

**Assessment & Learning in Practice Settings (ALPS) -
Implementing a large scale mobile learning programme:**

A Report

Prepared by Assessment and Learning in Practice Settings (ALPS)
Centre for Excellence in Teaching and Learning (CETL)

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About this report

The purpose of this report was to capture the experiences gained by the ALPS CETL whilst it was developing a large-scale mobile learning programme, and to ensure that the learning that the CETL and its staff took away was not lost. The report can be read in its entirety, or in sections as appropriate. Our key recommendations around each activity can be found at the end of each section. We hope that you will find the report both an interesting record of a unique learning and teaching programme, and a useful guide in setting up your own mobile learning projects.

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1. Executive summary

The purpose of this document, “ALPS - Implementing a large scale mobile learning programme: a report” is to talk about our experiences and learning from developing and implementing one aspect of the Assessment and Learning in Practice Settings programme, a Centre for Excellence in Teaching and Learning. By extending students’ opportunities for assessment whilst in practice placement ALPS developed a mobile learning and assessment programme to support students. This report is comprehensive in detailing this work, from establishing the collaboration of five universities and other stakeholders including commercial partners, running pilot projects, designing the architecture for mobile use, undertaking a procurement exercise, preparing and allocating the devices, implementing and ensuring engagement with the mobile programme and finally, recording how the universities foresee sustaining and embedding this aspect of the ALPS programme.

This report is written from multiple perspectives, from the collaborating academics, the health and social care professionals, learning technologists and other support professionals.

This report does not record every detail of the ALPS programme but we hope that we have given a good outline of the complexity of not just implementing a large scale mobile learning programme, but the “unexpected” aspects which arose during the course of this project and needed to be managed.

The ALPS CETL website (<http://www.alps-cetl.ac.uk/>) and the ALPS Helpdesk website (<http://www.alpsweb.net/>) can be used to find further detail about the programme and act as a useful supplement to this report

2. Introduction

2.1 ALPS in context

Work-based learning is a method of learning using the work environment as a place for study and is a growing approach in both the commercial sector and within secondary, further and higher education generally. The government push for a wider choice of educational opportunities, especially in the 14 - 19 curriculum, has resulted in specialist schools and academies offering a range of options including work-based learning (DCSF, 2007).

This trend is also present in undergraduate university programmes. Whilst health and social care programmes use work-based placements as a necessity, increasingly more degree programmes outside of the health and social care arena include a work placement. Courses such as management, engineering, international studies and geography all include such placements. Moreover, the increase in placement learning is a key element in university strategies, eg. The University of Leeds Strategy Map (2006), designed to increase the employability of graduates.

This move towards a more outward looking university experience is due to the unique learning opportunity the workplace provides. Students are able to gain a real insight into the professional context of their programme of study, gain skills that increase their employability and potentially open opportunities for postgraduate employment. With the increasing need for universities to create globally competitive graduates (Urry, 2002) these opportunities are increasingly not just desirable, but necessary.

Additionally, with current Government policy promoting the implementation of interprofessional education (IPE) (Craddock *et al* 2006), education and training for health and social care students has by necessity had to encompass elements of interprofessional learning. Craddock *et al* (2006: 237) suggest that IPE's place as a policy was brought sharply in to focus with recommendations from the Bristol Royal Infirmary Inquiry (Department of Health: 2001) and the Victoria Climbié Inquiry (Department of Health: 2003) both 'reinforcing its importance'. Specifically, The Victoria Climbié inquiry actually focussed on the suggestion that effective action was taken to ensure the successful sharing of 'relevant information on an inter-agency basis' (Department of Health, 2003: 11). Consequently, education providers have been under pressure to introduce their students to the principles of interprofessional learning and working. ALPS aim was to take this learning a step further by introducing interprofessional assessment across a large number of its partner undergraduate courses. Traditionally, health and social care professions have tended to require a member of their own profession to assess and "sign off" a student as competent. ALPS challenged this principle by suggesting that generic competences, such as communication, team working and ethical practice, can be assessed by another profession, as long as the workplace assessor has been appropriately briefed.

Students value assessment processes which accurately and fairly measure their capabilities and provide effective feedback as a basis for reflection (Nicol and Macfarlane-Dick, 2006). To support this, ALPS aimed to assist students to feel confident, as well as competent, on graduation, by extending the range of formative and summative assessments, for example, by increasing the different settings in which assessments take place, and the number and type of assessments using a greater

variety of assessors to provide a comprehensive portfolio of professional competences. This work was to be supported by research to improve the validity and reliability of assessing competences which had proved notoriously subjective when being assessed (Boursicot, Roberts and Pell, 2006).

At the same time, student expectations about the provision of information and communication technologies as they arrive at Higher Education Institutions (HEIs) are cause for concern as the latter fear they are not providing sufficiently against these expectations (Cooke, 2008: p23). The recent report, Higher Education in a Web 2.0 World, published by the Committee of Inquiry into the Changing Learner Experience (CLEX) suggests that prospective students' expectations of ICT in higher education are focussed on basics such as '...universal internet access, use of their own equipment; support for university systems; an online backup for lectures.' Furthermore, these expectations are generally met (CLEX, 2009 p.26). This is reinforced by the relatively high satisfaction scores recorded in the National Student Survey for access to general IT resources (National Student Survey, 2009). Higher Education in a Web 2.0 World reports that student expectations are shaped by and consistent with their school experience. A view shared by the JISC report Great Expectations of ICT (Ipsos MORI, 2008 p.36). Higher Education in a Web 2.0 World points out that the learning experience in school, although mixed, is moving increasingly in the direction of collaborative, project-/group-based approaches to learning using technology and this is reflected and reinforced in the spaces being provided in the school' building programme. It suggests a likely 'substantial mismatch' between prospective students' expectations and the actuality of higher education practice and approaches in the foreseeable future (CLEX, 2009, p.37).

It should be noted though that whilst Universities have control over the technology provided to their students whilst on campus they may have little or no control over IT provision within health and social care placements attended by their students. This was a motivating factor for examining mobile technology as a method for delivering assessment and learning in practice settings.

Assessment and Learning in Practice Settings (ALPS) recognised the value of increasing the number and range of assessments whilst students were on health and social care practice placements and used this as the core of their bid to host a Centre for Excellence in Teaching and Learning (CETL). To support these student assessments a large scale mobile technology plan was devised to enhance student work-based learning. A bid from the ALPS collaboration (the Universities of Leeds [lead partner], Bradford and Huddersfield, and Leeds Metropolitan and York St John Universities) was submitted to the Higher Education Funding Council for England (HEFCE) in anticipation of receiving funding in the latter's 2005 CETL programme.

The CETL programme was intended "to reward excellent teaching practice and to invest in that practice further in order to increase and deepen its impact across a wider teaching and learning community" (HEFCE, 2004). HEIs were encouraged to define their excellence, providing evidence of scholarly practice and a track record of teaching and learning excellence. By dint of their bid HEIs would show how they intended to use and advance this excellence if successful in being awarded CETL funding.

The CETL programme was the largest ever learning and teaching funding initiative with £315 million available to fund CETLs over the five-year period from 2005 to 2010, with additional capital investment of £140 million in the first two years of the funding period.

HEFCE's intention was that CETLs would "enthuse (...an HEI's...) staff and attract and motivate students through their attentiveness to and investment in support for successful modes of learning.... By 2010, we hope that some CETLs will have taken risks, pioneered innovative learning approaches and significantly extended the use of new technology" (*ibid*).

ALPS were, therefore, ambitious in their plans to fuse work-based learning opportunities and interprofessional learning with the potential which technology offered to students for mobile learning. Large scale funding such as this would provide the opportunity to challenge current assessment methods and practices. A programme as ambitious as ALPS, particularly in the aspects of mobile learning and collaboration, would have to take risks as well as be innovative. Funding for the five year programme would run to £2.5m revenue and £2+m capital. These figures excluded the contribution, both direct and indirect, which the five ALPS partners made and which has totaled in the region of an additional £1.5m.

All five ALPS partners, in their original submission to the bid, highlighted that assessment was central to student learning. Assessment, either as formative or summative, should help build student understanding and knowledge of, and encourage them to reflect on, their performance. Partner learning, teaching and assessment strategies were quoted in the bid as their commitment to enhance assessment practice to support student learning in practice settings. By doing so they would support student learning and assessment across institutional and learning environments. Introducing the use of mobile technology widely supported in the partner IT and e-learning strategies, would further enhance the opportunities and potential improvements for student learning and assessments in the workplace. Included in the bid was an outline vision for the supporting mobile technologies:

"the CETL provides the opportunity to extend and share the existing excellence and expertise in e-learning and development of virtual platforms in the following areas:

- Electronic portfolios to support learning and assessment at a distance
- Using mobile technologies (including personal digital assistants) to support student learning and assessment in practice settings
- Extending technologies to support learning and assessment across institutional boundaries and learning environments

...The assessment tools will be developed so that staff and students can perform the assessment activity in the placement with instant recording of performance. We propose the piloting and use of PDAs for on-the-spot recording of work-based assessment episodes...This would reduce time for busy staff and enable students to receive feedback or results without delay".

A centrepiece to the work of ALPS has been a common competency mapping exercise involving all of the sixteen professional groups (appendix a) which produced three Common Competency Maps on the topics of communication, team work and ethical

practice. These define the skills and standards that students must reach to be assessed as competent in these areas (Holt *et al*, 2009). The Maps have been used to generate an assessment toolkit to increase the range of formative and summative assessments which can be used within and across the sixteen professions. So far five assessment tools have been developed and accepted for use in practice assessment scenarios:

- Gaining consent
- Providing information to a colleague
- Knowing when to consult or refer
- Demonstrating respect for a service user during an interaction, and
- Working interprofessionally

The ALPS assessment tools were simulated using students, service user representatives, tutors and practitioners prior to being piloted with students.

The approach to improve competence and confidence of students is to build on the Boud (2000) theory of sustainable assessment. Students are encouraged to take feedback from a variety of sources, reflect on that feedback and deduce further action to improve performance. This student activity is predominantly reflection in action (Schon, 1995) and enhances the richness and quality of the students' reflections thus developing life-long learning skills. The ALPS common assessment tools were developed using agreed best practice from the different professions involved in the ALPS programme. For example: social work students already gain feedback from service users at some time during their practice placement experience. This concept is being considered in the nursing profession (Speers, 2008). Each of the ALPS common assessment tools is intended to deliver formative feedback from a range of stakeholders. What essentially differentiates these assessment tools from traditional models that facilitate top-down feedback, is its multiple sources, which allow a flow of feedback to students from a number of potential participants in the assessment scenario. These include the practice assessor (from their own or a different profession), peers (from their own or a different profession), service users (and carers) and self. Feed forward is a key outcome of the process and there is provision in the tool for students to reflect on the feedback they have been given and to develop an action plan which can be signed off by a practice assessor.

Work-based learning in health and social care is built around a tripartite relationship between the learner, the workplace, and the university. The system developed needed to reflect this dynamic relationship and support the ALPS pedagogic processes. The ALPS mobile assessment cycle (Figure 1) was developed to meet these requirements.

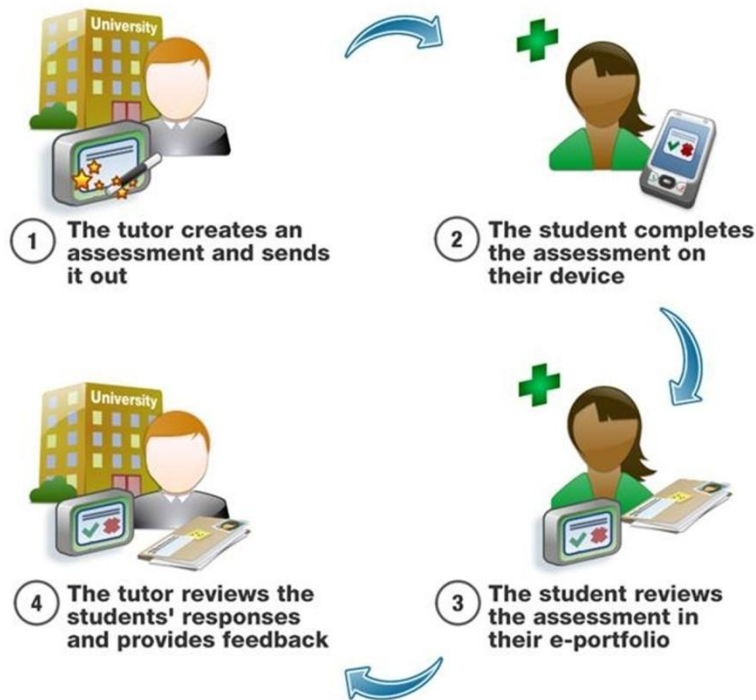


Figure 1. The ALPS mobile assessment cycle

Assessments (and learning objects) can be securely sent out to students' devices and any completed assessment by the students can be uploaded securely from the mobile device to a password protected web-based e-portfolio. This can be accessed by academic tutors (back at base) to monitor students' progress and provide an additional source of feedback. It offers students access to assessments and learning materials and provides them with the means to gather timely feedback from a range of sources. The ALPS Mobile Assessment Suite enables this feedback to be captured in both text and audio formats. This has meant that the devices have been found particularly useful by students with dyslexia (Dearnley *et al*, in press).

2.2 ALPS partners working together: creating a collaborative culture

With the closing date for CETL bids in October 2004 and the work getting underway in late 2005 with the recruitment of staff, the ALPS partners spent time establishing themselves as a collaboration with all the associated organisational issues. ALPS was working not just across five university partners, but across multiple placement-providing organisations such as acute and primary trusts, community and social services settings. Working with students from 16 health and social care courses across the five ALPS partners making 32 HEI course permutations in a variety of placements with associated practice staff, illustrates the complexity ALPS was managing. Alongside this, each organisation and profession had its own culture and "way of doing things", both formal and informal.

The initial bid document intentionally focussed on excellence in learning, teaching and assessment with pedagogic and organisational benefit flowing from the proposed CETL.

Mobile technology was a significant element in the capital bid but was viewed as a method to support the achievement of CETL outcomes rather than an end in itself.

The aims of ALPS were reflected in the governance structures proposed in the bid document which were designed to deliver, monitor, evaluate and disseminate the educational outcomes of the bid. The bid did not address the requirement – the who and the how – to deliver a large scale innovative mobile technology programme across the five quite different ALPS partners.

ALPS first task was to establish its own organisation and decision-making processes. A management structure (appendix b) as outlined in the original bid was implemented and consisted of a Joint Management Group who would be responsible for the major decisions affecting the programme and smaller operational groups which would manage the aspects of the programme, viz. research, IT and mobile learning, dissemination, monitoring and evaluation. In the early stages of ALPS all partners wanted to be represented on all Groups. This was probably borne out of a desire not just to be involved in developing strategy and operational plans but also out of a degree of concern that a particular institution's interests might not be fully represented when decisions were being taken.

Clearly, there existed differences across the ALPS partners, not just in obvious aspects such as numbers of students and courses involved in ALPS, but also how decisions were made. For example, York St John University (or York St John University College as it was at the start of ALPS) was able to take decisions at a senior level relatively quickly due to its comparatively small size. Additionally, one of the bid writers from York St John was Professor Patsy Cullen, Director of Learning and Teaching, and had remained involved with ALPS through membership of a number of ALPS Groups. In other ALPS partners, bid writers had moved on from the position they held in 2003 and 2004, and had since been appointed to positions, sometimes outside the faculty which was represented in the collaboration. Establishing a rapport with “new” collaborators who had not been part of the bidding process, and remembering that there had been an interregnum of up to a year in activity, became critical. At times, it was clear that there existed a gap in knowledge of ALPS' aims and the degree of partner “buy-in” as the collaboration started to work together. Additionally, institutions were being asked to work in co-operation where in the past they had often been working in competition.

There also existed very clear boundaries, both academic and practice-based, between the 16 health and social care professions. ALPS' challenge was in asking these professions to work interprofessionally and co-operatively developing the curricula, particularly assessment, which historically was and still is, validated by the statutory and regulatory bodies of each profession in conjunction with the institution hosting the course.

It is important to understand the size and complexity of the collaboration as this was the culture in which the ALPS partners were being asked to work together, share and make decisions about their own courses, students' education, and, ultimately strategies.

The development of the mobile technologies strand of the original ALPS bid was driven by three main factors:

- A shared interest in exploring the interface between pedagogy and technology

- The opportunity to share expertise and build capacity across the partner institutions
- The logistics of managing student learning in multiple workplace environments

Plus, given the competitive nature of the process, there was the desire to enhance the distinctiveness of the bid. None of these would have been possible had not all the institutions already developed learning, teaching and assessment strategies which encompassed e-learning and who all had well-developed IT infrastructures including VLEs. It was felt at the time, with four of the five partners using either BlackBoard or WebCT (subsequently taken over by BlackBoard). A further consideration was the inclusion in the bid development group of members whose expertise lay in learning and teaching, including e-learning, rather than in the health and social care subject specialisms.

Recommendations

- Be aware of gap between the bidding process and project start up in terms of senior staff buy-in and their influence on those who will work directly with the project
- Be aware that HEIs work in competition much of the time and being asked to work collaboratively can result in delay before trust is established & outputs available
- Size matters – the logistics of organising meetings, securing appointments across a collaboration can take an inordinate amount of time and energy
- University health and social care courses are validated by regulatory bodies (as are a number of others). Projects which seek to address changes in assessment practice and incorporate an element of interprofessionality can find their desire to effect change constricted by these external bodies. Though this is not always the case and HEIs may incorrectly make this assumption
- Mobile learning is identified as a fast growing area (Horizon report 2009) of education and assumptions cannot be made that it is a novelty and will disappear
- Development of such complex IT infrastructure is very time consuming and an appropriate level of testing must take place prior to live trials
- Mobile assessment provides us with a view of work-based learning not previously available and has implications for quality assurance processes.

3. Initial activity

3.1 Early decision-taking

It is important to contrast the planning process for ALPS with the 'normal' ways in which universities conduct their business. The HEFCE invitation to bid was published in January 2004, with a first stage submission deadline of April that year. Successful CETLs were announced in January 2005 with the expectation that their work would commence in April. The timescale was thus extremely tight, especially for a new collaborative partnership of five HEIs. As a result, the bid development group had to proceed with a significant degree of autonomy and to take decisions without the usual detailed research and options appraisal. The decision to develop a mobile technology strand, while having a sound theoretical basis, had to be taken without a complete analysis of its potential implications. However, the invitation to bid was explicit that CETLs should 'engage in innovation and experimentation' (HEFCE 2004/05) and will have 'extended the use of new technology and maybe even taken some calculated risks to break new ground in their areas of excellence' (HEFCE 2003/36). The inclusion of mobile technologies as a core element of ALPS was just such a calculated risk.

3.2 Information Technology Group

One challenge for ALPS was to build a partnership and organisation capable of delivering not only ambitious learning and assessment outcomes but also to develop a learning technology programme over five years with the capital funding spent within the first two years. There was a clear need to build capacity and capability within ALPS to deliver the mobile technology programme. To this end, a recommendation was made to the bid development group (the acting Joint Management Group) to establish an Information Technology (IT) Group to review current support, and establish requirements, for mobile technologies to support assessment of learning in the workplace.

