## 0188

# An analysis of first-year business students' mobile phones and their use for learning

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This paper reports on ongoing work into mobile learning that has been conducted with an incoming group of first-year Business Studies students over the last five years. A longitudinal study has been conducted with this student group over the period. The paper focuses on the data that has been gathered from this study, which offers an insight into the student cohort; what it tells us about the mobile phones that they own; their attitudes to using them, and in particular how they are using them for learning. How the survey will be followed-up with in-depth research with a small number of students is outlined. This work offers a valuable overview of the appropriation of mobile phones by students. It is timely to present our findings, given the recent 'New Horizon Report (2010) and its focus on mobile computing – one of six 'technologies to watch', by which we mean the 'use of the network capable devices students are already carrying'.

**Keywords:** mobile learning, mLearning, students mobile phones, longitudinal study, higher education, HE, mobile phone survey, mobile phone use, learning with mobile phones, evidence

### I. Introduction

This paper presents ongoing research into mobile learning conducted with a group of first-year students at London Metropolitan University. Mobile learning has been introduced into the blend of teaching and learning activities gradually, aiming to make use of the increasingly powerful mobile phones that the students have, to enhance engagement, communication and learning in a range of learning scenarios. Underpinning these pilot activities, is a longitudinal study in which a survey has been conducted with the student group for the past five years, which gives us data about these students, their mobile phones, their attitudes to using them, and how they are using them for learning. It is the results from this survey that are the main focus of this paper, but the paper briefly discusses previous work to put our research into perspective, and also outlines the direction of current research, which is looking in more depth at how students are currently using their mobile phones for learning.

It is timely to present our findings about student mobile phone use, given the recent 'New Horizon Report' (2010) and its focus on mobile computing – one of six 'technologies to watch', by which we mean the 'use of the network capable devices students are already carrying'. The report further identifies, 'the fastest growing sales segment belongs to smart phones – which means that all over the world a massive and increasing number of people now own and use a computer that fits into their hand and is able to connect to the network wirelessly from virtually anywhere''. Furthermore, figures from the recent GSMA Mobile Media Metrics report show that Internet access from mobile phones is increasing in the UK: more than 25% of the population (16 million people) accessed the Internet from their mobiles in December 2009 (Guardian.co.uk, 2010). The highest accesses were for Facebook, followed by Google and a range of other websites.

Mobile devices have a number of important characteristics which make them attractive from an educational perspective, including increasing portability, functionality, multimedia convergence, ubiquity, personal ownership, social interactivity, context sensitivity, location awareness, connectivity and personalisation (Pachler et al, 2010). We know from the results of our student survey that all students now have mobile phones that are becoming increasingly sophisticated, and they are keen to use them for learning outside the classroom.

Mobile learning definitions tend to be based around the mobility of the device, the learner, or on the facilitation of informal learning beyond the confines of the classroom (Laurillard, 2007; Sharples et al, 2007; Wali et al, 2008). We view mobile learning as learning that takes place using mobile devices at a time and in a place that is appropriate and convenient to the learner. This can be both within and outside the classroom, and indeed there are examples of where mobile learning can bridge the gap between formal and informal learning (e.g. Cook, Pachler & Bradley, 2008). Outside of the classroom, the use of mobile devices provides more opportunities for learning, allowing students to have more choices in where and how and when they learn. There is also a growing body of evidence coming from a number of studies that show that using mobile technologies can help to engage some students into taking part in learning activities (e.g. Savill-Smith 2005, Bradley et al, 2009).

Traxler, (2007) discusses the affordances of mobile learning and the contexts within which mobile learning may be situated, and that how it develops will depend in part on the affordances of any given situation. There are clearly many appropriate contexts for mobile learning, but our current line of research is to explore the contexts that students are themselves adopting so that we can harness the powerful technologies they have and carry around with them, and encourage wider adoption of these practices.

In this paper we briefly discuss previous work to put our research into perspective, followed by an analysis of the data, and we conclude by outlining the direction of future research.

