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CoMo: Supporting collaborative groupwork using mobile phones in distance education

Final Report

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Execute Summary

The CoMo project, funded by the Centre for Distance Education, University of London, aims to investigate how distance learners can be supported in their collaborative group work using mobile devices. The objectives are as follows:

- Iteratively co-design and develop a set of collaborative mobile phone-based group work activities (with students and course leaders)
- Determine the ways in which the activities provide students with opportunities to reflect on their practices
- Identify distance learners' and tutors' experiences of these activities in support of distance learning
- Reflect on our design process and evaluate the activities enabling the production of 'lessons learnt', detailing how the activities enhanced (or not) student learning.

Each section of this report addresses one of the objectives of the project.

Co-design of collaborative mobile phone-based group work activities

The learning activities were primarily co-designed and developed with tutors at the Royal Veterinary College: Kim Whittlestone, Senior Lecturer in Independent Learning, Dr. Matthew Pead, Senior Lecturer in Orthopaedic Surgery and Head of the Small Animal Medicine and Surgery Group, Arthur House, European Specialist in Small Animal Surgery and Lecturer in Small Animal Surgery and Richard Coe, European Veterinary Specialist in Surgery and Temporary Lecturer in Small Animal Surgery. Students acted as *informants* rather than participants in the design process.

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The key outcomes of the design process are:

- Identification of six learning activities as detailed in Deliverable 1
- Co-development of two of these: *Hospital Rotations* and *Cows in Spring* as detailed in Deliverable 2
- The activities reflected the key concerns of both tutors and students.
- Tutors' primary concerns were as follows:
 - Confidentiality: it was very important that the technology used allowed for the privacy concerns to be addressed. Control over what was uploaded, where it was stored, who had access to it and the ability to delete were provided
 - Student use: Tutors were concerned that the technology should aid students with the pragmatic aspects of learning as well as the social ones. Tutors were also receptive to the organisational aspects of the technology, for example, the ability to contact students across the campus when they were needed in surgery
 - Social conventions: other faculty (outside of the study) needed to be made aware that the mobile phones were being used for the purpose of learning, and not for personal social use.
 - Tutors were concerned that 'new students', i.e. fourth years new to rotations, would have too much other work to be engaged in, and so would not use the technology
 - The technology should aid student reflection on their practice
- Students' primary concerns were as follows:
 - Familiarisation with the technology so as they could use it effectively
 - The need for the technology to fit within their busy schedule. They did not want to have to spend lots of extra time on it
 - The activities needed to be directly related to what they were doing
- Iterative and detailed co-design is time-consuming but results in activities that are deeply related to their context-of-use
- An important outcome of the design process was the need to provide tools to practitioners that allow them to partake as equal partners in the process. For CoMo, we developed *visual scenarios* as tools for mediated discussion. Exemplars of these are available from:
<http://www.slideshare.net/yish/como-scenarios-ii-239051>

- Furthermore, we identified a productive and resource-efficient method for embedding new technologies in educational settings. This method consists of the following stages:
 - Observe: an ethnographic study of the particular context of learning. This entailed following learners through their daily routine, recording their actions with video and stills, interviewing students and tutors in action. The purpose of these observations is to identify the existing ecology of resources, common practices and needs.
 - Identify: note the gaps in existing practice, which could be addressed by the new technology.
 - Blend: consider how the new technology, and any new practices derived from it, would fit in with the existing ecology.
 - Sketch: draw visual scenarios of specific activities in which the new technology plays a part.
 - Poll: present these sketches to as wide an audience as possible, collect feedback and adjust the design.
 - Enhance: deploy the technology, and guide learners in using it to improve their learning experience.
 - Perturb: challenge learners and teachers with new possibilities emerging from the technology as they have adopted it.
- Our initial analysis suggests that the use of camera phones supported learning in several dimensions:
 - Social: veterinary training is a cognitively, physical and emotionally demanding course. The social relationships between students are an important support framework. The phones were sometimes used completely off topic, to support pure social functions. This should be seen as a virtue, not a limitation.
 - Memory jog: snapshots of key incidents facilitated group reflection at a later time.
 - Clinical subjects: students documented conditions they encountered for future reference.
 - Clinical procedure: students documented key medical procedures for future reference.
 - Temporal analysis: students documented case progress over time. Using the phones allowed them to compare clinical snapshots of the same case over several days, even when the treating student changed.

