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Table of Contents

NB: This table of contents 'auto-populates' - to update the table of contents – place cursor in the table of contents, right-click your mouse, click 'update field', select appropriate option

1) ACKNOWLEDGEMENTS ............................................................................................................................ 4

2) REPORT SUMMARY .................................................................................................................................. 4
   2.1 PROJECT OVERVIEW ........................................................................................................................... 4
   2.2 PROJECT OUTPUTS .................................................................................................................................. 4
   2.3 IMPACT AND BENEFITS TO THE COMMUNITY .................................................................................. 6
   2.4 MAIN LESSONS LEARNT ...................................................................................................................... 7

3) MAIN BODY OF REPORT ........................................................................................................................... 8
   3.1 WHAT DID YOU DO? (METHODOLOGY) ............................................................................................. 8
      3.1.1 Project Context ............................................................................................................................... 8
      3.1.2 Aims and Objectives ...................................................................................................................... 9
      3.1.3 Pilot Activities - Fieldtrips ............................................................................................................ 10
      3.1.4 Pilot Activities - Placements ........................................................................................................... 13
      3.1.5 Main Phase Developments - Fieldtrips ......................................................................................... 15
      3.1.6 Main Phase Developments - Placements ..................................................................................... 25
      3.1.7 Project Methodology ..................................................................................................................... 27
   3.2 WHAT DID YOU LEARN? .................................................................................................................... 29
      3.2.1 Fieldtrips ....................................................................................................................................... 29
      3.2.2 Placements ..................................................................................................................................... 35
      3.2.3 Project Wide Themes ................................................................................................................... 37
   3.3 IMPACT .................................................................................................................................................. 37

4) CONCLUSIONS & RECOMMENDATIONS ............................................................................................... 39

5) IMPLICATIONS FOR THE FUTURE ............................................................................................................ 40

6) REFERENCES ........................................................................................................................................... 42
1) Acknowledgements

This project was part of the Transforming Curriculum Delivery through Technology programme and was funded by JISC. We would like to thank our critical friend, Andrew Comrie, for his valuable contributions and insight, and also all of the staff of our fellow projects of Cluster B, with whom we had enjoyable discussions, visits and feedback. We also recognise the valuable input we had from JISC staff and others in providing feedback and support, and especially that of the JISC programme manager Lisa Gray. We would also like to thank the staff and students at DMU and KU who supported the project including those who sat on the project board including Professor Barry Mitchell, Professor Mary Stuart and Michael Hill.

2) Report Summary

2.1 Project Overview

The MoRSE project built on the expertise developed by Kingston University in the pedagogy and practice of mobile technologies in the curriculum, and allies this to the expertise of De Montfort University in Web 2.0 tools and approaches, to develop a situated understanding of the impact of the tools on student practice, beyond the institution, and the concomitant impact on institutional processes. This study has been undertaken in the context of two distinct disciplines (Geography and Pharmaceutical & Cosmetic Science) and two ‘beyond institution’ environments (fieldtrips in Geography and placements in Pharmaceutical & Cosmetic Science)

Student fieldtrips were run to many national and international destinations, where both institutional and personal and mobile technologies were used to support learning and learning activities. These technologies were also investigated in terms of student placements. The placement curriculum was also redesigned to incorporate reflective learning activities, a University Certificate in Professional Development was validated, and a placement year run and evaluated.

The mix of private and public tasks, institutional and third party environments and technologies has been complex across both placements and fieldtrips. Preparatory activities have been important and many lessons have been learnt with regard the effective use of technologies to support remote learners.

2.2 Project Outputs

- Validated UCPD
- Reflective learning embedded within placement curriculum
- Enhancement of student learning and development during placement and fieldtrips.
- Enhancement of staff practice in supporting placements and fieldtrips supported by workshop activities.
- Use of student-generated information as part of guidance for prospective placement students.
- Enhanced preparatory activities and resources for students going on placement and attending a fieldtrip.
- Implementation of Student mentor support on Geography fieldtrips.
- Dissemination of information via MoRSE blog and DMU-hosted meetings.
• Multimedia presentation of the development of a Twitter mash-up collaboratory
  http://blogs.kingston.ac.uk/morse/2010/10/22/geocollaborative-twitter-map-used-on-
  malta/
• Screen video with audio commentary describing key aspects of establishing a field
  based GIS server (using professional GIS software from ESRI).
  http://blogs.kingston.ac.uk/morse/2010/10/22/a-demonstration-of-moving-data-from-
  desktop-to-server-to-mobile-gis/
• Review of Mobile phone based technologies for supporting student learning on
  fieldtrips and other locations remote from the institution.
• Introduction to Personal Technologies on Field Trips Guide
  (http://blogs.kingston.ac.uk/morse/2010/10/29/morse-guides-to-personal-
  technologies-on-fieldtrips/)
• Mapping Photographs and other Resources Guide (see link above)
• Sharing Photographs Guide (see link above)
• Georeferencing Photographs Guide (see link above)
• Baseline Technology Survey http://blogs.kingston.ac.uk/morse/2010/10/31/students-
  personal-technologies/
• Multiple papers presented at national and international conferences:
  o Andrew, M. February 2009 'Mobilising Remote Student Engagement using mobile
    and Web 2.0 technologies: initial perspectives' at the IADIS (International
    Association for Development of the Information Society) International Conference
    on Mobile Learning, Barcelona.
  o Downward, S. & Field, K. March 2009 'Mobile communications support for aiding
    geography fieldwork' at the Annual Meeting of the Association of American
    Geographers, Las Vegas.
    (http://communicate.aag.org/series/aag_org/program/AbstractDetail.cfm?AbstractID
    =25051).
  o Downward, S., Linsey, T., and Ooms, A. 2010 Learning support by mobile
    technologies on GEES fieldwork, GEES Learning and Teaching 2000 to 2020 10th
    Anniversary Conference, Plymouth, UK
  o Field, K. March 2009 'Using GIS and Mobile Technologies for Fieldwork in
    Geosciences' at the Annual Meeting of the Association of American Geographers,
    Las Vegas.
    (http://communicate.aag.org/series/aag_org/program/AbstractDetail.cfm?AbstractID
    =25272).
  o Field, K. And O'Brien, J. July 2009 GIS in the outdoors: Progressing fieldwork in
    geosciences, Presentation at the 9th Annual ESRI Education user Conference, San
    Diego.
  o Field, K. S. and O'Brien, J. (2010) Cartoblogging: experiments in using and
    organising the spatial context of micro-blogging, Transactions in GIS, 14 (s1), pp5-23.
    social networks through spatial representation, Proceedings of the GIS Research UK
    18th Annual Conference, pp209-215
  o Field, K. And O'Brien, J. 2010 Deploying innovative mobile learning environments in
    the geosciences, GEES Learning and Teaching 2000 to 2020 10th Anniversary
    Conference, Plymouth, UK
  o Field, K. S. and O'Brien, J. (2010) Developing methods and workflows to support
    mobile learning for GIS fieldwork, invited keynote presentation at the ESRI UK
    CHEST user conference, 23rd September 2010
    effective learning environments with mobile GIS, Proceedings of the GIS Research
    UK 18th Annual Conference, pp447-454
  o Hall, R. & Linsey, T.K. 2010 MoRSE, JISC Elluminate Wednesdays online seminar
    (Presentation and audio available via the project blog and at
    https://sas.elluminate.com/mr.jnlp?suid=M.CCF6A4B32AF0E603053ED269292EB1)
2.3 Impact and Benefits to the Community

Both fieldtrip and placement students reported positively on the impact of the project innovations on their learning and motivation. The mix of private and public tasks, institutional and third party environments and technologies has been complex across both placements and fieldtrips.

The GIS students responded positively to the implementation of the institutional ‘GIS laboratory in the field’, especially in its ability to reduce the time between the collection of primary data and its analysis and being able to complete projects while still in the field. All fieldtrip cohorts appreciated the role that personal technologies could play in enhancing their participation in learning activities, and there was significant engagement with the GIS Collaboratory mashup. The placement students highly recommend the placement year, and although they found the concept of reflective writing difficult to pick up at first they came to realise its value in enhancing their learning. The development and implementation of the UCPD acted as a motivator for students and led to reflective learning being embedded more firmly within the placement curriculum.

Academic staff approaches have developed including skills concerning reflective learning and its assessment, and with regard the role that personal and mobile technologies can play in enhancing student learning.
2.4 **Main Lessons Learnt**

The mix of private and publics tasks, institutional and third party environments and technologies has been complex across both placements and fieldtrips. Specific issues have included employer concerns over confidentiality; data protection issues; and student concerns over privacy and control of their technologies.

Contextualisation, and scaffolding the experience, is the key determinant of technologies to use.

Other key headlines include:

- Students prepared to take personal technologies on field trips
- Students did not use their personal technologies for learning activities unprompted.
- Students reluctant to use technology unless it had a perceived benefit
- Key Importance of Preparatory activities and support, though need varied across cohorts
- Positive impact of student mentors on field trips
- Sustained student use of personal technologies
- Demonstrable Impact of Personal Technologies
- Technically and logistically feasible to migrate a GIS laboratory to the field.
- GIS laboratory in the field – Benefit to Learning
- Minimising the time period between data collection and analysis
- Lessons on balancing the mix of Institutional and personal Technologies
- Lessons on Personal versus social learning
3) Main Body of Report

3.1 What did you do? (Methodology)

3.1.1 Project Context

The MoRSE project built on the expertise developed by Kingston University in the pedagogy and practice of mobile technologies in the curriculum, and allies this to the expertise of De Montfort University in Web 2.0 tools and approaches, to develop a situated understanding of the impact of the tools on student practice, beyond the institution, and the concomitant impact on institutional processes. The two key areas of student practice beyond the institution being addressed by the project are that of fieldtrips and work placements. The fieldwork component of the project was centred in the School of Geography, Geology and the Environment at Kingston University, with the school running 15 national and eight international fieldtrips each year, ranging in length from one day to two weeks. The placement component of the project was focussed in the School of Health & Life Sciences at De Montfort University on the Pharmaceutical & Cosmetic Science (PCS) course.

There is nascent work being undertaken on practice-based curricula, in order to develop a series of case studies of learner engagement. This enhances the personal-support and institutional-readiness precepts highlighted in the QAA code of practice for work-based learning. However, there is little evidence of how Web 2.0 tools are being integrated with the learner’s own mobile technologies, to deliver a personalised learning experience, which is integrated within a situated, social learning context. Moreover, there is little evaluation evidence for the impact of these tools on the delivery of meaningful curricula. In the case of Geography the wider issue of technology use in the field has been has been discussed in the literature with, for example, Fletcher et. al. (2007) noting an “absence of a widespread pedagogic drive for the use of C&IT in fieldwork”. They further note however that the value of technologies on fieldtrips has not been investigated properly while exponents have reported improvements in factors such as engagement and ‘deeper preliminary learning’. Teeuw et al. (2005) identified the role of technologies in challenging existing fieldtrip practices and supporting the development of new approaches. Technological developments (e.g. wireless technologies) coupled with decreasing costs for hardware and software has also enhanced the potential for using sophisticated technologies in the field with large cohorts (Field et. al, 2005).

