

## ***How does having a Pocket PC affect doctoral students' experience of learning? A case-study and its implications for postgraduate research training***

Dr Cathy Gibbons  
Graduate School, University of Nottingham  
Nottingham  
UK  
[cathy.gibbons@nottingham.ac.uk](mailto:cathy.gibbons@nottingham.ac.uk)

Abstract: The University of Nottingham Graduate School was expanded in 2006 to provide a range of facilities, training opportunities and support to develop a range of transferable generic research skills and techniques for more than six thousand postgraduate students across the full range of academic fields. With three campuses in the UK and satellite campuses in Malaysia and China, the University of Nottingham has a diverse and dispersed population, with one in five postgraduate research students studying part-time. A capital grant from the Visual Learning Lab was used by the Graduate School to fund ten Pocket PCs for use by part-time students. In collaboration with the School of Nursing, which has the largest number of part-time research students, a small scale project was developed.

The aim of this Pocket PC project was to give immediate access to mobile technologies for part-time doctoral students and to explore the anticipated benefits of mobile learning. The project also sought to lay the foundation for the success of future teaching and learning initiatives using complex interactive technologies by introducing mobile technology. This was a recently established Graduate School staff team that was in the process of developing a common culture of practice around teaching and learning.

This paper will present the Pocket PC project as a case-study outlining the presumed and perceived benefits of having access to mobile learning technology. The mechanisms for providing support online and the limitations of the device will also be detailed. The main findings of the project, which centre upon the perception of the device as a *personal information management tool* rather as a *learning tool* will also be discussed. The paper will then turn to the role of the project in the development of both (what is by now) fairly standard use, and, innovative use of technology in the development of research training provision by the Graduate School. The paper will conclude with a discussion of the needs and capacity of teachers, trainers and facilitators when incorporating new technologies into cultures of practice in teaching and learning.

Key words and phrases: Mobile learning; Pocket PC; Supporting research students; Practical application of technology in learning

## 1. Introduction - Project context

The main focus of this paper is a project which gave doctoral students access to pocket PC technology. This section will give an introduction to the context in which the project took place. Subsequent sections will take the reader through a case-study of the project and its findings, before moving to a discussion of the findings and the implications for postgraduate research training. Whilst the focus will be on doctoral research students, this paper and the findings will be of interest to e-learning researchers, educational practitioners generally, technologists in the field of e-learning and managers who may be thinking of introducing new mobile technology for their team.

The Graduate School of the University of Nottingham UK was established in 1994 to provide a structural and strategic focus for postgraduate education within the University. Education and training for researchers, including postgraduate students, became the focus of new scrutiny in the UK as the UK government sought to address the skills required for a 21<sup>st</sup> Century global economy. As part of its productivity and innovation strategy, the Government commissioned Sir Gareth Roberts to undertake a review into the supply of science and engineering skills in the UK (HM Treasury *SET for success*, 2002). It was found that "The amount of training – particularly in transferable skills – available to postgraduates was criticised as inadequate, contributing to many employers not valuing a postgraduate student significantly more than a first degree graduate." (Roberts, 2002:32). The Research Councils UK (RCUK) began to implement the recommendations of the Roberts Review (2002) to improve researchers' careers and had already issued a Joint Skills Statement (*JSS*, 2001) which addressed significant areas of the Roberts Agenda, specifically Research Management; Personal Effectiveness; Communication Skills; Networking and Teamworking and Career Management. The Government's response to the review included the Roberts' Skills Training Fund, allocated to Universities on the basis of research student numbers. The University of Nottingham is in the top 10% of Higher Education Funding Council for England (HEFCE) funding for both teaching and research and is consistently in the top eight in terms of research student numbers (*HEFCE Research Assessment Exercise 2008: the outcome*, 2008). So, in 2004, whilst some Universities were starting to establish Graduate Schools, the University of Nottingham Graduate School was able to use this and other funding to expand beyond the delivery of core research and transferable skill courses to Postgraduate Research Students. The new remit included growth of wider networking between faculties and the development of a Graduate community, both nationally and internationally. Staff numbers doubled by 2005 (and are now almost four-fold in 2009).

