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**USING PDAS FOR CAA:  
PRACTICALITIES, PROBLEMS,  
APATHY**

**J.J.Trinder, S.Roy and J.Magill**



# Using PDAs for CAA: Practicalities, Disasters, Apathy

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## Abstract

For the last 3 years the Departments of Electronics & Electrical Engineering and the Robert Clark Centre for Technological Education at the University of Glasgow have been collaborating on projects to investigate the potential of PDAs in flexible learning and the use of highly portable mobile devices as CAA delivery platforms.

During this time a number of challenges have been identified which will have implications for more widespread deployment of mobile devices. The project has now been extended and PDAs have been given to the students to use throughout their 4 years at university.

This paper describes some of the technical, institutional and social factors that have been encountered during the project, various methods we have used to overcome these difficulties, and an assessment of the merit of each method, singly and in concert. Although our chosen platform has been a Palm OS based device the problems encountered are largely platform independent.

## Background

The first phase of the project started in 2002 when a one-year pilot project was funded by a Learning and Teaching Support Network (LTSN – now part of the Higher Education Academy) mini-project grant. The mini-project was titled "Portable Learning and Assessment - Towards Ubiquitous Education" The grant was used to purchase 25 entry level PDAs, spare parts, software and batteries. (Trinder *et al.*, 2005b)

The students were loaned the PDAs for 3months, and we found that interest in using the PDAs diminished towards the end of the loan period. Initially we assumed that the brevity of the trial was the root cause, as students had no incentive to buy applications to customise the PDA to their own requirements, and hence enhance their usefulness.

“Some early attempts of use of laptops in university contexts failed as instructors did not make use of the technology capabilities and the students quit bringing (and subsequently sold) the laptops. Professional

support as well as collaboration among instructors is required to create a critical mass and expand acceptance. Management sensitivity to providing incentives and support needs to be initiated.” (Csete et al., 2004)

When we repeated the project a year later, however, with another group of undergraduate students, the students lost interest in the PDA within a few weeks. Subsequent interviews indicated the reason for the disinterest was that most of them owned mobile phones that outperformed the PDAs. The applications that had made the PDA worth carrying, mainly diary and address books were incorporated into their phones.

We believed that if students are given PDAs there is more incentive for them to personalise the device and purchase software for it. When a PDA is loaned it ceases to be personal and becomes a Portable rather than Personal Digital Assistant. Therefore, in October 2004 we began a four year trial of a system for learning and assessment delivery via PDAs to evaluate the benefits of such delivery for a cohort of technology undergraduate students, where the students have greater control over PDAs use beyond the scope of the research, and an ability to customise / personalise the PDA software set without impacting on the project and their ability to use the technology in an active learning environment.

In addition to evaluating the PDA's potential as a CAA platform other areas are under investigation are: evaluation of PDAs as a store, transfer mechanism, and viewer of course materials in electronics format (linked to our online learning environment (OLE) Moodle; monitoring of student PDA use in terms of duration and purpose (both educational and personal); identifying limitations and challenges of PDA use within the educational context, and identifying technical and social techniques to overcome such limitations.

## **Current Project**

The PDAs used in the project are PalmOne Zire72s. The Zire incorporates a camera, capable of recording movies and still images and an MP3 player; these facilities were likely to appeal to students, and had additional pedagogical uses (for example using the camera to collect data as part of folio work in a design module). Each PDA was supplied with additional software: a simple Quiz application for delivering self assessment questions (PocketMobility) and an application to enable the viewing and editing of Word and Excel files on the PDA.

Prior to receiving a PDA each student completed a questionnaire to clarify their present exposure to mobile technology (for instance the functionality of their mobile phone). We also discovered that most students had a part time job (6 to 27 hours per week), and that time pressure on their studies indicated that portable devices to aid learning would indeed be of objective benefit. “Learning will move more and more outside of the classroom and into the learner's environments, both real and virtual, thus becoming more situated, personal, collaborative and lifelong.” (Naismith et al., 2005)

To identify when the PDAs were used we again choose to use an automated logging system that would record when the PDA was used (to  $\pm 1$  second accuracy) and which application was being used. To facilitate the collection of the logging information from the PDA required that student regularly sync their machines in our labs. In the earlier phases of the project we had only provided one machine for the students to sync to and that was purely for the purposes of collecting our logging data. We had little success in persuading students to do this and so the amount of data collected was small. (Trinder et al., 2005a)

For the latest phase of the project the syncing application was installed in all lab machines and a suitable, secured, cable was also fitted to each machine. The 'Palm desktop' software provided with each PDA was installed on the lab machines. This provides personal organiser, diary tools and an easy means of transferring sound and images from the PDA to a server. The lab machines were configured so that the information relating to Palm desktop was stored in each students' own home area on the university's central Novell network, whilst the logs collected by our logging system were saved in an area only accessible by member of the project team.

## **Data Collection and Results**

When the PDAs were first issued students showed enthusiasm, and most appeared to be technically adept (For instance, within a few minutes a number were attempting to "pair" the device with their Bluetooth enabled phones to get internet access, and in later lectures it was noticed that students had the ability to communicate silently and wirelessly). At this point the opportunity to obtain useful data looked very promising.

