

"エム ラーニン—モバイル通信機器と最新情報機器革新における 比較研究・考察および今後の課題"

"mLearning - Recent Device Innovations compared with a previous study on
Mobile Phones for Learning, and Reflection"

Anthony Brian Gallagher

Abstract

A look into recent device innovations and innovative implementations compared with a 2002 study on learning with mobile devices, such as cell phones and pocket computers. An update on popular and recent handheld devices used for both standard and foreign—language learning.

1: Introduction

With the release of the beta version of Apple Macintosh's "iPhone" and recent advances with the possibilities now open to other handheld devices becoming increasingly available for mobile learning more and more articles on "mLearning" (Mobile Learning), as well as "Handheld Learning" are being written. This has also been re-enforced by the release of the Nintendo's "DSi" in Japan in in-direct competition to Apple's "iPhone". With this new device DSi "users can now download via a wireless Wi-Fi connection all kinds of digital content, including songs, podcasts, photos, videos, and games" meaning that application-wise, this new handheld device will compete with the "iPhone" on a level par.

The exploration of similar devices has been covered in depth by Joiner et al (2003) because "there has been a general move towards, and much support for, the development of tangible and mobile interfaces to facilitate computer use"

The possibilities for learners with various learning difficulties as well as other difficulties like dyslexia or reduced vision have various possible applications to this format of learning. It has been reported that "courseware for PDAs and other mobile devices (Dye 2007) will be greatly explored with the changing of mobile devices as well as provide support for each".

In conducting an interview with an e-learning professional and getting into the mindset of my "Innovator" I discovered that these ideas are perhaps more highly conceptualised than originally perceived. Pre-interview during question planning research was performed to best explore the current state of mobile learning and to find contrasting information that might show clearly the progression of this style of learning as well as to highlight the timeline of the researchers to show whether or not they were actually innovative, adoptive or other.

2: Interview with an e-Learning Professional

Pre-reading thoroughly the article "Mobile Learning: Cell Phones and PDAs for Education" (Houser et al, 2002) which was co-authored by the Interviewee, allowed careful planning of questions around the information already available from the article with the express intention of following up on the innovation that was implemented and on possible success or failures that may have arisen; as well as the interviewees reflection on the process and results. From here I hoped to gain a better understanding of the entire process and to make a better approximation of the possibilities that lie ahead with new technologies and services that are now (and soon to be) available.

The interview was semi-structured so as to allow a greater exploration of ideas not explicitly written in the article with the intent on gaining an in-depth sense of work done by the interviewee prior to the article being published and also to explore subsequent information that may have followed on in hindsight of its publication. As the interview was semi-structured there was a degree of openness and fluidity to the interview so as to allow the interviewee to extrapolate on any information that he wished in order to more clearly express himself and to also allow better understanding of the work done.

My interviewee was a Professor at a Japanese University who co-authored the article "**Mobile Learning: Cell Phones and PDAs for Education**" with Chris Houser and Patricia Thornton (2002). In this article the authors "*introduce m-learning: learning with mobile devices, such as cell phones and pocket computers*". They "*review the hardware and research on m-learning, and discuss our future work with mobile foreign-language study.*" This interview was based on that paper published 6 years ago, but at

(Included in this article is the waiver form which was provided, signed and received pre-interview so as to make clear the intention of the interview and to give the interviewee as much information as possible about the questions that were going to be asked of him. As a matter of good practice and to ensure that the interview was conducted in both an Ethical and serious manner the consent of the interviewee pre-interview was very important. Initially the interviewee asked for anonymity for fear that information might have been divulged that perhaps should not and also to allow him to safeguard his university from any disclosure issues. Post interview he then decided that there were no disclosure issue and he commented that his name could be used. However, he later decided that he would revert back to his original decision and wished to remain anonymous.)

"エム ラーニン—モバイル通信機器と最新情報機器革新における比較研究・考察および今後の課題" (Anthony Brian Gallagher)

the time it was an innovation that was worthy of exploration. My interviewee was a key player and "Innovator" as described by Rogers (1995) in his Multi-Step Flow (Diffusion of Innovations) theory (fig. 1), in both the creation of this innovation and in the implementation at his University.