The delivery of a situated curriculum for students working beyond the institution in practice-based environments is critical (Knight & Yorke, 2004). The QAA Earth Science subject benchmarks state the importance of field-based studies in enhancing skills in team working, problem-solving, self-management and interpersonal relationships (QAA, 2007a). Fieldwork in the Geography discipline is seen as essential providing engagement with the real world through experiential and active learning (QAAb, 2007; Dummer et. al. 2008 after Gibbs, 1988). This is in contrast with some critiques of fieldwork where “the dominant style of fieldwork which has developed is the excursion-type, commonly called the "Cook's Tour" which is characterized by a didactic/instructive teaching approach with passive student interaction” (Hawley, 1996, p243). More recently Herrick (2010) raises further concerns that

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2 Learners' experiences of blended learning environments in a practice-based context (PB-LXP), [http://www.jisc.ac.uk/whattwedo/programmes/elearning_pedagogy/elp_phxpx.aspx](http://www.jisc.ac.uk/whattwedo/programmes/elearning_pedagogy/elp_phxpx.aspx)


“in the rush to impose risk minimisation strategies, and standardise the student fieldwork experience, provide value for money and entice students away from competitor courses with exotic locations, the far more fundamental pedagogic reasons for leaving the classroom behind are all often forgotten”.

Both the STAR (2008) and Learning from Digital Natives Projects (2008) have highlighted how skills may be developed informally, and how institutions need to develop broader and deeper social networks, amongst staff and students, in order to develop academic literacies. Yorke and Longden (2008) have also highlighted the impact of decision-making, new teaching styles, access to resources and social integration on the retention of first-year students. One approach for overcoming these issues is the development of strong, personal learning skills, and this is also true of fieldwork and placement students.

### 3.1.2 Aims and Objectives

The aim of the project was to develop a situated understanding of the impact of mobile and personal technologies on student and staff practices, beyond the institution, and on institutional processes. This study has been undertaken in the context of two distinct disciplines (Geography and Pharmaceutical & Cosmetic Science) and two ‘beyond institution’ environments (fieldtrips in Geography and placements in Pharmaceutical & Cosmetic Science). The key objectives are outlined below:

1. To understand how learners who are working beyond the formal institutional context currently achieve and what are key issues that both limit and promote this achievement.
   
   a. understanding current practice in terms of designing and implementing learning activities; identifying key challenges that students face;
   b. identifying the range and functionality of student personal technologies;
   c. understand how students use these technologies currently to support their studies and;
   d. how staff have used personal and web 2.0 technologies to support student learning.
   e. Identify the kinds of student-student, student-tutor and student-mentor interactions that are taking place.

2. To develop an understanding and models of how mobile and personal web 2.0 technologies can be efficiently, effectively and sustainably used to enhance learning and the learner experience in settings beyond the institution.
   
   a. Develop learning activities to address prior constraints and limitations, and review and develop new activities which may have been previously unfeasible
   b. Understand the potential for, and the mechanisms by which personal technologies encourage students to reflect on their learning and learner experiences.
   c. Develop approaches to building academic literacies that access informal skills developed through engaging with personal technologies
   d. Investigate how personal technologies can be used to enhance and develop communication, collaboration and interactions between students, students to tutors, and tutors to students.
   e. Investigate how personal technologies can be integrated in learning activities to maximise the impact of appropriate feedback on student progress.
f. Assess the willingness and ability of staff and students to engage with personal technologies as part of formal learning and teaching activities.

It was expected that the findings and outcomes from this work would inform practice within the specific disciplines, and then beyond the two disciplines in terms of the pedagogic contexts. Also important for the project was the potential for identifying cross-disciplinary commonalities with implications for wider impact.

Prior to the pilot activities a Baseline technology survey was undertaken with both the placement students and the fieldtrip students. The survey summaries are available via the following URL:

http://blogs.kingston.ac.uk/morse/2010/10/31/students-personal-technologies/

3.1.3 Pilot Activities - Fieldtrips

Fieldtrips were run to:

- Isle of Wight, October 2008 and repeated in October 2009, attended by first year Geography Environment, Geology, Environmental Hazards and GIS students
- Almeria Province, Spain, April 2009, attended by 2nd year Environment students taking the module 'Design and Management of Projects: Environment students'.
- Malta, June 2009, attended by 2nd year Geography students taking the module 'Design and Management of Projects: Geography students', 2nd year GIS students and GIS MSc students.

A number of activities and approaches were trialled using both personal and institutional controlled mobile tools and technologies:

a. GIS Technologies and integration of Social Media

Prior to the start of the project GIS students used specialist GIS hardware and software in the field to undertake a number of learning activities including land use mapping and large scale surveying. A core technology in the field was a PDA device integrated (by Bluetooth) with a GPS receiver. The PDAs ran specialist GIS software (ESRI ArcPad – widely used in industry) which allowed students to map and edit spatial data in the field. The benefit of this type of approach was that it provided GIS students with the benefit of field experience along with exposure to technologies used in industry. The software used was similar in look and feel to the desktop ArcGIS environment that the students are familiar with from work undertaken in the laboratory back at the institution. Limitations experienced though included:

- Limited collaboration between student groups in the field, especially in the case of specific learning activities. A key example being that of land use mapping where student groups were mapping contiguous field areas to produce a collaborative map.
- Students had access to staff at limited intervals during the day.
- Significant work required by students to process and share data using portable PCs
- Limitations to the analysis that can be performed in the field.

In preparation for the Malta 2009 fieldtrip (the first visit to the island since the start of the MoRSE project) a number of changes were made including the introduction of social media and the use of a text messaging service as described below. Twitter was chosen as the collaborative medium partly to help separate social and professional use (most students did
not have Twitter accounts) and the 140 character limit had a benefit in terms of succinct field notes and communications. Text messaging was explored as an alternative primary collaboration / communication tool but the particular service used required a web client to broadcast messages. In contrast Twitter’s API however was open and accessible and data was more easily exportable for later analysis.

As part of activity to identify land use change each student group was allocated a contiguous $4^2$ km field area which would be mapped using the GPS enabled PDAs. To support and enhance collaboration the team developed a ‘Collaboratory’ based on a Twitter mash-up. Collaboratories are shared virtual spaces supporting collaboration and may include data repositories, instrumentation and conversation spaces. There are many examples of Collaboratories described in the literature, in particular to support scientific research (e.g. Kouzes et. al. 1996; Russell et. al. 2001), though not for geographical fieldwork. When the term was coined today’s social media tools and their functionality were unknown but they do make it straightforward to create such spaces. The framework used for this Twitter mash-up was the #uksnow map (Marsh 2009). Students were asked to use the #malta09 hashtag in any learning contributions made using social media. In particular they were asked to use the following syntax for Twitter postings:

```
#malta09 [latitude] [longitude] [rating] text [twitpic URL]
```

Student postings were displayed in near real-time on the Google based map mash-up:

![Map Mash-Up](image)

Each student group was issued with a portable PC equipped with a mobile broadband dongle to allow then to view the map in the field and to mitigate international roaming data charges.

Student and staff feedback from this pilot launch of the Twitter mash-up included:

- Problem of spatially coincident postings (tweets)
- How to manage threaded discussion in this environment
- How to link tweets discussing similar concepts.
The GIS Team then used the September 2009 Isle of Wight fieldtrip to refine the approach in preparation for the Malta 2010 fieldtrip.

The term ‘Cartoblography’ was coined by the team to represent geographical mapping via Micro-blogging.

b. Text messaging activity and support (GIS and Geography Environment, Geology, Environmental Hazards Students).

Students were provided with a telephone number and a fieldtrip specific keyword linked to a specific in-box on a web-interfaced text messaging service. The service was used primarily to provide students with an additional channel of communication with staff located remotely. Staff were based in Kingston-upon-Thames having previously surveyed the field-sites so at the time of the SMS text messaging exchange had information regarding the landscape at immediate disposal (maps, photographs, etc.) in order to answer students’ site-specific questions.

Students were assigned to groups for the exercise to encourage peer learning and discussion concerning the field phenomenon and the questions they were answering. Group sizes were approximately five and, where possible, comprised students from each of the subject areas (GIS, Environment, etc.).

We discovered that students would tend to elect one person per group to ask the questions. Questions could generally be answered within five minutes – this was deemed desirable because otherwise the group may have moved from the field-site to another. Given that the take-up of this support service was generally low (most groups asked one question, but seldom two), answering questions in this timeframe was not problematic. Answers could also be in the form of a question to prompt the student groups to think and discuss the field phenomenon for themselves, occasionally prompting a second question.

c. Photographic data collection with Web based photograph sharing site (Geography students)

Students were asked to use their personal technologies to photograph specific features of interest in the field and upload these to a web photograph sharing service (Flickr) along with a narrative and specific search tags. This is particularly valuable as several field-sites were visited over the period of the fieldtrip. Students were instructed to provide a location-based tag (place-name), a theme-based tag (e.g. water management) and additional tags as they see fit. As part of the assignment students were required to explore field trip images uploaded by other students and append their own comments. An important aspect of this activity was that images were uploaded as the field trip progressed which had the additional benefit of allowing contributions by students not attending the field trip.

We make several observations based on the pilot study:

The requirement to tag and comment on the photographs uploaded was hoped to encourage better consideration of the field phenomenon being recorded. Previously we note that students have a tendency to acquire multiple photographs of a field-site without necessary considering the geographical and/or environmental significance.

Few students took the opportunity to actually upload photographs to Flickr. We suggest reasons may include: the upload was not in-situ but happened in the evenings back at the hotel, often at the end of a long day; students seldom saw the ‘assessment’ advantage of the
activity and typically believed that their time was more valuable reflecting/researching other aspects of the fieldtrip.

Internet-enabled laptops provided for Flickr uploads were more commonly used for uploading photographs and commentary on personal social networking sites.

d. Using Mobile and Personal Technologies to collaborate with students back at the institution and other remote locations

An initial assessment was made of mobile phones and their functionality including the use of third party applications. This was done to assess the capability of the ubiquitous personal technology in supporting field based learning activities, and the ability for students to collaborate at distance. This review covered sharing location, tracks, photographs, audio and live video. A summary of this initial review can be found at:

http://blogs.kingston.ac.uk/morse/2009/03/12/a-brief-review-of-mobile-phones/

e. Use of laptops with wireless internet connection for students at the hotel.

Prior to the project student access to the Internet in the evening during a fieldtrip was not provided consistently. However where possible this has been arranged with all hotels with additional charges paid where necessary. This was for the purpose of allowing student access to the Internet in the evening to access the institutional VLE and web resources. These included access to the Kingston University library to access academic journal material, practitioner-based web material (e.g. in Spain, the Ministry of the Environment website) and undertake more general research and support-based tasks

The ability to for students to blend their field-acquired learning experiences with information and data acquired via the internet was valuable. This is prompted where the assessments relating to the fieldwork activities (in this case the collection of student fieldwork notebooks) stated that we would be looking specifically for evidence of synthesis and discussion of the field observations.

