IEEE Computer Society (LTTF),
- [6] Meridian Player, [http://www.meridianksi.com/products/meridian\\_player.htm](http://www.meridianksi.com/products/meridian_player.htm).
- [7] Flexible Learning: Mobile Learning Objects, <http://www.knowledgeanywhere.com/MobileWhitePaper.pdf>
- [8] Chastine, J. and Preston, J. Designing Effective Communication Tools for Online Computer Science Courses. 32nd University System Annual Computing Conference. <http://www.usg.edu/oiiit/re/re03>
- [9] Riffie, William H. Putting a Faculty Face on Distance Education Programs. Syllabus, vol. 16, no. 7 (February 2003), 10-13.
- [10] Palloff, Rena M and Pratt, Keith. Building Learning Communities in Cyberspace. Jossey-Bass Publishers, San Francisco CA. 1999.
- [11] Hamalainen, M. et al. Electronic Markets for Learning: Education Brokerages on the Internet. Communications of the ACM, 39, 6 (June 1996). 51-58
- [12] English' Tibia Micro Edition; Link: <http://www.tibiame.com/faq/?language=en>
- [13] Agilix Labs – Making Learning Mobile, <http://www.agilix.com/www/mobilizer.html>
- [14] TibiaME Case Study, Forum Nokia; Link: [http://www.forum.nokia.com/info/sw.nokia.com/id/c091febd-a907-417a-9c75-0c038032c203/Tibia\\_v\\_1\\_0.pdf.html](http://www.forum.nokia.com/info/sw.nokia.com/id/c091febd-a907-417a-9c75-0c038032c203/Tibia_v_1_0.pdf.html)