Rogers (1995) Adoption/Innovation Curve

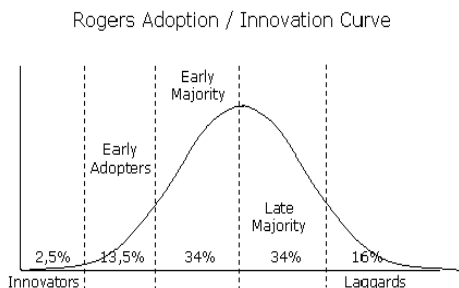


fig.1

The innovation adoption curve of Rogers is a model that classifies adopters of innovations into various categories. It is based on the idea that certain individuals are inevitably more open for adoption than others. This is also called "*Multi-Step Flow Theory*".

Innovators: Brave people, pulling the change. Innovators are very important communication mechanisms.

Early Adopters: Respectable people, opinion leaders, try out new ideas, but in a careful way.

Early Majority: Thoughtful people, careful but accept change more quickly than average people do.

Late Majority: Sceptical people will use new ideas or products only when the majority is using it.

Laggards: Traditional people, who love to stick to the "old ways", are critical about new ideas and will only accept it if the new idea has become mainstream or even tradition.

What was interesting about the ideas that they implemented was that they were truly innovative at the time. Relatively years ahead of others (in Japan), these innovations were aided by the fact that, the Head of the university's multimedia centre was also an "Educator", not just a technical expert, and "was very open to new ideas and willing to take risks"¹⁾. Perhaps the fact that this university is privately owned and run made the implementation of the ideas possible as there were fewer obstacles to

1) These quotes are from the interviewee

overcome, however, some barriers still remained which would later lead to their (the innovations') demise. The Head of the Multimedia Centre (MMC) -had been at the front of CALL (Computer Assisted Language Learning) education in Japan for many years and was also one of the first to implement "Moodle" into the University and many of its courses.

The Innovations Implemented

The series of innovations that were created and implemented by the interviewee was researching on the use of mobile phones for English Education. The research examined innovative uses of mobile phones for English education as it was implemented in a tertiary academic situation. One should point out that although research in itself can not be described as an innovation, research-related activities may be classed as innovative.

"During the creation period, 31 different activities were created for the course on the basis that they could be learned using pre-learned user skills".

This shows the depth to which the technology was explored in that there were numerous activities all based on the same ideology of improving learning skills cumulatively. We do not know however if they were carried out consecutively or concurrently. One must assume that based on standard curriculum implementation and scheduling that they were in fact performed consecutively. The hypothesis was that their learning outcomes could be achieved without the users needing to be specifically taught new technical skills, rather, that they would explore the possibilities themselves and develop their understanding in a more personal and exploratory way. This then is leaning towards student-centred learning.

"The activities included (but were not limited to) usage of video animations for Idioms ("Vidioms"), "Rallies" (similar to orienteering, in that the students were given information piece by piece as they travelled around a predefined area) and "Cliff-hanger stories" (stories that end each time with a suspenseful or interesting question about what is to follow in the subsequent chapter or episode) all being used to facilitate mobile learning while creating student interest."

While the ideas themselves were not all original or innovative, the implementation at the time, was.

"Due to the fact that carriers in Japan use different data sets in their provision of service from each other meant that at the time there were 6 different formats which needed to be supported to make the course run on each service and covering each student

"エム ラーニン—モバイル通信機器と最新情報機器革新における比較研究・考察および今後の課題" (Anthony Brian Gallagher)

's requirements."

"After implementing the idea, it was later scrapped as the Implementation team had exhausted their interest in its application and had decided that the obstacles made the course impractical. (2 different curriculae have superseded this course since the time of its completion)."

"The cost of the service at the time was higher than expected and students incurred expenses that the University administrators as well as the course directors were unhappy with placing that kind of demand on students."

This is one of the most common and key barriers to course implementation. Completion of which is often dependent on financial resources. The strive at this time was to focus on Computer Assisted Language Learning (CALL), however, the interviewee explained that CALL has now become "*de-rigueur*" and the appeal, or rather novelty of this learning terminology and style has become lost somewhat. It can be argued that CALL is an established branch of language learning and teaching, but with the progression and evolution of handheld & mobile devices this kind of learning is becoming re-named and termed as m-learning, e-learning, handheld learning and a host of other terms. These terms are becoming more widely used and understood. The simplified nature is another clear example of the progression in learning, in that learning is becoming increasingly simplified and even the nomenclature of it is becoming more streamlined and simplified.