Wireless internet facilitated activity (c) above by allowing students to upload photographs and video to a web-based photograph/video sharing site/s (e.g. Flickr).

Wireless internet allowed for digital social networking. Although this activity was not directly encouraged we observed that students used the opportunity to use the laptops and ‘free’ wireless internet for their social purposes.

3.1.4. Pilot Activities - Placements

Preparatory Placement exercises were run with academic supervisors and students ahead of the 2009/10 academic year. A curriculum redesign to incorporate reflective learning activities was completed along with an assessment made of technologies to support learners at a distance. In addition development was initiated of an accredited route for placement students through a University Certificate in Professional Development [work-based learning] worth 60-credits at Level 5.

a. Introductory workshops

Introductory workshops were run by for the students who would be going out on placement in 2009-10, as well as students returning from their placement during 2008-9. These sessions established the students’ expectations of placement learning and support, and their
capabilities and limitations with regard to the various technologies available for this. In addition the whole of the second and final years of the course was surveyed to find out the details of the students use of technology.

Five academic staff and two staff from the Faculty of Health and Life Sciences' Placement Unit supported the eight students from the Pharmaceutical and Cosmetic Science course who went on Placement in a range of settings. The eight students and the academic supervisors were trained on a range of read/write web tools to support reflection in practice. Academic staff have also been involved in professional development sessions, in order to focus their support for students around the use of multimedia, blogs and wikis to support reflection on placement.

b. University Certificate in Professional Development (work-based learning)

Work was started work on developing a University Certificate in Professional Development (work-based learning), in order that the students receive extra credit for the Placement (60 credits at Level 5). 30 credits is assessed via a technical report, which was the previous model for evaluating performance on placement. Additionally, 30 credits is based on a series of monthly, reflective tasks. The validation document for the UCPD mapped assessment tasks to learning outcomes, and also against FHEQ Level 5 descriptors.

c. Tool Selection

Mobile technologies have been considered in other placement contexts (e.g. for healthcare students, www.placementlearning.org/da.cfm?=46). The context for such trials is often practice-based learning which constitutes a substantial part of the student experience and is a requirement of their professional accreditation, and the placement provider plays a formal role in this professional development. The placements for Pharmaceutical and Cosmetic Science students takes place in a completely different environment, that of a high technology commercial company where there are frequently issues of commercial confidentiality. The decision was taken, after considering a variety of mobile and web 2.0 technologies, to use tools available in the institutional VLE (Blackboard). This was to reassure the industrial partners about the security of the systems being used, and it was considered that a community with restricted membership (the students, academic and other staff associated with the project, and industrial supervisors) on the University's secure Blackboard server offered the best solution. There was also the advantage that the students were familiar with the workings of Blackboard, although encouraged multimedia postings as well as traditional written ones were encouraged.

Following the pilot activities two main modes of communication were established, a collaborative wiki open to all participants, and personal blogs which were accessible only by the individual student, the industrial supervisor, and the academic staff.

d. Learning Task development

Two major categories of learning task were used: 'persona'l activities, where the student’s work was only available to the academic, and where necessary industrial, supervisors; and ‘public’ activities where postings were available for all students to view and comment on. There were two main channels for the student to post these activities:

- personal blog – visible to the student and academic supervisor only, but can be accessed by other members of the academic team or the industrial supervisor;
- public wiki for sharing, comment, critique of experiences.
The wiki had use as an information repository where contact details or information about the host company and location was posted, while the blog was used for messages and articles about various aspects of the students' placement learning. While postings were envisaged to be largely text-based, video and audio postings were encouraged, especially with the expected increase in familiarity of the staff and students with this mode of communication and the underlying technologies. The intention was to share these products with students who are considering placements in the following session, and it was proposed that a real-time or face-to-face meeting be held in January between current and future placement students.

The general activity structure was for the task in odd-numbered months to be a specific update on the student's placement progress, developing into a dialogue between the student and the academic supervisor where reflection on placement learning was developed. The even numbered months were collaborative tasks to build up a general collection of information about the placements and a series of impressions about the whole experience of moving to a new place and starting work in a different environment.

e. Administrative Issues

DMU academic supervisors considered whether a separate confidentiality agreement was needed between the students and their placement employer to cover any commercial confidentiality issues arising from the reflective tasks on placement. The conclusion was that the contract signed between student and employer was sufficient to cover both parties and frame the tasks that were undertaken in a public/private sphere. However, it was important that in the development of the UCPD, developments were made in partnership with both employers and the DMU Placement Unit, using established programme-team contacts. A negotiated and shared view was key to successful engagement in reflective learning moving forward.

### 3.1.5 Main Phase Developments - Fieldtrips

i. Preparatory Activities

During the pilot field trips there was an indication that the non-GIS students were tending not to use their personal technologies unless prompted by staff. There was also a sense from the pilot studies that students were not fully conversant with the technologies many of them have with their own personal mobile devices. The pilot studies also demonstrated to learn computer-based skills on the fieldtrip in tandem with acquiring geographical and/or environmental knowledge-based information was not ideal. Prior skill acquisition and training was deemed to be valuable ahead of the fieldtrip in the hope that students would put these skills into practice. Prior training was also believed valuable to underline the relevance of the exercises and how it may benefit them: for the specific upcoming fieldtrips (Spain for Environment students and Malta for Geography students) and transferrable lessons they could take into other areas of their geographical/environmental study, for example, skills acquisition for their independent research projects.

The GIS students however demonstrated on the Malta fieldtrips (2009 and 2010) that they were aware of the technology provided by their personal devices and incorporated it into their fieldwork activities where they identified a shortcoming in the provided equipment or where they felt they could obtain a competitive advantage. The GIS fieldtrip team therefore felt that any further preparatory support for students, especially in terms of the professional technologies and the collaboratory, could be integrated into learning activities on the fieldtrip.
It was therefore decided to run preparatory exercises and briefings for all Geography and Environment degree students in advance of further trips. A session was run on the 19th March 2010 for those attending Easter fieldtrips to Spain and Malta. The 5 hour session consisted of:

- Presentation on field techniques and the use of the field notebook. Field notebooks in the past have been of variable quality and we were keen to improve the protocols that the students use to record field observations. In particular, training was provided to underline the importance of cross-referencing acquired information, for example recording location (GPS), filename references to photographs, video and audio recordings.

- Overview on the potential of personal technologies on fieldtrips and how they might be used to enhance student contributions to learning activities.

- Field activity in the local area as a pilot training exercise to familiarise students with technologies and methods of use. Students worked in groups to promote peer learning (we discovered that some students take to the technologies much faster than others).

- Laboratory session and feedback. Students were provided with support in manipulating digital resources that they had captured.

- Students were given access to the devices (e.g. GPS, laptops) in advance of the fieldtrip and encouraged to practice and develop the acquired skills prior to leaving for their field destinations.

A decision was taken that these exercises would not be summatively assessed. Instead, staff emphasised that these skills were likely to have wider benefits to the ability to conduct the fieldwork tasks (and the summative assessments associated with these tasks) and the transferability of these skills to other areas of geographical and environmental study.

In addition to running preparatory activities it was considered that student mentors could also play a role in supporting students in their use of personal technologies on fieldtrips. This was a lesson developed from the pilot studies:

- Staff time is often spent dealing with academic knowledge-based issues and the logistics associated with running the fieldtrip. Students are encouraged to speak to staff regarding matters of geographical and environmental relevance. If staff are also in-field ‘instructors’ in technologies then time is compromised.

- Student mentors are ideally suited to the role: they can be selected from students one year above who are already familiar with the field-sites and it is hoped that they will be viewed as highly approachable with a certain informality that they may not perceive of staff.

Four final year students were appointed to attend the Malta and Spain field trips as student mentors. These student mentors participated in the preparatory exercises as well attended a further session to review their role and to receive further briefings.

Blog accounts on a University Wordpress server were established for every student including edit rights on two blogs formally linked with the Spain and Malta fieldtrips. Staff and mentors also populated this blog with material that was supportive of the wider learning aims of the fieldtrip/s in the hope that this would add relevance and provide a valuable incentive to participate.
In addition every student was provided with a briefing document (which has been subsequently further developed as a series of guides) and further online support resources are being developed.

The aim of the resource was to suggest the type of technologies students could use for specific purposes and act as a briefing for staff. For the Malta trip additional materials from ESRI Virtual Campus classes (available as part of the CHEST agreement) were used to prepare students for some of the software tools they would be using for data collection. The MoRSE team have continued to investigate potential personal and mobile technologies that could potentially be utilised by students to support their learning. A summary is provided in the following section:

ii. Review of Personal Technologies for Fieldwork

The following tables classify examples of mainly mobile phone based technologies by functions particularly relevant to geography fieldtrips: multimedia; location; mapping, sharing and support; and local information.

### Multimedia

<table>
<thead>
<tr>
<th>Function</th>
<th>Device</th>
<th>Example Applications</th>
<th>Analysis</th>
<th>Potential use and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dedicated device</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flip camera</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Youtube (<a href="http://www.youtube.com">http://www.youtube.com</a>) and Ustream – Live streaming. (<a href="http://www.ustream.tv/mobile">http://www.ustream.tv/mobile</a>)</td>
<td>Captions and annotations maybe added via Youtube website</td>
<td></td>
</tr>
<tr>
<td>Video / Live video streaming</td>
<td>Mobile phone</td>
<td>Youtube (<a href="http://www.youtube.com">http://www.youtube.com</a>) and Ustream – Live streaming. (<a href="http://www.ustream.tv/mobile">http://www.ustream.tv/mobile</a>)</td>
<td>Captions and annotations maybe added via Youtube website</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dedicated device</td>
<td>Youtube (<a href="http://www.youtube.com">http://www.youtube.com</a>) and Ustream – Live streaming. (<a href="http://www.ustream.tv/mobile">http://www.ustream.tv/mobile</a>)</td>
<td>Captions and annotations maybe added via Youtube website</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(e.g. Flip Camera)</td>
<td>Upload by MMS, mobile interface or mobile App (Android, iPhone) and Ustream – Live streaming. (<a href="http://www.ustream.tv/mobile">http://www.ustream.tv/mobile</a>)</td>
<td>Captions and annotations maybe added via Youtube website</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Camera</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