## 2. Background

First-year students at London Metropolitan Business School all take a core module designed to assist them with settling into Higher Education. The student body is diverse: there are many mature learners who are returning to education and overseas students who do not speak English as their first language, many of whom have just arrived in the country to study. In an effort to engage these students (of whom only 12% enter with a traditional 'A' level profile), the curriculum was redesigned to facilitate blended learning, where students could access materials at a time and place of their own choosing, yet be fully supported in the classroom. The curriculum is designed around a visit to the Tate Modern Art Gallery, with student activities scaffolded by an interactive website used both inside the classroom and for independent study [http:// learning.londonmet.ac.uk/LMBS/quickstart]. Web statistics for the site showed a tremendous response from the students, with visits made 24 hours a day every day of the week, illustrating engagement in this aspect of the module (Holley & Dobson, 2008).

In 2005, the first survey into students' attitudes to mobile phones revealed a willingness to experiment with learning via their mobiles. This justified the trial introduction of a commercial package, mediaBoard [www.mediaboard.co.uk/apps/demo/] to encourage the sharing of materials and facilitate groupwork online (Cook at al, 2006). mediaBoard enables students to upload images and SMS messages from their mobiles (or a PC) to an online shared group space. This was followed by the introduction of 'student study tips' the following year where the lecturer texted the students learning tips to scaffold their presentation research. More recently a text messaging system 'TxtTools' [www.txttools.co.uk] has been incorporated within large lectures, to encourage students to ask questions by sending them in as SMS messages and thus engage and participate in the lecture to a greater extent (Holley et al, 2010). These trials have introduced mobile learning into the blend of teaching and learning activities, aiming to enhance student engagement, communication and learning.

However, the use of commercial systems such as mediaBoard and TxtTools require funding and commitment from the University to be sustainable. In our current area of research we are looking to utilize the devices that the students have and what they are already using them for.

The next section presents the survey results, accompanied by analysis and discussion of the key emerging issues.

## 3. Survey results and discussion

A longitudinal study has been conducted with first-year students taking a core business module, 'Studying Marketing and Operations'. Students completed a short paper-based questionnaire in about Week 4 which asks about the mobile phones they have, their views of using their devices for learning and what they use them for. The data from the last five years (since 2005) is presented in this section. Grounded theory has been used to analyse the qualitative data in order to explore the student situation and what it is telling us about their mobile phone attitudes and uses (Strauss and Corbin, 1998).

### 3.1 The students and their mobile phones

The following tables provide information about the students that have completed the survey and the mobile phones that they own. Table I shows the number of students that have completed each survey, their gender and age.

	No. of students	Gondor	Age range				
Date	in sample	No. of females	18-20	21-25	25-30	30-35	36+
2005	69	67%	60%	25%	10%	3%	2%
2006	101	71%	45%	37%	10%	3%	5%
2007	65	69%	53%	36%	8%	3%	0%
2008	91	68%	49%	45%	4%	2%	0%
2009	76	72%	61%	33%	5%	1%	0%

Table 1. The students in the study

Between 65 and 101 students have completed the questionnaire each year, thus providing us with a reasonable sample size. In each year about 70% of the students are females, and the majority is aged between 18-20, with 21-25 the next largest group. Only a small percentage is over 25. This student profile reflects the module cohort as a whole, which is similar each year, being predominantly female and in their late teens/early twenties (a significant number of fashion marketing students study this module).

Table 2 shows the level of mobile phone ownership and the proportion of students that have their mobile on contract (rather than 'pay as you go').

Date	No. of students owning a mobile phone	No. of students with a mobile phone on contract
2005	98.6% (  didn't)	46%
2006	100%	49.5%
2007	98.5% (  didn't)	58.5%
2008	100%	57%
2009	100%	63%

Table 2. Mobile phone ownership

In 3 out of the 5 years all students have owned a mobile, the exceptions being in 2005 and 2007 when I student in each year did not (both were international students waiting for an ordered phone to arrive). The data show an increase in the number of students that have their mobile on a contract over the period. Contracts usually provide inclusive call-time and SMS messages, and more recently data downloads. The implication is that if students have inclusive minutes, texts and data downloads within their monthly tariff, they will be more likely to use their mobile phone, and for University-related activities as well. There is a concern that students may be put-off from using their mobile for what could be considered 'non essential' tasks (such as for University) because of the costs incurred. In 2009 63% of the students had their phone on a contract. We also asked which mobile phone they owned, but the results are not presented in detail here, as the number of different models owned is large each year, ranging from 11 different models in 2008 to 49 in 2007. However, there is definitely a trend in the data that shows that the sophistication of the owned devices increases each year, with more and more students owning smart phones. In the 2009 sample for example, 14 had Blackberry's and 6 had iPhones. This trend is also reflected in the features that their devices have (see Table 4).