All ALPS partners were asked to nominate a member of staff to join the Group. The first meeting of the Group was held in June 2005. However, by this stage, there was agreement on a number of issues that would decide the direction of future development, for example, that a single IT infrastructure would be developed to support mobile learning across the partnership. The first meeting of the Group established the terms of reference including: *develop and implement a vision for the use of mobile technologies to support work-based learning and assessment.*

The focus of the IT Group during 2005 was on establishing the scope and scale of the pilot projects and building knowledge of mobile technologies within the ALPS partner HEIs. At this stage, there was little contact with some of the providers who were to feature in the later stages of the project.

The IT Group also considered at an early stage whether to employ an external consultancy with experience of mobile technologies to act as a consultant for the Group. This was rejected as it was felt it did not build capacity within the partnership and represented poor value for money.

The second meeting of the Group started planning the future direction of the programme and made recommendations about how this should work. In particular, the Group recommended locally run pilot projects to raise awareness of ALPS, increase knowledge and capacity in local partner and improve local acceptance of innovation.

Recommendations

- Developing a collaborative bid is a time-consuming process requiring significant commitment by the partners. With no guarantee of success, partners will be unwilling to commit significant resource to planning but the short interval between the announcement of a successful bid and the requirement for it to start does not take account of the time required to:
 - set up collaborative working and implicitly establish the trust which ensures the collaboration functions effectively
 - ensure that high calibre staff are identified and recruited
 - make early, key decisions whilst capturing the expertise of those who will become involved in the project
- Understand the potential impact of your bid and engage with key decision makers at the earliest possible stage. As an example corporate IS/IT will want to understand the academic benefit, the wider strategic fit of your bid, the potential impact on IS/IT resources and the long-term support of your outputs.
- The opportunistic nature of the bidding process is at odds with institutional business planning and decision making processes. Use this gap to explore innovation whilst minimising risk to the institution's strategic direction, financial planning and reputation.

4. IT pilot projects

4.1 Pilot projects context and awarding criteria

The pilot projects were intended to explore the feasibility and identify the issues of using mobile technologies in the assessment of health and social care students in practice settings and inform the overall ALPS mobile technologies plan. The pilots also aimed to identify the current position of the partner institutions in their preparedness to adopt the mobile technologies, and the infrastructure available and required for support.

ALPS partners were invited to submit their pilot project plan and timetable, including details of when they would undertake required activities (eg. implementation, evaluation and dissemination, etc). All projects had to be completed by July 2006 at the latest, including submission of a pilot project report. Feedback from the pilot projects would be used to inform and develop the main IT project plan which would start in September 2006. The main plan would be developed whilst the partner pilot projects were underway and partners were encouraged to think about this whilst undertaking the pilots.

ALPS partners were asked to bid for pilot projects of up to £30,000. They were given a relatively free rein to determine the scope and type of project they would run, although they would need to address the ALPS strategic aims:

1. To develop and improve assessment and thereby learning in practice settings for all health and social care students
2. To develop and promote skills of assessors in practice-based assessment
3. To develop the role of service users and carers in practice assessment
4. To develop project management and partnership working
5. To research, evaluate, disseminate and change professional cultures
6. To respond to and influence policy changes nationally and internationally

Projects were reviewed to ensure they met the following criteria:

- Collection and recording of a student activity – the activity
- Activity in practice settings involving tutors and ideally practice-based assessors – where the activity takes place
- Health and social care students - must be those involved in the activity
- Mobile technologies - must be used to deliver the activity
- Value for money – ALPS must be accountable for financial expenditure

Each ALPS partner ran a pilot project following this planning process. A paper on the outcomes of all five pilot projects was published in 2009 (see Dearnley *et al*, 2009). What follows are two case studies from amongst the projects with associated learning points.

4.2 Mobile pilot case study 1: York St John University

York St John University (YSJ) considered several options when deciding how to pilot the use of mobile technology for assessment, before deciding on mo-blogging.

Context of the study

YSJ wanted to use the pilot as a test bed to see whether or not it was possible for their practice-based students to use mobile devices for reflection. The pedagogical benefits of academic reflection are firmly grounded and the YSJ tutors wanted to use mobile services to enable them to view student reflections online. By having these reflections available online, tutors could access them from anywhere with an internet connection

and provide supportive comments for students during their placements. This would provide students with a sense of connectedness, whilst away from campus in possibly isolated or remote areas.

The anticipated outcomes were as follows:

- Reduction of paperwork
- Electronic record of student achievement on placement
- Enhanced relationship between university based tutors and service based placement educators
- Targeted and informed support for placement educators from college
- Quicker response time to support students who were struggling to meet learning outcomes
- Reduction in the time spent by staff in visiting placement students and the cost reductions associated with this
- Possible transferable benefits to other courses within the University which involved placement periods, such as teacher training

The project plan

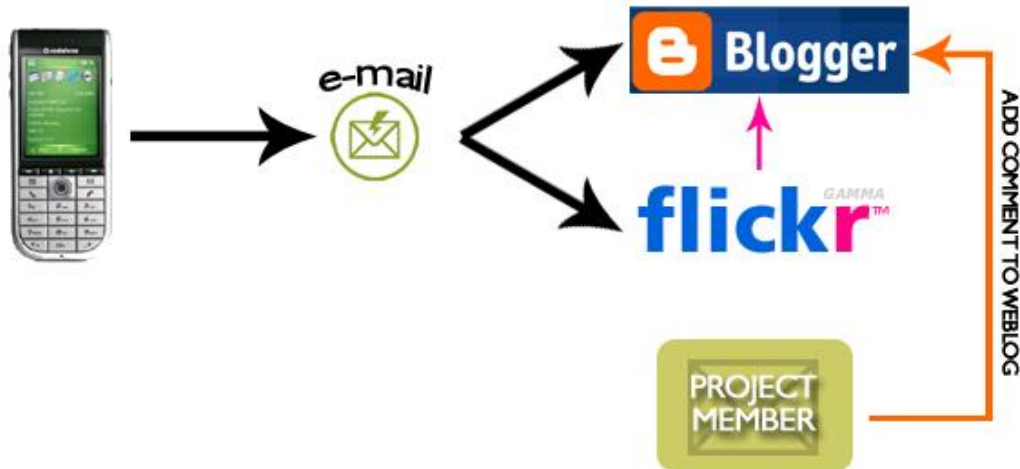
Initially the plan was to use SMS, or text messaging. This was because SMS is a feature native to many mobile devices and would involve a process with which both tutors and student users would already be familiar. However, this was quickly discounted because of the restrictions on characters within SMS messages which would immediately limit the quantity and quality of the reflections posted. Furthermore, tutors also wanted the facility for students to be able to add photographs to their reflections.

Considering hardware to achieve this, a handset was required which was capable of taking photographs, had an easy to use keyboard, and finally the capability to send email. Of course, for this solution to work there was also a need for an airtime contract to provide reliable and remote connectivity, therefore reducing the need to synchronise the device to a central source, i.e. a PC.

Methodology

Initial trials of the device with staff team members highlighted that the text input mechanism, in other words, the keypad on the device, was difficult to use and could impact negatively on contributions and student engagement. For this reason, an external, compact Bluetooth keyboard was identified and offered to students, allowing half of the trial group to post their reflections on a full QWERTY keyboard. This provided the opportunity to compare **keypad** input against **keyboard** input.

The proposed and accepted software solution was to use a mash-up of web2 services to achieve the functions required by the tutors, using a weblog (“Blogger™”) and an image hosting website (“Flickr™”). By adjusting settings in these accounts, it was possible to get them to work together such that when a photograph was posted to Flickr™, it also displayed in the Weblog. Email accounts were created via the airtime provider and each device had the email account configured and tested, ready for students to use as soon as they were given the devices. The image below highlights the services used and the data flow.



The following YouTube video also demonstrates the process:

http://www.youtube.com/watch?v=Ta_9GjG3NCs

Outcomes

Students were heavily supported before and during their placements. After lectures, tutors explained the pilot project to them and identified a cohort of user volunteers to trial the devices and process. Students were given face to face sessions to help them setup and use their devices. They were also given explicit guides which detailed how to setup and synchronise their Blogger™ and Flickr™ accounts. An external support website containing information, documentation and video guides was created. In addition, a discussion forum was created for technical issues and questions, within the university Virtual Learning Environment (VLE).

Evaluation

Students were given a pre- and post-project questionnaire to complete. Their discussion forum posts also served as valuable qualitative samples. Feedback from students was extremely mixed:

“There is so much I could say but I’ve tried to keep details to a minimum mainly 2 save myself going insane using this phone.”

“I don’t like typing on this phone, it is awkward to hold when typing with fingers, so I end up using my thumbs, which end up aching. It also takes ages and I only wanted to send one picture...”

The following were the “positives” which emerged as themes from the pilot and the evaluation:

- Students enjoyed keeping a reflective journal of their learning
- Students also enjoyed sharing their reflective journal with their peers
- Some excellent practice demonstrated

As would be expected, the evaluation also resulted in a large amount of feedback on the technology which was used:

- Phones not user-friendly for a text-based task
- Frequent problems with email from phone

ALPS Implementing a large scale mobile learning programme

- Some placement settings not able to use phones
- Minimum problems with Bluetooth keyboards
- Frequent technical problems using email accounts
- Time to compose and send emails would discourage future use
- Students preferred to blog via PC
- Mixed response from educators
- Not always allowed to use mobiles in hospitals

In addition, feedback was also collected which enabled a comparison of the two “input methods”, ie. the phone keypad and the Bluetooth keyboard:

Phone Keypad

- Content was generally 1-3 pages
- Abbreviated text
- Limited quality and quantity
- Easier to use on train
- Some technical problems

Bluetooth Keyboard

- Content was much more detailed, some up to 11 pages
- Fuller sentences were used
- Resulted in “more” reflection
- Minor technical problems
- Popular with students

4.3 Mobile pilot case study 2: the University of Bradford

(This work has been reported in more depth elsewhere, see Haigh et al, 2007 and Dearnley et al, 2008)

Introduction

The aim of this project was to explore the feasibility and identify the issues of using mobile technologies in the assessment of health and social care students in practice settings. We report here on a case study, which took place at the University of Bradford with students who were on placement in varied clinical settings. Twenty-nine student midwives and five members of lecturing staff took part in the study and were issued with PocketPCs on which to record assessment documentation including action plans and evidence of achieving performance criteria. Qualitative data was obtained from three focus groups with student midwives and individual interviews with their link lecturers. Quantitative data was gathered through short questionnaires to provide simple descriptive statistics.

Context of the study

The participants in this case study were first year students and lecturers from an undergraduate midwifery programme, which had an established system of practice assessment using a paper-based portfolio. This contained action plans and evidence of achieving agreed performance indicators, which the students had to present at assessment interviews with link lecturers and clinical mentors.

Windows Mobile® was chosen as the desired operating system for the mobile devices. We anticipated that its similarity to Microsoft® Windows® would make it desirable and

familiar and thereby lessen the impact of resistance to change from stakeholders. Additionally we believed that Windows Mobile® offered a strong development platform with set standards and that the associated pocket office applications and functionality would be useful. The devices themselves were then selected based on having a suitable screen size, keyboard and price. The type of device finally selected for use was the HP iPAQ 6500.

The project plan

The original intention was to create electronic forms using Microsoft® Word®, which students could work on using their personal computers or the mobile device. These forms would replicate, as far as possible, the paper based format with which students and staff were familiar.

The plan in practice

It soon became clear that Pocket Word® or Excel® did not have the functionality necessary to create user-friendly mobile versions of the portfolio. PocketPCForms™, a form creation package, was identified as a suitable alternative.

The cost and complexity of providing the full PocketPCForms™ programme to students was prohibitive, which meant that students could not complete their records on their own PCs as planned. Each student was given the client application of PocketPCForms™ which would only allow the viewing and filling out of forms on the PocketPC. All data therefore, had to be entered through the PocketPC and could be synchronised with a PC for storage purposes only.

Methodology

A case study approach was used to evaluate this project focusing on the circumstances, dynamics and complexity of the unit of study (Bowling, 2002). Within the case, multiple research methods were employed to fully investigate events. The findings are not generalisable but may provide some insight into the possible benefits and caveats of using mobile devices in similar circumstances.

Sample

24 student midwives participants and five link lecturer participants.

Methods of data collection and analysis

Questionnaires containing qualitative and quantitative questions were issued to students on completion of the study. These questionnaires were completed and returned by 24 students and specifically tested student reaction to the device itself. Similar questionnaires were given to five members of staff who had used the devices. Four staff questionnaires were returned.

Five members of the midwifery lecturing staff were interviewed individually and three focus groups with eight students in each group were conducted. All were recorded and transcribed verbatim. Qualitative data from all sources was amalgamated inductively and deductively through the processes of comparative and content analysis.

Outcomes

Positive Aspects – the student experience

Students liked the fact that the Pocket PC was a convenient and neat tool as opposed to the large paper portfolio, which became worn with use over the three year period of their

training. They preferred to be able to word process rather than write assessment documents in long hand and there was evidence that the Pocket PCs helped to instil some pride in their work. For example:

"I like that it's neat, that it's not your normal scruffy hand writing, I like that it's all contained there in that one little thing, and it is all neat and tidy and readable"

Students liked the fact that they could edit and extend their records on an on-going basis. To some extent, it also seemed to overcome barriers to writing. Some students made this point very clearly:

"I could write short notes, I could adapt it, I could add to it, I could change things, I could put my references in, I didn't have to cram it all in, it expanded andI could put it in my bag and take it along... it was just so much easier"

Students discussed the use of various functions such as games, GPS, calendar and the sharing of photos and Word documents. The student questionnaire revealed that the diary was popular but this was only used by 46% of the sample and was closely followed in popularity by the Games function (37.5%). Other functions of the PocketPC, such as the task facility, the alarm, music, photo storage and GPS were used minimally by students.

Positive aspects - the staff experience

There were many positive aspects reported by staff with an overall consensus that 'going mobile' was a good thing! Staff liked the calendar function, which synchronised with the electronic diary system used by the University. Two of the five had used satellite navigation system, one having purchased software for nationwide use. All felt that their use of the tool would increase with practice as they became more familiar with the functions.

Negative aspects - the student experience

Students were anxious about the reliability of the device and the possibility of losing assessment data. This was reinforced by the experience of some students actually losing data by allowing the batteries to run completely down. Students were reluctant to invest time setting up the synchronising connection, that could have prevented this, for a variety of reasons. Some students saved data to an SD memory card.

There were three options for entering data into the PocketPC, the small device keyboard, the onscreen keyboard or handwriting recognition. 50% of students preferred the device keyboard, 38% preferred the onscreen keyboard and the rest discussed using the various approaches although there was some frustration with the handwriting recognition when it failed to recognise words.

Another detrimental issue was that the project was seen by students as time limited and therefore they did not want to become too reliant or too attached to the tool; nor did they necessarily want to invest valuable time in learning how to use a device that might soon be taken from them. Linked to this was the problem that some students were afraid of losing or breaking the PocketPC and this led to minimal use in some cases. As one student said:

“I didn't take it with me cos I thought I don't really need it and I don't want to take it and then lose it.”

Similarly, the actual 'value added' by the electronic version was not clear and many students failed to fully engage in their use. This was possibly because for this stage of the study they were not actually required to use the PocketPC for accessing information. Some students did not perceive how a PocketPC might help them in practice.

Negative aspects - the staff experience

Only one member of staff held particularly negative views about using the PocketPC. She couldn't see the benefits of it and described herself as 'not a very technical person.' She did not use the University's electronic diary system and therefore could not benefit by synchronising with this. As with some of the students a key issue for this staff member was the time factor and how long it would take to learn the new skills held against limited perceived benefits. The only other problems identified by staff related to the devices crashing and batteries running flat. It was generally acknowledged that with familiarity, these problems could be overcome.

Using the PocketPC in clinical practice

Students reported that many mentors appeared reluctant to engage in the process. During assessment interviews, some refused to type into the PocketPC, preferring to use a paper copy or dictate to the student or link lecturer. Some mentors were happy to use the PocketPC, possibly because they were used to text messaging and they could transfer those skills here.

Some students reported that they had been told by practice mentors not to get the PocketPC out in front of clients, whilst others appeared to have regulated the use of the tool in practice themselves. They discussed how they had explained its use and purpose to clients when ever they used it. Others, anticipating disapproval (“they might think I'm texting my boyfriend”) simply did not use it in clinical areas; some not even taking it with them.

Link lecturers initially had varying levels of competence in using the PocketPC to facilitate interviews, based on their ability to access and utilise the appropriate software. This improved with practice.

The impact of the PocketPC on the assessment process

Students had varied responses to how using the PocketPC had impacted on the actual assessment process. There was some evidence that the tool allowed for greater student involvement in the process:

“with the PDA I just felt a lot more involved, I didn't have any problems with it, my link lecturer and my mentor were quite OK with it”

Lecturing staff supported this notion by describing how they had used the PocketPC. Students were generally encouraged to use the eForms as a prompt as they discussed their clinical outcomes with their link lecturer and mentor allowing a three way dialogue to prevail. This facilitated a student centred approach.

Conclusion

This case study, and subsequent learning, indicated that electronic portfolios supported by a mobile device have some benefits in terms of supporting the assessment process and encouraging students to record and reflect on their practice experience. The introduction of mobile technologies into undergraduate courses for health and social care students may enable the value and skill of seeking current information to become a routine that students will take into their professional practice. However, the introduction of mobile technologies into both the learning and clinical environments will require a significant shift in existing cultures and significant skill development. These must be underpinned by adequate training and support mechanisms and by resolute adherence to acknowledged pedagogical principles (Dearnley *et al*, 2008).

Recommendations

Section 4.1

- Consider launching activity with small projects to elicit interest and identify individuals who will be responsive to innovative activity
- Identify aims and objectives of pilot projects that meet local needs in addition to the overall organising group
- Involve a wide range of staff in the pilots at local level to secure engagement with the work of the overall programme
- Pilot projects, although small can be very support intensive. It's important to ensure they are adequately resourced.
- Be wary of unexpected costs for pilot projects, especially if you are buying air time that includes voice.

Section 4.2

- As with all changes there is inevitably resistance and people need to invest time to learn any new system, build in time to accommodate this.
- Think very carefully about what you need the technology to do and make sure the technology you purchase can meet these needs.

Section 4.3

- There will be a reluctance in both students and staff to engage and invest the time needed to become familiar with the technology if the benefits/added value are not clear or perceived to be insignificant
- Students are unlikely to engage in short term usage of mobile devices because of the time investment in learning how to use the device, the benefits must be very clear to get buy-in
- Students are bound by professional codes of conduct to maintain confidentiality and security of data and should be reminded of this if being encouraged to use mobile devices in practice settings
- Contracts of use signed by students at device allocation remind students of these issues and impose their responsibilities on them
- The introduction of mobile technologies into both the learning and clinical environments will require a significant shift in existing cultures and significant skill development, therefore initial training and communication with all parties is crucial.

5. Parallel projects: Developing the use of digital media

5.1 Introduction

One of the drivers for the introduction of mobile technology into learning and assessment is the ability to use digital media other than text. The use of multimedia including images, video and audio can enhance the experience of a learner. For example, a photograph of a particular medical condition can aid diagnosis and the provision of video clips can demonstrate techniques such as patient lifting or manipulation. The use of audio can help reflection by providing an easy way of recording a student/tutor review of a service user encounter.