# Location / Mapping

<table>
<thead>
<tr>
<th>Location</th>
<th>Device</th>
<th>Example Applications</th>
<th>Analysis</th>
</tr>
</thead>
</table>
| Location | Mobile Phone Standalone e GPS unit | Google Maps ([http://maps.google.co.uk/maps?hl=en&tab=wl](http://maps.google.co.uk/maps?hl=en&tab=wl)) and available via many mobile phones. Location can be shared via email etc or through using Google Latitude. 
MapDroyd. Offline maps. Android App ([http://www.mapdroyd.com](http://www.mapdroyd.com)). | Google Maps Recording and sharing an observation point, site location etc. 
Maps based on Openstreetmap can be downloaded in advance of the fieldtrip. Especially useful in avoiding data roaming charges. Useful for address matching and geocoded field notes. |
| Bearing | As above | Compass ([https://catch.com/compass](https://catch.com/compass)). Android App. | Recording a compass bearing in addition to a location. Can be attached to a photograph taken at a given bearing. |
| Geo-coded Photographs | As above | Flickr ([http://flickr.com](http://flickr.com)) upload by App or email. Photographs can be geocoded at the point they are taken if using a mobile with integrated GPS. | Georeference stored within a JPEG photograph’s internal Exif file. See Georeferencing guide. |
| Geo-coded field notes | Mobile phone | Twitter ([http://twitter.com](http://twitter.com)) Catch ([https://catch.com/](https://catch.com/)) which can also be used with Compass. Also see Evernote ([http://www.evernote.com/](http://www.evernote.com/)) | Potential for taking field notes that can be stored with a grid reference, bearing and photograph, and shared in near real-
### Asynchronous Tracking / Mapping

<table>
<thead>
<tr>
<th>Software</th>
<th>Description</th>
<th>URL</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>My Tracks</td>
<td>Record GPS tracks with ability to set point interval. Save as GPX and KML files, upload to Google maps and share.</td>
<td><a href="http://mytracks.appspot.com">http://mytracks.appspot.com</a></td>
<td>Sharing mapping and routes, particularly useful in the absence of dedicated GIS hardware and software.</td>
</tr>
<tr>
<td>OSMTracker</td>
<td>Designed to be used with OSM but can be used for mapping.</td>
<td><a href="http://wiki.openstreetmap.org/wiki/OSMtracker">http://wiki.openstreetmap.org/wiki/OSMtracker</a></td>
<td></td>
</tr>
</tbody>
</table>

### Synchronous Tracking / Mapping

<table>
<thead>
<tr>
<th>Software</th>
<th>Description</th>
<th>URL</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instamapper</td>
<td>Blackberry, Android, iPhone. Records and share tracks / routes in real-time.</td>
<td><a href="http://www.instamapper.com">http://www.instamapper.com</a></td>
<td>Can be useful for sharing location with students for example working back at the institution who can provide resources based on location and feedback on sampling strategy etc based on being able to follow a live track.</td>
</tr>
</tbody>
</table>

### Sharing / Support

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>URL</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro-blogging</td>
<td>Twitter</td>
<td></td>
<td>Useful for collaboration and sharing succinct field notes which can be geo-coded.</td>
</tr>
<tr>
<td>SMS</td>
<td>Text tools</td>
<td><a href="http://www.txttools.co.uk/loginjsp/txttools/index.jsp">http://www.txttools.co.uk/loginjsp/txttools/index.jsp</a></td>
<td>Backup form of support and collaboration in the field in the absence of a 3G network. All phones capable of using SMS.</td>
</tr>
</tbody>
</table>
iii. **Professional Technologies for Fieldwork**

The pilot fieldtrip activities had demonstrated the potential of using Professional mobile GIS technologies in the field to enhance student learning. Although the use of PDAs for data collection had been introduced into GIS fieldwork at Kingston University prior to the start of the project, students still needed to undertake 3-6 hours evening group work to download, edit and collate their data on a laptop. A major drawback of this approach was that student time was focused almost entirely on data manipulation rather than analysis and interpretation. The decision was taken to attempt to adjust this balance in favour of analysis and interpretation by migrating GIS tools, normally restricted to the laboratory, into the field. This had the additional benefit of demonstrating to students the changing industry trends from desktop implementations of GIS software to server based installations. The core commercial software used on the GIS Degree programme at Kingston is the ESRI suite (see [http://www.esri.com/](http://www.esri.com/)). ESRI’s ArcGIS Server was implemented on a Panasonic Toughbook laptop which was used in conjunction with a wireless router. The wireless router was not used to provide a wireless Internet connection but rather to allow wireless mobile devices to communicate with the portable server. In this case the wireless mobile devices were PDAs (Junos) running ESRI’s ArcPad v8 software and students could connect to the server by coming within 100-200 metres range of the router. Technically it would have been possible to use a 3G data connection but the roaming costs were prohibitive in Malta.

The server was running a spatial database that supported versioning of data so that when uploads of the same data took place the datasets were tagged with a username, date and...
time enabling “good” data from one student group could supersede “bad” data from another group. This database also provides a central archive for all uploaded data. By making this server mobile and accessible via WIFI students did not need to cluster around laptops (students did express dissatisfaction with the number of institutional laptops available). Instead they were able to sit within range of the WIFI network and simultaneously upload their data to the server. The server handled the data manipulation and collation and streamed updates back to all students PDAs as required. Within 5 minutes of the process starting students were able to view the data on screen using the data catalogue tool (ESRI ArcCatalog). Students could then switch from the PDAs to laptops to access the collaborative datasets and start analysis and interpretation.

This development is novel as servers are traditionally located in secure, temperature controlled environments – not the rooftops of Mediterranean hotels (or anywhere else the staff might need to set it up). Students have traditionally spent a significant amount of time engaging in basic data aggregation tasks to the detriment of the more important data analysis tasks (a problem that no longer exists). Instead the students can focus on for example “analysing the level of agricultural change which is the focus of this exercise”.

One of the student group blogs reflected that “One of the more interesting part of this exercise was the data aggregation technique utilizing arc server. This allowed all the data to be synchronized with the server into one document very quickly. If it were not for the excessive data roaming prices abroad this facility could be excellent for productivity when multiple teams are digitizing an area”.

A detailed treatment of the technical details concerning the setup of the ESRI software to provide mobile services is provided by the following screen video with voice over: http://blogs.kingston.ac.uk/morse/2010/10/22/a-demonstration-of-moving-data-from-desktop-to-server-to-mobile-gis/. This video was created during trialling of the technology on the September 2009 Isle of Wight fieldtrip in preparation for the Malta 2010 fieldtrip.

In summary key advantages of this approach were:

- The ability to feed “live” background image data to students
- The ability to modify the students’ data collection areas, tasks or collection methodology on the fly, remotely.
- The ability to feed and receive live spatial and attribute data to/from groups of students
- The reduced need for post-processing by using ArcGIS Server geoprocessing services (do analysis in the field)
- Improved student monitoring (and output)
- Focus on interpretation and analysis.

iv. Collaboratory Twitter Mash-up
To support student collaboration on learning activities using the above professional technologies the Collaboratory developed during the pilot phase of the project was significantly enhanced. In addition to feedback from the 2009 Malta fieldtrip the work was also presented at the AGI Geocommunity 2009 conference. Feedback from this conference confirmed that a Twitter avatar provided a good marker symbol and that a visual timeline was effective in highlighting the temporal dimension of tweet postings. The Google Maps API v3.0 (Google 2010) was used, and to ensure control over the base map Javascript APIs
from Kingston’s institutional GIS software (ESRI ArcServer and ArcGIS) were used so that institutional controlled datasets could be used in conjunction with Google maps data. This approach allowed students access to historic imagery in the field.

The twitter API search function was used to find #malta10 (hashtag for the fieldtrip) with students having been asked to use the following syntax:

#malta10 [latitude][longitude][rating] text [twitpic URL]

The matching tweets were then automatically mapped as illustrated below. In addition based on an analysis of the text within the tweet the most popular discussion items could be displayed below the map and within the map around the tweets. The tweets could also be mapped in different ways such as to represent the temporal dimension of the tweets.

Figure 3.2: Automatically mapped tweets from the land use mapping activity in Mellieha, Malta. The base map is OpenStreetMap data (base map © 2010 CloudMade – Map data CCBYSA 2010 OpenStreetMap.org).

Although by the time of the Malta 2010 fieldtrip Twitter had released a geolocation API this was not used for the reason of ensuring accuracy (only 22.5% had usable automatically provided locations)

**Technical details:** The Twitter search API returned a JSON formatted data stream of all tweets with the specified hashtag. The latitude and longitude values were passed to the Google Maps API function GMarker along with an icon scaled to the student specified rating and then mapped. The text was processed through a Javascript Word Cloud library to determine the most popular discussion topics. These were then displayed along the bottom of the collaborative map and around the mapped tweets. The content of the tweet along with any twitpic link was written to an HTML popup linked to the map marker enabling mouseOver and mouseClick events.

A presentation with audio commentary describing the development of the Twitter Collaboratory can be found at:
http://blogs.kingston.ac.uk/morse/2010/10/22/geocollaborative-twitter-map-used-on-malta/
In addition the option of delivering OpenStreetMap (OSM) data (as a tiled map service using styles designed using Cloudmade) to students rather than Google maps was enabled. This provides future potential for integrating OSM data collected by students using personally controlled technologies (e.g. My Tracks, OSMTracker and desktop editing software such as JOSM).

v. Learning Activities

a. Professional Mobile Technologies used in Conjunction with a Social media based Collaboratory - Learning activities (GIS students, Malta 2010)

During a variety of activities students working in groups had to address issues of data quality, sampling, capture resolution, classification and recognition. Specific activities covered:

- Collaborative land use assessment and mapping creating a land use map of Mellieha (Northern Malta) using GPS enabled PDAs running professional GIS software (ArcPad v8.0). Students were allocated specific field areas that were downloaded onto their PDAs as illustrated below:

![Figure 3.2. Field sites allocated to students and downloaded to PDAs issues to students](image)

Each student group was issued with the telephone number of a text messaging service being monitored by staff to enable remote support. Students were able to return to a central location to upload their data to the map server and to receive updates recorded by other student groups. Although the each student group was allocated a specific contiguous field area and was responsible for mapping it, all of the groups had to work collaboratively to ensure that the individual group maps could be combined into a final map product. Students therefore needed to agree a number of criteria and specifications including defining and specifying:

- Common land use classes
- Common feature type representation
- Common spatial object types
- Scale and resolution of capture
Students were strongly encouraged to use the Collaboratory Twitter mashup to work towards consensus on their criteria and specifications for land use types and to share their experiences while they were dispersed across the study area. Example of further interactions included:

- Question for others to consider and respond to
- Resolving logistical issues in the field
- Providing rudimentary environmental quality assessment
- Responding to questions of how much of the group area had been mapped
- Administrative activities including notification of end of exercise meeting location.

The use of Twitter also provided a framework for staff to monitor from a distance student discussions and provide top-down guidance and direction (where necessary) to the students’ bottom-up data collection and classification strategy. An example of one groups output is illustrated below:

![Figure 3.3. Output from one group's land use mapping](image)

- Large scale planimetric surveying using RTK-GPS (GPS used in conjunction with a known base station in the field enabling centimetre accuracy). These activities focussed on large scale industry standard surveying practices and as described above this data could be shared, manipulated and ready for analysis and interpretation within the same day through the use of the mobile server.
b. Personal Technologies – Learning activities

Both Geography and GIS students were encouraged to use personal technologies to support their learning both through formal learning activities and informally.

- Blogging. Institutionally maintained public facing blogs were set up for both geography and GIS modules and formed part of formal learning activities including group reflective blogs.

