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**What can we learn from a WoLF? Mobile learning lessons from an HE  
in FE project**

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**Abstract**

In this paper we present findings from a mobile learning action research project designed to investigate how pocket PCs can support work base learners. Three major issues focused on access, competence and motivation are addressed and discussed. A framework is put forward of how PDAs can be conceptualized to support mobile learning.

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**Project context and background**

There is rising global interest in mobile technologies as tools which offer the potential for teaching and learning. **Work-based Learners in Further education (WoLF)** is a JICS funded mobile learning research project described as a Higher Education (HE) in Further Education (FE) project. It is a collaborative project between Leicester College and the University of Leicester (UoL) aimed at investigating how Pocket PCs can support portfolio development by Teaching Assistants (TAs) on a foundation degree programme in UoL.

For most TAs who wish to gain Higher Education qualifications, a Foundation Degree (FD) in Educational Studies is the usual route. Acquiring this qualification accords with the vision of national government and the local East Midlands Learning and Skills Council, of ensuring that all TAs are professionally qualified to Level 3. Learning for an FD by TAs occurs in many different places such as weekly face-to-face sessions with tutors; practice and observation while at work and private studies at home. The potential challenges for TAs are similar to those faced by other work-based learners such as self motivation, the learning environment at work and the social and work structures that support learning in the workplace (The Learning Workplace, 2007).

**Study aims and objectives**

WoLF is designed to address two main challenges directly concerned with TAs' ability to learn. Its aims are to:

- i. Examine how Pocket PCs can open up opportunities for TAs to develop their portfolios, thereby promoting reflection in practice through systematic recording of classroom activities

- ii. Enable TAs to integrate varied learning activities that occur, by mapping learning in one space onto learning in other spaces.

In order to meet these aims, WoLF has been designed to achieve three main objectives, transferable to other learning contexts as follows:

- i. *A Pedagogic Model* and ‘proof of concept’ that can be reused and retried in different work-based learning contexts and disciplines
- ii. *Resources for practitioners* for design of reflective learning activities using work-based learning scenarios of pocket PCs to capture evidence
- iii. *Guidelines* for integrating the use of Pocket PCs into institutional VLEs within disciplinary and institutional specific contexts as part of e-learning strategies.

### **Research method**

The question of what research method(s) are best suited to mobile learning was the focus of a major conference recently organised under the auspices of The Work-based Learning for Education professionals (WLE) at the Institute of Education in December 2007. One fact which became evident from the conference was the plethora of research methods employed by mobile learning researchers, the choice of which is determined mainly by project aims and objectives. WoLF is using action research.

As a research method, action research is seen as appropriate for problem solving involving people, tasks and procedures where change of features result in a more desirable outcome. Action research combines action and research with the intention of improving practice; it focuses on practical issues identified by participants; bringing about practical improvement, innovation and change of a social practice (Cohen, Manion & Morrison 2007). These characteristics of action research matched the aims and objectives of WoLF.

Data gathering was from two main sources following ethical guidelines:

- i. Semi-structured interviews with TAs and project staff
- ii. Tracking TAs’ use of project Moodle including content areas and discussion boards.

Sampling was based on purposive and opportunity sampling methods based on convenience of access to TAs whose registration on the UoL Foundation Degree was done via Leicester College. Data analysis was carried out using Decision Explorer, cognitive mapping software which enabled detailed modelling of the views, experiences and feelings of the research participants. As data analysis tool, Decision Explorer supports a subjective view of knowledge in which individual beliefs, assertions, attitudes and values are considered valid and hence provide evidence for research (Eden & Spender 1998).

### **An overview of mobile learning**

In the past two decades there appear to be a paradigmatic shift away from education and training to learning, from teacher-centred to student-centred education, from rote learning to learning as reflection, and from face-to face to distance and e-learning (Jarvia, Holfors, Griffin. 2003). One dominant feature of this shift is the innovative application of technology to enhance the delivery of education. This has led to the emergence of a new approach to learning called e-learning characterised by different perspectives through different theoretical lenses and highlighting different schools of thought (Conole and Oliver, 2007).

Perspectives such as virtual learning, online learning, ubiquitous learning, blended learning and, integrated learning to name but a few are very common. Over the past ten years mobile learning has grown as an extension of the e-learning frontier from a minor research interest to a set of significant projects in schools, workplaces, museums, cities and rural areas around the world (Sharples, 2007) and as a deliberate effort to ‘domesticate’ mobile devices for educational purposes (Bachmair 2007. p. 106). The features which distinguish mobile learning from the other forms of e-learning can be found in the plethora of definitions put forward, in the learning attributes which are said to inhere in mobile learning, in the nature of activities said to be permitted, the pedagogical possibilities which have been proposed and the issues which mobile learning has engendered.