Advances in technologies such as the speed of broadband and mobile networks, the capability of mobile devices where most now have cameras and the availability of high capacity electronic storage means mobile devices are able to handle digital media at higher speeds and lower cost. This makes digital media more accessible for use in developing teaching material and more practical for learners to use for reflection.

As part of the development of the IT strategy for ALPS a number of additional projects were undertaken which would inform the development of a mobile learning environment and the handling of multimedia learning and assessment materials. These parallel projects were:

- Use of digital repositories and Re-useable Learning Objects
- Blackboard report
- Wireless CiC report

5.2 Digital repositories and Reusable Learning Objects

Several initiatives, mainly driven by funding from JISC, are providing digital repository technologies for higher education. The digital repository provides high capacity storage of digital learning objects and provides tools to:

- Classify these objects
- Search and locate these objects
- Manage access to these objects

The technology of digital repositories is relatively new and typically there are two types of repository which are emerging. These are:

- Digital object repositories that typically handle raw digital objects of a single media type such as video, audio and images, ie. Flickr, YouTube
- Learning object repositories which handle digital objects which are focussed on delivering teaching and learning and may be made up of a combination of digital media objects, ie. NHS Library for Health

The university libraries are key organisations responsible for managing these types of projects and often these are linked to programmes to digitise library journals and other archive material. For example a large digital repository project at Massachusetts Institute of Technology is focussed on the storage and classification of PhD theses.

Within the ALPS partnership, several projects to develop digital repositories at each institution were already occurring independently from ALPS. Initially the University of Leeds were engaged in the MIDESS project but latterly have launched their LUDOS repository. Leeds Metropolitan University have introduced their learning repository project based on intraLibrary™ from Intrallect, and York St John University have introduced a repository called YSJDigiRep and developed by PTFS Europe. Nationally, Jorum is the Higher Education learning repository and this is based on the intraLibrary™ product.

With extra capital funding ALPS instigated parallel projects with the ALPS partnership designed to look at the development, use and handling of digital objects.

The goals of this work were:

- To establish the connection between the University of Leeds digital repository and a VLE, and demonstrate the seamless integration of the search capability from within the VLE
- To build and utilise digital media objects in the repository to build sample assessments within the VLE
- To build digital objects that can be used to create assessments for a mobile environment and evaluate their use
- To investigate any potential issues in the management of rights associated with digital objects
- To inform subsequent stages of the ALPS programme and provide a basis for associated research

These projects were allocated as follows:

Leeds	- Loading objects into a repository
Leeds Metropolitan/Leeds	- Connecting a VLE to a digital repository
York St John	- Creation of e-learning objects for healthcare professions

The outcomes of this work were:

- A series of mobile enabled, video learning objects for healthcare
- A strategy for linking the VLE to a digital repository and a method of remote access using Shibboleth authentication

5.2.i Reusable and Mobile Learning Objects

With funding through ALPS, York St John University was able to produce a series of Reusable Learning Objects (RLOs), with the aim of benefitting the other ALPS partners and the wider academic community.

The concept of RLOs has received much academic interest. A good starting point is the 2003 paper by Tom Boyle. Generally, it is agreed that good re-usability comes down to two design principles – cohesion and decoupling. A unit has strong cohesion if it does one thing and one thing only. This ensures that it can be re-used in many contexts without it containing surplus information relevant to some contexts but not others. Decoupling is necessary for a similar reason. According to Boyle (2003) the principle of decoupling states that:

- The unit should have minimal bindings to other units
- There should be no necessary navigational bindings to other units (eg. embedded hyperlinks) that are required as part of the learning experience
- Learning object content should not refer to the content in another source so as to cause necessary dependencies

In addition to these general re-usability guidelines, it is also important that the objects have relevant and useful meta-data or some kind of taxonomy that allows effective searching and retrieval of the objects. It is by adding additional data to a Re-usable Learning Object that enables classification and subsequent search and retrieval to be possible. In the case of ALPS this should correlate with the ALPS Common Competency Map(s), <http://www.alps-cetl.ac.uk/maps.html> so that learning objects matching given skills gaps can be retrieved.

As part of the ALPS programme it was important to consider how these learning objects were going to be packaged for use on the mobile devices. It was noted that at the time the emerging standards were SCORM/IMS. At the time of this project it was not known how the ALPS Assessment Suite would work and whether it would comply with these standards. Compendle the part of the ALPS Assessment Suite which packaged learning material does in fact use the SCORM standard. (For a useful introduction to the SCORM standard see <http://www.scormsoft.com/scorm>). The ALPS commercial partner ecommnet then created a solution to allow these learning packages to be delivered and used on a mobile device.

The following series of video sequences were chosen for the next stage of the project:

Using a ceiling track hoist	demonstrations showing how to lift from bed to chair
Using a mobile hoist	lifting from floor to chair
Parts of hoist equipment	description and discussion of the components of hoist equipment
Physiotherapy demonstrations	showing passive movements to the shoulder joint, passive protraction and retraction of the scapula in side-lying, trunk mobilisation from sitting, and facilitation of stepping and weight bearing in standing
Stroke case study (neurological)	discussion of the effects of stroke

The budget given allowed for a high quality video to be created using the services of the film and TV department. This highlights one of the most important reasons for re-usability; in most instances where this material needs to be taught, the resources or time required would not be available to create these kind of resources, but having done it once for a given piece of material, it does not need to be done again - it can be used many times in a variety of different contexts.

It was important to ensure that the primary media (mobile devices) was considered throughout the entire process of filming, editing etc. This resulted in uncluttered shots,

repeated use of close ups, clear lighting and so on. These measures generally do nothing to damage the effectiveness of the material on a desktop, but greatly enhance their suitability for small screens. The videos that work best contain both a voiceover, and captions summarising what is being said. This helps accessibility, and also means that they can be followed without any sound at all, which may be useful in certain mobile scenarios such as reviewing a technique in a public place.

Generally, the videos work well as examples of multimedia learning objects, but one area which proved slightly problematic was in designing their re-usability. How reusable can content like this actually be? One problem lies in the fact that the language used in different healthcare professions varies hugely. Regardless of this, an example of a demonstration relevant in a number of different areas is the technique of rolling a person onto their side. This is included in the series of videos on using a ceiling track hoist. Decisions as seemingly insignificant as the title screen of the video can actually have a large effect on its re-usability. Two ways of introducing the video are shown below.

The first picture shows a version with its full context – a title for the overall series of videos, a series number, and explicit mention of the context in which the person is being rolled onto their side (“Preparing to fit sling”). The second picture however has all of this removed, meaning it can be used without causing confusion in a context not even remotely connected to hoisting.

Ultimately, there are benefits to both approaches. It was decided that it would sometimes be worth sacrificing some re-usability for clarity when presenting the entire sequence of videos.



Figure 2. Examples of video introductions with/without reference to context

A more difficult problem to overcome is when context is made explicit as part of the actual content of the video. This happened in the filming of the neurological videos, due to some minor misunderstandings in the script writing. During these videos reference is often made to, for example, the module handbook, or a particular lecture. The sequence is also not broken into separate conceptual chunks with clearly defined learning objectives, so it does not afford splitting into short videos – there is strong rather than

loose coupling, and not enough cohesion. Despite this, the sequence still works well as a learning object, but a longer and less re-usable one.

File formats

Issues to consider when choosing the file formats include file size, quality on mobile screens and quality on larger screens. The following gives a brief assessment of the most popular formats:

AVI	normally uncompressed - best quality, but with huge file sizes
MPEG, MOV, WMV	not supported consistently or delivered in a consistent way
FLV	most widely supported in browsers and can be embedding in a well defined way. Flash® in general is common in Jorum
3GP	massive compression (350Mb -> 0.5Mb!). Generally used for mobile devices

The decision was made to create versions of the videos in both FLV and 3GP. For use on desktop PCs, it is best to follow the lead of contributors to Jorum, who tend to use Flash® for its multimedia and interactive possibilities. For mobile devices 3GP is required for its compression but Flash Lite® may be an option in the near future.

The final project website, containing all of the converted video materials can be found at the following URL: http://www.yorksj.ac.uk/learnteach/alps/learning_objects/

5.2.ii Repository loading and authentication

This project initially started by integrating with the MIDESS project at the University of Leeds Library. The MIDESS project explored the management of digitised content in an institutional and cross-institutional context through the development of a digital repository infrastructure. It was based on the Creator™ repository product from Endeavour. The company was bought by Ex Libris and Creator™ was superseded by DigiTool™. We were able however, to load the DigiTool™ repository at Leeds with some of the learning objects created by York St John and demonstrate how to use these objects from a digital repository.

Leeds Metropolitan University created an instance of WebCT which could be accessed by ALPS partners. It was hoped that this could be linked to the University of Leeds instance of Curator™ to demonstrate and investigate linking between VLEs and repositories. Sadly the change in software provider for Curator™ meant that a live version of the repository was never able to run before the end of the project. The integration module which had been provided by the Creator™ product was absent from its successor. Software to create this link was available but at a prohibitive cost.

VLEs are not typically designed to be accessed through other services and as repositories traditionally launch an object to be viewed rather than providing a data stream which can be fed into a VLE this created barriers to integration between the two. Work was done however, on the provision of a link through remote login using Shibboleth as an authentication tool. This work added value to the Leeds Metropolitan University plans to provide remote authentication with Shibboleth and demonstrated that an object could be deposited and retrieved from the repository.

MIDESS also provided useful work in the examination of the storage and distribution of sensitive material such as the learning objects found within health and social care. Enabling investigation into the issues around complex access criteria to material either at the host institution or when accessing material whilst out on placement. It was also useful in highlighting the benefits of extending integration of repositories to include those such as the NHS Library for Health Digital Repository to improve opportunities for sharing learning objects. For further reports on the work of MIDESS see <http://ludos.leeds.ac.uk/midess/about.html>.

5.3 Blackboard report

As part of the planning process for developing the ideas for mobile learning ALPS commissioned Blackboard Consulting to examine the current ways in which each profession assessed their students. And, once this was understood, to produce a suite of “use case” descriptions which could then be used to inform the development of the ALPS Assessment Suite.

Blackboard Consultation undertook this work using a series of consultations followed by the generation of a report which included all the “use cases” which ALPS needed to consider when developing mobile learning. These “use cases” described the transactions which needed to take place between student, tutor and practice professional: <http://www.alps-cetl.ac.uk/UTLS2006.html>

5.4 Wireless CiC report

The Wireless Technologies Centre of Industrial Collaboration (Wireless CiC) based at the Universities of Bradford and Leeds was involved in producing a report on the status of the mobile technology and its relevance to mobile learning. The Wireless CiC is a centre of excellence in wireless and satellite technologies and this report helped inform ALPS on the work of building an architecture for mobile learning. It focussed on the device and communications areas of the architecture.

5.5 Conclusions

The conclusions from the pilot and the parallel projects were used to inform the next phase of the ALPS programme which was the procurement of devices, networks and solutions for the delivery of ALPS assessment and learning.

By undertaking the pilot and parallel project ALPS learnt that:

- Mobile devices could be used to facilitate learning and assessment

- The ergonomics of the device were very important to the acceptability of the use of mobile devices. For example a keyboard was seen to be important but needed to be a full QWERTY type and not the “phone keypad”
- Training and support were key to a successful introduction of the devices to staff and students
- The development of Reusable Learning Objects, such as the skills videos from York St John, were a useful and valuable tool in providing learning material to students
- The development of digital repositories to house the mobile learning objects was a feasible proposition both for raw digital content and packaged as learning objects
- That the developments in 3G mobile networks made the use of digital media a feasible proposition for learning and assessment
- Access to university systems (for example the VLE) was a necessary requirement to support students whilst they were in practice

Given the above findings, the need to define an architecture which brought these findings and outcomes together was highlighted. The process of defining and building architecture is discussed in Chapter 6.

Recommendations

- Provide profession specific learning resources alongside generic material so that context is clear to students
- Institutional adoption of any new technology is hindered if new systems do not integrate well with existing university systems. Always involve senior IT staff in procurement to ensure maximum opportunity for integration
- For maximum opportunity to re-use material make sure
 - it is divided into discreet sections which can then be split up
 - it uses a high quality format to enable it to be saved in differing formats without losing too much quality
 - it is fit for the environment it will be used in i.e. subtitles if the clip may be viewed somewhere where sound is not acceptable
- Save time and money by looking at existing digital repositories such as Intute to see if suitable learning material already exists rather than creating your own

6. Architecture

6.1 Introduction

Following the completion of the pilot projects and the feedback from the parallel projects a decision was made to develop a common architecture which would support mobile learning for all ALPS partners. The basis of this decision was that it would be more productive to focus on a single mobile device platform and develop mobile learning assessments and objects which could be distributed across the ALPS partnership. If each partner adopted their own device platform then this would lead to five different and divergent development paths which would add to costs and complexity.

When undertaking a large implementation ALPS found it was very important to have an overall view of the architecture within which the implementation of mobile learning and assessment was to take place. It proved to be an important tool in setting the direction of the developments and also in gaining acceptance from the partners and the ALPS management groups.

6.2 Developing the architecture

Each university runs similar types of system to support learning and teaching. These do not, however, all use the same technology and each partner was at a different stage of their systems development strategy. Examples are:

- The Virtual Learning Environment (VLE) eg. Blackboard or WebCT
- The student and staff portals
- The student administration systems eg. Banner™ or SITS™
- Digital repository systems eg. DigiTool™ or intraLibrary™

These are the business systems of learning and teaching and are provided both for student learning and teaching support and for student administrative support.

In designing our architecture, the following key functions were considered:

- The provision of the devices themselves
- The support of the devices from a device management and security perspective
- The access to digital content to enable tutors to build assessment for students
- The access to learning and teaching systems such as the VLE
- The ways in which mobile learners can access content, be given assessments and be able to return completed assessments to their tutors

A benefit of producing an architecture was also to inform and gain acceptance of the ideas from the various ALPS stakeholders and partners. The architecture that was developed by ALPS can be represented in the following diagram:

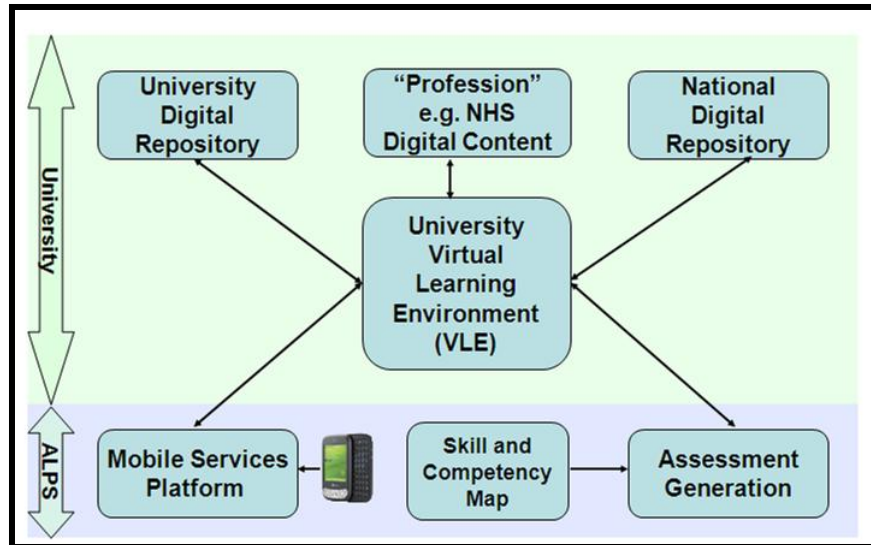


Figure 3. ALPS mobile learning architecture

The key points are:

- The main focus was on the VLE being the centre of resources for learning and hence should be the key part of the mobile learning environment
- Digital resources would be held in repositories at local (HEI), professional (NHS) and national (Jorum) levels
- A mobile services platform would be needed to provide device management, content distribution and submission, and security
- Simple to use tools would be needed for the tutor to develop assessments for the students to use based on the ALPS Common Competency Maps for interprofessional assessment

The partner universities were providing the content repositories and the VLE systems. ALPS would need to provide the devices, a mobile services platform and assessment generation tools.

This was the architecture that ALPS presented to potential suppliers and subsequently tendered for through the Office of Government Commerce (OGC), an independent office of HM Treasury. Our experience, following the implementation of the ALPS Assessment Suite (the software for assessment generation and distribution with added e-portfolio), has changed our ideas of the architecture especially with respect to the importance of the VLE in the mobile learning environment. Our experience has shown that the e-portfolio products have proved to be more suited to the mobile learning environment because they provide the technology to upload resources such as completed assessments, reflections and other evidence from the mobile device to a student portfolio area within a universities learning and teaching systems domain.

6.3 Infrastructure

When providing a mobile learning infrastructure it is important for students to get access to networks whenever possible. There are two types of technology which can support this:

- Wireless networks (WiFi, WiMax)
- Mobile networks (2G, 3G, 3G HSDPA)

Students working within any of the ALPS partner university campus are provided with access to a wireless network. This is a much improved service in terms of availability of connection and also bandwidth and has been driven by the need to support a large number of student laptops across the campus. Outside the campus access can be obtained through various hotspots (free or paid) depending on location. These are mainly town and city based; many coffee chains offer this service for example, as do many telephony providers. Within the NHS itself, however, wireless networks are available in some areas but where provided are restricted to NHS employees.

The NHS has traditionally been averse to anyone using a mobile device whilst on NHS premises, for various understandable reasons, including but not limited to patient (service user) comfort, confidentiality and disruption to machinery caused by telephony equipment. This has resulted in many NHS premises enforcing a blanket “no mobile phone” policy. However, new Department of Health guidelines published in January 2009 entitled “Using mobile phones in NHS hospitals” have allowed for a more flexible approach to mobile device use, and allowed individual trusts to make their own decisions about when and where such devices can be used.

As the primary use of the device was to support teaching and assessment in the practice setting ALPS decided to opt for the use of mobile data networks as they offered wider access off campus.

6.4 Compatibility with HEI learning and teaching systems

When looking at the architecture diagram (figure 3), it should be remembered that each university has their own implementation of VLE and digital repository services. At the time of designing the architecture there were several procurement processes in action to upgrade, replace or provide completely new facilities. One of these was the University of Leeds procurement to replace its Bodington VLE. The University of Leeds subsequently chose Blackboard Academic Suite (now Blackboard Learn). Also commercial events affected the way systems were implemented. The merger of WebCT with Blackboard affected four out of the five partners as two already had Blackboard and two had WebCT. As a result of the merger Blackboard were planning a converged product and were curtailing the development of WebCT. In the long term this should be valuable as all universities would run the same technology base for their VLEs, although individual implementations can vary. The lack of any real support for mobile learning by Blackboard was a major shortcoming which is only now being addressed with Blackboard Learn 9.1 and Blackboard Mobile Central.

In terms of the repository, the product used by University of Leeds was part of another takeover of Endeavor by Ex Libris® in the migration of the Leeds' repository to DigiTool. Sometimes the adoption of commercial products worked in ALPS' favour. However, with

the Intrallect® e-learning repository (also chosen by Leeds Metropolitan University) powering the UK national e-learning repository, Jorum, Intrallect® was also chosen to power a pilot for an e-learning repository in the NHS (England) and in a separate project in Scotland. The NHS pilot was led by MyKnowledgeMap our chosen provider for ALPS mobile learning and framework design.