It is worth noting that Graduate Schools in the UK operate a number of different models. Some administer all academic postgraduate courses for a particular University or Institute. Others have individual graduate level 'schools' or departments that are part of an academic discipline school or faculty. At the University of Nottingham the Graduate School provides and administers research training and development activities for all postgraduate research students and early career research staff. These are registered with one of more than thirty academic Schools and Institutes across more than three national campuses and three international campuses (UK, Malaysia and China). All of our activities are free of charge to

eligible staff and students. Postgraduate teaching and research training in the UK is guided by the QAA policy on good practice ("Code of practice for the assurance of academic quality and standards in higher education," 2004).

In terms of pedagogies, the Graduate School research training staff are particularly keen to move towards interactive and student centred models of learning and assessment. To achieve this, staff identified the need to develop more basic technological hardware competencies before moving on to complex learning contexts. This will contribute to a suite of web-based training courses in Research Techniques as well as the use of more localised visual technologies, such as video recording and video conferencing in teaching and learning. Additionally it will be used to build on reflective learning practices amongst student researchers.

The Visual Learning Lab (VLL) is a HEFCE funded learning, teaching and research centre which supports a range of visual learning projects across the University of Nottingham (*The Visual Learning Lab*, 2007). In 2007 the Graduate School was successful in securing a capital award from the VLL to fund the purchase of visual learning technologies. Schools from across the University had reported a concern that part-time students, particularly those who are based at a distance from their supervisor and central services, may feel isolated and lacking in support. Maximising inclusion for these students was and is an ongoing project for the Graduate School and its partners in the then UKGrad, now Vitae, Midlands Hub. To this end we approached the School of Nursing, which has among the largest cohort of part-time doctoral students, with an invitation to explore the presumed benefits of mobile visual learning for this group.

## 2. Case-study of project

### 2.1 Project Outline

The need for the development of a range of learning materials and methods had been identified as especially important for our regionally based part-time nursing students, some of whom have to spend considerable time travelling. The substantive aim of this project was to give immediate access to mobile visual technologies for a number of specifically targeted students, and explore the presumed benefits of visual learning in relation to researcher activity, for these and other postgraduate groups. The central question for students therefore was *How does having this device change your learning?* The exploration also included examination of:

- Types of learning materials accessed
- Volume of material accessed
- Perceived effectiveness of the learning material
- Uptake of different types of material
- Time management benefits
- Range of learning contexts
- The suitability of the visual format for learning compared with audio format - learning styles preference

- Unforeseen use of the technology

The project was longitudinal, with a staged programme of investigation and evaluation. A cohort of postgraduate part-time students from satellite campuses was identified in collaboration with the School of Nursing. The participants were given a HTC TyTN Pocket PC. The TyTN had the usual Microsoft programmes one would find on a PC. It also had camera, video and sound recording functions, as well as being a standard SIM card-free mobile phone. It further promised access to the Internet via WiFi or phone network. Participants were supported by a face-to-face training session with the device and access to advice and blogging activities through the Blackboard Learning System, WebCT. It was envisaged that evaluation of the project would be both qualitative and quantitative, and employ such strategies as student reflection upon their own learning experience, student logging and blogging, WebCT discussions and questionnaires. The specific methods were to depend to a large extent on the usage by students. A phenomenological case-study method was employed (Cohen, Manion, & Morrison, 2000; Yin, 2009). Stage-gates were built-in to the project plan where the project working group would address such issues as initial and ongoing usability issues, evaluation methodology, seeding of further resources, dissemination and collaboration. The capacity to undertake such evaluations was provided internally by the Graduate School research training team, and the e-learning co-ordinator. The students were given the Pocket PCs for a period of not more than six months.