Various definitions have sort to distinguish mobile from elearning by emphasising spatiality (Kress and Pachler, 2007 p. 18-20, Alexander, 2004, and O’Malley et al 2003) learner autonomy and motivation (McFarlane, Roche & Triggs, 2007, p.8), ubiquitous access to resources, (Kress and Pachler 2007 p. 18-20), communication (Nyíri (2002), technical and functional features (O’Connell and Smith 2007) and learning across context (Walker 2007, p.5). Others, have pointed to specific attributes of mobile learning such as site-specific learning, degree of ownership and control (Laurillard, 2007 p. 154 – 157) personalisation, adaptation, engagement, self evaluation and reflection (Stead, 2006); change in the physical relations between teacher and learner, learner generated context, and learner generated understanding (Winters 2007, p. 7 - 8); and the affective dimension offered by mobile learning (Jones, Issroff & Scanlon 2007). Learning activities reportedly supported by m-learning also point to some distinction. They include exploring a physical environment, discussing with peers synchronously and asynchronously, capturing data through sound, images and text, sharing data captured, adapting learning in the light of feedback or comments and reflection using shared knowledge products (Laurillard, 2007. p. 157).

Yet another way by which m-learning can be distinguished is from the pedagogical perspectives proposed. A number of writers have demonstrated how existing theories of learning could be used to evaluate the applicability of mobile technology in the educational context. In an elaborate activity-centred literature review on mobile technologies and learning Naismith, Lonsdale, Vavoula, Sharples (2004), have identified a number of examples of how mobile technology can be appropriated in a learning context from a behaviourist, constructivist, situated, collaboration, informal and lifelong learning, and teaching support perspectives. Taking a more dialectical approach, Taylor, J et al (2006) have presentation of a task model to understanding mobile learning derived from sociocognitive engineering design methods. Their approach is in many ways similar to those put forward by Sharples, Taylor, and Vivoula (2006).

A communication and everyday media use and learning perspectives have also been proposed by Nyíri (2002) and Bachmair (2007) respectively. Furthermore the issues mobile learning engender such as profiling of learners (Becking et al 2004), learning conditions (Walker 2007), accessibility and user control (Syvanen and Nokelainen 2004), usability factors (Kukulaska-Hulme 2007), evaluation of mobile learning (Taylor 2007), learning design (Milrad 2007), and integrating mobile devices with broader educational scenario (Hoppe 2007) offer insights which helps to also differentiate mobile learning from other forms of learning. Specific examples of case studies which reflect some of these dimensions are evident from the work of Wisharta (2007) and Matasuura (2005).

What is evident from these various ways of explicating m-learning are the differences in understanding held, the emphasis place on its usefulness and the learning opportunities m-learning is seen as presenting. They also highlight some of the challenges faced both by practitioners and learners within this new learning habitat. A lot of these issues emerged from the findings of our study.

## Key findings

This study identified three main themes following analysis of data as follows:

- i. Access
- ii. Competence
- iii. Motivation

Under each theme various sub-categories of issues also emerged. The combined effect of these issues were found to influence the context in which PDAs were used by TAs, the functions of the PDAs they most preferred and the extent to which the PDA was seen as either enhancing or inhibiting learning.

### Access issues

The access issues coalesce around six sub-categories namely:

- a. usage
- b. functional preference
- c. technological rivalry
- d. institutional factors
- e. personal factors
- f. ethical issues.

They are presented as questions.

*(a) What was the context in which the TAs used the PDAs?*

Our finding shows that TAs' use of the PDA is both *actual* i.e. definitive uses but also *speculative* i.e. contemplative uses. Actual usage of PDA was found to occur mainly in the classroom setting and was driven mainly by practical activities with children with reported difficulty.

- *Just carrying it around... I don't like putting it in my pocket because its too bulky*
- *With work with children we are generally on the floor, kneeling down, bending over and it can slip out of my pocket.*

We also found that the majority of respondents' use of the PDA was linked to science based activities with children. For example learning about the sun, moon and earth, and activities on melting ice and snow. The likelihood exist that because interview with TAs coincided with their course module on technology and science, the focus on science subjects is coincidental rather than intentional.

- *I have taken a couple of photos for the 4 to 5 weeks science experiment*
- *I have taken photos of them drawing skeleton*

Speculative uses were on the high side and were reported as forward looking activities.