For the first few weeks the students were left to investigate how to use the PDAs themselves. This was a conscious decision in order that students would take ownership of the devices. Staff were available at lecture sessions to help with syncing to lab machines and provide technical support, but in spite of all the opportunities created, the students rarely, if ever, synced their machines in the labs. Our informal enquiries indicated that most had connected their PDAs to a machine at home, mainly to enable to transfer of photos and the transfer of music files. The majority of students had purchased an additional memory card for the PDA, mainly for the purpose of enabling the PDAs MP3 playing capability that requires the use of a removable memory card. That students made an unprompted personal financial investment indicated to us that the predicted sense of ownership had taken place.

Although technical barriers in syncing PDAs to lab machines had been lowered as far as possible, it seemed that students perceived no benefit to syncing. Explanations from lecturing, technical and research staff that such syncing would back-up the contents of the PDA, protecting students from data loss had no effect, even for students who had already experienced such data loss. For us to collect logging data it was essential that syncing occurred. We noted that most of the students had installed games on their PDA and suggested to the students that we held a weekly prize draw to win a

commercially produced game – donated by a UK manufacturer. This incentive produced almost no effect on the rate of syncing.

As the students were unwilling to sync their machine in the lab we needed an alternative means of collecting the logging data. The logging application was modified so that the logs produced by it could be beamed to a lecturer's machine. In addition a special application was also written for the lecturer's PDA to receive the logs and also to provide the decoding and conversion facilities that had previously been performed by the desktop syncing application. The tutors log collecting application also provides an easy means of sending multiple items to students PDAs. This was especially useful as it made distributing new sets of quizzes much easier as it required one button press to transfer multiple items to a student's PDA. (Ninelocks, 2002). To further provide incentive to syncing we made the logging process a method of proving attendance at compulsory classes, rather than having to fill in a paper register.

## **Discussion**

Looked at naively there were barriers to at least some PDA use, specifically syncing, which did not seem to have an obvious simple explanation. For example the students were already familiar with personal mobile technology. Practically all used mobile phones, most used phone functions other than simply communications, and many were familiar with higher level applications which utilise technology such as Bluetooth. Interestingly when forced, by the strictures of a formal laboratory organised to teach PDA skill, the devices were used, the exercises – simple synchronisation of files and other data – were completed quickly, and the students showed both efficiency and enthusiasm about PDA use. However, even after this lab, there was no obvious improvement in the rate of syncing. In addition students in weekly lectures regularly denied having brought their PDA, although one-on-one requests showed that they did actually have them. Often students would 'accuse' other students of having brought their PDAs to class. This latter behaviour gives some additional insight into class behaviour, and suggested a hypothesis which we now discuss.

The class was drawn from a spectrum of academic ability and demographics. We may assume that as they had all been given PDAs at the same point in time, and none of the students indicated prior familiarity in pre-course questionnaires, that we had created a level playing field for this specific technology. However, their use of mobile phones was already prevalent, and mobile phone use is generally perceived as a small group activity, and in adolescence, as an activity that helps to define position in peer group – which is of critical importance at this stage of their lives. The PDAs were, in addition, introduced half way through the first term, where initial peer group ordering had been established over the whole class, but where confidence about the nature of peer group position and hierarchy was not yet firmly established. (It should be noted that students always seemed, even one-on-one, to be lacking

in confidence about PDA use, and far less confident than our objective analyses showed. Their confidence of this specific technology was very low.)

This lack of confidence was exacerbated by the fact that open use of a PDA among their peer group might show their technical ability to be significantly different from that perceived by their peer group. We posit that this effect might be socially disruptive, and create a significant barrier to PDA use.

Evidence that may be considered to support this hypothesis is that similar problems did not surface in students using the OLE. Students were introduced to Moodle early in the course as peer groups were forming, and analysis of Moodle access shows 1st year students predominantly downloading course texts, rather than doing any higher technical functions of Moodle. The ability to download files from the web is ubiquitous.

## **Interviews**

Due to our impression that there was a frequent failure of students to bring the PDA to lectures we interviewed a random sample of the class to find out why. Although a small minority of students expressed specific concerns (two students had problems with battery life, and one saw no advantages other than use as a portable MP3 player), most were positive, and some had found interesting uses for the PDA and said that they "carry it with me all the time". (for instance one found that the camera was useful to taking pictures of book covers in the library to remind them of books they wanted to look at in more detail at some later time). "New technologies always spawn forth new uses that were unthought-of of prior to the introduction of the technology" (Norman, 2004)

These interviews were carried out before the formation of our hypothesis that worries over peer esteem dissuade students from open PDA use, which meant that we could not specifically probe this area. However, the fact that students were far more positive in a one-on- one situation gives some support to the theory. (Interviews were, of course, constructed to give a supportive environment for specific comments describing both the benefits and disadvantages of PDA in order to minimise bias in the interview results).

In the next iteration of this project, in order to collect a more significant amount of objective information of PDA use, logging/ syncing of PDAs will need to become more routine for students. We will issue PDAs earlier in the course before student peer groups have had time to form, and give immediate basic training in the use of basic PDA functions critical to the course. We will also encourage active regular use of PDAs amongst their peers in a classroom setting (rather than only in private for formative assessment), by using them to collect attendance information, and by more regularly transferring information from the lecturers via PDA beaming. Since it is possible that the logging aspect of the project made students reluctant to sync their machines to University computers, this will be introduced later, once good syncing habits have been formed.

In addition, interviews will be conducted with the present cohort of students, post vacation, to assess the nature of peer group in open PDA use.

It appears that successful introduction of mobile personal technologies is critically based on the very *interpersonal* networks and skills that are often naively assumed to be unimportant when dealing with *personal* technology.

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