## 2.2 Participants

All of the participants were nursing lecturers registered for part-time doctoral studies. They were all supervised for their doctorates centrally but worked at one of the many satellite locations of the School, or for another regional University. Hence they had frequent contact with the academic functioning of nurse training as part of their professional life, but were physically distanced from the research student culture and support mechanisms for their doctoral studies. There were six participants; three women and three men, equally distributed across the stages of doctoral study. Relevant School permissions were sought and they were recruited through the School of Nursing via email during the Summer of 2007. A training and development agreement was drawn up and one of the participants became a member of the project working group. The remaining four devices were distributed to research training staff (including the author) and the e-learning co-ordinator who were all members of the working group. This was in keeping with the secondary aims of supporting the development of Graduate School staff competence with new learning technology hardware.

## 2.3 Equipment

The TyTN Pocket PC has camera and video capability in addition to the audio and visual file playing functions of an MP4. This was seen as enhancing the potential for active engagement with the technology and a large range range of contexts in which visual learning may take place. It also allows direct communication with the user via email and possible WebCT discussion groups which were planned to aid data collection and monitoring of the project. It has mobile phone capability and 1Gb of additional card memory. It also has

a WiFi connectivity function for free connection the internet through the University's WiFi system, or through home broadband systems. In 2007 it was a top of the range item. It was chosen above the iPhone as the University of Nottingham IS service supports PC rather than Mac systems.

#### 2.4 Process and Evaluation

As stated in the outline, participants were given the Pocket PCs for a period of six months, and the project working group met every 2 months. The Graduate School has a working culture of monitoring and evaluation in achieving its objectives, both in generic and specific terms. There were three stages to the evaluation of this project:

In the first stage participants were given one-to-one instruction on the features of the device. They also gave a brief verbal report on previous experience of technology, self-report on competence, and expectations of the device. As the equipment was for remote use, the face-to-face introduction to the device and the WebCT group was an important scaffold for learning. It was suggested that the equipment would give students mobile access to the internet, PDF files, and video streams to support their learning about research as well as their substantive fields.

For the second stage, a WebCT online discussion forum was made available with support and input from the project lead and the user representative on the working group. This was available to students as soon as they had picked up their equipment. Further material and discussion points were provided with the help of the bi-monthly working group discussion which helped to inform the nature of the input and support given. For example it was modelled to users that the equipment could be used to gather visual (and audio) data and be used as a tool for reflection in research. Blogging and journal streams with visual prompts (recorded by Graduate School staff using the TyTN) were created for this purpose in WebCT. Out of this arose the online *Research Café* (see next section). In keeping with the phenomenological character of the methodology, the emphasis evolved to focus less on the technological functionality and more on the use of the device as a tool for facilitating learning about research.

The final stage involved the return of the device and a face-to-face exit interview. This was recorded and the transcript analysed. Interview themes included the original themes of competence, types and volumes of material accessed; perceived effectiveness of available learning materials; time management benefits; range of learning contexts and locations; suitability of visual format for learning compared with audio format; wider or unforeseen use of the technology; advantages and disadvantages; issues of cost. However, students were also encouraged to reflect upon the use of the device in their research activities, and their engagement with the support activities of the project, such as the WebCT group and the *Research Café*.

## 2.5 Research Café

The *Research Café* was an online asynchronous conference. The development of this activity arose as there was concern in the working group that engagement by participants with generic or substantive research discussions was minimal. The *Café* was modelled on the face-to-face activities of the School of Nursing which the project lead had encountered in her work with the School. The School has short informal Friday afternoon meetings which research students and staff attend. It also has bimonthly weekend activities with formal presentations from staff and students on research themes. The weekend activities were originally designed to support part-time research students but proved popular with full-time student as well. This online *Research Café* was seen as mirroring familiar developmental research activities of the School, with the technological challenge of using the technology to produce and make their submissions to the *Café*. The suggested theme for the *Café* was 'Research Ethics'. However, participants were invited to choose an unrelated research topic if it was more appropriate to their learning needs.

## 3. Case-study findings

Rogers, 1995 (in Carroll, Howard, Vetere, Peck, & Murphy, 2002) has theorised that people have a tendency to focus on ideas that match their existing needs, interests and attitudes. Therefore, from the outset it was important to identify the expectations of the user. In the first face-to-face meeting a range of overlapping expectations about how the device would be used was reported. These included: Using PC programmes on the device whilst on the move between locations; Synchronisation with home or work PCs; Keeping notes about research; Accessing and responding to emails; Mobile storage of data and documents.