Student reflection on their practice

Burchell and Westmoreland (1999) coined the term *purposeful reflection* to describe the concept of reflection on action where students “recapture their experience, think about it, mull it over and evaluate it” (Boud et al., 1985).

Based on these definitions and the nature of competences in initial teacher training (Calderhead and Gates, 1993), we specifically define the aims of the CoMo activities as enabling students to:

- Adopt an analytical approach towards practice
- Foster an appreciation of the social context in which they are working
- Develop their own perspective on practice
- Engage in ‘purposeful reflection’
- Discuss their practice in relation to the competences they feel they need

Student reflection was framed to potentially support the capture, visualise, discuss and reflect cycle over time. We proposed that a Popperian schema can structure this cycle, and developed a framework shown in Figure 1 to support its integration with CVDR. For more details, see Deliverable 1.

Data is captured (step 1) and visualized (step 2) to represent the problem (p1) the learner is currently grappling with. The right arrow in the triangle denotes this progression. p1 is presented to the other member of the small group, and detailed using the collected data. At this stage, the learner proposed a solution to the problem (tt), which is discussed and reflected upon (step 3). The bottom arrow denotes this. At this stage, the other learners proposed potential solutions (ee), based on their on-going discussions. They may also relate it back to their own working practices, looking for common solutions.

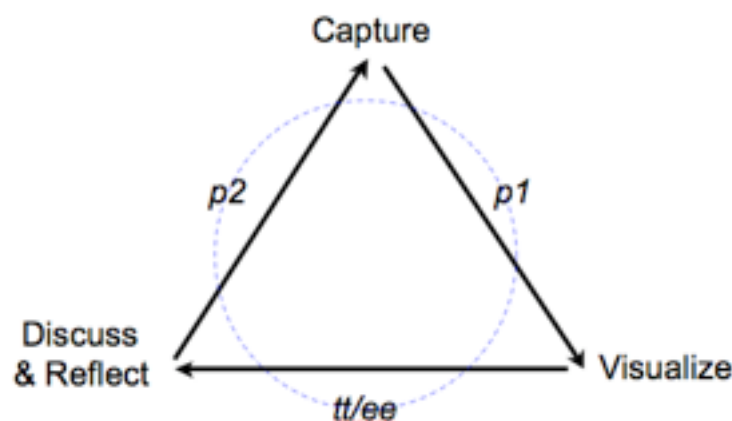


Figure 1: CVPR Framework

Based on the scenarios developed (see Deliverable 2), students captured various

veterinary surgical practices using mobile phones. These were automatically uploaded to a website for review at a later stage. This process is shown in Figure 2.