Date	6 months	12 months	18 months	As long as possible
2005	9.5%	38%	36.5%	16%
2006	9%	36.5%	18%	36.5%
2007	10%	39%	14%	37%
2008	13.3%	38.9%	18.9%	28.9%
2009	1%	37%	27%	35%

Table 3. Length of time students keep a mobile phone for

Table 3 shows how long students are likely to keep a phone for. This provides a measure of how frequently new devices are acquired, each one generally having greater functionality than the previous one. The data shows that the largest number of students (just over a third) keep a phone for 12 months, but a high proportion in each year also like to keep their phone for 'as long as possible'. Recent changes increasing the standard period of contracts to 18 months are also reflected in our data.

The real indicator of what students can do with their phones is shown in Table 4, features of mobile phones. Features have been added to the survey over time as they became introduced into handsets, so if a feature did not appear in the survey in that year, the result appears as 'N/A' in the table.

Date	Colour screen	Camera	Record video	Record audio/ voice	Internet / WAP	Wifi	Bluetooth	3G	GPS
2005	68%	68%	N/A	N/A	56.5%	1.4%	41%	14.5%	N/A
2006	88%	83%	78%	77%	75%	14%	80%	21%	N/A
2007	92%	89%	85%	83%	72%	15%	83%	28%	31%
2008	94.5%	96%	83.5%	80%	80%	22%	97%	32%	39%
2009	97%	96%	86%	84%	80%	50%	91%	46%	50%

Table 4. Features of students' mobile phones

The data show that the proliferation of all features has increased over the years (apart from a minor blip in some years for some features). Colour screens are now standard for 97% of the students. The ability to be able to capture and generate content is also a possibility for a high proportion of students: 96% have a camera, 86% can record video and 84% can record audio/voice. The ability to access data networks and share data has also increased over the years. In 2009 80% of students can access the Internet from their mobiles. 50% can access WIFI, which is important as it enables students to have free access to the Internet and other data sources. 91% now have Bluetooth, 46% 3G and 50% GPS.

#### 3.2 Students' attitudes to using their phones for learning

Three questions were asked about their attitudes to using their mobile phone for learning and being contacted by the University. The graph in Figure 1 plots the responses to the question 'How much is the ability to learn at any time and in any place important to you?' which was designed to find out about their attitude towards flexible learning, and therefore potentially mobile learning.



Figure 1. How much is the ability to learn at any time and in any place important to you?

One pattern which can be seen in the data is that those who answered '1' on the scale of it being important, are on the whole in the majority – responses range from between 30-38% of students, and show a slight decline over the years (30% rated '1' in 2009). There is also a reasonable number of students who rated '3' in the middle, and were thus undecided or unsure – responses range from 14-34% (26% in 2009). However the views are either positive or undecided on the whole, with low numbers of responses at the negative end of the scale – responses to '4' ranged between 3-5%, and '5' from 3-9%. We can deduce from these results that a large number of students are open to the idea of learning at any time and in any place that is important to them.

Figure 2 explores the question 'How useful would it be to access learning materials via your mobile?', as earlier research explored developing learning objects for mobile phones.



Figure 2. How useful would it be to access learning materials via your mobile?

The results are not easy to interpret for this question, but between 26-30% have chosen '1' on the scale, so the results over the years are consistent for this rating, indicating that just over a quarter of students each year think it would be extremely useful. Between 16-34% have answered '3', and at the negative end of the scale between 12-22% have answered '4' and 9-19% have answered '5'. Some explanations for the more reticent opinions could be that students do not feel that they have a phone that would facilitate this, or maybe some are concerned about the cost implications that could be involved in downloading or accessing

materials online. It is also possible that some students are not able to visualise what learning materials could be like on a mobile (they will think of the online learning materials that are available within the module in WebLearn, the institutional Virtual Learning Environment, some of which are quite sophisticated). This is one area that we intend to follow-up in our in-depth study with students.

Figure 3 shows the responses to the question 'How would you view the university contacting you via your mobile for learning purposes?' which aimed to find out how 'personal' students viewed their mobiles and whether they were against what could be perceived as intrusive activities.



Figure 3. How would you view the university contacting you via your mobile for learning purposes?