CALL is a learning approach not a learning style (students' have learning styles such as "visual", "kinetic" etc) and at this time it is still very active at different levels of education and in some cases is favoured by many learners and teachers. However, the novelty effect of CALL has worn off as can be seen in the reported information from this university

"In classes as recently as 4 years ago, student numbers were at approximately 103% (70/68) uptake of CALL materials, but now just 4 years later the student uptake ÷ interest rate is approximately 15—~20% (10—~20/68)."

This means that as recently as 4 years ago that popularity of the latest technology was very high and students sought to immerse themselves in such a modern environment, using modern tools, technologies and techniques. This reflects on the modern day lifestyle of many young students and popular culture in that learning was for a time very fashionable, new and accepted, but now the fashion has faded and students have lost interest somewhat dramatically.

The interviewee said:

"When I started the class nobody had an email address, and so it was really neat to come into class and get an email address, and to get to try and figure out your own signature and to Cc: people." However, this has now become a *"part of everyday occurrences. It's now nothing special."*

As is common in almost all institutions, the professor and the MMC staff found it difficult to convince their administrative department that these activities were valid teaching activities and that they should be used by students and staff as pedagogically sound learning activities.

Developing the skills of students to extend their knowledge using a device that they are already familiar with is a very good way of building on pre-existing learning and broadening the horizons of students. By opening the door to greater possibilities, while developing both their language as well as their mobile usage skills is a clever way of introducing a teaching format without having a huge outlay first..

Other problems that were not pointed out are (of course) factors that would greatly affect usage and acceptance of devices in student learning. The health implications involved with such a small device, screen size, technical support, hardware support, disabilities, device insurance, battery powering etc.

It has been suggested by the NY Times that at Stanford and Harvard University, freshmen may be given "iPhones" with orientation material preloaded and are expected to use it as their daily contact with the University administrations as well as teachers and fellow students (Glater, J.D., 2008).

"Whether this could be a possibility at this University was shunned by both the administration of the University and the Educators at the University because of their belief in the right of each student to individually choose their own preferred device as well as for the financial implications that would be involved in such a roll out".

It was made clear that:

"Japanese students have a certain regard for their small, sleek and often chic handsets (mobile phones) and the idea of standardising this would and could make students very apprehensive and perhaps it could disassociate them from the tasks at hand because of the conflict that could arise".

It's certainly true that there's research that suggests students don't like to be forced to use specific software, so the same is almost certainly true of hardware.

"エム ラーニン—モバイル通信機器と最新情報機器革新における比較研究・考察および今後の課題" (Anthony Brian Gallagher)

This is a paradox that is often encountered in Japan, where people dress very similarly and act in a similar fashion but truly they wish to have open expression of their inner selves and perhaps in this way student centred learning can be reinforced with this group perhaps more than others. This can be seen in the game industry where groupism comes into great effect with collaborative gaming and teamwork without boundaries.

The innovations led by the interviewee were not limited to those which were focused on during the interview. Quite on the contrary, this professor (with the assistance of the Educator who heads the University MMC) has developed many teaching innovations and has tried and tested them over a number of years and with various groups of students.

A Scottish Case Study:

Implementation of innovative ideas that are pedagogically sound and of good practice are continuing and a very clear example of this in practice was the report by Brown-Martin (2008) on a case study led by child psychologist Dr. Tanya Byron (of the Byron review: Children and New Technology) and innovatively implemented by Derek Robertson (of the Consolarium, Learning & Teaching Scotland) of an elementary school class in Scotland that "*looked into the influence of videogames on children*" by "*studying whether learning could be dramatically enhanced by using the kind of technologies and experiences that are already a part of many young learners' lives.*"

The study was based around the Nintendo game "Nintendogs". She noted that on visiting the primary school involved that she "*became immersed in an ocean of active learning where the Nintendogs game was being used as a "contextual hub" from which at least a dozen other activities were spawn. In a large open-plan space, learners were busy collaborating with their DS's; running a pet-shop, learning about dog awareness and care, running a dog-walking service, building an online blog, participating in design and technology craft to create kennels, learning about animation to create a movie, establishing a mentoring service and more.*"

In the study she continued on to explain that "*Most consumers want technologies that they can simply switch on and use rather than be baffled by the intricacies of manuals or operating systems*" which becomes good practice over time.

This idea is echoed in the use of the Japanese university students' with their wish to use their mobile phones to interface with the technology but is also limited by the

capabilities of the devices they were using at the time. The implementation of both kinds of devices and the feedback received by each person in charge of the projects show clearly innovative ideas in implementing handheld/mobile learning. Both involved quite different; groups and subject matter, age groups and language capabilities, and device capabilities.