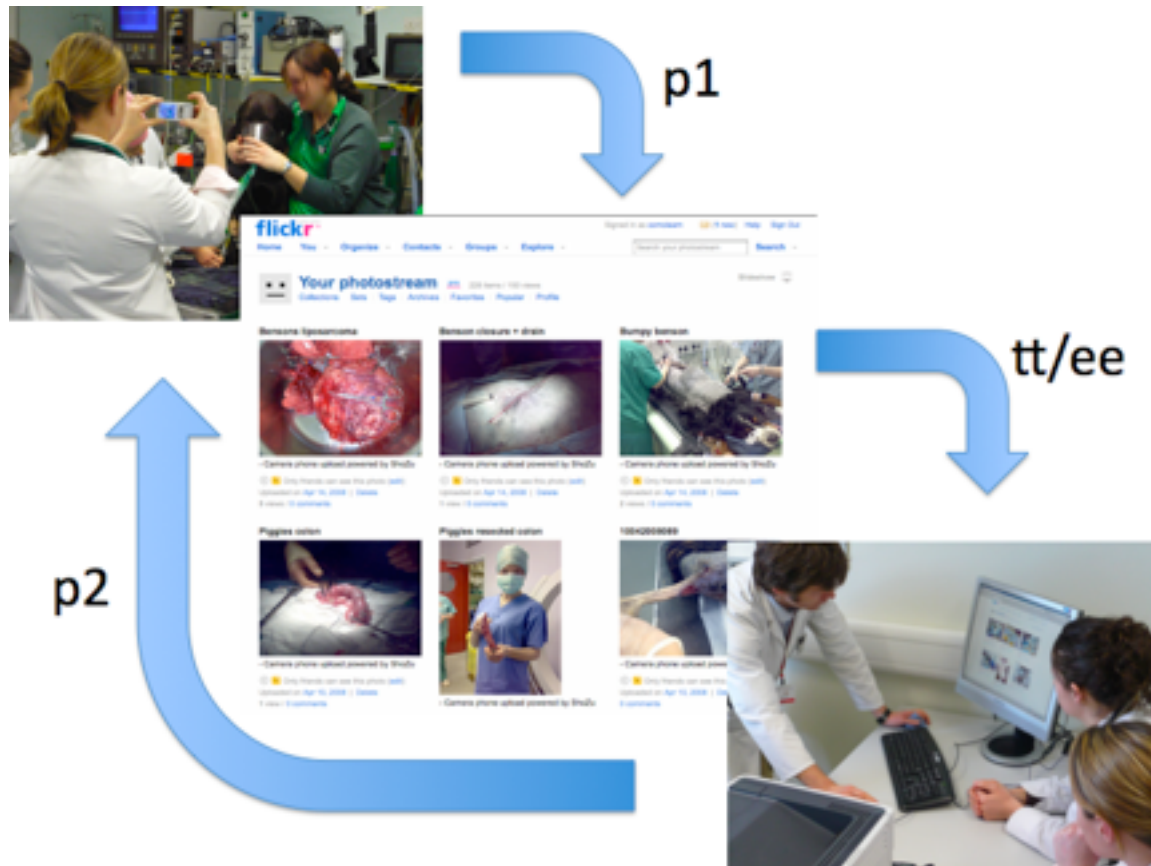


Figure 2: The CVPR Framework in practice

As can be seen from Figure 2, students uploaded the pictures to a single flickr account. This was beneficial for three reasons: (i) the tutor could see at a glance the work students were doing between sessions, (ii) the tutors could then determine which practices were most interesting to discuss and (iii) the website acted as an information store for images taken *across* cohort groups. Thus, one group of student could reference the work of another group.

There are five key outcomes that we would like to focus on:

- In this pedagogic design the *tutor* was the primary driver and mediator of reflective practice. The students did not engage in reflection of their own accord – they required a *structured framework* in which to do this.
- Reflective practice did not relying sole on the use of ICT. As shown in Figure 3, group sessions often took place in consulting or teaching rooms equipped

with whiteboards, internet-connected PCs and projectors. Therefore, the tutors used all of the technologies available to them to help in mediating reflection.

- In the context of the RVC, where using images (X-Ray, CT, MRI etc.) is common practice, the images from the mobile phones were seen as valuable because they focused student attention on *what was presented*, as distinct from the technical aspects of imaging.
- In general, students did not view the photos on the website outside of the teaching sessions. The website was not used by them to mediate their learning, indicated by the fact that there was one known case of a student revisiting and editing photos on the web. Students did use their mobile phone to discuss their photos with each other but could not access the website on their phone due to access restrictions.
- Tutors further mediated reflection by uploading related interesting cases from their own archives for discussion with students. An interesting example was of improvising the bandaging needs for extensive wounds, where one tutor uploaded examples of his previous practice.



Figure 3: A consultation room at the Royal Veterinary College

Learners' and tutors' experience

We determined learners' and tutors' experience from four full-day observations at the Royal Veterinary College. These were recorded using notes of key practices – radiology, prep room and student tutorials, which were videoed and recorded using still images. 24 semi-structured interviews of varying length (2 minutes opportunistic interviews to 42 minutes sit-down interviews) with 11 students, 1 student-tutor group, and 3 tutors were undertaken.

The key themes are as follows:

- Both learners and students found the use of phones to be of use in their everyday practice
 - Ease-of-use and the mobility of the device were key motivators of use
 - Students photo upload was high (213 photos over 3 weeks) but tagging was very limited. One student noted that “the little keypads don't work for me”
- New ways to communicate
 - Tutors used the website as a “window on what the students attention was” and felt that it “integrated very well”
 - Tutors were happy with the ability to SMS students
- Tutors noted that the tools needed to “have a critical mass” in order for them to be successfully embedded over the longer term
- Supporting clinical understanding
 - One tutor commented that the pictures “added a different factor as it allow us to see what was presented” and were “less technical but it did appear to provide more global overview of case management”
- Two students who described themselves as visual learners, liked that it was “[g]ood to see and visualise what was happening”
- Social conventions
 - Students noted that other staff were fine with the use of mobile devices once their use “had been cleared”
 - A student noted that “[i]f tutors are into it then it will work”
- Collaborative use
 - “I took a picture of something I didn't think would be that interesting, something we do everyday . . . it reminded [student A] of a point in rounds she wanted to bring up”