The results for this question are relatively consistent across the 5 years. Between 26-38% answered '1' and 23-27% answered '2' at the positive end of the scale. Those answering '3' and somewhat undecided ranged between 22-29%. Answers at the negative end of the scale were relatively low: between 7-12% for '4' and 7-13% for '5'. Again, there are large numbers of students who are positive, and also a reasonable number who are undecided. In 2009 '3' was the mode response (29%), and 26% answered '1' and 24% answered '2'. One factor influencing answers here may be that this question could be interpreted as 'other parts' of the university, such as administrative contact, which could be considered to be unhelpful and intrusive. One of the problems of getting attitudinal feedback via a questionnaire is that the reason behind students' answers cannot be explored further. However, we intend to investigate student perceptions in this area further in our in-depth study which will follow.

#### 3.3 How students use their mobile phone to help with their learning

The final question was 'Do you currently use your mobile phone to help with your learning?', and if so, what do you use it for? This is the question that is most pertinent to our current research, and is interesting as it reveals what students are actually using their mobile devices for. This question was introduced into the survey in 2007, so we have data to compare from the last 3 years (see Table 5).

Date	No. of students answering 'yes'	% of sample answering 'yes'	No. of different uses cited
2007	8 (n=65)	12%	12
2008	16 (n=91)	18%	25
2009	22 (n=76)	29%	34

Table 5. Do you currently use your mobile phone to help with your learning?

In all years, some students have cited more than one use. Both the percentage of students using their mobiles and the uses they are putting them to have increased in each subsequent year. In 2009 nearly a third of the students reported using their mobiles for learning (29%), citing 34 different uses.

All of the uses cited by each student have been grouped into categories (such as communicating, using tools etc.) and are presented in tables 6 to 8 below for each year.

Category	Mobile phone use	Total uses per category
Communicating	I always call people to ask about homework Contact my assessor on an external course Calling other students Receive text messages from lecturers	4
Using tools / applications	Calculator (3 students) Converter	4
Organising	Organiser Reminder	2
Generating content / artefacts	Take pictures of potential images that aid my research	1
Other	Group work	

Table 6. How students use their mobile phones to help with their learning – autumn 2007

In 2007 12% of the students (8) cited 12 uses of their mobile phones for learning, and these have been grouped into 4 categories: 'communicating', 'using tools/applications', 'organising', 'generating content/ artefacts' and 'other' (other uses that did not seem worthy of adding another category). The categories 'communicating' and 'using tools/applications' each had 4 entries. Calling people was cited by 3 students and receiving text messages by one. In the 'using tools/applications' category, 3 said they used the calculator and one the converter. In the 'organising' category, one used the organiser and one the reminder. In the 'generating content/artefacts' category one student said they used their mobile to 'take pictures of potential images that aid my research''. In the 'other' category, one cited group work (but didn't explain how their phone was used for this).

Category	Mobile phone use	Total uses per category	
Communicating	Calling friend to ask them about studying stuff Contacting group members to discuss work Communicate with other students Texting/SMS (2 students) Texting during lectures VOC. from text messages	7	
Using tools / applications		0	
Organising	Timetables (3 students) To find the lesson's time and where it is Schedule	5	
Generating content / artefacts	Pictures	1	
Conducting research / getting information	Internet (2 students) Google (3 students) Wikipedia Finding out information Research	7	
Notetaking	Saving useful information because I always have access to it Notes	2	
Other	WebLearn (2 students) To record lecture	3	

Table 7. How students use their mobile phones to help with their learning – autumn 2008

Table 7 shows the responses from 2008, where 18% of the students (16) cited 25 uses of using their mobiles for learning, more than double the number of uses cited in 2007.

It is significant that two new categories of use have emerged: 'conducting research/getting information' and 'notetaking'. Two categories 'communicating' and 'conducting research/getting information' each had 7 uses cited. In the communication category, 4 mentioned text messages, 1 mentioned calling, and 2 mentioned contacting or communicating with others without mentioning the specific form of communication(s) used. In the 'conducting research/getting information' category, the ''Internet'' and ''Google'' were each mentioned twice, and the other 3 cited ''Wikipedia'', ''finding out information'' and ''research''. We have made the assumption that if students were using the Internet for learning, they were likely to be using it for 'research/getting information', and likewise if they were using Google and Wikipedia. Two students were using their phones for 'notetaking'. In the 'other' category, 2 used their mobiles for WebLearn (the University's VLE) and one ''to record lecture''. In the 'generating content/artefacts category' only one use was cited ''pictures''. No uses were cited in the 'using tools/applications' category.