- Multimedia Mapping (GIS Students)

Students had the task of designing a multimedia map based project to address a particular problem. The students were encouraged to use the range of technologies they had available (institutional and personal) and use various media types as appropriate. One such project that students worked on was to develop a resource that would support mobility friendly navigation around Valetta, e.g.

“We spent the day collecting GPS waypoints, track logs, photo, video and sound that would ‘mashup’ to form a multi-media tourist map aimed at disabled persons. We created a tour of interesting sites around Valetta avoiding steep inclines and stairs so mobility impaired person would have a defined route they could traverse with limited difficulties. We took 360 degree videos (via filming while turning around in a circle) of the sites so an audio impaired person may get a feel for the sites they could see, and identify possible dangers. Sound recordings were taken at sites to give a feeling for the atmosphere and to determine where caution may be needed. Photos were taken of sites and features to identify where access ramps were and if there were steps into places of interest or unavoidable inclines” (extract from a student group blog posting)

- Using Personal and mobile technologies as part of the standard fieldtrip toolset

Following the fieldtrip preparatory workshops and activities geography students were encouraged to use their personal and mobile technologies in conjunction with their field note books to enhance data collection, communication and collaboration. Updated versions of the project developed guides to using personal technologies on fieldtrips were made available to students identifying techniques and technologies they might wish to use, but the point was clearly made that “The technologies listed are not recommendations but rather examples and you may know others that better suit the tasks that you are undertaking, work with your device, or that you already have accounts with”.

3.1.6 Main Phase Developments - Placements

The students started their placement years between July and September 2009.

a. Learning Activities
A series of guided learning activities were devised with the aims of spreading information about the placement experience between the students already on placement, and encouraging reflection by each individual on their own experience - this development of reflective learning became a key outcome of this part of the project. The VLE was configured with a communal wiki and individual blogs to address the twin aims of helping the students maintain a sense of community with each other and the university, and fostering reflection on the placement experience. The wiki contained a mixture of work-related activities, such as posts setting out their initial expectations of the placement, and more general discussions, for example describing the area in which they live or work. The blog was more private, and access was restricted to the student concerned, their industrial supervisor, and the academic team, with the students' contributions reflecting on some part of their placement experience. There was some discussion over who should have access to the blog. While there was general agreement amongst the academic team that students should not be able to access each other's blogs, as it was felt that open access might inhibit the reflective writing, there were differences of opinion about whether industrial supervisors should be allowed access as well. In the end the benefits of transparency were considered to outweigh the risk that negative comments might not be reported, and each student's supervisor was invited to register on the blog.

The original intention was to have a new set of activities in either the blog or the wiki every month, but the students' work commitments led to deadlines slipping and the plan was modified to bundle several sets of activities to be completed in a more open-ended fashion. The following activities were set:

<table>
<thead>
<tr>
<th>Wiki</th>
<th>Blog</th>
</tr>
</thead>
<tbody>
<tr>
<td>General description of the placement. Expectations of the placement year. First impressions of the placement. Discussion of induction activities.</td>
<td>More specific information about expected role and responsibilities within the placement organisation.</td>
</tr>
<tr>
<td>Discussion of interesting and/or unexpected aspects of placement.</td>
<td>First reflective piece (e.g. on challenges of first few months, new skills or techniques learnt, any problems encountered and how they were overcome.</td>
</tr>
<tr>
<td>Description of area around the placement organisation - focus on practicalities of living there, amenities, recreational facilities etc (illustrate with photos, videos, sound commentary as appropriate).</td>
<td>Continue reflective writing.</td>
</tr>
<tr>
<td>Advice for students considering going on placement.</td>
<td>Continue reflective writing using same prompts as before. Also to reflect specifically on two challenges met during the placement year (their nature and how they were overcome).</td>
</tr>
</tbody>
</table>

The final set of tasks included an update of their Key Skills assessment, the assembly of evidence for the reflective portfolio and the writing of the commentary for the portfolio.

b. University Certificate of Professional Development (UCPD) in Industrial Studies

A UCPD is a 60 credit qualification offered by De Montfort University and is a flexible solution to recognising learning outside a formal classroom situation. Before the start of this project the placement was assessed by a combination of supervisors' evaluations and a technical report prepared by the student, but no credits were attached to this work and successful completion was shown by the addition of "...with Sandwich Placement" to the degree title. The UCPD in Industrial Studies was developed to provide an enhanced formal
framework for the students' placement learning and give recognition for their development during the year out, the placement is still being recognised in the degree title. The UCPD consists of two 30 credit modules at FHEQ level 5, and conforms to the QAA precepts for Work-Based and Placement Learning. The first module is based on the students’ technical report and evaluations by the industrial and academic supervisors and is essentially a transposition of the existing placement tasks and assessments. The second module is the students’ reflection on their learning and personal development during the placement and is built on the model of collaborative and personal activities developed during the MoRSE project, with the expectation that it will make use of mobile and web 2.0 technologies (although this is not a requirement in case some students are not able to have access to, or use, such technologies during their placements).

The UCPD was validated in July 2010 with grade bands of Pass, Merit Distinction or Fail, and the placement students during the 2009-10 session were eligible to submit their work to obtain this award. The validation panel recommended that the model of using an e-learning based UCPD to augment an existing placement component within a degree programme be made available to other programmes within the university which do not have a stand-alone award, and that consideration should also be given to making the UCPD an independent award for use in workplace CPD outside the university. The validation meeting led to a fruitful discussion about the assessment and grading of reflective learning, part of which argument has been blogged by the external panel member here: [http://recentreflection.blogspot.com/2010/07/on-validations-and-grading.html](http://recentreflection.blogspot.com/2010/07/on-validations-and-grading.html)

The progress of the MoRSE project and the development of the UCPD were presented at two meetings hosted by De Montfort University: The Technology-Enhanced Learning Symposium in May 2010, and The Employer Engagement Conference in June 2010.

### 3.1.7 Project Methodology

A mixed-methods methodology was used to address the research questions. Data was gathered (pre, during and post fieldtrips and placements) through questionnaires, focus groups and semi-structured interviews with academic staff, business partners and students. A Student baseline questionnaire was distributed to Placement students at De Montfort University and Fieldtrip students at Kingston University (Responses from 49 students at DMU and 52 students at KU), along with interviews with all staff participants (5 staff). All data collection instruments were pilot-tested prior to administration. Tailored Design Method (Dillman, 2000) will be used for questionnaire development and administration.

#### i. Fieldtrips

Fieldtrips were classified as non-intervention, semi–intervention or fully interventional as summarised below.

- **Non-interventional:** hands-off observation of students and staff using technology.
- **Semi-interventional:** guidance for students and lecturers to use technology.
- **Fully-interventional:** training and hands-on support provided in the use of technologies before and during the fieldwork. Monitoring guidance and training provided by GEES lecturers, MoRSE staff and student mentors.

The evaluation activity associated with each fieldtrip activity is described as follows:

1. **Reseacher present on the fieldtrip**
A researcher attended each of these fieldtrips listed below and observed the students use of personal technologies.
- Isle of Wight (October 2008 and 2009),
- Almeria, Spain (April 2009 and 2010),
- Malta (April 2009).

The researcher also used the Almeria, Spain 2009 fieldtrip to pilot test the data collection methods.

2. Interviews and focus groups with students were conducted and videoed using Flip cameras for the following field trips:
   - Isle of Wight (October 2008 and 2009),
   - Almeria, Spain (April 2009 and 2010),
   - Malta (April 2009).

3. During the Isle of Wight fieldtrips, which took place at the beginning of the academic years, students were asked to complete a pencil-paper questionnaire about their use of technologies on this fieldtrip. Fieldtrip leaders were interviewed on return and had also recorded reflective notes
   - Morocco Field Trip (January 2010)
   - Australia (March 2010)
   - Dubai (November 2009) – A member of staff at an international conference engaging with students back at the University. An interview was conducted with the lecturer who attended the conference in Dubai. Students were asked to complete an online questionnaire

4. Trained student evaluator present on the fieldtrip to collect data

   A student researcher was provided training and then attended the Malta 2010 fieldtrip to observe student use of personal technologies and to conduct interviews and focus groups with students and staff. These were also recorded using a Flip camera.

5. Fieldtrip Preparatory workshops – March 2010. A researcher observed all sessions which were additionally recorded. The researcher along with an assistant joined student groups in field activities.

ii. Placements

Placement student evaluation has focused upon a mix of extended focus group activities with six participants, with thematic analysis of outcomes to follow, alongside thematic analysis of blog and wiki outputs. The thematic analysis will link to an emergent taxonomy for mapping affective and cognitive outcomes.

All the placement students have been visited at least twice by their academic tutor and they, with the industrial supervisor, have discussed the impact of MoRSE on their placement. Most of the students returned to the University in the middle of January 2010 to take part in a discussion of their experiences of the placement and how it has been affected by MoRSE. Two short video interviews with them have been prepared and a full audio recording of the 90 minute meeting.
Discussions were held with the student and the industrial supervisor during the final placement visit to evaluate the operation and impact of the project.

3.2 What did you learn?

3.2.1 Fieldtrips

Students prepared to take personal technologies on field trips. The baseline study indicated that 64% of students were interested or very interested taking their personal technologies on fieldtrips including portable PCs, mobile phones and digital cameras, even to international destinations. This was reinforced by observations made by staff across a range of field trips. In terms of mobile phones (100% ownership amongst the students sampled) a high percentage of students felt that the mobile phones could contribute to their learning (e.g. 77% of students willing to use their own text credits in learning activities).

Students did not use their personal technologies for learning activities unprompted. Our evidence from the pilot fieldtrips was that students did not use their personal technologies in the field unprompted. For example the majority of students on the pilot fieldtrip to the Isle of Wight were not observed using their personal technologies, including digital cameras (dedicated or integrated with phone) and integrated GPS devices. However when student groups were prompted they did use these technologies and in the one case where a technology was formally introduced to students (text messaging service aimed at enhancing communication with staff), the student feedback was positive with 86% students (somewhat) agreeing that the SMS service had a positive impact on their understanding in the field. Lessons emerging from this finding were the need for improved preparation for students in advance of and on fieldtrips in terms of:

- The role personal technologies can play in learning activities
- Support for students in the field
- Staff use and attitude towards personal technologies for learning activities

Students reluctant to use technology unless it had a perceived benefit. This was exemplified through the use of the text messaging service where some students showed reluctance in using text messages to communicate with staff if they felt they would have the opportunity to ask the question face to face within a reasonable time frame.

Importance of Preparatory activities and support (Geography and Environment Students). The preparatory session activities and guides were well received by students. Students showed an interest, took notes, were focused, were eager to try out the technologies and asked good questions. The perception from questions asked of and by students indicated that students did not have an appreciation of how their personal technologies might be used, and that their existing use was very much focused on social tasks. In a show of hands the vast majority of attendees used Facebook, whereas approximately 10% had used tools and functions that might be considered particularly applicable to geography students (e.g. Google My Maps, Flickr, geocoding photographs).

Positive impact of student mentors on field trips.