"mLearning" will continue to need this kind of support from a range of Innovators in order to move forward in this field and with the continual improvement of devices as time progresses, we are perhaps soon to arrive at a new range of devices that will accommodate the needs of learners worldwide.

Word Count 2800

REFLECTION

My interviewee came across as a classic example of a brave innovator, being imaginative and wanting to promote change not only at his own institution but nationally and internationally.

I have never owned a Mac, used iTunes or been enthralled by the fashionable nature of this line of devices, but, with the advent of the beta iPhone the plethora of possibilities that can be had with such a device has created much interest. The cost of the device (Apple iPhone = 80,000JPY? 800USD) is still a huge barrier for many, however, the Nintendo DSi is a fraction of the cost (20,000 JPY? 200USD).

Reading about mLearning research that was carried out in Language Learning back in 2002 One begins to wonder why it never became main-stream. There has been much research in the area of mobile assisted language learning (MALL) since 2002. In Japan, proponents of MALL include Glenn Stockwell ♣ and Joseph Dias♦, among others. There seems to be a focus on technological barriers, and this appears to limit the penetration of the market, but there are also severe pedagogical barriers to be overcome, even if there are no costs involved.

Many answers were revealed to me during the course of the interview and the subsequent articles that I have read regarding the topic. The ideas were there 5 years ago, they were implemented and proven to be somewhat successful, but the limitations on the service provision, the cost and the infrastructure required to make it all happen were accumulatively too much to make it viable. However, now the door may be not only re-opened but the opening has been made bigger and better than ever

♣ Dr. Glen Stockwell, (Professor of Law, Waseda University, Tokyo, Japan) profile available at <http://www.f.waseda.jp/gstock/> (accessed Nov 18th, 2008)

♦ Joseph Dias is an Associate Professor at Kitasato University. His research interests include CA in medical settings and CALL (especially mobile language learning) & the application of critical thinking to Web-based information). (accessed Nov 18th, 2008)
<http://jaltcall.org/conferences/call2002/program-detailsD-J.html#dia001>

before, with a multitude of possibilities that will be (perhaps) free, simple and easily available to every handset user worldwide. Open source and freeware software is leading the way of many developers and facilitating a more open progression of software development and programming possibilities that can and will lead to the progression of language learning worldwide.

The use of PDAs for reading and working on documents of various sizes, have differing limitations based on capabilities of each device and the software choice. This combined with the quick progression of mobile phone technology and ease of access to devices of varying capabilities means that soon there would appear to be a more focused choice or genre of devices that are somewhere in a middle ground. Netbooks (small, lightweight notebooks) are looking increasingly likely to become the latest device that will allow a host of applications and will allow users to perform a variety of popular tasks. The general progression is that as devices become smaller they also become more energy efficient, lighter, more flexible and more suitable to the needs of learners. By developers listening to users complaints and suggestions, combined with the openness of the internet for people to blog and share ideas makes for an endless resource for programmers, developers, manufacturers and educators to strive towards the next best product that will fulfil the needs of learners. Combining this with the entertainment requirements of users and energy requirements of the devices themselves will also contribute towards the future development of these types of devices.

The vast majority of adopters are becoming more and more interested in the concept of having one device that will allow them to do a multitude of things, (whatever they may be) with the ability to travel lighter and reduce the amount of accessories and peripherals that accompany many of today's devices. One such device that was released in Japan on November 1st 2008, was the "Nintendo DSi", featuring: both a touch panel screen and regular screen; memory card slot; camera; microphone (to allow Skype or other VOIP messaging); Wifi connection (Wireless) as well as a whiteboard conferencing system that works remotely with up to four users at a time. This combined with the standard gaming capabilities of the previous device (Nintendo DS of which over 70 million have sold globally) make for an all round useful learning tool. Although still lacking in many features and not capable of performing a great number of tasks, the user interface of this device makes it a very useful and user-friendly tool to improve learning and education. As well as being portable, durable and inexpensive, this device (including its predecessor, the Nintendo DS) is widespread and accepted by students both young and old. The amount of software available is ever increasing and at present Nintendo Japan has published and marketed between 100 and 200 educational titles under the genre name of "Edutainment" in Japan alone. The range of titles available also is soon to include economy training games like "Real

Estate Broker DS" which is said to "help players learn the basics of the economy, how the economy works, and to help familiarize players with keywords that are used in economic talk"²⁾.