- *I want to start a 4 week experiment on growth, so going to grow plant and take photos of the process*
- *[Going shopping] I could just pull my PDA take some pictures of them [children] shopping, paying for items, putting it in the bag, & leaving the shop.*

*(b) Which of the PDAs' many functions did the TAs choose to use?*

The majority of users reported using the visual functionality of the PDA. A few others reported using the audio and video functions.

- Mine is been only voice recording and photos that was quite easy
- I have used it for videos and photos

One user reported using the PDA as a phone, whilst another reported using the alarm function and also downloading personal music unto the PDA.

- I have been using mine as a phone
- I use the alarm....that was one of the first things I worked out

No evidence was found to suggest that the communication functions of the PDA were used for e.g. emailing or internet browsing. Also, we found no evidence to suggest the use of the PDA for note taking.

- I still write up quite a lot of my assignments in rough and the type up.

However some TAs speculated about using the PDA for recording lectures and managing assignments.

- Thinking about it if I want to I could use the dicta phone and record a lecture
- I can find many reasons of how it will help me in my assignment

The non-use of the word processing function of the PDA could be attributed to the fact that at the time of interviewing TAs keyboards have not been issued to them. However some TAs reported that practical use of the PDA in the classroom setting was difficult to effectively capture momentary critical incidents. Dissatisfaction with the screen size and the fiddly nature of the devices were also reported as inhibiting.

- I find it quite fiddling and small... tend to use my laptop instead of using that

(c) How did the PDA compare with other devices available to the TAs?

Our study found that use of PDAs compete with other mobile technological devices such as personal mobile phones used by TAs which had similar functions on them as the PDA.

- I have tried the phone, and I do prefer my little phone because it's smaller.

We also found that access to other devices such as cameras, video recorders, interactive white boards and laptops available in the school and home environments contributed to minimize the use of the PDA.

- I still tend to use my laptop instead of using that
- we are used to using digital camera's and the digi blue visual recording

(d) How do institutional policies and practices influence the use of PDAs?

Another important finding about access relates to institutional policies and practices. We found that physical access to resources occurred on two levels. Firstly access to resources preloaded unto the PDAs before they were issued to TAs e.g. staff biography and also details of modules. The second aspect of access to resources was through the WoLF project Moodle, for example technical guidelines on how to use the PDA. One fact which emerged was that although a lot of time had been invested by the learning technologist to make available technical information, use of the project Moodle was still low. This was found to be partly due to ICT policies and services within some schools. For example, in one school there was only one computer shared with a number of staff which had only dial-up facilities.

- Its quite difficult to try and get the internet
- I couldn't access my hotmail accounts...there are certain things it won't let you do.
- There is one [internet access]. The teachers use it, we have nothing to do with it.

We thus found a correlation between access to PCs and effective use of the PDA.

*(e) What personal issues impact on the use of PDAs?*

Some respondents reported lack of access to internet facilities at home, although the project took this for granted. Yet for others it was the case of difficulty installing the piece of software needed to synchronise PDAs with a PC. Other problems reported were cost of connecting the PDA to the internet and time and pressure both at school and home. For example on the home front some reported competition for access to the home computer between them and their children. Another personal factor which emerged was Technophobia i.e. the psychological difficulty of learning how to use the PDA.

- *You don't see what you are typing and this is annoying,*
- *There is too much energy and strain. I don't need it; I like to make my life simple*

Clearly these personal issues raise questions about the psychological (pre)conditions of using mobile devices for learning.

*(f) What ethical dilemma concerns exist?*

The need to obtain ethical consent was reported by a few TAs as inhibiting the extent to which their PDAs could be used to record, capture or video children within the school setting.

- *I am not allowed to take pictures of any of my children because of the nature of my work*

Another ethical problem related to *public* versus *private* space and *personal* versus *co-owned* spaces. Participants expressed concern about using their PDA within social spaces which are publicly owned.

What is evident from the access dimension of our study is that the PDA is used to capture data and learning activities. Its use however appears to be classroom-centric and unstructured making it difficult to measure the specific ways in which it impacts on the learning experience. The potential of the PDA to support learning management and planning also comes e.g. help me plan assignments. These uses were however not without challenges.

### **Competence issues**

The second set of evidence which emerged from our study regards competence issues. This showed up in three main areas namely learning style, skills and support.

*(a) Learning style*

Our evidence shows that although TAs were taken through an induction training programme prior to the PDAs being issued to them, learning to use the PDA occurred mainly through experimentation and was thus self initiated and self taught.