In reality, the capabilities for mobile access in the Blackboard products were minimal and it became obvious that an e-portfolio approach was more suited to a mobile learning assessment scenario where student evidence and reflection was being created. One of the key points is that an e-portfolio allows the student control over the management and publication of their content with the portfolio. This is not the case for a VLE where the tutor has a full view of everything a student deposits in the course area.

E-portfolios are an emerging technology for the HEI learning and teaching environments and became a significant tool in the development of the ALPS Assessment Suite.

Recommendations

- It is important to produce a model of the architecture of the data and technology you wish to mobilise, what main systems are involved and how these systems interact with each other. Staff time must be allocated to create these plans.

Section 6.1

- Consider resources including staff time in order to focus project activity of achievable outcomes (i.e. too big and too ambitious will achieve very little)
- Provide an outline of the vision and the architecture (visually as well as textual) to set the direction for developments and also to help gain acceptance of the mobile programme

Section 6.2

- It is important to understand and recognize the external systems which the mobile learning solution will need to interact.
- It is also important to recognize that these systems will be different in different institutions and organisations. The architecture should allow for and plan for this difference.

Section 6.3

- Different Network technologies (e.g. 3G or Wi-Fi) have very different performance characteristics and it is important to understand the coverage and technology of the mobile network to secure the right one for your needs.

Section 6.4

- In the same way as discussed in 6.2, organisations have differing systems based on different products. It should also be clearly recognised that these systems will change, both for commercial reasons (supplier company mergers for example) and organisational reasons

7 Procurement

7.1 Strategic decisions

Once ALPS had agreed an architecture for the deployment of mobile technology, the main task was to agree a method of procuring a solution, the process by which the chosen method would be executed and the decision-making process involved in agreeing a solution. ALPS was working under some constraints which were:

- The timescale by which the capital funding (from HEFCE) needed to be recognised as spent. If not spent by end of March 2007 then the funding would be lost
- The size of the budget available (circa £750K) which needed institutional level approvals for expenditure
- Working across five different institutions who would benefit from the solution which raised issues of ownership

The strategic decisions that were made in order to procure the solution by the agreed timescale were:

- University of Leeds would lead the procurement process with the approval of all partners
- The technical solution would be purchased in parallel with the development of the pedagogic solution
- ALPS did not have time to undertake a full European level procurement and it was agreed with that the Office of Government Commerce (OGC) procurement process was acceptable and legitimate
- That ALPS would look to procure a “solution” and not a set of component parts
- That ALPS would invite mobile network operators to make proposals under the appropriate OGC Framework and propose partners for their bid/solution

7.2 Tender and bid

Prior to the tender, ALPS researched possible solutions and partners via exploring:

- Industry knowledge and contacts
- Research into literature and industry trade shows
- University connections/networks

As a result possible suppliers were categorised in to:

- Mobile network operators
- Device manufactures
- Solution providers
- Systems integrators

And, from the work on the architecture for ALPS, the preferred solution was comprised of:

- Mobile network
- Mobile devices
- Mobile services platform (to manage security, devices and material)

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- An assessment platform (to create and generate assessments and other learning material)
- A way of integrating these as an overall solution

The first stage in our process was to send out the architecture documents to a number of suppliers in all categories and invite them to a meeting where the ALPS team described their purchasing requirements, the timescales and constraints and the scope of the funding available. Prospective suppliers were invited to bring other partner companies who they thought might be able to contribute to the solution. OGC, as the purchasing framework, and University of Leeds Purchasing Office also contributed to the meeting. At this stage there were no commitments to potential suppliers except to issue an invitation to come back to ALPS and suggest possible consortia and solutions. The meeting gave a number of companies the opportunity to meet and discuss the possibility of forming consortia/partnerships. At this meeting ALPS made a commitment to produce a tender specification document.

Following the tender launch meeting further meetings were held between the ALPS Core Team and the potential suppliers to discuss how their products worked and what part of the solution they might fit. As a result the four mobile operators that were approved under the OGC Framework for mobile solutions were forming an outline. In parallel ALPS completed the tender specification and obtained approval for this through the ALPS Joint Management Group.

ALPS issued a tender document through the OGC to four mobile operators in late 2006. These were:

- O2
- Orange
- T-Mobile
- Vodafone

Responses were requested by January 2007. As a result, consortia were established by all four companies although Orange withdrew from bidding during the process. Throughout the ALPS Core Team continued to have meetings with all potential suppliers as it was felt that this was not a typical procurement process. At this stage, the ALPS solution could only be specified at a strategic level but subsequently ALPS was able to issue a detailed functional specification. ALPS looked for partners who could help develop an innovative solution and could work closely with ALPS over a number of years to build and deploy that solution.

Three operators submitted proposals. These were:

Mobile operator	Partner 1 (Solution)	Partner 2 (Integrator)
O2	Giunti Labs	Wireless CiC (Universities of Leeds and Bradford)
T-Mobile	MyKnowledgeMap	e-commnet (NOKIA)
Vodafone	Tribal CTAD	IBM Global Services

The evaluation of these proposals was done through a team established by the ALPS IT Group. The key process in the evaluation was the invitation to all three consortia to present to an audience from all the five ALPS partners. This was a critical meeting and

as a result ALPS had hoped to produce a shortlist. In reality, a clear leader emerged through the commitment and technologies offered and it was decided to negotiate with one partner whilst holding the others in reserve.

The final decision was taken at an ALPS Tools Working Group meeting and ratified by an ALPS Joint Management Group. This latter Group agreed that contract negotiations should begin with T-Mobile.

7.3 VAT exemption

The issue of VAT exemption was a key discussion which was a critical element in the decision making process. Goods bought for the purpose of medicine and health education are exempt from VAT, (17.5% at the time), and as ALPS had a fixed budget the decision on whether the ALPS purchases were exempt was crucial.

ALPS and the University of Leeds Purchasing Office were confident that exemption could be claimed, as this was existing practice. ALPS however would have to discuss the issue with HM Revenue and Customs to ensure this was acceptable in the circumstances and, at the same time, ensure that Chief Finance Officers of the supplying companies did not become liable for this VAT.

With the help of the Purchasing Office ALPS achieved this. This process was complex because:

- Interpretation of VAT rules is undertaken by local offices and officers
- Each supplying company deals with a different local office
- This ruling is healthcare and medical related which meant that not all sub-departments within The University of Leeds Finance Office had experience of dealing with this issue
- The local tax official dealing with this solution tended to be familiar with telecommunications rules and not healthcare and medical education rules

ALPS did eventually get a favourable and positive decision that this solution was exempt from VAT.

7.4 University management of the funding

At the CETL bidding stage the University of Leeds, as lead partner, received institutional sign off for the proposal. This meant that the University of Leeds took responsibility for receipt and disbursement of the income for HEFCE. The University's financial regulations also required that any possible recurrent costs as a result of undertaking the project were identified in advance and were then to be approved, or not, by a committee of University senior managers. The ALPS bid was duly approved on this basis. Further approval was needed as the procurement exercise got underway and this required excellent communication to ensure that the approval obtained tied in with HEFCE capital spend deadlines.

Innovative learning and teaching programmes are more likely to involve uncertainty, evolving work programmes, use of technology, unexpected innovative methods and unintended consequences, and less likely to involve programmes of work which are clearly agreed at the outset. Indeed, during the procurement process ALPS gained an additional £500k of funding from HEFCE. As a result of this the University needed to demonstrate, quickly, to HEFCE that we had a valid business case for this additional award. We also needed to adjust the invitation to tender to accommodate this increase in funding. Future funding calls may favour use of innovative teaching methods rather than investment in building and for this organisations will understand the aims of such innovation and have suitable business processes to accommodate them.

The recommendations at the end of this report highlight the specific instances where communication and funding and procurement procedures could be improved in the light of ALPS' experience.

Recommendations

- It is important to remember that buying a mobile learning solution (or any mobile solution) is a complex project as there will be a mix of hardware (mobile device), telecommunications (the mobile network) and software (the application). You will be buying a Mobile Learning Solution and not a set of discrete products and it is important to recognize that many organisations do not have a great deal of experience in purchasing complex solutions. Additionally, the suppliers may not be very experienced in selling this style of solution as they do not normally take overall responsibility for a project.
- Recognise funders' expenditure deadlines which do not allow enough time for the establishment of the project, procurement exercise, including funds not being available over the lifetime of the project, and the developmental aspects of the project to be taken into account, e.g.:
 - up to 6 - 12 months for core team to be established (in ALPS case, at a time when 73 other CETLs were recruiting)
 - capital funds to be used to purchase as goods are received and not paid in advance. Where suppliers need to deliver over an extended period consider the use of escrow accounts to provide surety in terms of quality of services and goods
 - if funds cannot be paid over the lifetime of the project look at ways in which contract deliverables can be separated out so that the different goods and services can be split by specification and phase. Development of these services must be written in to ensure the specification can remain flexible
- Availability of capital funds over the programme lifetime would ensure that upgrades for mobile technology could be obtained within contracts. ALPS' funding requirements did not allow for this and resulted in less favourable contracts being secured by projects
- Ensure that running costs of capital investment, particularly where this involves use of mobile technology, is resourced through an appropriate funding stream, in order that the activity can be sustained and embedded
- Ensure that universities maximise the opportunities which innovative learning and teaching projects such as ALPS offer, e.g. in advancing a university's agenda in e-and blended learning where the project can provide evidence

- Ensure that all university staff share an understanding, which is reflected in procedures, of the developmental aspects of such work, e.g. products are unlikely to be bought “off-the-shelf”, and service specifications will be developed and delivered over the lifetime of the contract/programme
- Establish early contact between project staff and university faculty and central services staff to establish relationships, identify needs and requirements of all parties, etc
- Ensure that central staff and project staff communicate during critical periods, i.e. towards deadlines
- Continue to meet and liaise as far as possible over the lifetime of the project, this will ensure sustainability of both formal and informal procedures adopted
- Ensure that communication between the units remains a priority, that discussions involve all those engaged in both the University and the project
- Consider having a key senior manager (e.g. university’s Director of Finance) on an internal project management group in the formative stages of the programme
- Promote and use professional procurement services, such as the OGC buying solutions, to reduce project resource spent on the procurement process
- Work with University purchasing colleagues to obtain the optimum category for VAT status
- As a result of increasing the risks to the lead partner, i.e. paying in advance for goods and services, the university has taken on a major part of the risk. Whilst this may be the responsibility of the lead partner, thought needs to be given as to how this risk is quantified and shared between partners

Section 7.1

- We recommend that you identify the source of your funding and any constraints surrounding it as soon as possible. In government funded projects, factors such as capital v recurrent funding and when the funds have to be spent are vital considerations.
- We also recommend that you identify the sign-off levels in your organisations and make them aware of the project.

Section 7.2

- Contact and use existing networks to identify potential suppliers and categorise them (as discussed in this section). It is very important to understand the organization or company you are going to deal with.
- The initial actions should be to identify suppliers through a process of “expressions of interest”.
- Whilst you are receiving expressions of interest you will need to understand the procurement process. Do you need to undertake an EU level tender (public sector) or are their UK public sector organization (e.g. OGC) that can provide you with a framework?
- Commercial organisations will have their own processes. Suppliers who bid for public sector business should already have framework contracts that can be used to good effect. This also means that they will have a track record and can give references.

Section 7.3

- This is a very specific recommendation for Medical and Healthcare teaching, public sector or Research in general. Investigate the rules for VAT exemption and be very tenacious if you think you have a case for exemption. VAT exemption is decided on locally by local customs and excise offices and most suppliers will be hesitant in case they pick up a liability. It is worth following up though.

Section 7.4

- We recommend that you get a good understanding of your partners' goals and their priorities. Negotiate with them and agree who is leading the procurement. If your funding is public sector it may have some deadlines in terms of when the capital funding needs to be spent. This may be an issue with technology projects such as mobile learning as you may need to make the purchase earlier in the project than you would like. You also need to consider how a capital funding model supports a project over, say, a 2 year period. An example of how this can be achieved would be to include extended warranty with hardware purchases so they can be capitalized.
- If at all possible, then build upgrades from suppliers in to the contract so that changes in technology can be made available when they appear. This reduces the risk of the inevitable technology changes which will occur over a 2 to 3 year project.

8. Device allocation

With 900 devices to be allocated between students and staff of the five ALPS partners it was anticipated that there would be more demand for the devices than there would be devices. When the ALPS programme began in 2004, the student numbers across the sixteen health and social care courses delivered by all five institutions was just over 9,000 and as such it was always known that 900 devices represented just under a tenth of the potential ALPS population. Some discussion was therefore inevitable over what sort of 'allocation model' should be adopted for the devices. One option was for the allocation of the devices to reflect the 'partner share' of student numbers – with the institutions with the largest numbers of students receiving proportionately the largest numbers of devices. However this did not take in to account the 'spread' of courses – where some of the 'smaller' institutions offered a course unique to that institution. Nor did this guarantee they would receive enough devices for one cohort of that course. This latter point was an important consideration as, for each cohort, the student experience offered needed to be equitable, i.e. devices needed to be offered to ALL students on a cohort or none, particularly when the impact of the devices on learning and assessment was unknown. Many previous projects have selected students on a voluntary basis (see examples in Kukulska-Hulme and Traxler, 2005, Ally, 2009). To see a true reflection of what students felt about m-learning it was important that whole cohorts were used so that any bias from technically savvy students was removed.

Through discussion and negotiation it became apparent that the preferred allocation model would therefore take into account the spread of courses at the different partner sites – with the preference being for the model which would offer devices to the largest range of courses. Another key aspect that was discussed was that the devices needed to be allocated to courses where there was staff engagement/buy-in. As allocation discussions continued, it became apparent that some course leads did not want devices to be allocated to their students for a variety of different reasons. These included a lack of staff engagement with the devices (or more accurately the 'idea' of the devices) and concern over the amount of staff or student time that having the devices would require. As a result the obvious decision was to make sure that devices were not given to courses where they were not wanted; and preferably that they were given to courses where they were actively sought after. In retrospect, this was a perceptive observation as experience demonstrated that the staff involved were often at stretching point finding it hard to cope with the amount of extra work involved in understanding the software, communicating with all their users, setting up devices, providing training, monitoring their progress and providing feedback. The need to be able to manage the number of devices was not to be underestimated.

A system of 'bidding' for the devices was subsequently set up, which was managed through the Tools Working Group. Each partner was asked to return a pro-forma detailing the following information: number of devices requested, course the devices was being requested for, year of study of the students who would be using the devices and placement details (length and type). Once all 'bids' had been returned devices were allocated with reference to getting the best spread of courses and placement types as possible. The proposed distribution list was then taken to the next meeting of the ALPS Joint Management Group for approval.

Minor adjustments were made to the device allocation, mainly in relation to the staff allocation, with the model being approved by the Group.

Recommendations

- Tutors, as well as students, need to see alignment with course outcomes and benefit from using the mobile technology. If tutors cannot see reason to engage then it is unlikely that the students will
- A balance needs to be achieved between identifying staff champions (enthusiastic) to lead and promote the use of technology and keeping the less enthusiastic staff involved to ensure future embedding
- Only provide devices to enthusiastic cohorts and tutors where there is a clear need and benefit. Do not underestimate the commitment required to change methods of practice and overcome any technical issues which may and often do occur!

9. Rollout of devices and software

9.1 Distribution of devices

Once the order had been placed for the mobile devices, there was then a certain amount of pressure for ALPS to take delivery of the devices. This related to the fact that T-Mobile could not hold the devices once they had been paid for, and needed to have provided the devices to ALPS (the customer) by the end of the financial year in which they were paid for. However this in turn created further dilemmas for ALPS; as soon as delivery of the devices had been made, the 'clock was ticking' on the airtime contracts. ALPS was aware that the software for the devices and the assessment tools were not ready, and did not want to take delivery of the devices and start the airtime contracts until this was the case (otherwise there was no benefit to the ALPS programme of having the devices). In the end a staggered delivery process was agreed, with the first 200 devices being delivered to the ALPS Core Team by the latest date possible, and the rest being sent directly to the ALPS partners who would be using them when their cohorts were ready to go out on placement.

As a result, those within ALPS who had the first cohorts of students due to go out on placement received their devices from the Core Team's central location. It was time consuming to record all the device and SIM card details as initially the ALPS Core Team were responsible for devices. This data was later recorded and kept by each ALPS partner institution IT support, but that recording itself proved difficult when devices were swapped between cohorts or recalled due to faults, ensuring that the information was correct and up-to-date. The delivery information was such that this could not be used to keep a record of device details as the SIM cards and devices initially came in separate boxes. However, it was important that ALPS could trace which devices were paired with which SIM card, so one member of the ALPS Core Team had to unpack each device and SIM card and manually pair them, and then record these details. The record keeping (including which SIM cards were in which devices and to whom had they been allocated) became particularly important to partners when trying to trace and recall devices. A device management system that recorded this information and to which the ALPS staff (tutors and course administrators) had access would have been very useful.

The Intellisync software which was eventually put on the devices did offer some of this functionality, but not in a way that was very usable for staff. To access the information required staff to be given administrative log-ins to the Intellisync server, and the reports accessible within the server were then limited. For example although all this information discussed above was held in the Intellisync system it could not be easily accessed to show a report for a cohort. Following the first rollout ALPS recognised the need for providing better reports to the tutors and administrators (reports that would be based on the live rollout, detailing who has which devices, what software is installed on the devices and which SIM card is being used in that device) and that these reports could be generated automatically from the information held by the device management and synchronisation software (Intellisync). As this report is being written, the final development and testing of an improved reporting system is being completed by our commercial partners. This new functionality within the system will reduce the staff time involved in keeping the detailed records described above and will ensure that the records kept are accurate and up-to-date.

There were also issues in regards to how the devices were stored before being distributed. The weight and number of boxes meant a lot of hard labour was involved

moving them to storage areas. Finding an area large and secure enough to keep 200 devices in was also a challenge. When ALPS partners did eventually want to take receipt of the devices, representatives from the institutions then collected the devices in their own cars, which was not ideal in terms of the safety and insurance of the devices.

As mentioned previously, the remaining 700 devices were sent directly to each ALPS partner. A guide was created and given to each institution to alert them to the issues they would need to consider before delivery including issues of delivery times, safe storage, partners' responsibility for insurance and responsible usage of devices, availability of support, software requirements, training and distribution of devices to students.

9.2 Software

9.2.i Initial software rollout approach

The initial idea was to run training sessions where the mobile devices would be given to the students with guidance on basic navigation and use. The students would then be given time to get used to the device before acquiring the software necessary to run the ALPS Mobile Assessment Client. In practice some students had the devices for a year before receiving the software which led to disengagement by those who had no desire to use the basic functions of the devices, ie. access to email and the internet.

There were four key pieces of software that needed to be installed on the mobile devices in order for the ALPS Mobile Assessment Client to work correctly and securely. These were:

- Intellisync (the device management and synchronisation software)
- SafeGuard PDA (the device security software)
- .NET framework (underpinning software used by the ALPS Mobile Assessment Client)
- ALPS Mobile Assessment Client (the software that manages and displays the ALPS assessment tools on the mobile devices)

ALPS started off optimistically believing that our students were “digital natives”, (Prensky, 2001), who would find the installation and set-up of this software easy and would require minimal support. As described below this did not turn out to be the case and a number of different approaches were used before it was decided (for the second rollout) that the best procedure was to recall devices, install and set-up the software and hand them over to students (almost) ready to go.