In 2008 the survey shows that for the first time students were using their mobile phones to access the Internet to help with their research, and were starting to use them for notetaking. Two were accessing WebLearn, although they did not specify what for (the module makes good use of the VLE, providing a week by week schedule with links to online learning objects and podcasts for some topics).

Category	Mobile phone use	Total uses per category
Communicating	Email (2 students) Saving emails To receive emails Contacting group assignment members Fashion facebook group	6
Using tools / applications	Calculator (3 students) Microsoft Office	4
Organising	Putting reminder alarms for meetings Check my exams Organiser	3
Generating content / artefacts	Take pictures/photos (3 students) Voice recording	4
Conducting research / getting information	Internet (4 students) Google (3 students) Research (2 students) Researching on the Internet Accessing info pages Search information	12
Notetaking	Write notes	
Other	Accessing learning materials Presentations Record presentations Transport files (PDF, Word, Powerpoint)	4

Table 8. How students use their mobile phones to help with their learning - autumn 2009

Table 8 shows the results from 2009, where the number of students using their mobiles for learning had increased to 29%, with 22 students citing 34 different tasks, all of which could be aligned with the same categories from 2008.

The category seeing the largest area of growth was 'conducting research/getting information', where 12 uses were cited. 8 mentioned using the Internet (5 directly mentioned the Internet and 3 mentioned using Google). The 'communicating' category saw 6 uses cited: 4 mentioned email which had not been mentioned in previous years, 1 mentioned 'contacting group assignment members' and social networking makes an

appearance with 1 citing "fashion facebook group". The 'using tools/applications' category saw 4 uses, with 3 mentioning "calculator" and 1 "Microsoft Office". The use of Microsoft Office is interesting here, as for this student, their mobile phone is clearly taking over some of the functionality of their PC (this student owned a Blackberry Curve).

There was also an increase in the 'generating content/artefacts' category, with 4 uses cited: 3 mentioned taking "photos/pictures", and one "voice recording". The 'Other' category also saw an increase: 2 mentioned using their phones for presentations, and two new uses emerge, "accessing learning materials" and "transport files (PDF, Word, Powerpoint ...)", other indicators that students' mobile phones are becoming more sophisticated and that they can use them for a wider range of activities. The 'organising' category saw a decrease to 3 uses: "putting reminder alarms for meetings", "check my exams" and "organiser". The 'notetaking' category had one use cited, "write notes".

The extent to which students' mobile use has been influenced by tutor-led mobile learning activities is difficult to assess. In 2007 and 2008 the lecturer experimented with using text messages to engage students, but most of the uses that students cite do not reflect this, and suggest that what they are doing is of their own initiative. Conversations in class with the lecturer, however, indicate that some students are unaware of, or had never considered using their mobiles as a study device, leading us to believe that making students aware of what they can do with their phones may encourage wider appropriation.

## 4. Conclusions

The number of students using their mobile phones for learning in 2009 is not a large proportion of the sample (29%), but there is clear evidence that the number is increasing each year, along with the range of uses for which they are appropriating them. Comparing the data from the last three years, the most noticeable change is that students are increasingly using their mobiles to access the Internet and get information for research, more than using their phones for communication which was common in 2007 and 2008. We do, however, see the emergence of students using their phones for email for the first time in 2009. In 2009, another area of increased use is for 'generating content/artefacts', with students taking photographs and making audio recordings. The growth in these two areas (Internet access and user generated content) and the increase in the range of tasks for which students use their mobiles, is made possible by the increased sophistication of the devices they own. This is evident from the data presented in Table 4 earlier, 'Features of students' mobile phones'. Not only has device sophistication increased over the five year period, but in our 2009 sample, 80% can access the Internet, 96% have a camera, 86% can record video and 80% can record audio, clearly illustrating that students have the capabilities in their mobile phones to engage in a wide range of learning tasks. Our results are also in line with the mobile phone ownership and usage findings reported in the New Horizon Report (2010) and GSMA Mobile Media Metrics report (2010) outlined earlier, which showed that smart phones are increasing, along with Internet access from mobile phones. Not only do students have the capabilities, they are appropriating their phones for learning purposes, and demonstrate a range of learning activities.

