

Cover Sheet for Bids <i>(All sections must be completed)</i>			
Name of JISC Initiative (identify strand ie A, B or C):		Assessment and Feedback Programme: Strand A	
Name of Lead Institution:		St George's, University of London	
Name of Proposed Project:		New Innovations in Mobile Learning Assessment	
Name(s) of Project Partners(s)		University of London Computing Centre (ULCC)	
This project involves one or more commercial sector partners NO		Name(s) of any commercial partner company (ies)	
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Length of Project:		2 Years and 3 Months: 23 Months funded, 4 Months unfunded	
Project Start Date: 02/09/11		Project End Date: 28/10/13	
Total Funding Requested from JISC:		£178,187.00	
Funding requested from JISC broken down across Academic Years (Aug-July)			
Aug11 – July12		Aug12 – July13	
£102,710		£75,477	
Total Institutional Contributions:		£44,547.00	
Outline Project Description: Workplace based assessment in medical schools occurs during students' clinical attachments, such as hospital wards. Since these can be busy places, assessments need to be unusually simple and reliable. In this situation, paper based assessments are prominent. Recent changes have led to students completing more attachments and more assessments during each attachment. This has led to tens of thousands of paper assessments each year, and growing. Processing all this paper created problems with efficiency and quality of student feedback. The proposed project would run a trial of three diverse mobile technologies to see which is most effective in which clinical attachments, for electronic submission. At the least, this project should eliminate hundreds or thousands of papers. At the most, assessments would be faster, more thorough, and provide feedback that is easier for students to locate, compare, and synthesise.			
I have looked at the example FOI form at Appendix A and included an FOI form in this bid		YES	
I have read the Funding Call and associated Terms and Conditions of Grant at Appendix B		YES	
For FE institutions only: Please tick this box if you are an FE institution in England, please tick this box to confirm that you meet the eligibility requirement of teaching HE to more than 400 FTE		<input type="checkbox"/>	

1. FIT TO PROGRAMME SCOPE AND OUTCOMES

This document describes a project entitled New Innovations in Mobile Learning Assessment, or NIMBLA. This project will trial a *nimbler* and more effective approach to assessing workplace learning in medical education. The project will originate from the eLearning Unit (ELU) at St George's, University of London (SGUL).

1.1 Workplace Assessment in Medical Education

If assessment drives learning, workplace based assessment drives the most authentic learning available¹. Ironically, the learning opportunities in the workplace can be so numerous that they create respectable challenges for assessment. An example from medical education occurs when students work with patients and clinicians in a hospital, which is referred to as students' "clinical attachments". During these attachments, students learn many real-world issues. These include patients' social and psychological needs, how to respect these needs while asking important medical questions, how results from medical tests influence how students consider information from a patient, and how complex medical, emotional, and pragmatic issues interact, often in a short time.

One important task for clinicians is commenting on events that students observe or assist with. A second task for them is to assess students. A challenge for clinicians is giving sufficient explanations to students, especially when hospital wards or other clinical environments get busy, so less time is available for clinicians to assess students, sometimes just a few minutes. In this situation, paper based forms are used for assessment to make the most of the limited time available. Paper based forms are also familiar and reliable.

Not surprisingly, paper forms have their own problems. A small but important number of forms are completed incorrectly, leaving students with an incomplete or confusing assessment. Students then need to submit these forms to university staff, who scan them for mistakes, enter information from them into a database, and store the forms. Unfortunately, the time involved with processing forms means that staff only type in all the information from *summative assessment* forms, which count towards student progression. Information from *formative assessment*, used for developmental feedback, forms is reduced to a yes or no, showing if a student viewed or completed something during an attachment. The inability to electronically store formative assessments removes many of the benefits of formative assessment, as described below in the stakeholder analysis.

From a learning technologist's perspective, it may appear surprising that technology wasn't used years ago, to reduce the amount of paper, the number of errors on forms, and inevitable errors with data entry. Unfortunately, technology-based solutions for assessing student attachments have faced three challenges. First, there is rarely a computer nearby a patient. Second, wireless access has been limited inside hospitals, and third, mobile computing technology has only recently reached acceptable levels of simplicity, reliability, and cost for clinicians and students. Issues of simplicity and reliability are unusually important in this case, since a patient's care cannot be affected while a student or clinician pause to get the technology to work.