Initially it had been hoped that by providing comprehensive guidelines and technical support through the ALPS Helpdesk that the students would be able to download and install the initial piece of software, Intellisync, over the air. This piece of software would enable the Helpdesk to then automatically send the rest of the software to the devices with minimal intervention by the student. In practice it could be difficult to get an online connection and the slow speed of the internet on these devices combined with the students' lack of experience with this aspect of mobile usage (software installation and changing settings) meant that downloading and installing Intellisync was time consuming, difficult and ultimately very frustrating.

It should be noted that the software installation and set-up that we are discussing here is not the fairly passive “plug and play” installation model that students may have been used to on their computers and nor was it the simple download model that some may later have come across through use of iPhones or iPods and the Apple Apps Store. The installation required students to download software over the air and wait for several points where install questions were asked and user intervention was required. Over the air this installation could take 10-20 minutes in some cases. Furthermore once the installation was complete then students had to follow instructions to change the settings on the system (identifying the server that Intellisync should use, entering username and password and changing the connection settings).

It became clear some way into the rollout that this procedure had too many places where user error, problems in understanding and following the instructions or simple frustration at the time involved, could result in the installation not being completed successfully. If any of the steps outlined above were missed when installing and setting up Intellisync then it would not work correctly and therefore could not be used to push out other software. Even when students had managed to install Intellisync correctly they could still have problems downloading and installing the other software. This is because the approach relied on students keeping their devices charged up and turned on for long enough for the device to sync (which it was set up to do at regular intervals) and the software to download and install. In practice many students did not do this and so the synchronisations either did not happen or were cut off part way through as the student turned off the device, the power ran down or the connection was lost.

9.2.ii Changes to the rollout approach – Helpdesk IT sessions

After reviewing the situation it was decided to set up a series of ALPS helpdesk sessions (prior to the training) with each cohort of students. The aim of these sessions was to help students through the software installation procedure. Ideally we would have wanted to run these sessions in a classroom with a member of staff demonstrating (onscreen) the process for installing the software and with students able to follow this step by step and therefore complete the installation and successfully complete their first synchronisation. However, earlier experiences had shown that this procedure could not be guaranteed to work for large groups. This was due to contention for connection to the local mobile cell. In some locations the overload on the local cell would result in connections being lost and synchronisations failing to complete. So whilst the procedure did work in some locations (ALPS ran a successful device handover including sync'ing with a group of 20 dental hygiene and therapy students in Leeds) it was unreliable in other locations (notably Bradford where there were problems with groups as small as five) and this meant that it could not be used across the board.

ALPS partners therefore tried out a range of different approaches to running these helpdesk software installation sessions including:

- Timetabled sessions prior to or after a lecture (Bradford)
- Session run alongside the ALPS training (Leeds)
- Sessions run alongside other course activity (Leeds Metropolitan)
- Drop-in sessions run over a week long period (York St John)

The success of these different approaches will be discussed in section 9.2.iv, but first the section below will describe the technical problem that was identified once these sessions started.

9.2.iii Intermittent problems with the devices

Running these sessions did help us to identify another problem, which had not been observed during the desk tests of the installation procedure. Whilst students had been attempting to complete the installation at a distance the problems reported all appeared to stem from user error or network connectivity problems. However, when IT staff tried to install the software during the helpdesk sessions they observed (in a minority of cases – around 10%) that the software installation could lead to the device crashing and becoming unresponsive. Subsequently there were also a couple of reports of this happening unrelated to the software installation. Recovering from this required a hard reset of the device and the complete set-up and installation process to be repeated.

This problem was intermittent and could not be reproduced on demand and hence the cause was both difficult to trace and fix. The problem hit ALPS hard since it not only disrupted the helpdesk sessions and subsequently the rollout, but it also led to motivational problems. Despite only affecting 10% of the devices it was talked about a lot by students and staff and this subsequently led to exaggerated statements being made and a belief that the majority of devices were affected. Although in some ways this view was accurate in that everyone knew someone whose device had hit this problem or they may have had to wait in a queue whilst someone else's device was fixed and so arguably everyone was aware of it. This issue has also affected subsequent rollouts where new cohorts have discussed ALPS with those who had devices previously, demonstrating how hard it can be rebuilding the students' trust.

An additional intermittent (and irreproducible) problem was also encountered at this point. In this case the devices suddenly became unable to view the storage card which was integral to the use of the Mobile Assessment Client. This problem again hit a small number of devices (around 20 reported the problem over the whole of the first rollout). However again it caused delays to the student concerned and others when it was spotted at a helpdesk session and there were also concerns that it was affecting more devices but that users were unaware of it.

One reason why it proved difficult (indeed impossible) to reproduce these errors on demand was that the actual set-up, build or configuration of the devices prior to the error occurring was unknown and the possibilities were too numerous to test. This was a result of the fact that ALPS had had to take possession of the devices almost a year before the software was ready and so the devices had been given out to students and were in variable (unknown) states when the software installation was attempted.

ALPS had many meetings with the software supplier (ecommmnet) and the device supplier (T-Mobile) to discuss these issues and to attempt to identify the underlying causes (and hence find a solution). These discussions also involved the software companies (notably Utimaco) and the device manufacturers (HTC). Ultimately the discussions included senior staff from the University of Leeds Purchasing Department and the Office of Government Commerce (through whom the original tendering process had been managed) as ALPS tried to identify the cause and agree on a solution to this problem.

One of the clear problems for ALPS at this stage was that since the cause of the problems could not be clearly attributed to solely the device or the software then it was unclear who exactly was responsible for it. Both the software supplier and the device supplier claimed that their product was not at fault and it was not their responsibility. It looked as though the problem was actually an interaction between the software and the device. Notably when ALPS had originally put the work out for tender they had wanted one supplier to take overall responsibility of the whole solution (devices, airtime, and software). If that had been achieved then it would have been much clearer where the responsibility lay. The lead contractor would have had responsibility for providing a total solution including ensuring that the interaction between individual components of that solutions worked reliably. Unfortunately, given the short timescales for capital expenditure, it had not proved possible to set up the contracts that way and ALPS was obliged to negotiate separately with each supplier.

Finally the device manufacturer (HTC) offered the solution of updating the ROM on the device. The device manufacturer had been sent two devices for testing and it was following their tests that they proffered this solution. Further negotiations between ALPS, T-Mobile and HTC led to a “goodwill gesture” from T-Mobile including extending the airtime contracts on the devices for one year (a request that ALPS had made in response to the time lost due both to the early handover of the devices before the software was ready and the impact of the technical problem discussed in this section) and HTC/T-Mobile updating the ROM on 200 devices in time for the second rollout in September 2009. The ALPS Helpdesk (see Shared Services section 10.8) took on the job of updating the ROM on the other devices. Although they were called on again as problems with the HTC/T-Mobile updating had its own problems.

We have subsequently learned that the upgrade has not eliminated the storage card issue. This has left us having to swap devices where this problem occurs, which is a burden on staff and student time. These obstacles though are inherent in innovative, pioneering technology projects such as ours but may have been avoided if we had been able to wait until a clear specification for the ALPS systems had been created before procuring devices.

9.2.iv Review of the Helpdesk sessions

As described previously, during the first rollout ALPS used a number of different approaches to providing helpdesk sessions and supporting the students in installing the relevant software on their devices, namely:

- Timetabled sessions prior to or after a lecture (Bradford)
- Session run alongside the ALPS training (Leeds)
- Sessions run alongside other course activity (Leeds Metropolitan)
- Drop-in sessions run over a week long period (York St John)

Different problems were encountered with each of these approaches. The drop-in approach suffered from very low turnouts. Despite our monitoring showing us that many students’ devices were not set up correctly and sync’ing regularly, when the sessions were run as voluntary drop-in sessions the attendance was very low. This meant that students still turned up at training sessions with their devices not set-up correctly.

All of the remaining three approaches suffered due to the intermittent technical faults that affected a minority of devices. Solving the problems for the small number of devices that hit these problems actually took up most of the time and with limited IT staff available, this led to queues of students waiting to be seen and IT staff working under pressure (and potentially missing steps themselves). Another “problem” that took up time at these sessions was where students who had forgotten their password to access their device (in some cases this was the password that they had set using the proprietary phone lock and in others it was students who had successfully installed SafeGuard but had then forgotten the password). To recover from this involved either going through the challenge-response wizard for SafeGuard (which was time consuming) or hard resetting the device.

Therefore, in some cases it simply was not possible to set-up all the devices in the time made available and this led to both staff and student frustration, particularly if these slots had been fitted in at lunchtimes or at the end of the day. In later rollout sessions devices were given to the students in a pre-configured state with students only needing to alter a few personal settings which reduced waiting times and effort on the students part. Ultimately the time it took IT staff to pre-configure devices was significantly less than the amount of time which had been spent trying to assist and fix the issues which had occurred when students had been ask to install the software themselves.

ALPS learned lessons along the way and procedures were put in place in later sessions so that devices that hit problems were put to one side and students were handed a pre-built device (that had been set up in advance). This did reduce the time spent on solving the problems in the session, but also meant time needed to be spent outside the session on preparing devices and rebuilding the faulty ones. It also meant that careful records needed to be kept during the sessions to ensure that we did not lose track of which students had which devices. Ultimately the amount of time put in by staff before, during and after these sessions was much higher than had been anticipated by all concerned.

Even when using the approach of running the helpdesk session alongside a teaching session and taking spare devices, it was difficult to ensure that all the devices would be ready at the end of the session and IT staff were working under a lot of pressure, which increased the chances of mistakes being made. When these sessions were run alongside an ALPS training session it also meant that students could not use their own devices during the training (demo devices were taken for them to use whilst their own devices were set-up by IT staff).

Based on these experiences and knowing that we had to recall the devices to have the ROM updated (see section 9.2.iii) it was decided to use a different approach for the second rollout. We would set up the devices in advance and hand them out to the students with all the key software already installed. Students would then just need to follow some simple instructions to finalise the set-up (entering usernames and passwords). This approach was trialled with a new group of dentistry students at Leeds. Devices were recalled from one group, set up over a week and then given out to a new group. This session ran very well and is the model that ALPS has now adopted.

Furthermore the ALPS Helpdesk took on the role of installing the software on the devices. ALPS partners were encouraged to return their devices to the Helpdesk to be rebuilt. This ensured that the rebuild was done by a small set of people and therefore reduced the chances of mistakes being made. The Helpdesk also introduced a

procedure for installing the software that involved an image of the ALPS build being taken from one device that was set-up correctly and copied to all the others, rather than installing each piece of software and changing the settings. This procedure was not only quicker but also guaranteed that the set-up was identical on all devices.

The technical rollout lessons we learned during the first rollout included:

- Key software should be installed on the devices by experienced IT staff, ideally following a procedure which does not allow any room for human error. Relying on students to install software over the air is not realistic
- Devices should have all the software installed and require minimal set-up by the students when they are handed over
- Students should be able to use their own devices during the training sessions to ensure that they are familiar with how the system works on their device
- Drop-in Helpdesk sessions will only be used by the very keen, motivated students. Students who have already lost interest are unlikely to take up this offer of additional support

As this report is written we are starting the second rollout and will be monitoring and evaluating whether the approach we are now taking is more successful. Already we have identified another issue - the difficulty that some partners have had in recalling devices; with devices either not being returned at all, returned very late or returned with components missing. Success at recalling devices has varied across cohorts and the ALPS IT Group is reviewing this and will be producing a set of guidelines and best practice for device recall.

Recommendations

Section 9.1

- Negotiate flexible start dates (for airtime and warranty) with the mobile providers based on the date that a device is first used rather than a shipping date. This allows for phased rollouts and reduces the impact of any unexpected delays in deployment.
- Where possible use device management software to keep track of which devices / SIMs have been allocated to each user. If this approach is used it is essential that users leave a device handover session with devices synced otherwise there will be no record of which device they have.
- Be aware of the physical space and moving required to store and distribute the mobile technology
- If a central team/one institution purchases technology for sharing with project partners i.e. other institutions, agreement on particular issues such as ownership, insurance and repair/maintenance arrangements, need to be confirmed

Section 9.2

- To minimise the need for follow up support for students on placement it is important that the mobile devices be in as reliable a state as possible. The software should be well tested and work reliably for its required purpose. The more problems students encounter the more they disengage from the project

- To ensure a successful rollout of mobile technology the students should have as little set-up to do on the devices as possible, whilst they may be frequent users of mobile phones setting up devices for the purposes of learning is very different.
- Always have technical staff present when handing out devices and providing training.
- Students should have access to the technology they will be using at the training sessions to ensure that they are familiar with how the system works on their device
- Consider how many devices will be involved in your training session and if possible run some checks (with the mobile providers) to ensure that that multiple devices can simultaneously connect to the mobile network from that location.
- Have a pool of pre-configured devices ready to swap with users' faulty devices. If a device has a problem that takes some time to resolve then swapping it will save time and lead to a fewer frustrations.
- Beware of exaggerated reports of "technical failure"; when issues do arise these bad news rumours can have a devastating effect on student/staff engagement. Be prepared to counter such reports with precise information and positive stories.
- Working with multiple partners on building an IT solution over time may obscure contractual responsibilities. Try where possible, to build clear inter-linked (software – device) responsibilities into the contracts and build a partnership (rather than customer-supplier) relationship so that IT providers remain engaged with the project throughout its lifetime.

10. Implementation

10.1 Systems development

When ALPS put the work out to tender it was clear that we were looking for commercial partners who would work with us to develop a solution. ALPS and the commercial partners worked together (principally through the Tools and IT Groups) to develop workpackages and to draw up and approve specifications for these. The commercial partners were invited to these Groups and regularly attended the meetings as well as working with the ALPS Mobile Technologies Project Manager. In addition, simulation exercises were also held where early prototypes of the systems were used by students, tutors and practice assessors in role play situations and feedback was gathered. This feedback then fed into the ongoing software development.

The idea of this initial development model was that through the use of the Tools and IT Groups and the simulation exercises all the relevant ALPS stakeholders would be able to influence the systems development at an early stage. As a collaborative programme, ALPS has ensured that all those with an interest in the work have been involved in the development of systems and processes. Membership of ALPS Groups, simulation exercises, consultation documents and ad hoc opportunities have ensured that ALPS has received and acted on feedback. These activities have in themselves, and particularly, in the development of the mobile learning aspects of the programme, created further activities for involvement, such as the MEDS (Mobile Enabled Disabled Students) project, hosted by the University of Bradford which investigated the barriers and essential specifications of mobile devices used for learning and assessment purposes with disabled students. A subsequent project, EMET (Embedding Mobile Enabling Technologies) explores barriers other than those around impairment, which may impede embedding of the ALPS mobile assessments which uses a methodology based on the that 'if it works for disabled students it will work for all'.

In practice it was found to be difficult for users (particularly those in the Tools Group who did not have a technical background) to make comments on paper specifications and it was not until the systems were fully developed and users were able to fully interact with them that they really felt able to give detailed feedback or indeed to identify extra functionality that they would like to have available. It should be noted that users did find it easier to comment on interface specifications and that there were lengthy discussions at times about the actual wording used. Even with meetings taking place on a monthly basis it still took a long time for agreement to be reached on some specifications. This was in many ways a product of the complexity of the ALPS partnership. It was impossible for all professions and stakeholders to be represented within any Group. Also, with so many different Groups involved, there were times where there was disagreement over what functionality should be considered most important and therefore prioritised in the development work. Consequently, staff wanted to take specifications back to their PSIGs (Partner Site Implementation Groups) for approval to ensure that they had approval from all the relevant people. This slow, collaborative decision-making was in stark contrast to the much faster decision-making that could be taken by the commercial partners, who, being Small to Medium-sized Enterprises (SMEs) were much more agile. The commercial partners also found that this approach led to them spending more time than anticipated on project management and consultancy and therefore having less time available for the development work itself.

Once the initial systems development had been completed (autumn 2008) then later systems development did become more agile, with changes being pushed out to the live system for comment and development time being kept back in order to then make changes in response to these comments. One example of this is the Accessibility Improvements project running in autumn 2009. This project involves an iterative approach to development, with small changes being made to the ALPS Mobile Assessment Client, a focus group being held at which users get to try out the new client and give feedback and leading to another set of changes being identified. The plan is to go through this development and feedback cycle three times over a three month period.

Overall ALPS found that they required great flexibility from their commercial partners (possibly more than those partners had anticipated at the beginning). It was felt that we did achieve this with both of our two SME commercial partners (MKM and ecommnet) and that this was one of the benefits of working with SMEs rather than larger organisations. Treating our relationship with these companies as a partnership, rather than a strict customer-supplier relationship, certainly helped to ensure that the commercial partners were committed to the project and that they were as flexible as possible when that was required. Both MKM and ecommnet sat on two of the key ALPS Groups (IT and Tools Groups). Both companies were invited to be involved in discussions about the future direction of the ALPS collaboration and throughout the project the companies were referred to as our commercial *partners*. It has at times been a difficult balance, but overall we believe it has been very successful and that all parties have benefited from this approach. Whilst the companies may have ended up putting in more hours of work than they originally anticipated, they have also gained a much better understanding of the workings of HE and the potential for further technology enhanced learning work in this area, gained good access to key HEI staff, contributed towards the development of project bids and been included in funding submissions.

10.2 The ALPS Mobile Assessment Tools

The introduction of mobile, interprofessional assessments was a huge learning curve for staff and students on many levels. ALPS not only had to provide technical training on how to use the mobile devices and all the associated assessment and portfolio software but also there was a significant change in practice for some professions with the introduction of 360-degree type interprofessional assessment and reflective learning practices.

The ALPS assessments contain four sections:

- Self assessment to be completed by the student
- Peer assessment to be completed by a student colleague from their own or a different profession
- Service user assessment to be completed by an appropriately selected and consenting service user
- Practice assessor assessment where a student can be assessed by their own practice assessor or a practice assessor from a different profession

Many students from the majority of professions involved were not initially confident in peer assessment practice and required significant prompting and encouragement to review and assess a video clip in training. Other students were unconvinced by the idea of gathering feedback from service users using the PDA; some social work students for example saw it as a potential barrier to communication.

“It makes you look like a business person instead of a social care person. You might be discussing things of a sensitive nature, it doesn’t seem appropriate to be inputting it in to a little computer and recording it...it just seems a bit too official in a way and not caring enough – and if you’re going in to a family and they’re struggling to feed their kids, you’re getting out this little expensive looking gadget, it’s again that divide financially as well as setting yourself apart.”

For some professions, however, such as Audiology where technology is regularly used with service users, it was not perceived as a barrier. Some of the professions involved in ALPS were familiar with the concept of self reflective practice and so many could see a link with the self assessments and their placement diary. All students seemed to accept the idea of practice assessor assessment, probably as this does not signify a particular change to current practice. However whilst the majority of students could relate to the self and practice assessor assessments, they did not automatically see them as adding value to their placement. A large part of training consequently concentrated on linking the assessments to their current placement practice and illustrating the benefits of completing ALPS assessments.