Like Carroll et al (2002), we focused on the technology and an activities set which included work, leisure, and social and educational activities, rather than organisational systems. The extent of participant usage and evidence indicating the impact on their learning was initially evaluated from online discussion and an email questionnaire. There was a great deal of attention given to the functions and usability of the device, or to be precise, its lack of consistent function in giving WiFi and Internet access. Even where this aspect was a success, much discussion was around the physical quality of the device e.g. the likability or otherwise of the small buttons, the camera quality, the keyboard layout, and the size and weight of the device. There was little focus on the device as a tool for learning or communicating about research, and no unprompted discussion about their research learning. This was despite identifying research activities as part of their expectations of the project.

Carroll et al. (2002) describe the appropriation of new technology as a process of being attracted to technology, experimenting with it, and evaluating whether it adds value to one's lifestyle. They found that acceptance of technology amongst young people is filtered through such factors as convenience, affordability, support for their actual activities (rather than hypothetical ones) and satisfying a need for style or fashion. It would appear that participants in this project were prepared to accommodate small changes, or refinements to their usage of the technology. However for some the refinement needed to achieve desired

outcomes was too great, and as such they were disappropriation factors. These included, the device having too many unfamiliar functions, too great an investment of time required to make it function as desired, and fear of causing an institution-wide system failure in one case (as compared with the common but transitory fear of breaking the device). However, these mature professionals had similar criteria for engagement with technology as the young i.e. convenience, affordability, and supportiveness of actual activities. Most of the participant learning was around the incorporation of technology into current behaviours (actual activities) e.g. using calendar and email functions, and handling new technology with greater confidence, rather than the generation of new behaviours (hypothetical activities). Moreover, there was little evidence of extending or changing learning behaviours with regard to their research.

Consequently, there was a concern in the working group that participants were experiencing the TyTN device as a glorified memory stick for the storage and portage of files, as users reported that the device was too small to create or edit MSOffice documents with ease. However the mobile and instant access to files meant that participants were able to incorporate the device into their lives as a constant presence and actively engage with its functions. Participants reported making most use of their devices in their work lives and its use in meetings was most common. Accessing the diary/calendar for future synchronisation, and reviewing and reading files were reported. Participants also reported using the TyTN to transport presentations to conferences, as in-flight entertainment for family members, using the email function to send photos socially and to make audio notes around the home. Thus it was the context in which the device was used rather than any innovative combination of functions that added value for these users.

All of the participants actively engaged with ways of incorporating visual technologies into their work lives. However, when it came to their research tasks (such as online discussions and presentation of visual material) it seemed that participants were less aware of what the device might be used for. Therefore, research could be said to be constructed as a hypothetical activity (if only in relation to the technology). As such it required greater modelling for use as a research and learning tool, hence the decision by the working group to develop the *Research Cafe*. Despite low active engagement with the *Research Café* during the week it was open for discussion, participants in the exit interviews reported that it was a novel and helpful idea with regards to sharing, discussing and thinking about their research. Low active participation was attributed to lack of time and a curiosity to see what it involved before becoming involved themselves. They reflected that they had not thought of using the device in this way for communicating or thinking about their *research* until it was modelled by us, although it did not seem unusual to them to incorporate these kinds of visual and reflective activities in their teaching practice. Some expressed surprise upon reflecting that they had consciously transferred their skills and knowledge about health care technology into their acquisition of competence with the TyTN, yet had failed to transfer good habits and practice from their work lives into their research lives. This led to reflections upon their confidence in their identities as nursing educators as compared with their sense of themselves as researchers. That their studies were being funded by their employers raised

tension and even guilt around their identities and priorities. “Work always first, studies second”. Interestingly, all of the participants pointed out, that when it came to technology, they were more concerned about function than fashion. Never the less, most of them made comments about the desirability of attractive pieces of technology or ‘vicarious bling’. The capacity of a piece of technology to impress others at a meeting, either because of its aesthetic quality or its sleek functionality was a somewhat sheepishly expressed view. It seems that the appropriation of fashionable technology confers status and inclusion on professionals in their context, much as these kinds of device are viewed as symbolic goods amongst the young and socially excluded (Haddon, 2000). Certainly there is further scope in the data for a greater analysis of the participants’ construction of their identities as Research Students as well as professionals and practitioners.