As this was my first time to interview an e-Learning professional and Educator, let alone an innovator in the field of mLearning I was surprised with how easily my interviewee opened up to me and described in detail his experiences and reflections on both the implementation of the innovation and the innovations themselves. His experience made me consider the novelty factor that is embraced by many early adopters of technology who have a great deal of enthusiasm for projects later become faded and slightly passe in nature. By understanding the "fashion" of CALL and mLearning I appreciate more the practical and pedagogical aspects to implementing these kinds of innovations and the limitations to their possibilities. As many innovations are never fully explored and others don't reach their potential, I understand how fickle - I'm not sure you really mean "fickle". You may mean "difficult" in this context - it can be to generate genuine success in each project attempted.

I very much empathised with my interviewee and thoroughly enjoyed the experience of speaking with someone who is interested in the same area as myself, and so close to my physical home. Studying on a distance course means that I am unable to attend many conferences and seminars and this interview has "recharged my" interest in the subject matter.

As mobile technology improves and technical capabilities are increased, the possibilities for learning (especially Language learning) will become astonishing. Already we know of schools using game consoles with educational software, and online collaborative group work, but as the opportunities for quick, easy, reliable, high quality mobile learning become financially easier more affordable, the more and more the rate of change in adoption will increase. I think that just now we are bridging the chasm (Rogers, 1995) from innovators to early adoption, but until the handsets and services become very low in price whether that be by way of subsidy or advertising revenue the majority will still be left behind.

I still believe (as I wrote in my blog February 15th, 2008) that, at this time, that mobile learning is fairly informal and new, like virtual communities (Gallagher, 2008) although many people have been working with them for almost 20 years now and some of them are also rather formal, and until the early majority of educators and learners have really opened themselves up to the possibilities of this platform for

2) <http://www.videogamesblogger.com/2008/11/13/economy-training-ds-game-in-development-by-nintendo-and-nikkei-inc.htm>

learning it will remain out of the more serious, formal side of learning and testing. This, I fear, will be a great lost opportunity, but if history is to repeat itself again as it has done so many times, there will always be a new technology that will revive the idea and perhaps that one will be the success story we are all looking for.

Word Count 1274

Interview Questions about Innovation

1. Please can you describe your role here at the University?
2. Please can you tell us something about the innovative ideas that you have implemented here at the University? Something about the context of the Innovation.
3. What role did you have to play in this innovation?
4. Did you create and lead it, or did you adopt an existing innovation?
Did you make this decision or was it at least partly made for you?
5. Was there institutional encouragement or even pressure - an elearning strategy in a university, for example, or company policy?
6. Did the innovation feel consistent with your own values, or was some struggle involved?
7. What benefits, if any, did you imagine the innovation would bring - a cheaper or better way of doing something, for instance?
8. Were you able to see, beforehand, benefits that anyone else had gained?
9. If there has been time to look back on it, have any expected benefits materialised?
10. Have there been negative consequences for you or for others?
11. Would they recommend the innovation to anyone else and, if so, why?
12. Has their initiation or adoption of the innovation affected (positively or negatively) relationships with colleagues (or with friends/family, if that is the context)?
13. How did you learn to use the innovation? Did you develop it yourself, and did they get support - from colleagues or friends, from websites or computer magazines? Was it complex or simple to make the change?
14. I have been reading and learning a lot about handheld learning and I was looking at innovations in a primary school in the city of Dundee, Scotland, where they were using Nintendo DS and using it as a tool, and peoples ideas were against it because of peoples thinking that it is only a gaming console as opposed to an educational tool. Now with the advent of the iPhone coming to Japan and the many possibilities with it, do you think that the interest or the novelty of CALL through the iPhone will follow?
15. Now in the United States at both Stanford and Harvard University, when students enrol at the start of the new year they were actually being given iPhones. Now if that was possible here at your university would you go with that idea?