The most “successful” cohorts were able to use ALPS assessments as evidence of skills development within their placement portfolio, thereby dovetailing the ALPS work with the core placement curricula required for their professional qualification. They also boasted the most tutor engagement and support. While the ALPS assessments are designed to be used interprofessionally the paradigm shift required for this to occur should not be underestimated, and while a minority of students were instructed by their tutors to complete an interprofessional assessment the majority of early implementation groups did not. Training had to encompass attitudinal development to address this paradigm shift as well as technical skill developments and had to be delivered when students were on campus, typically as part of the lecture timetable. This meant that training had to be tailored not just to the particular student and staff group, but also the time available in their teaching timetable. Essentially this meant that if only an hour was available several components designed to consolidate understanding within the training package had to be removed, which was not ideal from a student implementation perspective.

10.3 Methods of training

The practical elements of creating and running complex and numerous training sessions at multiple sites, and the levels of expectation and engagement provided us with some valuable experiences in terms of developing training programmes for the future.

It was clear early on that a large number of the people who might come in to contact with ALPS mobile devices and assessments out in practice were not people that the ALPS Core Team or academics from the ALPS partners would necessarily have direct contact with. The generic nature of the assessments meant that ALPS students could be asking for feedback from quite literally anyone. The only ‘constant’ in terms of the assessment was that the student would always be present. It was therefore decided that the training delivery should be student centred, with all students leaving the training confident in being able to show others how to use both the device and software sufficiently to fill in an assessment.

Given the lack of opportunity to add additional sessions to already full timetables, many students had to be given their devices far in advance of them entering placement (often at the beginning of their year or course). As such they needed the opportunity to refresh their memories of how to complete their part of the assessment cycle, necessitating multiple training scenarios. There was also a need to provide some training materials to the many practice assessors who would support students on placement, the large numbers of which made it impossible to offer face to face training. All students received training on how to use the device and the assessment software in a face to face, classroom based scenario. Once they had received the training, they then had access to the suite of online training tools, including videos and written documentation which could be shared with practice assessors. A selection of briefing documents for practice assessors was also developed and distributed via university link tutors and practice learning facilitators.

As the purpose of ALPS is to see the programme embedded at an institutional level it was important for the training be deliverable by people other than the ALPS Core Team. Consequently, all online materials were designed to allow anyone with a basic knowledge of the ALPS programme to run a comprehensive training session, and a handbook with a variety of delivery options was developed and distributed. Having a variety of materials from simple customisable slides to videos where the trainer only has to press play enabled people to engage with the training to the level they felt comfortable with and ensured consistency of message.

Throughout the process of developing and delivering the training, it became increasingly obvious that IT training alone is not sufficient. The training programme had to be a real combination of both the IT and pedagogy. Furthermore, it should be clear how the two work together, otherwise it is very easy for students to get overly focussed on the technology and miss the benefits to their learning experience.

10.4 Writing the training programme

Due to the speed with which the programme was developing some of the training sessions provided had to be arranged very soon after the mobile and online software was delivered. This resulted in the less than ideal situation of writing the training material before the software delivery had occurred, meaning that the training was written to the 'expectations' of what the software would deliver and how. Attempts were made to minimise these difficulties by working very closely with the commercial partners, who did provide trials of the software as far in advance as possible.

Developing training for a multitude of scenarios was time consuming so where possible, training materials were created to work for multiple scenarios. However, the number of amendments to software meant that training materials needed frequent rewrites, which proved particularly time consuming and costly in the case of digital media training options such as videos and podcasts.

One particular difficulty in terms of developing a generic training programme to suit all five ALPS partners was incorporating the differing preferred teaching styles and course design of the ALPS partners and the different professions. It became apparent very early on in the process how important it was to have pre-training discussions with the leading tutors to fully comprehend how ALPS would fit into their course, which then informed how students were trained.

10.5 Running training sessions

Finding suitable training rooms was key to the success of the delivery of training. At a bare minimum, multiple plug sockets, a projector screen and computer/Smart-board were required, as well as the ability to get a strong mobile signal. Frequently, as training sessions were ‘tagged on’ to the end of other pre-arranged sessions, training was being delivered in unsuitable classrooms without any of these facilities. As a result, students quickly became frustrated because this led to sessions being extended or being rearranged when the devices would not work in rooms with no connectivity.

The noise of unpacking mobile device boxes was a distraction which then increased when students started ‘playing’ with devices; this was not helped when students were in large (or entire) cohort groups. Asking students to unpack and set-up the devices did help save staff time but underestimating how much help they would need to download and install software meant that time saving was eventually lost. It also distracted students from learning about the assessments, e-portfolio and protocols for device and assessment use.

Technical issues (see section 9) disrupted training on the ALPS Assessment Suite and tools as students had either failed to turn up to ALPS Helpdesk-run sessions (set up deliberately to address technical problems) or had developed new problems since the IT session. An IT presence was therefore always required and present at every training session; this had implications in terms of resources for staff time. In addition, preparation for training sessions was always time consuming and involved many staff, creating user accounts and sending out tools for example.

For the second rollout in the autumn of 2009, ALPS had managed to address some of these staff time issues by training key partner staff in the administrative aspects of the ALPS Assessment Suite meaning that partner staff (rather than the Core Team) were confident and able to create user accounts and send out tools. Also, our commercial partners had added extra functionality to the Assessment Suite which enabled the user accounts to be imported from a database/spreadsheet, thus greatly speeding up this process. Further work is currently underway investigating how much more time may be saved if the user accounts could be pulled automatically from student record or central IT systems.

10.6 Partner engagement

ALPS found that it was important to establish partner roles and responsibilities well in advance (i.e. which members of staff needed to be present at training sessions, who would arrange practical issues such as room bookings and who would liaise with the students to make sure they would attend sessions). In addition, it became apparent that all staff involved needed sufficient training about the ALPS programme and technology before their students were trained so they had sufficient knowledge for them to guide and engage their students. Where staff were not engaged with the ALPS programme this became obvious to students when they asked questions staff could not answer. As such some of the students went away from training sessions thinking that if ALPS did not matter to the staff it did not matter for them either. The related issue of senior staff “buy-in” is dealt with in chapter 12.

The quality of training makes no difference if staff are not fully engaged and do not believe that the introduction of the tools is a worthwhile exercise which fits in well with what they teach. The requirement for tutor engagement in ALPS was not always seen

as top priority as ALPS was viewed by staff as outside their course or teaching responsibilities. This was ultimately detrimental to the introduction of the ALPS programme as again this was an attitude which the students noticed. In order for the introduction of any new educational intervention to be successful, students need to be told by their tutors that learning is **part of** rather than **additional to** their course. One issue that remains a barrier to buy-in amongst tutors however is the need for them to have the underpinning e-learning skills and training to create relevant course based material to make tools relevant to their subject. The tutors can be 'keen' to adopt a programme, but if they do not have the necessary expertise themselves (and are not offered the necessary expertise) to make use of it then they will quickly lose interest.

Again ALPS recognised this gap after reviewing the first rollout and in August 2009 appointed a peripatetic learning technologist to work one-to-one with tutors to give them the initial support and training that they needed to use the ALPS Assessment Suite more effectively. Supporting the creation of new tools and learning materials to be delivered via the Suite and assessing whether there were any existing teaching/learning processes in their courses which could benefit from being delivered via the Assessment Suite. This appointment seems to have been successful, even at this early stage, as we already have more tutors actively engaging with the Assessment Suite from 2009 onwards.

10.7 Ability and expectations of students

Over the course of the training sessions, ALPS quickly learned that all young people are not, as Prensky (2001) suggests, 'digital natives' but rather 'digital users but real need must be established' as described by Ramanau *et al* (2008). Some students could of course use the devices instantly and better than we had anticipated, but there were others who were neither interested nor particularly willing to engage with the technology. As a result, pre-configuring devices before they are given to students is highly recommended. Whilst, as discussed earlier, getting the students to set the devices up was seen as potentially saving staff time, the amount of support students needed to set up the devices, even when step-by-step guides were provided, negated any time-saving result. Students' knowledge of setting-up devices proved limited, particularly in the case of additional software ie. Intellisync.

Students' excitement at receiving new devices quickly dissipates if no real need or use is established:

"I think my main sort of quibble is...I did really start using it and I said 'right I've got to use this thing – I've got to learn to love it'. But it doesn't really replace anything adequately...so it makes it that one extra thing...and it just takes up more time than it saves I'm afraid."

This reflects the findings of earlier research projects such as the work of Kneebone (2005). It is important to create mobile resources before starting to hand out devices – content must be given with devices. ALPS was hindered in this respect by a number of factors including a desire by partners to take early delivery of the devices. This was due to, the airtime contract having started, the need to accommodate the timing of access to cohorts and the belief that the software would follow shortly when, in fact, the software was still being developed. This mismatch in timing contributed to a drop in enthusiasm for the devices and ALPS as a whole. However, those students who remained engaged

put learning objects, e-books and access to library resources such as journal articles, very high on their “wish lists” of uses for the device.

Overall training is key to the implementation of any new and large scale project. However without sufficient grass roots support and clear expectations from tutors to their students of what is required of them, it cannot be seen as a one stop solution to implementation. The key is the ongoing support and encouragement provided by tutors and, where necessary, IT services.

10.8 ALPS shared services

ALPS was planning to roll out up to 900 devices across five universities in various locations in Yorkshire. Students and staff using these devices and assessment tools needed support in a number of areas, including device support, network support, tools usage and the release of new assessments. The ALPS Mobile Services Platform and the tools and systems for generating the assessment also needed support. In addition, hosting of the servers was needed in order to distribute the assessment tools, manage the devices and return completed assessments to the portfolio.

The provision of support was discussed with the IT departments of ALPS partner universities. It was clear that at that time the support for mobile devices was at an embryonic stage at most institutions. Second line support was available for a number of components from the commercial suppliers such as T-Mobile for the devices and networks, and ecommnet for the Intellisync® software.

ALPS invited proposals from the ALPS partners for the provision of a shared support service to be delivered by one HEI partner on behalf of all the ALPS community. The idea of a shared service model was developed in conjunction with Professor Rae Earnshaw at University of Bradford and HEFCE and the contract was subsequently awarded to University of Bradford as they were developing similar services for their own institution. The contract was for server hosting and first line support for ALPS students and staff. As part of this contract, Bradford recruited a mobile technology support officer on behalf of ALPS. The shared services model was advantageous to ALPS for the following reasons:

- Each university was at a different stage in their development of mobile support
- Rollout for the ALPS devices and tools was happening at different times in each university
- The volume of use was not, and was not expected to be, high enough to justify the training and development costs in individual universities
- The support desk could provide a single interface to the commercial suppliers who were providing second line support with the advantage that the former could easily identify common issues and trends
- Server hosting and management could be in the same place as the support desk
- There would be a single source of performance reporting

Whilst ALPS did discuss the evaluation of the shared service with HEFCE, the early volumes of calls would not have given us sufficient data to provide evidence to HEFCE of the effectiveness of the shared services model.

Recommendations

Section 10.1

- Users found it difficult to comment on paper specifications, they found it easier and had more to contribute when using the systems/packages. Therefore, where possible, adopt a more agile iterative development approach – as this will gather meaningful feedback from users regularly and will enable this feedback to have an immediate impact on the further development work.
- Ensure that partnerships with industry are established rather than simply customer-supplier relationship as HE collaborative projects are often slower in decision making than commercial partners and can frustrate the latter
- Ensure that representatives of all stakeholder groups are involved in the design, testing and decision-making processes in order to achieve “buy-in”. Be aware, however, that this can conflict with the agile development approach if it means that decision-making needs to be taken back to different committees at different sites, resulting in slow decision-making. Try instead to have a small representative group who meet regularly to actively use the developing software/technology and provide feedback.

Section 10.2

- Clearly define collaborators’ roles and responsibilities for training to ensure that all aspects of training sessions are covered, particularly have clear roles for academic and technical staff

Section 10.3

- If the assessment process is student-led then ensure that training is focused on the student not just using the device but teaching others to use the device.
- Ensure the delivery of training is embedded in the organisation and does not rely on a (short-lived) central training team.
- Ensure that training is available in various customisable formats e.g. face-to-face, web and hard copy, but that the core of the material gives a consistent message.
- Ensure that training addresses both the pedagogy and IT aspects so the benefit of the learning experience is understood. If students cannot see how a technology will enhance their learning only those interested in technology will be interested.

Section 10.4

- To deliver both the pedagogical and IT aspects in the training work closely with software developers and leading course tutors.
- Training materials should be created to work for multiple scenarios.

Section 10.5

- Prepare devices e.g. unpacking and set-up, in advance to avoid distraction and time loss at training sessions.
- If students are to receive lots of ‘stuff’ i.e. device and extras and handouts then make sure a bag is provided particularly if the students are taking away expensive equipment. If the device is visible the students may then be a target

Section 10.6

- Make available learning support e.g. training in creating learning material, to tutors to support uptake.

ALPS Implementing a large scale mobile learning programme

- Student engagement with the process will be better if they are told that the educational intervention is part of their course and not additional/optional

11. Implementation in practice (work-based settings)

11.1 Introduction

Martin Bean (VC designate to the Open University) in his keynote speech to the ALT-C Conference, September 2009, said that there are three things to consider when implementing change:

- Process
- People
- Technology

This section discusses the people and process aspects of the ALPS implementation where they affect the implementation of a technology project. There are identified issues with evaluation of mobile learning (Traxler, 2009). However, most accounts are using small numbers of participants with some not being triangulated. The intrinsic challenge to different contexts and different cultures increases the concerns. Davenport (2005) states that:

Healthcare organizations have the responsibility to provide the safest possible patient care and that includes the use of the most current, most easily accessed information. To start, healthcare organizations should provide nurses with basic PDAs and basic drug databases along with PDA training and encouragement to help nurses overcome technical barriers. Nurses should encourage organizational commitment to PDA technology.

This is the recommendation from Davenport's study for healthcare organisations. However it must be noted that this study involved 75 qualified nurses of varying status. Davenport reported 68 benefits to using PDAs and 38 barriers, but apart from concerns over confidentiality the 38 barriers are not reported fully. The methodology of the study used a convenient sample using online snowball distribution. Therefore one can assume those who took part already had some IT literacy. This and other studies (Kukulska-Hulme, 2005) all use relatively small numbers of participants and in predicted areas of practice. The implementation of the ALPS programme would involve approximately 900 students with mobile devices in a wide variety of placements: some geographically near to the HEI, others not. Additionally these placement settings were mostly planned with students and the placement co-ordinators, but not always as there can be last minute changes.

11.2 Culture

With the increase in use of mobile technology within NHS trusts there was growing concern over data and confidentiality. Sometimes this concern did not always appear logical. Already the use of mobile phones had been restricted by the Department of Health due to their assumed interference with medical machinery, but recent guidance indicates their use is generally acceptable and only in certain circumstances would not be allowed (Department of Health, 2009).

However, sometimes this concern was legitimate since data had been reported as being sent unencrypted on a CD from, for example, the Department of Work and Pensions (BBC, 2007), or data with the passwords attached (Virgin Media, 2008).

These incidents coincided with the planned ALPS rollout of the mobile devices to students and, combined with already risk averse organisations, such as the NHS, there was an increased need for cautious planning.

Other assumptions which affected the planning could not always have been predicted. Numerous studies claimed that the younger the participants, the more likely there was to be acceptability of mobile technology (Prensky, 2001). However, our findings suggested that this was not always true.

The culture of our participants and the placement organisations were predicted to be conducive to the use of mobile technology within practice. Many previous studies are related to healthcare settings due to the ability to rapidly access information for the benefit of patients and for students to be able to maintain contact with peers and their host HEI (Garrett & Jackson, 2006). In some situations we were largely unprepared for barriers to their use:

“We need a device with better functionality so that the software just goes on it”.

“If I could use it for personal purposes as well like phone calls, I would use it more.”

“I think the idea of having something where you can look stuff up when you’re with somebody is, is great, but realistically with the, the size and quality of the internet pages you get on here and the speed of it, it doesn’t, doesn’t really make it very, very workable”.

(ALPS focus groups 2009)

We were well prepared for the concerns from senior managers within the organisations themselves – for reasons stated previously. Most previous studies were also related to mobile learning and the ALPS programme was concerned with reflection in action and therefore had to combine learning and assessment (albeit formative assessment). The security of the data on the device and during transfer was an additional consideration, which, to the knowledge of the ALPS programme, had not been tried and tested previously.

11.3 Engagement with practice

The approach to implementation took into consideration: past experience, present knowledge of the placement settings and specific cohorts and their professional requirements. All these aspects were concerned with culture and practice, so that what may have happened in previous studies, may not apply specifically to the ALPS programme.

The implementation strategy was largely based on communication and training. ALPS undertook the following activities:

1. Communication:
 - Presentations to senior NHS colleagues (board level)

- Presentations and discussions with operational colleagues (ie. middle manager level)
 - Reassurance to practice assessors (ie. at ward and placement level)
 - Dissemination via the NHS Yorkshire and the Humber to appropriate networks (eg. Allied Health Professions Forum, Practice Learning Facilitator forums and nursing networks, etc)
 - Continual reinforcement and contacts as students were placed in practice areas via specific professional groups
2. Training:
- Training for module/cohort leads within the HEI
 - Training and delivery of mobile devices and assessment software with lecturer/practitioner staff and similar roles
 - Training of students with the use of the mobile devices and assessment software
 - Additional support sessions, mainly for any IT problems
 - ALPS Helpdesk and accompanying literature and advice on www.alpsweb.net

However, the communication strategy was more sophisticated than the above lists suggest. The communication strategy was first targeted at the large, local NHS acute trusts, and then on the smaller primary care trusts (community). The large acute trusts were considered to be the most risk averse and potentially the most affected by students on placements with mobile devices. For example, Leeds Teaching Hospitals Trust is the largest acute NHS Trust in Europe and takes student placements from all 16 professions in the ALPS programme. This trust was visited first by the ALPS Director and Programme Manager and further follow-up appointments were made. Cooperation between the ALPS programme and the Risk Manager for the Trust was crucial in ensuring effective smooth running of the rollout. This is exemplified by a more recent situation where Accident and Emergency staff in an unnamed acute trust, were taking photographs of themselves and posting them on the internet. Despite the fact that the trust senior managers were discussing the ban on mobile phones, the use of the students with ALPS mobile devices was not at risk, thus illustrating a success in the ALPS communication strategy.

Similar presentations took place at other large acute trusts. More locally, presentations and visits to the primary care (community) trusts then followed. Meetings at mental health trusts also occurred recognising the particular concerns that they might have with the use of mobile devices. It was already accepted that the use of the mobile devices in prison settings would never be allowed. Any actions agreed from any of the meetings were always followed up and communication links maintained.

Continual information flow to known forums e.g. Nursing, Allied Health Professions and Practice Learning Facilitator, has been consistent and ongoing.

As students were going into practice with the mobile devices further practice visits were required. However, the decision was made that the assessment process would be student-led, due to the large number and variety of placement settings which would be encountered. This demonstrated one of the major differences between cohorts and professions, placement patterns and confidence of students using the mobile devices, tutor support and the placement support infrastructure.