When we started the student survey, one of the main aims was to ascertain how many students had mobiles (to ensure that no student was disadvantaged by any mobile learning developments), what devices they had and what they could do with them. Our study shows that we can now assume they will all have a device and the emphasis of our research has switched to how they are using their phones for learning and what tasks they are using them for.

Whilst the results from our survey may not be indicative of all students, it does provide an insight into the current practice of these students, and gives underpinning data that inform our work with them. The next stage in our research is to explore individual students' use in more depth to capture their experiences. We have funding for a small project that will lend students flip video cameras to record examples of their mobile phone use for learning. Afterwards we will ascribe meaning to their actions via one-to-one interviews. The results, in the form of some case studies of student practice, will be publicly available on the project website [http://www.londonmet.ac.uk/learningonthemove/index.html] along with some resource materials designed to encourage students and tutors to make more use of the powerful mobile phones that students increasingly have.

#### 5. References

**Bradley, C, Smith, C, Cook, J.** 2009. CONTSENS project, WP4 Product training using location and context sensitive technologies, evaluation report. Available from: http://www.ericsson.com/ericsson/corpinfo/programs/using\_wireless\_technologies\_for\_context\_sensitive\_education\_and\_training/products/london\_wp4\_evaluation\_report.pdf

**Cook, J; Pachler; N & Bradley, C.** 2008. Bridging the gap? Mobile Phones at the interface Between Informal and Formal Learning, *Journal of the Research Center for Educational Technology*, Vol 4 No 1 Spring 2008. Available from: *http://www.rcetj.org* Accessed 23/01/2010

Cook, J., Holley, D., Smith, C., Bradley, C. and Haynes, R. 2006. A Blended M-Learning Design for Supporting Teamwork in Formal and Informal Settings. *Mobile Learning* 2006, July 14-16, University of Dublin, Trinity College.

**GSMA Mobile Media Metrics report,** 2010. Data published at: http://www.guardian.co.uk/media/pda/2010/feb/08/facebook-rise-mobile-web-use Accessed 08/02/2010

Holley, D & Dobson, C. 2008. Encouraging student engagement in a blended learning environment: the use of contemporary learning spaces *Learning*, *Media and Technology* Volume 33 Issue 2 pp 1 39 – 150

Holley, D, Bradley, C, Weiss, M, Dobson, C. 2010. A little less conversation, a little more texting please - A blended learning model of using mobiles in the classroom, accepted for the 5th International Blended Learning Conference, 16-17 June 2010.

Horizon Report. 2010, The New Media Consortium and Educause Learning Initiative; available electronically from http://www.nmc.org/ horizon first accessed 25/01/2010

Laurillard, D. 2007. Pedagogical forms of mobile learning: Framing research questions, in N.Pachler (ed) *Mobile learning: Mobile learning: Towards a research agenda* (Vol 1 pp33-54) London, WLE Centre, Institute of Education

Learning on the move website: http://www.londonmet.ac.uk/learningonthemove/index.html Accessed: 18/2/2010

Pachler, N, Bachmair, B, & Cook, J. 2010. Mobile Learning: Structures, Agency, Practices. New York: Springer.

Savill-Smith, C. 2005. The use of mobile learning by homeless learners in the UK, in Isaias, P., Borg, C., Kommers, P., & Bonanno, P., (Eds.), Proceedings of the IADIS International Conference on Mobile Learning 2005, June 28-30, Qawra, Malta, pp 24-32.

Sharples, M., Arnedillo Sánchez I., Milrad M., Vavoula G. (ed). 2007. *Mobile Learning: Small Devices, Big Issues.* Technology Enhanced Learning: Principles and Products.

Strauss, A., & Corbin, J. 1998. Basics of Qualitative Research: Techniques and procedures for developing grounded theory. Thousand Oaks: Sage Publications.

Traxler, J. 2007. Defining, Discussing, and Evaluating Mobile Learning: The moving finger writes and having writ..., International Review of Research in Open and Distance Learning, Volume 8, Number 2.

Wali, E, Winters, N, & Oliver, M. 2008. Maintaining, changing and crossing contexts: an activity theoretic reinterpretation of mobile learning, *ALT-J*, *Research in Learning Technology* Vol. 16, No. 1, March 2008, 41–57