During the final year of the project, two student mentors joined each of two fieldtrips (Almeria and Malta) as mentors. The student-mentors had attended the same field trip the year before. Their role was to assist students with the use of technology. In addition, one of the mentor students also maintained a blog, which we thought would be useful for the students in the future while completing their assignments and will also be a useful resource for students in the coming years to prepare for the fieldtrip. The presence of the student mentors was successful for the students and for the staff and was also a very positive
learning experience for the student mentors themselves. The students approached the student-mentors for all kinds of questions. It seemed that the fact that the student-mentors are still studying and had been on the fieldtrip the year before, made them more approachable to the students. “It is less daunting as going up to lecturers; it is less pressurised having formulated the best sort of question to approach a lecturer than it is just to go up to someone that’s say a year older than you in academic levels and just ask them a question,” said one of the student mentors.

It was also helpful for the researcher to have the student-mentors on the fieldtrip because the student-mentors conducted some of the focus groups with the students, allowing for more data to be collected.

The staff perception of the role of the mentors was very positive including “...unexpectedly, they would ask those mentors not only about the mobile technology, but also about things to do with the environment; those guys had been there before.....the mentors were able to help....in the environmental objectives of the trip”.

**Sustained student use of personal technologies:** Student use of Twitter in Malta increased rapidly and remained at a high level with very gentle prompting before each day’s exercise commenced (“Don't forget about using Twitter today”). Sharing the “highlight” tweets with students at the end of the day also seemed to increase engagement and participation. Highlight tweets were those that were very useful in prompting discussion among students in the field, interesting questions from students or amusing anecdotes or comments made which demonstrated the multifaceted role of the communication medium to the students. An important factor was the development of a collaboratory based on a Twitter mash up which was promoted to students as an environment to support their learning activities.

Some illustrations of student (Geography and GIS) attitudes (and in some cases frustrations) towards the use and issues of personal technologies supporting their learning activities are provided below as extracted from reflective blog entries:

“I have forgotten to mention the use of twitter so far. Today this has been very useful in resolving issues that have arisen. I took a while to follow everyone and set up text forwarding but it was worth it. If it wasn't for the ridiculous roaming charges, it got me thinking about the use of Skype to contact students and tutors either over video, audio or text. Also you could use the conference calling feature to contact many people at once. I did attempt to geo tag my texts automatically using the phones gps receiver however this did not work well as it did not save the setting and would have to set it up every time I wanted to text twitter”

“My use of Twitter tailed off during the week, not because it wasn't useful – I think it got more useful as more people used it – but mainly because of the phone I was using as writing texts is very longwinded especially entering numerical coordinates.”

“Understanding and learning the different ways of importing and collating different sources of media and tagging spatial location to them (i.e. long/lat values for example) has given more interest in the subject and found some of the features pretty cool to analyse and present!”

“Collating data afterwards highlighted what would be the most frustrating part of the week – 1 laptop between 2 groups and 1 etrex cable between 6 groups was a nightmare and made it very difficult to keep on top of collating data. This was made especially difficult as days seem to finish at about 10pm and it’s only afterwards we can start postprocessing. This made it pretty impossible to keep up to date with video and online blogs. Catching up with these later loses the immediacy of thought and understanding which they’re meant to reflect.
Had I known about the video blogs beforehand I would have tried to get software on my laptop so I wasn’t reliant on the shared laptop.”

“In the evening we learnt about the software and methods we need to employ to sync the data to create a map mashup using Gpicsync. We also learnt a little about how to import the data into Arc using FME conversion software. I am sure we will have some new issues in converting the data particularly in geo-referencing the Google data, but that is often how you learn the most.”

“We took tons of photo’s but in the end we were only able to use the ones off my camera as its was the only one that had a memory card that would fit in the laptop, so I may have been lying about not having any technical difficulties. Later that evening we got all the data downloaded of the units were able to geotag the photos (pretty slick) and throw them up on google earth”

“Some lecturers don’t know much about technology and we are quite fortunate that XXXX was up-to-date with this kind of stuff. But then in a way I think some lecturers can overdose on the technology, they think oh we’ll have a blog, we’ll have a forum, we’ll have a this, we’ll have a that but what is the point if it is not used? But we are learning and I suppose they want to show us the ways we can use technologies in our future work, this is the idea, you don’t have to use it but you might find it helpful in your future work”

“I think the technologies I used and the way I used them helped my learning; in conjunction with other research they will give a broader and fuller picture of an environment"

“I think technologies are good but avoid over use. Use your own physical senses and common sense to make observations to. However technologies can help build a more accurate picture.”

The fieldtrip leader to Almeria, Spain (2010) made the interesting point that “fieldwork notebooks and personal technologies, they are just that, they are personal things and I am conscious that when I’ve in the past asked to look at student notebooks before they’ve submitted them, people can be a little reticent, they can be a little nervous that they’re being judged on something which should be a very personal observation” (extract from an interview transcript following the Almeria, Spain 2010 fieldtrip). It was perceived that this did have an impact on the questions and advice students were prepared to ask of staff on a fieldtrip with regard the use of their personal technologies. This was potentially an issue of sustainability, and where the students had a significant role.

**Impact of Personal Technologies.** A key illustration of this was the GIS land use mapping activity. Prior to the MoRSE project fieldtrips running this or similar activities tended to suffer from a number of problems, including poor collection technique and attribution, which then required significant post processing to produce a usable resource. Students had however attended extensive briefings provided in advance. It was therefore felt that the collaboratory had potential to enhance student learning and improve the final outputs. The result was that students progressively and collaboratively developed land use categories and a conceptual framework at a distance via the collaboratory, resulting in greater consistency across the groups in terms of data collection and an enhanced final land use map. As part of the evaluation of the activity a survey was undertaken of all students who participated in the activity in both 2008 (no collaboratory) and 2009 (with collaboratory) along with a quantitative analysis of the accuracy of the data recorded. Some of the key findings are outlined below:
<table>
<thead>
<tr>
<th>Task</th>
<th>% Coincidence between published data / task and student collected data / questionnaire responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008</td>
</tr>
<tr>
<td>Understanding of the purpose of the data collection and ultimate outcome</td>
<td>52</td>
</tr>
<tr>
<td>Feature classification</td>
<td>64</td>
</tr>
<tr>
<td>Decision on land cover based on temporal scale</td>
<td>38</td>
</tr>
<tr>
<td>Resolution of data capture</td>
<td>59</td>
</tr>
<tr>
<td>Collection of metadata</td>
<td>57</td>
</tr>
</tbody>
</table>

In conclusion the staff team felt that this improvement could have been achieved through adjusting the pre-task briefing but it was felt that the students had participated in an enhanced collaborative and realistic learning experience. In addition the archive of this Twitter based discussion developed into a communal diary of each day’s activities.

The perceptions of the geography field leader was that the preparatory activities had had a positive impact on the quality of geography student fieldwork notebooks and that students had been using their personal technologies for recording locations and cross referencing with the notebook. It was noted that “it’s not a completely digitalised version of the fieldtrip, they’re not going over completely to mobile; I wouldn’t expect that, I’d want them to find an integrated [approach]” (extract from an interview transcript following the Almeria, Spain 2010 fieldtrip).

**Appropriateness and limitations of Personal Technologies.** Students are carrying with them increasingly powerful personal technologies and are willing to take them on fieldtrips. Features that support communication, collaboration, geocoding, photographs and other media, note taking and sharing are particularly relevant. However our studies to date have indicated a number of issues that need to be considered in the field:

- **Battery Life.** Of the mobile phones used by staff no battery was capable of lasting the day when subjected to regular use of 3G data connections and GPS use in the field. The GPS functionality exerted a particularly heavy load on the battery. This may limit the extent to which such a device can be used when in the field for a day, or at least require a spare battery to be carried. This is additionally important when the phone is being relied on for safety purposes and maintaining the ability to make a phone call. Dedicated ‘single function’ personal technologies such as standalone GPS units and cameras did not suffer from this problem. This issue of relying on a mobile is illustrated by this students blog reflection “I did not anticipate my fone failing and it was the tool of choice over the borrowed work camera I brought with me…which begins the story”.

- **Bandwidth issues.** Mobile phone masts are less densely located in rural areas, especially in remote locations, coinciding in some cases with ideal field locations. This can cause issues with accessing a 3G signal, and where such a signal can be received might be subject to congestion if multiple students are simultaneously streaming data for instance. On the 2009 Isle of Wight fieldtrip this was particularly noticeable when trialing live streamed video from a mobile with a significant lag being present.

- **International data roaming charges.** Mobile data charges can be prohibitive in international locations though it has been possible during the MoRSE project to take advantage of network specific promotions. In addition during the project
European regulations concerning roaming charges changed (from 1st March 2010 – EU roaming Regulation No 544/2009) resulting in greater control of charges, but this does not apply outside of the EU. One approach is to use offline applications (e.g. MapDroyd for accessing OSM map data), and using the ability of the device (becoming more common) to connect to a WIFI access point to send and receive data (e.g. photographs, video blog posts etc).

- Accuracy. It is also important that the limitations of the technologies are clearly understood. Most individuals would recognise that in many cases a mobile phone integrated camera will not produce the quality of photograph that even a fairly basic dedicated device will produce. In many cases however the photograph taken with the integrated device will be adequate for purpose. However with other tools there might be an implied accuracy which in practice will not exist. Dedicated GPS devices will often qualify the expected accuracy that can be achieved with the device but for an integrated device such as a smart phone this information may be absent. Accuracy in both the horizontal and vertical planes can vary markedly between devices. Some current smart phones will give, in open spaces, horizontal accuracies to within 2-3 metres while with other devices this might be in the range of 15-30 metres. Digital compasses may be more sensitive to magnetic anomalies and along with other tools such as clinometers will often need to be calibrated to provide reasonable results. A resource is being developed that discusses these issues and how to make an assessment of accuracy. One learning activity on the Malta fieldtrip was to make an assessment of the spatial accuracy of a range of GPS enabled devices.

- Weather resilience. Technologies designed for use in the field will normally have some degree of weather proofing, e.g. dedicated GPS units or surveying equipment and even ruggedised laptops. This may not apply to all personal technologies risking damage to such devices in poor weather.

On the Almeria fieldtrip (2009 and 2010) the geography students did not engage as fully as might have been expected with the formal fieldtrip blog (2010) or with Fieldtrip Flickr site (2009). This was in contrast to the more active GIS students group based fieldtrip blog. The fieldtrip staff felt that this was due, at least in part, to the fact that students had little time to work on the blog in the evening following a long day in the field and other formal evening activities. However it was also felt that to develop this approach in the future the blog would need to be integrated into teaching and learning well in advance of the fieldtrip, rather than being regarded as a purely fieldtrip activity.