Dissemination

The following are the dissemination events resulting from the project:

- Seminar at the LKL, 14 November 2007
- PLaNet talk @ LKL Knowledge Seminar, 30 January 2008

(<http://www.slideshare.net/yish/planet-talk-lkl-knowledge-seminar-30-jan-2008-246126/>)

- A Language of Patterns for Mathematical Learning, Technion, Haifa, 13 April 2008 (<http://www.slideshare.net/yish/a-langauge-of-patterns-for-mathematical-learning>)
- CoMo Demo at the LKL Open Evening, 5 June 2008
- Natasa Lackovic has been interning at the LKL, working on some data analysis for the project. She will present CoMo at the EC 'Crosslife: cross-cultural collaboration in lifelong learning and work' project in September.
- Wali, E., Winters, N. and Oliver, M. (2008) Mobile Learning across contexts: Methodological considerations, In Proceedings of Mobile Learning 2008, p. 98-105, Algarve, Portugal.
- Capacity building: Jon Gregson discussed his CDE research at my Panel 'Designing sustainable technologies for Africa: engaging with local perspectives' at eLearning Africa 2008.
- Kim Whittlestone presented background work which informed CoMo development at Mobile Learning 2008. Whittlestone, K. Bullock, J. Pirkelbauer, B. & May S. (2008) The significant factors affecting engagement of veterinary students with mobile learning, In Proceedings of Mobile Learning 2008, p. 135-139, Algarve, Portugal.
- A CoMo case study will be presented at our Design workshop at the Infocomm Development Authority of Singapore (IDA), August 8 2008 (<http://www.ida.gov.sg>)

Lesson learnt: the design process and activity evaluation

The following section summarises the key lessons learnt from the project:

- Embedded in an existing infrastructure and *learning ecosystem*: the mobile phone is both an additional tool for the student and part of a 'family' of technologies used by the Institute.
- Learning activities need to be designed for embedding in this ecosystem. As indicated by Figures 4 and 5, the mobile phone augments the many technologies and tools already in use. As such, the context-of-use is critically important and is the combination of interactions a learner experiences across multiple spaces, in this case within the Institute.



Figure 4: The mobile phone is one of a number to learning and work aids used by students



Figure 5: The mobile phone augments technologies already in uses

- Easy to set up and use using off-the-shelf technologies: students engaged in spontaneous capture and upload. Their use was not, for the most part, pre-mediated – they need structure.
- The learning activities must be part of students' everyday practice. In terms of deep embedding with the Institute, one tutor commented that it "needs to have critical mass".
- Student (both experienced and new) use was high – 213 uploads. Tagging was rarely used.
- Tutors found the website useful as tool to view what students were doing

- Tutors like the ability to add their own contributions to the flickr account.
- Use in practice needs to be quick and easy. *Tutors drove reflection*. Students did not do this autonomously nor did they engage in high levels of tagging and commenting. A tutor commented that flickr was a “teaching modality that supported the teaching rather than being an add-on”.
- The CVPR framework worked well for collection and discussion of practice and embedding this with the use of existing tools. Tutors could easily use the website to find interesting cases from the uploaded photos. This directly and strongly supported the ‘p1’ and ‘tt/ee’ part of the cycle. Discussion of particular cases or *past surgical events* related to a case (e.g. What procedure happened before this one?) was common. However, the learning scenario did not strongly support the ‘p2’ part of the cycle. Tutors did not provide directly related subproblems to students to address arising from their reflection session. Primarily, this was because of the nature of their work: the cases acted a starting point for discussion for particular interventions and practices, which may not directly relate to the *next step* in an animal’s recovery.
- Students used their notebook primarily for information gathering *not* for detailing their practice. It acted as an information store.
- The immediacy of internet-connected mobile phones was found to be important to students. They could document their practice and in 1-click their photo was available to others.
- Images collected by students supported tutors’ approaches to problem-based learning. They were a bridge between the abstract nature of what was in the students’ textbooks and the way cases presented when they arrived at the hospital.
- As a socio-technical activity, mobile learning in distance education through interaction with technology requires supports that *emerge* from the specified learning context. Our scenario-based approach to the activity design aid understand and leveraging of this emerging context.