The FRAME model as described by Koole (2006) is used here to compare the approach to the ALPS implementation of mobile learning and assessment:

- Device aspect: encryption and data transfer software
- Learner aspect: training, selection of cohorts, learning material provided, websites recommended, tutor support, link with existing regulatory requirements
- Social aspect: NHS placements and their support, acceptability amongst students, telephone/text capability, champions within a cohort

Considering the barriers and issues which arose during implementation, ALPS were flexible and creative in their approach resulting in considerable achievements. With the benefit of reflection ALPS are now in a position to develop a model for similar implementation.

11.4 Security and ethics

Security and ethical issues were raised as potential barriers to the use of mobile devices in practice settings, or to store assessment data. As a result, in October 2007 the ALPS Core Team published a 'position paper' on ethics, which outlined all the work which had been done to address concerns about the 'ethics' of using or researching the devices. The content of this paper is outlined below.

11.4.i Ethical considerations

The position paper was distributed to all academic staff responsible for cohorts of students with mobile devices, with the recommendation that it was passed to anyone within placement settings, e.g. trusts, social services, etc, who would be working with the students who had devices. The paper was divided into the following sections:

- Provision of the mobile device
- Technical information relating to the device
- Research in to use of the mobile device
- Functionality of the mobile device in practice settings
- Example of Permission Gained

The remainder of Section 11.3.i is reproduced from the original paper:

Provision of the mobile device

The mobile device given to students is a direct replacement for a paper teaching tool. Instead of giving students a paper workbook or assessment book as usual ALPS is giving them the mobile device. This is a direct replacement of a teaching tool, and as such we do not need any permission from anyone to implement this change because it is a curriculum development – just as if we had replaced one paper workbook with a different one.

Technical information relating to provision of the device

The mobile devices are commonly referred to by several different names such as Handheld Computer, Handheld, Personal Digital Assistant (PDA) or Smartphone. The

main characteristics of the ALPS mobile devices are that it is a small handheld computer with the capability to take photographs, videos and record audio in addition to the normal functions of e-mail, internet access and document preparation. Currently it is a T-Mobile Vario I or Vario II with network connectivity through a mobile network or a wireless network with access to university and learning systems (VLE or e-portfolio) from the practice setting.

ALPS will control access to the devices through a gateway called the ALPS Mobile Services Platform. This enables ALPS to control the security and encryption of any sensitive data which may be recorded on the device or transmitted to University systems. It also offers ALPS the ability to disable the device if it is lost, stolen or misused.

Research into use of the mobile device

NRES (formally COREC) have stated that:

“This project is considered to be curriculum and teaching development with an evaluation of the introduction of these devices and should not be managed as research. Therefore it does not require ethical review by a NHS Research Ethics Committee or approval from the NHS RandD office”.

This means that the following will **not** require permission via NRES:

“We will want to do some research in to the introduction of these devices. In the first instance, this activity would involve talking to NHS staff involved in supervising students on practice placements and service users who might be involved in the student’s assessment” (ALPS letter of explanation 19th June 2007).

However, individual research/evaluation projects in to the introduction of these devices **may need permission from a local institution ethics committee** – either that of the HEI where the students are from the local Trust themselves. Anyone wishing to do some research work will need to investigate the requirements in their local institutions themselves. Please note that if you are unsure whether ethical permission is required, it is ALPS position that work should not be undertaken until you are certain of your position. Therefore we would rather you contact us to discuss this than carry out work which we do not have permission to do, and therefore can not publish as a result.

Functionality of the mobile device in the Practice Settings

The area where the PDAs obviously differ from a paper workbook is their ability to record pictures, audio files and video. These 3 functions all need to be treated as ‘additional’ functions which require additional permissions. The NRES letter states that:

“There are ethical issues associated with the involvement of NHS service users or carers and you should ensure that fully informed consent is obtained for the use of data and/or photos and video clips for the purposes of this programme and that confidentiality is maintained”.

In addition, it is likely that there will be local rules and regulations governing the use of any recording, and storage, of any data involving service users, whether this has been recorded for learning and teaching purposes or for other reasons. Many of these regulations will be based on the Department of Health Guidelines which were published

in May 2007. [These were subsequently superseded by Guidelines published in January 2009.]

It is therefore important that if you wish your student cohorts to use any of the additional functions of the mobile device that you have found out what additional permissions are required at each site that the students will be on placement, and have been granted these permissions.

If necessary it is possible for us to remotely disable ANY given function of the mobile device using the device management capability of the ALPS Mobile Services Platform. It could be that you gain permission for students to take still images and audio but not video – in which instance this function could be disabled on the devices given to all the students this caveat would apply to.

Example of Permission Gained

In the eventuality that you will at some point be asking for permission you may wish to cite an example of the sort of permissions these projects have been granted before. Dr Richard Fuller at the University of Leeds ran a pilot study during the summer of 2007 with some 5th year Medical Students. Dr Fuller first gained some guidance from the GMC on using the devices for video, audio and video recording and was then able to show the trust where the students were on placement that these guidelines would be followed. You may wish to approach gaining permissions in the same way.

The GMC stated the following about Dr Fuller's project:

You outlined a proposal for reflective learning which would involve students seeing a patient and recording the encounter for future study, and asked for our views on the potential ethical issues that may arise. In our guidance "Making and using audio-visual recordings of patients" (2002), we set out the basic principles of good practice (paragraphs 1-4) and the particular points to bear in mind when making recordings for training purposes (paragraphs 12 - 14). It would be good practice to make a record of the scope of the patient's consent (whether in writing or on an electronic form on a PDA) but the exact means of recording the patient's consent is subsidiary to the process by which their consent was sought and we do not offer guidance on this point.

In paragraph 4 of our guidance Confidentiality: Protecting and providing information we say that, where doctors are responsible for personal information about patients, they must make sure that it is effectively protected against improper disclosure at all times. We do not give detailed advice on how electronic medical records should be created or stored, though we suggest that arrangements should conform to the Department of Health's Records Management Code of Practice (which can be accessed on their website, www.dh.gov.uk).

In addition, Dr Fuller stated that: "For this project, the supervising team made sure written consent was secured by the supervisor if there was an audio or visual recording. The PDA is programmed to prompt, and then asks them to sign off before starting the recording. The idea is that this data will be kept secure on the PDA and uploaded onto the VLE. If the PDA changes hands, all data on the device and any data on the card will be erased to ensure no recording is kept. Very strict rules were imposed about recording – i.e. nothing vaguely intimate - and with clearly expressed penalties for misuse (which again, come under good medical practice and fitness to practice)".

11.5 Contract of Use for Students

Students who used the ALPS mobile devices signed a Contract of Use (appendix c) which was a contract between the student and their university. This ensured that the student was fully aware of their responsibilities regarding the mobile device and its use and that whilst on placement they would work under the direction of their practice assessor. When beginning a placement students are given an induction by both their own university and their practice placement provider which clearly states that the student must adhere to the policies and procedures of the placement provider. This includes instruction about the appropriate process to follow to gain permission which may be required from staff and service users.

The Contract of Use was drawn up jointly between the five ALPS partner universities with legal support. The Contract had a number of purposes including:

- ensuring responsible and fair usage of the device
- clarifying ownership of the device
- informing students of the help available

11.6 The mobile device

This section provides a brief description of the core security functions of the mobile device which ALPS commissioned and informs section 11.7 “Security arrangements”.

Authentication and encryption

The ALPS Mobile Services Platform ensures that the mobile device can handle secure user authentication and data encryption. ALPS uses a product from Utimaco called Safeguard PDA which ensures protection for users through authentication using a symbol based PIN, transparent protection of the data in memory and data card and encrypted data transmission from the device over e-mail, file transfer or memory card.

Device backup

The ALPS Mobile Services Platform implements a software product from Nokia called Intellisync which ensures that files on the device can be backed up to a central server to prevent loss of vital information.

Equally important in the provision of security features is the provision of services that enable ALPS to take action if a device is lost or stolen. The Mobile Services Platform enables a device to be automatically monitored for configuration details and, very importantly, disabled in the case of loss or theft. ALPS can remotely disable a device that is reported missing. Once it is reported as lost, then the SIM card can be disabled and the device blacklisted, such that it cannot be used again.

This is a double protection as the data on the device and card will have already been encrypted and the user’s password (symbol based PIN) would need to be correctly entered in order to access the device.

Data transfer

Data can be transferred from the mobile device to a central VLE or portfolio. The ALPS Mobile Services Platform ensures that this is done securely by encrypting the data as it moves from the mobile devices either over e-mail, network file transfer or from a memory card.

Authentication

Through the use of the ALPS Mobile Services Platform, users have to authenticate themselves against the university directories (usually an LDAP directory). This ensures traceability of use of any of the devices.

11.7 Security arrangements

From the beginning of the project, ALPS identified the need for security to be a fundamental and embedded part of the technology being used by the students. The use of a highly functional device in an environment where students are working with service users dictated our architecture and specification for ALPS. In addition the devices are used to record students' performance so it was vital that the assessment could not be lost, or changed.

In addition to the position paper on ethics, it also became clear during the course of our visits to placement providers that a number of security questions were repeatedly being raised. For the most part, the majority of the questions asked were around issues which the ALPS had already identified and met, or were working towards meeting. A further paper (appendix d) was consequently written which identified the background to the project, and the security measures that had been taken. The following information was given as a background to the project:

- The students on these courses will be using mobile devices to record their assessment processes and to access further learning and teaching resources whilst they are on work-based practice
- This will take place in practice settings such as hospitals, clinics and the community
- The devices are able to record, digital media such as photographs, videos and sound in addition to the recording of text based material. This material can then be used by the student as evidence of competence and to provide an environment for reflection
- Practice professionals can use the student device to record the outcome of an assessment in both a formative and summative way.

Recommendations

Section 11.2

- Any work implementing innovative practice across organisations and contexts need to be sensitive to the different cultures operating.

Section 11.3

- Ensure communication of the programme aims and activities reach staff both in organisationally strategic and operational levels.
- Be aware that communications may require reinforcing, even at the risk of repetition.
- Consider the type of student placement vis-à-vis mobile technology as the programme may need to pre-empt an organisation's decisions not to implement where these organisations may be more risk averse. Consider what is possible in such placements and judge whether these can be accommodated.

Section 11.4

- Where multiple centres are involved bring key ethical approval staff together to identify common processes and requirements which can be aligned to obviate the need for each partner to apply separately for ethical approval.
- Ensure communication of any such agreement is disseminated clearly by means of a "position paper".

Section 11.5

- Ensure that users, and the associated staff, who are "loaned" equipment understand the conditions under which they are lent. Produce supporting written documents to confirm these conditions and ensure they are approved by legal advisers within the institution

Section 11.7

- Provide written documents to placement providers outlining the project, and the policies and guidelines under which the students will operate. Ensure all staff and students receive copies of these documents and appropriate web support is provided.
- Ensure students know the limitations of their explanation requirements and refer complicated queries to university staff instead of dealing with them alone

12. Embedding Strategies

12.1 ALPS' strategy meetings

A key aim in HEFCE's CETL programme was to "To recognize and give greater prominence to clusters of excellence that are capable of influencing practice and raising the profile of teaching excellence within and beyond their institutions" (HEFCE, 2004). A requirement, therefore, of CETL bids was that individual CETLs would be able to demonstrate, "a discernible impact on teaching and learning within their institutions" (*ibid*) and that, "these centres will acquire significant influence inside institutions, shaping and guiding teaching and learning strategies" (*ibid*).

The partners were aware, from the inception of ALPS, that to sustain beyond the end of the programme, any potential changes to the way in which students were assessed would need to be embedded across the five HE partners and, as an extension to this, across all practice settings. The mobile technology part of the programme particularly focused minds on the fact that all development would need to be built in from the planning stage.

As part of the bidding process the early working group had already identified that, quite apart from the mobile technology programme, there was a need to ensure that all partners felt represented in decision-taking and that as such a management structure would need to be in place to provide this assurance. Having this structure ensured that the specific workstreams within ALPS, for example, research, IT and evaluation, had an associated management group populated not only with those with expertise but who also represented the views of their partner site. The Joint Management Group (JMG), with Chairs of these management groups and Partner Leads from each site, has overall management responsibility of the ALPS programme and makes collective decisions on behalf of the collaboration. Partners were therefore developing both embedding strategies within their own HE institution (pedagogical) but also for a method of working across ALPS to effect these changes (operational).

As evidenced in the ALPS bid the mobile technology was to support students' learning and assessment and therefore pedagogical considerations/findings would drive the requirements for the mobile technology. In order to embed the changes to assessment partners have further developed their own learning, teaching and assessment strategies.

At York St John University the potential of mobile technology to engage students in formative assessment while they are on placement has led to an interest in developing an "Intensive Care" approach for students struggling to meet learning outcomes. Historically, early identification of students who are at risk of failing a placement has been difficult, ALPS technology has provided the opportunity for students to be engaged in diagnostic formative assessments and receive timely, personalised feedback.

The focus on client-centred practice has ensured that the perspective of users and carers has always been central to the education of occupational therapy students at York St John University. Currently the user/carers perspective forms an important element of students' reflection on their competence that is recorded in their Personal Development Portfolio (PDP). Strategies for using electronic Personal Development Portfolios (eg PebblePad) in the curriculum have been developed alongside the use of mobile technologies to capture user carer feedback in a way that can be used as part of the formal assessment process in the future.

ALPS has also provided knowledge to York St John in their choice of VLE for the institution. Their decision to adopt Moodle has been strongly influenced by the fact that it is considered mobile-friendly supporting the development of a strategy which will enable students to become 'mobilised'. Staff also report that the early ALPS pilot and parallel projects were important in raising interest and influencing colleagues who had previously not been engaged with mobile learning innovation.

During the ALPS programme, the University of Huddersfield has significantly shifted their strategy to explore, develop and embed flexible forms of delivery at school level. Their reliance on Blackboard as the vehicle for remote contact limits the use of mobile technology at the moment, but they remain committed to finding solutions that allow mobile technology to reach its full potential. At university level significant developments are ongoing regarding IT-enabled learning, teaching and assessment, and ALPS has, and continues to, influence this growth.

As discussed earlier in this report, the IT Group was established to "develop a vision for the use of mobile technologies to deliver best practice in assessment and learning in practice settings in five years time". Its remit also included "To recommend requirements for hardware, software, training and processes to help deliver the vision for, manage the risks of and exploit the opportunities for the use of mobile technologies" across all partners. Members of this Group have included IT operational staff, learning technologists and senior managers involved in the development of institutional mobile learning strategy. Through this mix of staff ALPS aimed to address both the functional requirements of integrating ALPS systems with existing partner IT infrastructures, and also provide innovative ideas to the members who are senior staff in order that ALPS could be used to inform and shape their own institutional strategies.

For instance, at Leeds Metropolitan University, priority six of the Information Strategy Priorities 2008-9 is:

"Extending research into mobile learning and working solutions to inform future priorities for Information Strategy drawing on the CETL ALPS outcomes"

ALPS has been able to influence and position itself within learning and teaching, information technology and (to a lesser extent) estates strategies.

ALPS' supports the University of Leeds Learning and Teaching Strategy (2006-11) (University of Leeds, 2006) priority to "develop and implement blended learning to enhance learning and teaching" and the following Strategy Map themes:

- *Deliver excellent and inspirational learning and teaching (T7)*
- *Provide an exceptional student experience (T8)*
- *Provide first-class facilities (E2)*

The principal vehicle for developing and delivering blended learning is the University's Virtual Learning Environment (VLE) – Blackboard – in use since 2007. The five year vision for the VLE (University of Leeds, 2007) recognises the importance of mobile technologies in the future development of the VLE.

ALPS influence has been effective in influencing and contributing to projects that aim to integrate learning and teaching, information technology and estate strategies. The Space2Learn review (University of Leeds, 2008) endorsed by the University of Leeds' Learning and Teaching Board in 2009 investigated the future of student computing and its relation to the provision of learning and teaching spaces in the University. Its recommendations included a..." review of use and potential use of technology and

mobile devices to develop a strategy on their use to enhance the learning and teaching experience”.

Clearly to embed the ALPS mobile technology within the IT and e-learning strategies they would need to be scaleable and transferable across partner institutions. The capital award which was made as part of ALPS funding was finite and to sustain this part of the programme, an institution would have to adopt, if not all, then aspects of the mobile technology implementation. As well as partners' own dissemination and engagement activities for this work, ALPS hosted a number of meetings for partner senior managers. These meetings were held at strategic times in the ALPS programme to engender debate about the various options available to partners and to encourage the sharing of ideas as to what they might implement and how.

In April 2008, an IT strategists' meeting was held with the aim of examining the challenges of embedding the outcomes of ALPS and to develop strategies which would enable the mobile technology aspects of the ALPS programme be taken forward. To put the timing of this meeting in context, this was a year after the IT pilots had taken place and the tender for solution was published. This meeting included discussion on:

- mobility
- network access
- portable devices
- security
- information resources such as repositories
- teaching and learning management systems

and attempted to determine the strategic issues in moving these solutions in to the individual university mainstream provision. The target audience was senior managers from each partner involved in the strategic direction for IT and e-strategy. Those who attended included heads of IT, directors of learner support services and network management. A number of the commercial mobile technology and system providers attended. The outcome of this meeting was that key partner IT strategists, as opposed to ALPS partner staff, were made aware of the challenges their institution faced regarding embedding ALPS including:

- ensuring that the technology supports student learning, including support services
- who pays for what when the ALPS programme ends
- how to ensure the best deal (financial, upgrades, student perception versus device control issues, etc) with technology providers
- whether to progress this work post-2010 as a collaboration or institution-independent

The meeting also provided the opportunity for partners to articulate institutional requirements in order that the combined negotiating power of ALPS was well-informed and directed appropriately.

A second meeting for academic strategists (Pro-Vice-Chancellors for Learning and Teaching, members of the ALPS Advisory Board, Partner Leads and Chairs of ALPS Groups) was held in October 2008 with the aims of identifying and developing strategies to embed and sustain ALPS work at partner institutions. On this occasion, partners worked in their own institutional groups, as opposed to working collaboratively,

discussing the following questions in relation to learning and assessment, assessors in practice and mobile learning:

- What else do you need to embed?
- What are the issues to this embedding?
- What strategies can be adopted to overcome these issues?
- What else needs to be done to sustain the work of ALPS at your institution?

A major concern from the partners was the need to develop realistic costing models for mobile services and to identify potential savings from current support practices if they were to be able to make a strong case to secure funding for on-going developments after 2010. Again, the issue here is of mobile technology/airtime providers offering realistically priced services which would be scaleable across universities, or alternatively, devising a package for students whereby they would use their own devices but having airtime provided.

From early in the programme all partners have undertaken dissemination of ALPS to institution senior managers who could champion the work within their HEI. This has been essential in providing ALPS with both a profile and a lead to others towards adoption. Partners' work in dissemination has also included other pedagogical aspects which the mobile technology has facilitated. ALPS work is based on having developed interprofessional competency maps against which students are assessed. ALPS have revised these maps in order that any subject or profession could use them with students alongside the processes by which both the maps and the assessment tools have been developed with the 16 professions. There are many aspects of this work: skills development and measurement, the processes to develop these tools and the collaborative working, which have been demonstrated to others in order to encourage adoption. Providing the context in which mobile learning and assessment might be undertaken has enabled others to see the potential for such working.