Despite the initial lack of progress in understanding the device as a research *learning tool*, the device was a success for most of the participants as a personal *information management tool*. (Gibbons, 2008). Participants agreed that generic planning functions assisted them with their personal organisation for work activities. This then impacted positively on the time available for research activities. Involvement with the project had given them an affirmation of the high level of their technical abilities and a greater awareness and appreciation of the support that is available to doctoral researchers. The reflexive nature of the exit interviews offered space for students to reflect upon their use of the device and the opportunities for transferring their professional practices into their research lives.

#### **4. Implications for research training**

This project was seen by the Graduate School as part of laying the foundations for the success of future initiatives using complex interactive technologies to enhance the Postgraduate student learning experience at all the University campuses: Nottingham, Malaysia and China. As anticipated the learning from this project has helped staff to:

- Support the expansion of current courses and teaching practice
- Allow the expansion of visual media in planned new teaching and learning practices using online technology such as video streaming
- Increase access to learning materials for geographically isolated students, both nationally and internationally
- Develop cultures of practice within the Graduate School to normalise the use of technologies in teaching and learning, and the dissemination of ideas and practice in the learning community
- Build on a burgeoning knowledge and interest in staff and students for enhancing the wider learning experience of students through the use of technologies

We were successful in securing further funding from the Centre for Integrative Learning for a range of technical equipment, including mini camcorders for student use and HDV cameras for high quality visual feedback to students as part of their presentation skills training. Staff learning from implementation of the *Research Café* in particular has aided our



development of an increased number of online modules which have been very successful (in terms of student uptake and positive evaluation). The combination of visual technologies with the capacities of WebCT offers the Graduate School powerful possibilities for developing group learning.

Sun & Zhang's (2004) findings that increased experience, and increased technological, organisational and affective support, lead to increased acceptance of technology are supported. We believe that our current models of online learning are designed with as much consideration of the social factors affecting interaction with technology (Malhotra & Galletta, 1999) as the technology itself (possibly more, given that most of us are not technologists). As a minimum our activities are designed to stimulate discussion and learning around the participants' research, and, to provide a supportive platform for that discussion. We continue to seek ways to provide supportive examples of the use of technology to enhance communication and student dialogue; whether it is for research or social purposes. There is a recognised assumption amongst Graduate School staff that many of our learners have a requirement for flexible learning. Whilst undoubtedly part-time students (the majority of whom are women) do not have a great deal of flexibility in accommodating the different facets of their lives (Vryonides, 2008), this inclusive attitude is probably helpful to most of our students.

However, as a research training team we have begun to note the variety in quality and extent of discussion between online course instances. The findings of this case-study challenge us to ask about our models of teaching and learning and the methods that we use to scaffold those who are new to our modes of teaching and learning, including e-learning. Fundamentally we share a model of teaching and learning as a facilitated reflexive process (Schön, 1991). But do we have any agreement beyond this? Newly expanded with time bounded funding it would be unsurprising if a focus on delivery and measurable output was noted. It is Graduate School policy to review courses on a regular basis, however our methodology for examining input or process is limited and this is something we may wish to address as a team. The experience of being involved in the project process and reflective evaluation was arguably the more productive learning experience for our participants in relation to their research. This finding supports the ethos of Roberts funding for researcher-led activities, where early career researchers and research students are supported by the Graduate School in the process of design, budgeting, implementation and evaluation of small scale projects of their own devising to develop their generic transferable skills. The findings of this project suggest that in addition to encouraging participation, we may need to carefully facilitate these activities for research students, especially the reflective evaluation of their projects.