- *My IT competence is self taught. I think everything I have done is being [learned] through experience*

*(b) Skills*

Our data analysis also found that the skill profile of TAs divide into the technologically competent and the technologically incapable. This difference was found to be linked to past experience of using technology, exposure to technological media in the home environment and, to some limited extent age.

- *I am seen as an IT mentor in my school" (a younger TA)*
- *I don't really like to use IT, its time consuming, and brain consuming;*
- *I still a little bit old fashioned*

*(c) Support*

In terms of support to effectively use the PDA, participants reported reliance on both formal and non-formal support structures. Formal support was obtained from the learning technologist at Leicester College. This was found to be mainly reactive as opposed to proactive. Formal support was also reported to come via IT officers within schools. At the non-formal level some participants reported relying on their husbands, children and other family members to provide instant and interactive support. Whilst it is difficult to assess the level of competence of these individuals providing voluntary support, our findings show the existence of parallel support structures one of an institutional nature, and the other of a domestic nature.

- *I have been in contact with [learning technologist] and she's helped me through*
- *My cousin is in the IT business, & I have said to him sit down and teach me*
- *If I struggle... my children would help me... my children are my teachers.*

The competence issues discussed points to the degree of control TAs have or will want to have over the learning process. It also throws light on the factors which help or hurt use of PDA from an individual's point of view.

**Motivation and (De) motivation issues**

Motivation for using the PDA was found to be a function of risk and reward.

*(a) Risk factors*

On the risk level security of the PDA in terms of their cost, fear of it being lost, the possibility of being attacked physically by thieves when used on a bus, and possible virus attack when synchronised to a PC were found to de-motivate users. Of particular interest was the reported financial burden of using a piece of equipment which was not insured and for which TAs were required to obtain insurance cover through their home insurance.

- *For me I am a youngster, I don't really do insurance*
- *I have got enough insurance payment now I don't want another insurance*
- *For instance your PDA is hooked unto you pc and you download a virus from the internet and it spread;*

The second de-motivating factor found was one of ownership i.e. the PDAs remained the property of Leicester College and had to be returned at the end of the project. This lack of ownership created a negative feeling for some TAs and undermined effective use of the device. The means/timing of recruitment was also found to be another de-motivating factor. Although TA's were not obliged to be part of the project if they so wish, the recruitment process appeared to be automatic enrolment when they sign up for the foundation degree programme. This conscriptive way of recruitment was found to be de-motivating.

- *Have not used it as my phone... because it's not mine, and if you lose it*
- *to carry it is an extra thing because it doesn't belong to me you get scare*
- *to be honest and totally honest with you we didn't really asked for this*

*(b) Reward factors*

Reward was found to be linked to the perceived usefulness or value of the PDA. Our analysis shows that most TA's were excited when issued with the PDA. To many the possibility of using the PDA to enhance the learning experience was welcomed.

- *When I got it (PDA) I was quite excited*
- *I can find many reason of how it will help me in my assignment*

Another source of motivation was the expectation that information and knowledge materials produced through the PDA could be shared with colleagues.

- "XYZ" did that, she took some pictures today and brought it in and showed the kids doing some skeleton
- I suppose transfer it from my PCs to here (PDA) for some one to look at I suppose I could use it for that

The potential of the PDA for management everyday living was also reported.

- [In my personal life] It can be a mobile phone, and texting and things like that

Perceived usefulness of the PDA was obviously a source of motivation for many. The above findings clearly have implication for mobile learning design.