A third type of engagement for embedding at an institutionally strategic level was the partner-only hosted events. All partners have either held or contributed to events to which they invited staff from across their university who were enthusiastic and innovative proponents of learning and teaching. Identifying staff within schools who were aware of innovative methods of learning and had the ability to vision implementation and embedding within their own discipline was a method of simultaneously effecting change both strategically and operationally.

Recommendations

- Collaborative projects take time to establish trust between partners. Decision-making before trust is established is slow as partners seek to ensure their interests are represented.
- For projects which intend to effect significant change ensure that senior managers who can lead the change are involved in strategy discussions and decision making from an early stage.
- In order to influence and gain support from senior managers ensure they receive regular communication about the project, with occasional, face to face update meetings.

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- In collaborative projects allow time and space for individual units, in ALPS case the five universities, to develop their own strategies to ensure sustainability and embedding. Not everything has to be collaborative.

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14. Glossary of Terms

ALPS - Assessment & Learning in Practice Settings

ALPS Assessment Suite – an IT solution which enables the creation, distribution and collection of assessment tools integrated with an e-Portfolio system

ALPS Common Competency Maps – identify and define standards of performance and behaviour agreed by all ALPS stakeholders

ALPS Core Team – central team of staff who support the management and working groups in their achievement of ALPS' core work and outcomes

ALPS Helpdesk – student and staff helpdesk based at University of Bradford

ALPS Mobile Assessment Client – software which manages and displays the ALPS Assessment Tools on mobile devices

ALPS Mobile Services Platform – supports device management, content distribution and submission and security

Blackboard - a proprietary virtual learning environment

Blog – An online journal or diary, shortened form of 'web-log'.

Bluetooth – an open wireless protocol for exchanging data over short distances

CETL – Centre for Excellence in Teaching & Learning

Compendle – part of the ALPS Assessment Suite which creates packages of learning material and assessments for distribution to SCORM compliant products

DigiTool™ - a system which allows management of and access to digital resources

ecommet – ALPS commercial partner

e-Portfolio – online portfolio system which enables students to store evidence of their learning

Flickr – Online photo management and sharing application

HE - Higher Education

HEFCE – the Higher Education Funding Council for England

HEI - Higher Education Institution

ICT – Information and Communication Technologies

Intellisync – mobile device management and synchronisation solution

IntraLibrary™ - manages digital content including documents, presentations and animations

IT – Information Technology

Jorum - a free online service providing access to teaching and learning resources, for teaching and support staff in UK Further and Higher Education Institutions. Jorum stores open educational resources using a Creative Commons licence

LDAP - Lightweight Directory Access Protocol

LUDOS – University of Leeds management of and sharing application

Meta data – supporting information for a digital object

MIDESS - Management of Images in a Distributed Environment with Shared Services

Mo-blogging – Inputting 'blog' entries from a mobile device

MyKnowledgeMap (MKM) – ALPS commercial partner

OGC - The Office of Government Commerce

PDA – Personal Digital Assistant

PIN – Personal Identification Number used to authenticate user to a system

Reload – JISC-funded focusing on the development of tools based on emerging learning technology interoperability specifications. The project aims include facilitating the creation, sharing and reuse of learning objects and services

RLO - Reusable Learning Object

SafeGuard – data encryption and security software

SCORM - set of technical standards for e-learning software products which enables interoperability with other types of e-learning software

Service User – a person using a health or social care service

Shibboleth - Standards based, open source software package for web single sign-on across or within organisational boundaries.

SIM – Subscriber Information Module, a programmable card that stores a mobile phone subscriber's personal information and phone settings

SME – Small and Medium Enterprises

SMS - Short Message Service – text messaging via mobile devices

VLE - Virtual Learning Environment

WebCT – now owned by Blackboard, a proprietary Virtual Learning Environment

Weblog – a website with contributions from one or multiple individuals

WiFi – WiFi enabled allows connection of a device via a wireless network to the internet

WiMax - Worldwide Interoperability for Microwave Access

ALPS Implementing a large scale mobile learning programme

YSJ DigiRep - a digital archive at York St. John University

2G - 2nd generation cellular telecoms network

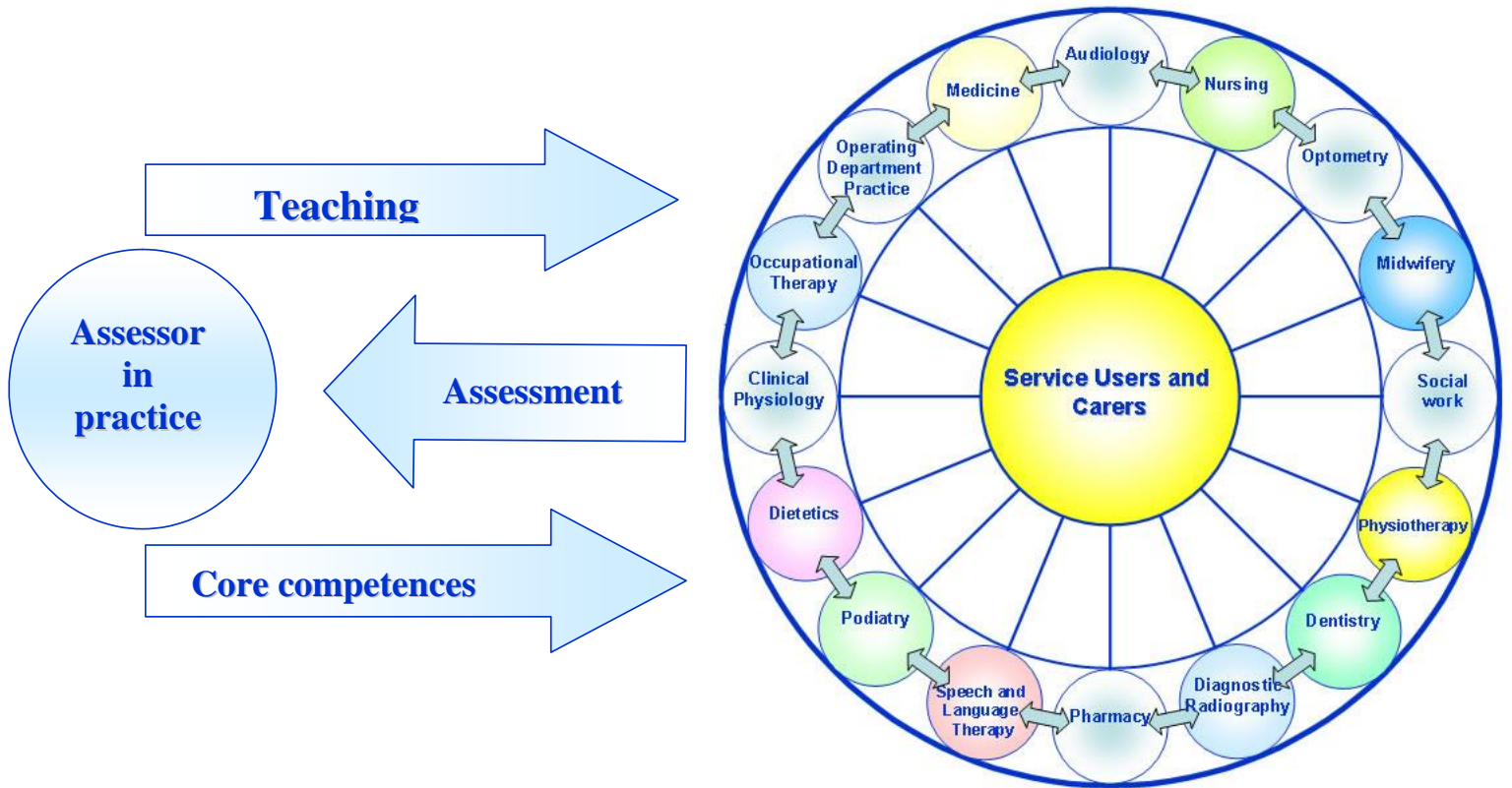
3G – 3rd generation cellular telecoms network

3G HSDPA – 3rd generation cellular telecoms network incorporating high-speed downlink packet access

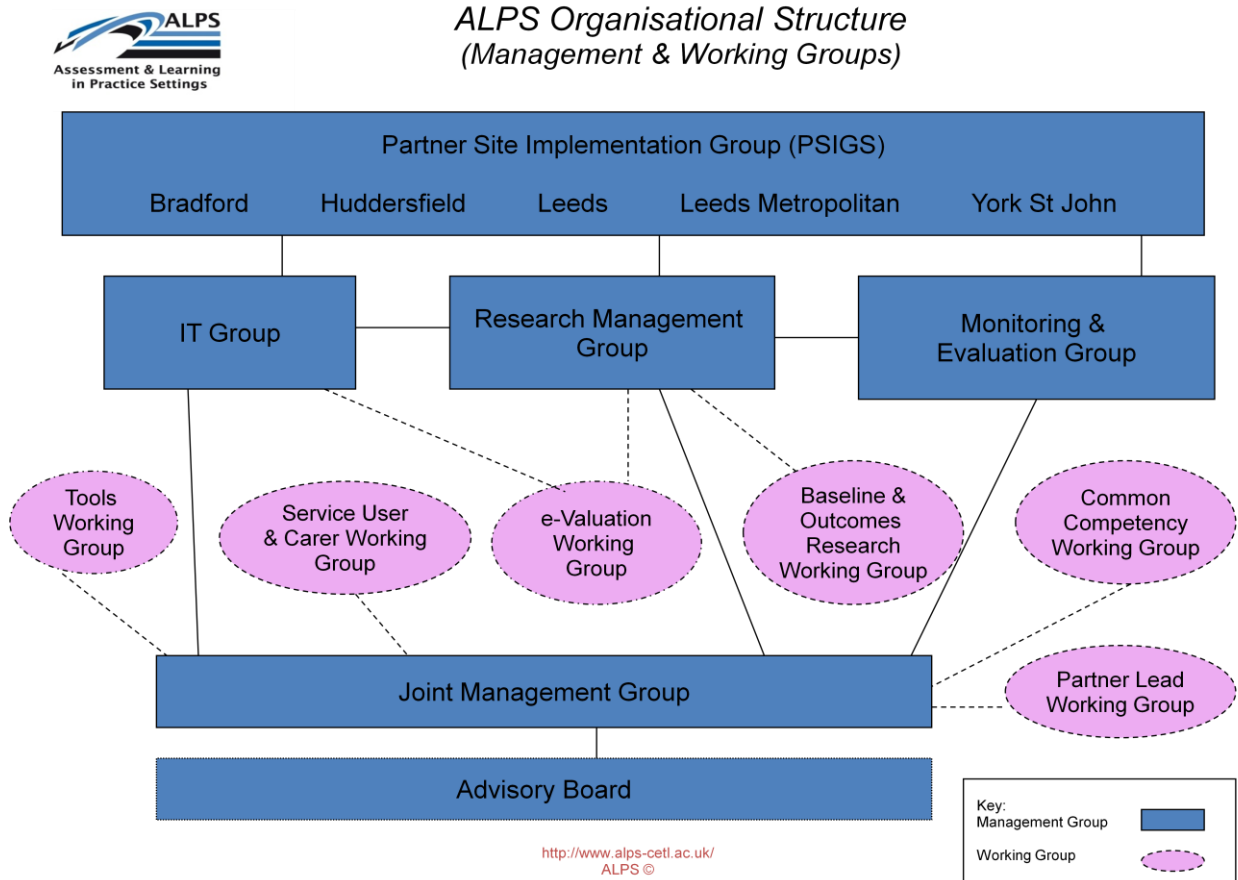
A variety of websites, including proprietary ones, were quoted in the compilation of this glossary.

15. Appendices

Appendix A: ALPS Professions Wheel



Appendix B: ALPS organisational chart



Appendix C: Student Contract of Use

ALPS and Partner Institutions Mobile Devices A Contract of Use for Students

Using the Device in Practice Settings

Devices must be used sensibly in a responsible manner in accordance with the guidelines you have received from your University programme manager ¹. Your programme manager will always tell you whether you may use the photo, video or audio function of the device in a practice setting. Do not use these functions unless you have been given permission, there are very specific reasons for doing so, and it is in agreement with your practice educator. Patient or Service User identifiable material must not be recorded without permission. The consent of the patient or service user must always be obtained in such a situation. Staff in the practice setting may request you to stop using the device at any time, due to a variety of circumstances. You must respect this request.

You must ensure that your device use does not disturb, distract or distress peers, other members of staff or service users and their visitors.

If you wish to undergo an assessment you must seek permission from your assessor and the patient or service user that you are examining. You must adhere to the permissions process explained to you at induction, i.e. filling in the appropriate section of the form on your device and also ensuring that this is recorded in the patient's notes.

If you are found using these functions without permission, or if there is evidence that you HAVE used these functions inappropriately, the device will be removed from your possession.

Caring for the Mobile Device

The device remains the property of the University and you agree immediately to return the device to the University upon request. If you should leave your programme of study, for whatever reason, please return the mobile device to your course tutor.

The Mobile Device that you have been given is a valuable piece of equipment and you will be expected to take the utmost care of this device. Whilst we want you to make the best use of the device please be conscious and aware of when and how you are using it. Don't make yourself a target. Please note that the device is not insured so you may wish to check your own personal insurance cover, in the event of the device becoming lost or damaged.

If your device is lost or stolen or for any other reason no longer under your control you must immediately inform the ALPS helpdesk:

Telephone Number 01274 XXXXXX

Email address ALPSHelp@Bradford.ac.uk

Hotmail for instant messaging ALPSHELP@Hotmail.co.uk

¹ Your University may use different terminology for this role. Please ensure you understand who this is before you take your device in to a practice setting.

Please note that when your device is reported missing; the device will be wiped and disabled remotely. This means that if you report your device missing and then find it again you will lose all the data which is not backed up on a computer. It is therefore important to ensure that you back up the files stored on your device as regularly as possible and do not report the device missing unnecessarily. If you have any doubts please inform the helpdesk on reporting that the device is missing so that they can take appropriate action.

General Use of the Mobile Device

With the device, you will have connectivity to the internet through the TMobile 3G Service. The parental controls normally associated with this connection have been removed on the grounds that everybody is over 18 years of age and may need to connect to social networking sites and software. Use of the device is subject to your University IT usage policy. You can receive phone calls and text messages on the device but not send them.

The data connection has unlimited data capacity but does have a fair use policy. The data capacity you will be expected to use both for your course and for your personal use will be well within these limits. Personal use of the device is encouraged as long it is done sensibly. The TMobile “Fair Use” policy specifies a 1GB per month maximum data transfer policy.

As an idea of sensible use of this maximum you will be able to download some video learning objects each day, deal with all your email messaging, deposit any reflective thoughts in your eportfolio, connect to a social networking site and take and upload several photos. Your course work will not require you to exceed any limits.

You will exceed this limit if, for example, you use the device as a modem for your laptop and download full size videos all day and every day. If you have any concerns about using the mobile device you can get further information on this from the ALPS help desk.

Data Protection

Without prejudice to other access rights existing under the law you specifically agree that **UNIVERSITY NAME** University and its ALPS collaborators may monitor your use of your device where there is reasonable suspicion that you are using the device in an unauthorised manner.

Given that you may be storing very sensitive personal data on your device you must ensure that the device is always kept secure and not accessible to others. In particular you must always:

- access the device using the access code given to you;
- keep the device in a secure environment on your person or safely locked away (never leave the device unattended or put on public display);
- delete all personal information (including photos and videos) immediately after use;

- immediately inform the Alps helpdesk if for any reason the device is no longer in your control
-

You must comply with the **UNIVERSITY NAME** Data Protection Policy which can be downloaded from:

[LINK TO ONLINE COPY OF DATA PROTECTION POLICY](#)

and more generally data protection law. You agree that in accordance with the Third Party Rights Regulations 1994 that the University of Bradford or any other party hosting data that you have sent may rely upon your commitments under this Agreement as if they were a further contracting party.

I agree that I will comply with the terms and conditions outlined above.

Signed: _____

Print Name: _____

Dated: _____

Appendix D: Student Guidance on Recordings

To be issued to Partner Leads who will customise for their own institution in discussion with placement providers

ALPS Guidance for students on storage and deletion of recordings involving service users/carers

This document is issued by Assessment and Learning in Practice Settings (ALPS) to provide students with guidance on the basic principles of the storage and deletion of recordings on their Personal Digital Assistants (PDAs) taken whilst on practice placement. The guidance provided is superseded, at all times, by the policies of the trust/placement provider in which the student has their placement and should be acted upon under the guidance of their practice educator/assessor. Students should seek advice from their practice educator/assessor if they are unsure of any aspect of their placement.

Students will be given induction by both their own university and their practice placement provider which will clearly state that the student adheres to the policies and procedures of the placement provider. This will include instruction about the appropriate process to follow to gain permissions which may be required from staff and service users/carers. For example the use of consent forms – see below.

The PDAs provide students with the opportunity to use recordings of their performance as evidence of their competency. However, the requirements on all agencies to seek service user/carer informed consent and the ability to delete such recordings should a subsequent request be made, act as a warning that students should not rely on these recordings as the only form of evidence.

Guidance for storage and deletion of recordings

- PDAs must always be password protected and you should not tell anyone else your password. Your PDA should have the encryption software downloaded before using for recording purposes in practice areas. For example “Safeguard”
- You should take care where you view or listen to any recording which involves service user/carer images or information. You should ensure that the recordings cannot be seen or overheard by anyone else
- If you have permission to keep the recordings you should upload them only to your university secure server **and nowhere else**
- Your programme manager ² will advise you about the acceptable period for which you may keep a recording. Unless you are told otherwise, you should not keep a recording on PDA for longer than one week.

General guidance for use of PDAs in practice

- PDAs must be used sensibly in a responsible manner in accordance with the guidelines you have received from your University programme manager
- Your programme manager will always tell you whether you may use the photo, video or audio function of the PDA in a practice setting. Do not use these functions unless you have been given permission. There are very specific reasons for doing so, and it is in agreement with your practice educator/assessor. Service user/carer identifiable material must not be recorded without permission. The informed consent of the service user/carer must always be obtained in such a situation. Staff in the practice setting may request you to stop using the PDA at any time, due to a variety of circumstances. You must respect this request
- You must ensure that using your PDA does not disturb, distract or distress peers, other members of staff, patients, service users, carers or their visitors
- If you want service user involvement in your assessment, using the PDA, then you must seek permission from your practice educator/assessor and the service user/carer who

you are wishing to involve. You must adhere to the permissions process explained to you at induction, i.e. filling in the appropriate section of the form on your PDA and also ensuring the fact that the service user has been involved in your assessment is recorded in the service user's notes.

If your PDA is lost or stolen or for any other reason no longer under your control you must immediately inform the ALPS Helpdesk:

Telephone number 01274 XXXXXX

Email address ALPSHelp@Bradford.ac.uk

Hotmail for instant messaging ALPSHELP@Hotmail.co.uk

Please note that when your PDA is reported missing; the PDA will be wiped and disabled remotely. This means that if you report your PDA missing and then find it again you will lose all the data which is not backed up on a computer. It is therefore important to ensure that you back up the files stored on your PDA as regularly as possible and do not report the PDA missing unnecessarily. If you have any doubts please inform the Helpdesk on reporting that the PDA is missing so that they can take appropriate action.

¹ In the context of this document recordings are photographs, and video and audio recordings

² Your University may use different terminology for this role. Please ensure you understand who this is before you take your PDA in to a practice setting