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## Literature Review on mlearning with the main focus on the Personal Digital Assistant

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Due to the broad scope of mlearning and the ubiquitous technologies about I have had to concentrate most of my research into a specific area. Therefore this literature review will refer to mobile learning in a general manner with the main focus being on Personal Digital Assistants (PDAs).

Advances in satellite systems and computer technology, particularly wireless communication, including bluetooth and infrared beaming have led to the emergence of m-learning from e-learning. There are many challenges in this area, particularly the barriers that HEIs face in trying to implement new technologies. A number of universities, and commercial concerns have recognised the potential of mobile learning, particularly PDAs to enhance student learning by supporting and augmenting their Managed Learning Environments (MLEs) - allowing the transfer of materials such as e-texts, lecture notes and timetables to students (Trinder, Magill, Roy 2005).

PDAs have been used to enhance computers in teaching environments because many models are, inexpensive, and relatively easy to use. PDAs are efficient organisational tools for educators (Ray, et. al., 2001; Scott, 2002). Bailey and Pownell (2000) are in agreement, noting that PDAs effectively support how educators work and use information in their teaching environment. Staff at Liverpool Hope University have found it clear that fieldwork enhances student learning - this is based on both student and tutor perspectives. A problem that consistently occurs, however, is that students have huge enthusiasm and commitment in the field that wanes on return - i.e. the fieldwork does its job admirably but there is a need to follow the commitment through to class-based and student centred follow-up and subsequent learning. Research suggests that re-using recorded information that has been assembled during an active learning task can provide the facility to support this re-representation and reorganisation process (Levene and Peterson 2002). Soloway (2000) argues that PDAs "support cycles of doing and reflecting" by encouraging educators and learners to look over their written work more often.

PDAs are a quick and resourceful method for transferring accurate data into a desktop computer (Hecht, 1997; Stover, 2001). Because PDAs allow users to swiftly share work by "beaming" files via infra red or bluetooth from one users PDA to another, encouraging collaboration, group effort, including peer reviewing, and sharing of information. This sharing and peer reviewing leads to an improvement in the quality of finished products, such as written drafts and reflective discussions

Soloway (2000). Reflection is well known to support the active learning experience as it enables learners to experience, construct, test, and revise knowledge (Thompson and Jorgensen 1989). Soloway (2000) also argues that PDAs support cycles of doing and reflecting by encouraging students to revisit their written work more often.

Use of mobile data capture with a PDA ensures that the high quality of data collection does not hit the hurdle of data organisation and entry on return. All the data is in a readily useable form so students can quickly move to the challenging and interesting phase of their work - analysis, synthesis, critique and application. This method has the potential to break down the separation that inevitably exists between fieldwork, practical (IT and lab-based) work and student report writing of investigative and survey work. As previously mentioned it can significantly enhance groupwork by the sharing of data as it can be instantly communicated electronically. It can also provide students with the experience of current data captures techniques in operation and actively engage them in meaningful activities already in use in their potential future careers. According to (Chickering and Gamson, 1987) this is considered an integral part of active experienced based learning

The use of PDAs in fieldwork allows students to actively engage in and collect background relevant digital information about an environment. This can provide both concrete and representational data. The data can be recorded and re-used according to content, time and location and provide different ways for students' to re-represent not only their own but others information and, in so doing, to support their thinking at different levels of abstraction.

It is now being recognised that children at school benefit from using such mobile technologies (Klekot, 2005). For example a primary school in Shropshire purchased PDAs for each child in KS2 primary education.

They found:

- Significant improvement in the quantity and quality of boys' writing, especially years 3 & 4.
- Significant improvement in SPLD children's ability to communicate.
- A raising of children's self-esteem.
- From an already high level, a significant improvement in the pupils' ICT skills and ability to manipulate information.

Wireless technologies are increasingly being used to facilitate collaboration within a mobile workforce and students should be enabled to learn about and reflect upon these applications. Actual engagement with the real technologies would enhance learning in both of these dimensions.

The potential for enhanced communication between students on placements, both within the work context and between students would also be a benefit. For example, trainee teachers on placement could collaborate with peers and tutors in an enhanced fashion.

PDA's have the ability to integrate a number of features and can therefore act as a holistic learning tool where students can archive information, retrieve up-to-date information, manage tasks and time through their diary, and above all, link with multimedia sources designed to promote learning. In sport it is envisaged that autonomy amongst learners will be encouraged, as the onus will be on the student for managing tasks within the PDA. Many students lose sight of the purpose of why they have actually collected data during tedious data entry time and this may lead to sluggish approach to continual learning. It is anticipated that the benefit of swift information exchange from fieldwork to laboratory will not only keep learner motivation and focus high but will allow the route to quicker restructuring of information which is instrumental in understanding newly acquired knowledge (Vygotsky 1978), which is also thought to be a significant part of the reflective process (Kolb 1984).

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### **Other sources of information**

The Warner CNR PDA Initiative

[www.warnercnr.colostate.edu/computing/pda/response.html](http://www.warnercnr.colostate.edu/computing/pda/response.html)

Programming Handheld Devices to Enhance Learning

[www.educause.edu/ir/library/pdf/eqm0318.pdf](http://www.educause.edu/ir/library/pdf/eqm0318.pdf)

Using Rapid Feedback to Enhance Student Learning in Mechanics

<http://fie.engrng.pitt.edu/fie2005/papers/1720.pdf>