## 5. Conclusion

This VLL funded project has helped to establish a secure foundation for the development of e-learning in particular. Staff have benefited more than was anticipated from the experience in the development of their technological competences and more staff are engaging with

the virtual learning environment. The case-study showed that having a Pocket PC does not, in and of itself, enhance learning. Part-time doctoral research students identified benefits in having a Pocket PC, especially in relation to personal information and time management. The failure of the device to meet participant expectations around internet functioning, caused disappointment, frustration and ultimately for some, rejection of the device. Critically the project identified the need for technological and social support for students and staff in the appropriation of technology for learning. The transfer of skills and knowledge from professional contexts was not as easily transferred to the research context as we would have predicted for this mature group of professionals. However, explicit and specific opportunities to reflect upon learning can affect the experience of learning positively. This has implications for how the Graduate School research training team develops its teaching and learning methodology for all its courses and models of interaction with students. Learner context is recognised as complex – issues of identity, power, responsibility and agency were of particular relevance for these doctoral students. Conscious transfer of knowledge or behaviour to new contexts may be contingent on these issues. Familiar activities need to be modelled when the context is new. Students may need explicit invitations and supported opportunities to develop their reflective practice.

## 6. Acknowledgements

The author would like to thank the Visual Learning Lab, and the staff of the Graduate School of the University of Nottingham, for their support in conducting this project and bringing this paper to conference. The author would also like to thank the reviewers for their helpful comments.

## 7. References

- Carroll, J., Howard, S., Vetere, F., Peck, J., & Murphy, J. (2002). Just what do the youth of today want? Technology appropriation by young people *35th Hawaii International Conference on System Sciences* (pp. 1777-1785). Hawaii: IEEE.
- Code of practice for the assurance of academic quality and standards in higher education. (2004). (2nd ed.): Quality Assurance Agency for Higher Education.
- Cohen, L., Manion, L., & Morrison, K. (2000). *Research methods in education. 5th ed.* (5th ed.). London: Routledge Falmer.
- Gibbons, C. A. (2008). How do part-time Doctoral Students benefit from having a Pocket PC? *International Network for Doctoral Education in Nursing Newsletter, Vol. 7* (No. 2), 4-5
- Haddon, L. (2000). Social Exclusion and Information and Communication Technologies: Lessons from Studies of Single Parents and the Young Elderly *New Media & Society, Vol. 2* (No. 4), 387 - 406.

Malhotra, Y., & Galletta, D. F. (1999). Extending the Technology Acceptance Model to Account for Social Influence: Theoretical Bases and Empirical Validation, *32nd Hawaii International Conference on System Sciences* (Vol. Track 1, pp. 14). Hawaii: IEEE.

*RCUK Joint Skills Statement*. (2001). Retrieved January 2008, from <http://www.vitae.ac.uk/cms/files/RCUK-Joint-Skills-Statement-2001.pdf>

*Research Assessment Exercise 2008: the outcome*. (2008).

Roberts, G. (2002). *SET for success. The supply of people with science, technology, engineering and mathematics skills. The report of Sir Gareth Roberts' Review*. London UK: HM Treasury.

Schön, D. A. (1991). *The reflective practitioner : how professionals think in action*. Aldershot Ashgate

*SET for success*. (2002). Retrieved February 2008, 2008, from [http://www.hm-treasury.gov.uk/ent\\_res\\_roberts.htm](http://www.hm-treasury.gov.uk/ent_res_roberts.htm)

Sun, H., & Zhang, P. (2004). A Methodological Analysis of User Technology Acceptance, *37th Hawaii International Conference on System Sciences* (pp. 10). Hawaii: IEEE.

*The Visual Learning Lab*. (2007). Retrieved February 2009, 2009, from <http://www.visuallearninglab.ac.uk/>

Vryonides, M. (2008). A Sociological Inquiry into Time Management in Postgraduate Studies by e-Learning in Greece *The Electronic Journal of e-Learning* (Vol. Volume 6, pp. 67-76): Academic Conferences Ltd.

Yin, R. K. (2009). *Case study research : design and methods* (4th ed.). Thousand Oaks, Calif. London: Sage Publications.