References

- Brown-Martin, G. (2008) "Derek Robertson - Hero Innovator" Handheld Learning.
<http://www.handheldlearning.co.uk/content/view/46/1/>
- Bruns, A., Cobcroft, R., Smith, J. & Towers, S. (2007). *Mobile Learning Technologies and the move towards 'User-Led Education'*. Australia. Queensland University of Technology. Online at: <http://snurb.info/files/Mobile%20Learning%20Technologies.pdf>. (Accessed 14th March 2008).
- Cobcroft, R., Towers, S., Smith, J. & Bruns, A. (2006). *Mobile Learning in Review: Opportunities and challenges for learners, teachers and institutions*. Australia. Queensland University of Technology. Online at: https://olt.qut.edu.au/udf/OLT2006/gen/static/papers/Cobcroft_OLT2006_paper.pdf. (Accessed 14th March 2008).
- Dye, A "Designing courseware for PDAs and other mobile devices" (accessed April 4th, 2008)
<http://mlearning.lnet.fr/index.php?2007/02/12/28-designing-courseware-for-pdas-and-other-mobile-devices>
- Gallagher, B. (2008) "Definitions of eLearning" (accessed 20th March, 2008)
http://blufiles.storage.live.com/y1pENGunWhGtmow_UXUWefQQGt4r0HNmkNexM55IGMrxIVwNDI6E3_NIztwojPNKYbZT8Hvk8A3Vs4
- Glater, J.D.(2008) "Welcome Freshmen. Have an iPod" The New York Times, nytimes.com,
<http://www.nytimes.com/2008/08/21/technology/21iphone.html?pagewanted=print> (accessed November 18th, 2008)
- Hall, K. (2008) "Targeting Apple, Nintendo Unveils it's latest Device" (accessed November 5th, 2008)
http://www.businessweek.com/globalbiz/content/oct2008/gb2008102_147631.htm?chan=top+news_top+news+index+++temp_global+business
- Houser, P., (2002) <http://csdl2.computer.org/comp/proceedings/icce/2002/1509/00/15091149.pdf> (accessed March 21st, 2008) International Conference on Computers in Education Houser,
<http://csdl2.computer.org/persagen/DLAbToc.jsp?resourcePath=/dl/proceedings/&toc=comp/proceedings/icce/2002/1509/00/1509toc.xml&DO>
- Houser, C and Thornton, P. (2002) "Mobile Learning: Cellphones and PDAs for Education" accessed March 20th, 2008) P. IEEE Computer Society
http://search3.computer.org/search/results?action=authorsearch&resultsPerPage=50&queryOption1=DC_CREATOR&sortOrder=descending&queryText1=Patricia%20Thornton
- Joiner, R., Stanton, D.& Luckin, R. "Guest editorial: Children and new technology" JCAL Vol. 19, No.2, June 2003., Universities of Bath, Nottingham and Sussex
http://jcal.info/notes_and_reviews/editorials/index.htm#ed192 (accessed November 10th, 2008)

"エム ラーニン—モバイル通信機器と最新情報機器革新における比較研究・考察および今後の課題" (Anthony Brian Gallagher)

Nils "Nintendo DS used in English Lessons in Kyoto Schools" (accessed April 6th, 2008)
<http://kyotown.com/2007/09/19/nintendo-ds-used-in-english-lessons-in-kyoto-schools/>

Rogers, E.M. (1995). *Diffusion of Innovations* (4th ed.). New York: Free Press.
[Diagram 1](http://mudpuppy.files.wordpress.com/2008/02/diagram_1) (accessed November 5th, 2008) <http://mudpuppy.files.wordpress.com/2008/02/innovationcurve.gif>

Sharples, M. (Ed.) (2007). *Big Issues in Mobile Learning: Report of a workshop by the Kaleidoscope Network of Excellence Mobile Learning Initiative*. Nottingham. Learning Sciences Research Institute. Online at: http://www.lsri.nottingham.ac.uk/Publications_PDFs/BIG_ISSUES_REPORT_PUBLISHED.pdf. (Accessed 14th March 2008).

ufi Learndirect / Kineo (2007). *Mobile learning reviewed*. UK. ufi Learndirect / Kineo. Online at http://www.kineo.com/documents/Mobile_learning_reviewed_final.pdf (Accessed 14th March 2008).

Webpages — Additional Resources

Moodle.org <http://moodle.org/> (accessed March 37th, 2008)

iPhone from Apple "" (accessed March 19th, 2008)
<http://www.apple.com/iphone/features/index.html#phone>

"Targeting Apple, Nintendo Unveils it's latest Device" (accessed November 5th, 2008)
http://www.businessweek.com/globalbiz/content/oct2008/gb2008102_147631.htm?chan=top+news_top+news+index+--+temp_global+business