**Technically and logistically feasible to migrate a GIS laboratory to the field.** The GIS team demonstrated that it was feasible to establish a GIS server and related technology in the field and be used effectively by students both in the UK and at international locations (i.e. Malta)

**GIS laboratory in the field – Benefit to Learning.** A key benefit to students was that it reduced the time spent on basic data processing and preparation (3-6 hours reduced to 5-10 minutes per group), and therefore allowed more time spent on analysis and interpretation. This approach also enhanced the ability of students to share data and for the first time complete a GIS project (from data collection, through analysis and interpretation to the delivery of a final product) while still in the field. The students were also exposed to current technologies used in industry in realistic field based problem environments. Two extracts from student reflective blogs provide an illustration of the student response to these activities and their learning:
“I think I might have to say that this has been my favorite day so far. Its the first time during my whole degree that I’ve gone from collecting data myself to displaying it in as finalized product I created. Basically the first time i’ve taken the whole GIS process from start to finish all myself.”

“It has definitely been very enlightening, understanding where GIS data is collected from and how it is collected, makes you really appreciate how much work and effort has been put into data such as Mastermap data. I feel i have taken a lot from this field trip, its been eventful and exhausting but I’m ready to go home now”.

Fletcher et. al. (2007) highlighted the importance of the immediacy of data analysis while in the field “The ability to collect and analyse data within a short period of time improves the continuity and the concentration of field investigation and analysis”.

In addition the GIS laboratory in the field combined with the Collaboratory mash-up enabled students access to key relevant spatial datasets while in the field completing an activity. Fletcher et. al. (2007) identified this on-site access “can be envisaged as an excellent tool to contextualize field data or to provide the opportunity for comparative analysis”.

Minimising the time period between data collection and analysis. The previous section highlighted how institutionally provided technologies could significantly minimize the period between data collection and its interpretation and analysis. This can also apply to circumstances where only personal technologies are being used. One example is that of taking geo-coded photographs and sharing these via a photograph sharing site, then mapping the photographs automatically via Google Maps with the ability to enhance the map through linking other media (e.g. GPS tracks, video and audio tracks) and adding annotations.

Appropriate mix of Institutional and personal Technologies. The balance in use and application of personal and institutional technologies was dependent partly on the degree programme that students were following (BSc Geography, BSc Geographical Information Systems) and the nature of the specific learning activities such as described below:

i. Specialist equipment required. Learning activities based around high resolution (cm accuracy) land surveying required specialist equipment for which personal technologies could not substitute. However personal technologies were used in conjunction with these specialist technologies to support communication (e.g. SMS and Twitter).

ii. Specialist equipment ideal but scope for substitution. This applied to the learning activities based on land use assessment requiring lower spatial resolution and involved institutionally provided Trimble Junos PDAs and ESRI software. However consumer based GPS technology (dedicated or integrated) with differential GPS capability (in Europe receiving correction data from EGNOS satellites) could possibly be used in conjunction with GPS tracking applications and POI recording tools such as ‘My Tracks’ and associated mobile editing tool ‘My Maps Editor’, with sharing via Google Maps. During navigation exercise some students supplemented or replaced supplied technology with personal technology if batteries were low in supplied technology or they couldn’t achieve a desired function (e.g. used personal iPhone for GPS position instead of University supplied Magellan GPS).

iii. Personal Technologies suitable. Learning activities such as the multimedia mapping activities that involved geo-coded photographs, audio recordings and tracking.
3.2.2. Placements

Initial feedback on the project's progress was obtained at a meeting with the placement students at DMU in January 2010. First impressions of the meeting have been blogged here: http://tinyurl.com/35yo4xx, and further reflections on the first few months are here: http://tinyurl.com/284rg93.

Personal vs social learning

The general reaction of the students was very positive, and they all highly recommend the placement year. They found the concept of reflective writing difficult to pick up at first, but gradually adapted to it and came realise its value in enhancing their learning. They felt comfortable with the technology, as they were used to the VLE from previous years' study, and with sharing their experiences with other students. There have been some interesting discussions about who should have access to the personal blogs: the students were happy that each other, and the academic staff, can see them, but less so for their industrial supervisors. This countered the view of academic staff that students would want to keep their blog private from each other. The latter opinion has prevailed because of potential confidentiality issues. It should be noted, however, that the willingness of this particular group to share their reflective work with each other might just be a mark of them constituting a small, socially cohesive group, and that individuals in other, larger groups might wish to preserve their privacy.

The students' use of the blogs and wikis was slow to take off, as might be expected, but the structured tasks provided a good stimulus to reflective writing - an activity which largely goes against the traditional training of a scientist which removes the personal from the subject. As their confidence with this new form of learning grew they developed distinctive voices, especially in their personal blogs, which emphasised the positive aspects of their placements while dealing with any drawbacks in a mature and constructive manner. The writing in the blogs was of necessity more reflective and tended to be produced some time after the events being discussed. There were examples of reflection in 'real-time': one of the students blogged about a presentation he had to make to his department, posting his thoughts during the preparation, just before the presentation, and the day after; the academic tutor posted replies during this period to make this a real, albeit asynchronous, conversation. Some sense of community developed through the wiki, though this manifested itself more as references to posts by colleagues rather than direct conversations with each other. This does not mean that there was a lack of communication between the members of the group, of course, as much of their social interactions took place through other, private social media. The wiki helped by showing individuals that their own experiences and concerns were shared with other students, and much firmer links were maintained with the university. The following are representative quotes from students as part of the post-placement evaluation:

"I found participating in the MoRSE project an excellent way of keeping in touch with the university and tutors, it made me feel like I was still part of the university and they had not just totally left me alone in the working world. It was also a great way of taking a few minutes out of the everyday hectic work life to just reflect on how far you have come and what you have learned and also what you would like to do in the future."

"The reflective writing part helped me understand my progress throughout the year and highlighted area's in which I did well and areas which needed attention. Whilst working through the year I gained lots of key skills but I didn't realise this until I had written the
reflective diary. It also allowed the students to stay in contact and gain an insight into each other’s placements.”

"I found the morse project a very open experience. I could talk about anythink (sic) and feel as though everyone would understand where I was coming from."

"By completing Wiki's and blogs on blackboard I feel this has helped as I can look back and see what I had done and reflect from each blog to see how I have developed and what new skills/knowledge I had gained. It was a good way to read everyone's Wiki's to see what other people have been up to on their placements. The reflective writing part was a good way of reflecting and learning from your experiences and an opportunity to put down your thoughts and feelings about something then seeing how you have personally developed."

"The tasks enabled me to really think about the work that I was undertaking and reflect on each aspect of it. Sometimes when you are in a working environment you may not realise that you are developing important “soft” skills (such as communication, organisation, problem solving etc.) in day to day work. An example of such an incidence is when I had been allocated a role in a project which involved having the responsibility of certain tasks. I began to plan my schedule more carefully so that I could dedicate more time to this work thus improving my organisation.

As I was given the freedom to undertake the task in a way I thought best, I set up meetings with other colleagues to discuss these matters further, thereby working on my communication and problem solving skills.

These improvements did not occur over night. It was the subtle adjustments in my way of thinking and carrying out tasks that lead to the skills being enhanced and I feel that this project has helped me to identify these areas.

Ultimately the project has helped me to identify the areas in which I need to improve to enhance skills further. It has also helped me to think “outside the box” and encouraged me to look at alternative methods when problem solving."

The employers were supportive of the project providing confidentiality was not breached, and all industrial supervisors were briefed on the background to the project and the technology at the start of each placement. The direct supervisors were generally happy for their students to participate, as long as it did not interfere with their work duties. The supervisors were offered access to the blogs and wiki as contributors, and most wanted to be able to use this access to check the students' contributions for possible confidentiality issues. There was no great desire to actively post to the blogs and wiki; in part this was due to pressures of work allowing little time for such activities, and possibly also because the activities were seen as being the university’s remit. One company was not willing to allow the students to participate in the public wiki as it has a policy of carefully controlling communications with external parties, so a solution was negotiated whereby the students completed the technical report as usual and kept a reflective diary, with monthly entries to meet the learning outcomes for the reflective module of the UCPD. Despite this modification to the original intentions, the company provided ample support to the students, and this case has provided useful experience of adapting the pedagogic methods to suit local requirements whilst still allowing the learning outcomes to be met.

The process of carrying out this project has also enhanced the academic tutors' practice. In a scientific and technical discipline there is great emphasis on analytical thinking and treating the subject matter impersonally, and reflective thinking tends to be unconscious. Moving towards supporting and assessing reflective learning has needed a degree of adjustment in outlook and this engagement will have an impact on other learning activities within the subject. There has also been a direct, operational benefit of increased contact between the
students and their tutors, although it has to be said it was not necessarily through the e-
learning tools but via telephone or email - the more 'traditional' methods of communication.

3.2.3. Project Wide Themes

The mix of private and publics tasks, institutional and third party environments and
 technologies has been complex across both placements and fieldtrips. Specific issues
 have included employer concerns over confidentiality; data protection issues; and student
 concerns over privacy and control of their technologies. Employers negotiated agreements
 with the placement team over public and private postings for reasons of confidentiality and
 corporate policy. The decision was therefore taken to use the institutional VLE to reassure
 partners over concerns of privacy and security. On the fieldtrips this issue did not arise and
 therefore mixtures of institutional and third party environments were used. The institutional
 VLE was used to provide core resources for students but most interaction and collaboration
 was undertaken externally to the VLE. However due to issues including data protection an
 institutionally maintained public facing blog environment was used to support the fieldtrip
 blogs (on which every fieldtrip student had an account). In addition the field guides provided
 to students highlighted alternatives to using third party tools and environments through the
 use of the institutional VLE and other institutional technologies.

Pre-placement/fieldwork tasks are key. This includes current students sharing outputs
 with prospective placement/fieldwork students and participating in formal preparatory
 activities including tools to be used, activities to be undertaken and ground rules for
 collaboration. There have been discussions by both the field and placements teams about
 rolling forward student wiki and blog contributions for use by following cohorts. However this
 has raised issues such as cohort ownership.

Contextualisation, and scaffolding the experience, is the key determinant of
 technologies to use. The student use of blogs and wikis was slow to take off with issues
 over reflective writing. The importance of structured tasks, especially in providing a stimulus
 for reflective writing has been important. Particular issues for the geography fieldtrip
 students was the time available in the field to work on the blogs but also the
 contextualisation of the blog in learning activities that extend beyond the field.

Reward and Recognition. The development of a robust curriculum leading to a University
 Certificate of Professional Development (UCPD) in Work Based Learning has enhanced
 student motivation for placement students. The student mentors appointed to support
 fieldtrips were asked about formal recognition for their work and whether some form of
 certification would be appreciated. However the message was clear that it was the ability of
 students to be able to quote this experience on their CVs.