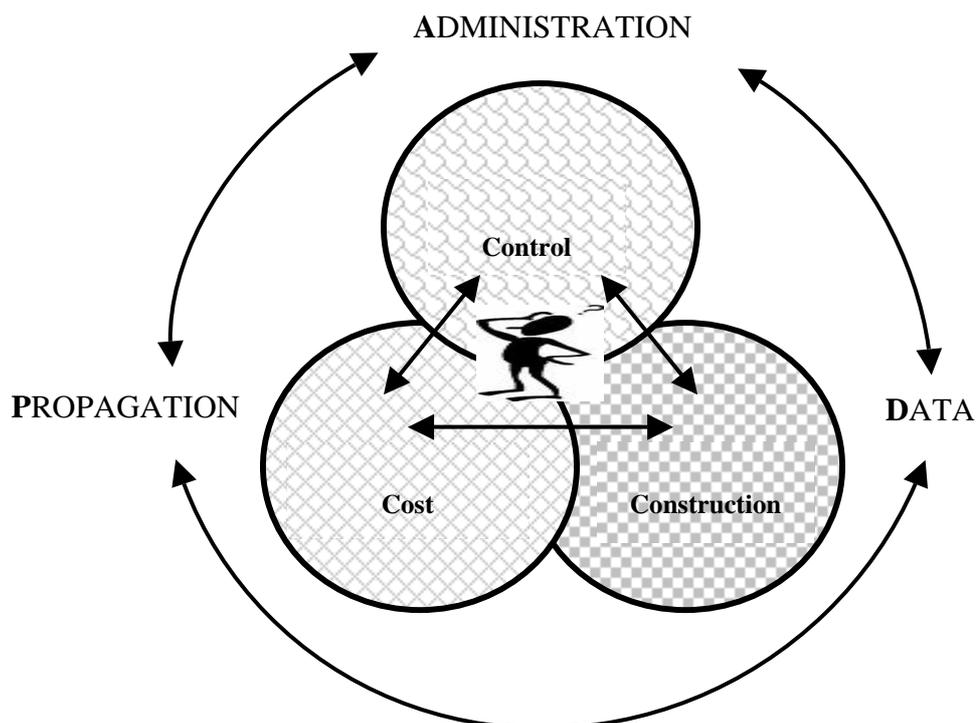
## Discussion

From the evidence so far adduced from analysis of this study the following conclusions can be made. That TAs use of PDA is actual as well as speculative. Many TAs value the PDA for its potential to help them plan and manage their learning and everyday activities e.g. assignments, contact information, and as an alarm/ alerting system using the appointment functionality of the PDA. In this regard the PDA can be said to support clerical or **administrative** goals. A potential challenge connected to this could be one of **control** over the learning management process.

Secondly, the PDA is used mainly as a **data** capturing device. The major challenge which remains for most TAs is moving away from using the PDA as a device for *pulling* or data gathering to one for knowledge **construction**. The third conclusion is that use of the PDA both actual and speculative is for sharing experiences and/or **propagation** of ideas. A major inhibiting factor found to achieve this is personal **cost**.

When we bring these three dimensions together a simplified triadic framework emerges as follows which derive from our analysis.

### A TRIADIC FRAMEWORK OF PDA USE FOR LEARNING



The outer part of the framework covering *administration*, *data gathering* and *propagation* of knowledge represent stated and/or intended goals of TAs. The inner part of the framework represents stated and/or potential challenges for achieving the outer goals.

Our framework provides a simplified way of how PDAs can be viewed in relation to mobile learning and the key challenges which need to be addressed. On the administrative front is quite evident that the hidden dimensions of learning and knowledge acquisition such as planning and control are key elements of how learners continuously tackle new and unexpected learning situations (The Learning Workplace P6. P7.) Our contention is that for PDAs to be effective as learning tools they must first and foremost be integrated into the personal and everyday planning activities of learners. In this respect there is a lot to be learnt from the student learning organiser project of the Birmingham University (Holmes, Sharples 2002) which share similar aspects with our finding.

Our second contention is that mobile learning must move away from it being used simply to capture events and attend to issues related to knowledge construction and therefore learning. In this regard questions such as those pose by Kress and Pachler about “Attention” i.e. what should be attended to and how, and “Framing” i.e. who decides how to frame the world in which learners engage must be addressed. Judging from the distractive nature of the school and home environments for mobile learners “reflective dens” (Facer et al. cited by Naismith et al 2004) or “thoughtful territories” as Bell (2008) chooses to call them i.e. places and spaces for reflection needs to be embedded in the design of m-learning to enhance the construction of knowledge. Our findings show that there is a correlation between risk and reward factors and motivation to use the PDA for knowledge production. Learning support must also be designed to reach-down, reach-out and reaching around the individual needs of learners. The “owned” versus “owed” syndrome of learning tools and spaces also needs to be addressed.

This study has found that knowledge propagation or sharing is influenced not simply by individual disposition but also by cost, regulatory policies and existing infrastructure. We contend that for learners to feel empowered to share their experiences in a mobile learning context, institutional infrastructure, regulatory policies, and learner friendly cost models must be adopted. Sharing and shaping of knowledge in mobile learning must attend not simply to “my device” but also “my space”.

## Conclusion

The findings reported in this article are based on the exploration stage of the WoLF project. It is thus difficult to assess the full impact of the PDA on the learning experiences of TA’s at this stage. Notwithstanding this we have found evidence which support the view that use of PDAs can either help or hurt the mobile learning process base on personal and institutional factors. Our framework provides a way of thinking about the *help* and *hurt* dimensions of using PDAs.

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