3.3 Impact

Enhanced fieldtrip experience of students.
GIS Students: Data shows that the use of technologies had a positive impact on the overall
 field trip experience for the students. Over 75% of the students reported that the use of the
 technologies made the fieldtrips more enjoyable and that they had a positive impact on their
 motivation to study. When asked if the use of the technologies had an impact on their
 understanding, 40% of the students said they agreed and an additional 37% somewhat
agreed. These results are thus overall very positive and it is believed the uses of technologies during field trips are important if not essential. Students learned to use technologies specifically designed for their profession (significantly enhanced during the Malta 2010 fieldtrip through the implementation of the ‘GIS laboratory in the field’) but also learned to use technologies which can be used for other educational, personal or professional purposes. For instance, the students learned to geotag their pictures and there was positive student feedback on the use of the Collaboratory Twitter mashup. These are transferable skills. Evidence from the student group blogs also demonstrated that the implementation of the ‘GIS laboratory in the field’ had had a positive impact on their learning, especially through being able to complete a project from the collection of primary data, its processing through to its analysis and interpretation. The literature has indicated that this reduction in time between data collection and analysis is one of the positive benefits that technology use in the field can provide.

Geography Students: The Geography field trip Leader (Almeria, 2010) perceived that the preparatory activities had had a positive impact on the quality of geography student fieldwork notebooks and that students had being using their personal technologies for recording locations and cross referencing with the notebook. The student mentors also reported positive engagement with students on their use of personal technologies to support learning activities.

Peer Interaction: The technologies also positively impacted on peer interaction for a large number of students. Just under 50% of the students reported that the use of technologies helped them to interact with their peers and helped them to get to know their peers. Even though this was not the case for the majority of the students, it is still believed that the use of technology can be useful, especially during induction. In addition, students learned to develop resources which they could share with one another but which also will benefit future students. Again, these are skills that are transferable.

Mentor students. The mentor students reported a number of ways in which they benefited from their presence during fieldtrips. They learned the technologies themselves, but also felt it was a unique experience for them. One student reported: “I also got a very short [insight] into the academia life which I think is a really good thing actually because it’s something that I would never normally have feel it was an opportunity to.” The students also reported to have learned to use new technologies. They also had the experience to run a focus group and to conduct interviews so their research skills increased.

Institutional dissemination and impact. Information about the MoRSE project has been disseminated at DMU and KU hosted meetings (e.g. Quality Enhancement Committee, KU; Learning Technologies Review Steering group, KU; DMU TEL symposium; DMU Employer Engagement Conference; DMU Learning and Teaching Committee Annual Report) and the potential for applying the UCPD model to placements in other programmes within DMU has been explored, along with its use as CPD in work-based learning in external organisations. The field guides for students on using mobile and personal technologies are being integrated into the University wide ‘Kingston University Skills Site (KUSS)’ wiki to be available to all students. Further events are being held to disseminate (and cross-disseminate) MoRSE findings widely across the two institutions, including in the case of fieldtrip staff demonstrating how mobile and personal technologies have the potential to enhance more traditional approaches and the use of the field notebook. It is intended that workshops on mobile learning will be hosted by DMU and run by KU through the DMU TEL Team.

Community Dissemination and impact. Over 15 papers have been presented at national and international conferences including to both discipline focussed (e.g. Geography, Earth and Environmental Sciences subject centre annual conference) and learning technology events. In addition the GIS team won a highly commended award at the ESRI (UK) user conference in May 2010 in the ‘Innovation & Best Practice – Communities’ class.
This was for ‘Taking GIS out of the classroom: developing effective learning environments with mobile GIS’. The award citation stated “Fieldwork in geoscience develops skills and enhance understanding in the real world. Kingston University’s Centre for GIS places a strong focus on fieldwork and has developed methodologies that take GIS out of the classroom which harness developments in mobile GIS. Students utilize ArcPad and ArcGIS Mobile via an innovative in-the-field Arc Server implementation to rapidly collect data in the field, share it on the fly with each other and teaching staff and collaborate to build a shared understanding”. In addition the GIS team was invited to give a keynote presentation on "Developing methods and workflows to support mobile learning for GIS fieldwork" at the ESRI UK CHEST user conference (September 2010).

**Reflective learning embedded more firmly within placement curriculum.** The development of the UCPD connects to the DMU Employer Engagement project, funded by HEFCE, and which led to the creation of other UCPDs designed for work-based learning, and focused around engagement with web and mobile technologies for those in employment. The UCPD was the first named award for students at DMU and its successful validation will be disseminated across the University, as a site for accreditation, reward and recognition of student, life-wide learning.

**Development of academic staff approaches.** This includes skills concerning reflective learning and its assessment. In the case of the fieldtrip team there has been a change in staff approaches to field based teaching and learning and the role that personal and mobile technologies can play. This is clearly demonstrated through the development of the GIS Collaboratory and the establishment of fieldtrip blogs across both the Geography and GIS fieldtrips.

**4) Conclusions & Recommendations**

For those students working remotely from the institution, the use of social media and personal and mobile technologies that have been effectively contextualised and scaffolded have demonstrated the potential to enhance both student learning and the student experience of learning. Although differences were noticed between cohorts of students the use of preparatory activities in advance of fieldtrips and placements were crucial in terms of tools used, activities to be undertaken and ground rules for collaboration. We found that some cohorts of students would not have considered the use of personal and mobile technologies to support their learning without intervention.

Both Fieldtrip and Placement staff should consider the role of student mentors, especially to support the effective student use of mobile and personal technologies as part of their learning. In addition the mentor students on fieldtrips were shown to have a role in supporting discipline specific issues and benefited significantly themselves from the experience. In terms of recognition for this role the key was the ability to cite the experience on a CV, or in the case of Placement students through the UCPD. The cost to the fieldtrip institution of implementing this scheme was the cost of mentor students travel, accommodation and subsistence on the fieldtrip. In terms of placements it would be the cost of time in a synchronous technology.

The delivery of a situated curriculum for students working beyond the institution in practice-based environments is critical along with the ability to be active contributors in real world problem solving. The ability of both institutional and personal technologies to effectively and appropriately enhance this situated curriculum and experience is crucial. For example
fieldwork experience in real problem environments for students has been crucial to student understanding to all aspects of real world scenarios from the collection of primary data through its processing, interpretation and analysis to the completion of an output. This experience can be lessened through the student having to split work on a project between the field and institutional laboratories because of time and access to technologies and resources. In addition basic data processing tasks can take a significant period of limited fieldtrip time that could otherwise be spent on analysis and interpretation, and increases the time between data collection and its analysis. It is therefore recommended that fieldtrip teams consider as appropriate:

- Establishment of GIS processing and analysis technologies in the field allowing students to complete the full cycle of a project while still in the field.
- The role of Collaboratories to enhance student collaboration and communication while on-site. (This can take the form of a formal scripted mashup such as the project’s #malta10 mashup of Twitter, Google and professional technologies, or a more loosely coupled environment that could be based on a shared Google map for example).
- Consider the ways in which personal and mobile technologies can be used to enhance traditional fieldtrip approaches, including the fieldwork notebook.

In terms of Placements, the ability to develop approaches to theory-in-practice: future-proofing their skills; developing resilience; managing pressure; developing team-work; understanding business contexts; were critical situated experiences for students. For staff the value of enhanced communication with students and supervisors in industry, enhanced the role of situated learning, where industrial supervisors, had: support for implementing personal, private tools that are “low cost”, in terms of time and management; recommended formats/structures for concise and positive outputs focused on impact, surprise, originality, and learning; and an understanding of the curriculum and its delivery was critical.

The team has not identified a need to develop specialist mobile applications to support remote learning but rather has been able to utilise widely available technologies that often run across multiple platforms and are continually updated (The baseline study demonstrated the diversity in student technologies). It is recommended that an appropriate mix of institutional and widely available third party and personal technologies are considered as appropriate to the learning context with recognition to those technologies that students are already using.

5) Implications for the future

The project has demonstrated how student learning, while working remotely from the institution in practice based and real world environments, can be enhanced through the effective and appropriate use and integration of institutional and personal and mobile technologies. However, a key element in this is the transition to working remotely and then back into the institution, especially where the student is “abroad” for a longer time-period. This involves partnership between academics, externals and students.

In the case of both fieldwork and placements MoRSE has demonstrated that the effective and appropriate use of these technologies should not be seen as a threat to existing sound practices but rather as a way to enhance that practice and support student autonomy, for instance in the context of the scrutiny that Geography fieldtrips have come under recently (e.g. Herrick, 2010), and in the validation of a UCPD for placement students. A number of specific scenarios and implementations have been described including the ‘GIS laboratory in the field’, the ‘#malta10 Collaboratory’ mash-up, fieldtrip blogs and the use of student
mentors which demonstrate ways in which fieldtrip activities can be enhanced and potentially provide models that can be built on. In placement work the duality of private/public social media positions has been mapped through negotiation with a range of stakeholders.

During the period of the project mobile and personal technologies have continued to develop at a significant rate, as demonstrated by the rapid increase in the range and type of smart phones on the market and the new generation touch screen tablets that have emerged since the beginning of the project. This has been coupled by the growth of the mobile application “App” market, development of 3G mobile infrastructure and new regulations introduced in the EU covering roaming charges. These developments will no doubt have an impact on the type of personal technologies that students own and the way that they will use them to support their learning. However it is likely that it will be a heterogeneous mix of technologies and probably very fragmented. Therefore it is probably important to focus on the learning and those technologies that are widely and freely available running across multiple platforms. It is worth noting that some of the key technologies used as part of this project have been around for many years including RSS (geo-RSS), SMS and MMS and they continue to provide a baseline to contributing from devices that today would be considered basic.

However, it should also be noted that the use of an institutional VLE was also highly valued, as a familiar space from which students could leave and re-enter the institution whilst working remotely. This sense of being “in-touch with the familiar” was important, as it focused on a space, a set of functions, and participants who were known to the student and the staff. The key here was the development less of technological innovation, and more of epistemological engagement, especially in how to use personal tools like a blog, for reflection in a social setting. This was often uncomfortable, and again the use of familiar tools, in an accredited framework enabled transition to a new way of working.

In technical terms a specific future enhancement will be to enable GIS students to regularly upload data to the GIS server during the day and share this data with staff and other groups. This is partly subject to 3G roaming data charges when overseas. This will enable students to see each other’s progress, for staff to keep an eye on areas of interest that are being missed, student group locations to be monitored and data quality to be checked (e.g. if staff know the land cover of a particular area and it’s incorrectly tagged this can be corrected while the group is still in the field).

The project has demonstrated how powerful specialist GIS technologies can be established in the field and integrated in part with social and personal technologies. The ability to do this clearly demonstrates how this powerful technology could be further developed to be accessible to students more broadly across the Geography and the Earth Science disciplines and perhaps beyond.

The project took initial steps to look at how students at the institution could be involved with and collaborate with students in the field and on placement, but this has the potential to be much further developed. This could, for example, be Level 1 students engaging with a Level 2 field trip which would provide both preparatory support for the Level 1 students and practical support for the Level 2 students. Equally in managing the transition to and from placement, experienced others are important. This is a key element of reflective and evaluative engagement and will be extended over time. This might also provide a mechanism for multi-discipline engagement and development of future multi-disciplinary fieldtrips and placement experiences, for example in inter-professional education.
The project team aims to maintain the MoRSE project website and will update it with relevant resources and updates.

6) References


Herrick, C. 2010 Lost in the field: ensuring student learning in the ‘threatened’ geography fieldtrip, Area, 42(1) 108-116.


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