Another paper based assessment is used while students are on an attachment but not working on the wards. This assessment is a brief reflection paper. Students submit these papers to teaching staff, who mark them in offices and give students feedback on the papers. The combination of paper forms and reflection papers have provided an efficient way to assess students while they are on their clinical attachments. Forms provide an assessment that can be quickly completed when students are working with a clinician and patients. Reflection papers allow students to contemplate

¹ Miller, A., & Archer, J. (January 01, 2010). Impact of workplace based assessment on doctors' education and performance: a systematic review. *Bmj (clinical Research Ed.)*, 341.

what they learned on the wards and allow markers to take some time giving students feedback and a mark. Unfortunately, the amount of paper assessments is increasing dramatically, which will be described next.

2. SPECIFIC ISSUES AT SGUL

At St George's, University of London (SGUL), all students studying for an MBBS in Medicine participate in student attachments during their last three years. Since the MBBS is the largest course at SGUL, these attachments rank among the top of institution-wide learning activities. This is one reason why the problem of paper so large, and any solutions so influential. SGUL has made some effort to reduce the number of paper based assessments. Students now submit most of their reflection papers into a drop-box in Moodle. To error on the side of caution, students are also submitting a paper copy, but this dual-submission should end soon since Moodle drop-boxes have shown to be simple and reliable.

Using Moodle has been a modest effort, but it has started a process of electronic submission instead of paper submission. It is important that this move toward electronic submission continues and grows because SGUL created a new curriculum that requires more student attachments and more assessment during attachments. This curriculum was created in response to the report *Tomorrow's Doctors*, which was published by the General Medical Council. The new curriculum gives students more of the benefits of authentic learning in a workplace, clinical attachments in this case, but there is also a respectable increase in paper assessments that need to be processed and stored, for as long as a student is enrolled.

2.1 Needs Analysis

In the previous curriculum, students returned 28 sign-offs or other attachment related paperwork over the course of their three clinical years. When each piece of paper is roughly considered an "item", each student submitted 7,840 items each year. In the new curriculum, each student is submitting 187 attachment related items over the course of their three clinical years. The total for one student year group is about 52,360 items, usually in triplicate.

The actual definition of an "item" is unusually complex and related to the details of curriculum design at SGUL. For the current discussion, the percentage increase is the most important issue. With the new curriculum, there is a 667% increase in the number of items each student will submit, most of which are pieces of paper. The need being addressed in NIMBLA is explore diverse technical options to show if or how assessments can be submitted electronically instead of with paper. Currently, two year groups of students are completing clinical attachments in the new curriculum. This is about 600 students. That number, and the amount of paper, will increase to about 900 in the 2011-12 academic year, as more students complete medical attachments under the new curriculum.

2.2 Stakeholder Analysis: Support Staff

As previously described, a solution is underway for addressing reflection papers, but a solution is needed that will address at least some paper forms that clinicians use to assess students. Otherwise, support staff at SGUL will be seriously challenged to process all the assessment forms that students will submit during clinical attachments. This processing involves receiving the forms, reviewing they have been completed properly, entering information from the forms into a database, and storing the forms. Some compromises have already been made to keep up with the amount of paperwork. Data from forms are only entered into a database for summative assessment, during clinical attachments. Data from formative assessments is reduced to yes or no, indicating that a student did or did not observe or complete a task. Even with this compromise, inevitable data entry errors occur, when data from forms is typed into a database, leading to mistakes in student assessment.

2.3 Stakeholder Analysis: Students

Since many of the paper forms are completed in triplicate, students are given a copy of the assessment. The best way for them to proceed is to carefully store each paper form for three years. That would allow students to refer back to them and get additional benefit from their clinical

attachments. Unfortunately, students face the same problem with storing forms that support staff face. Storage has become more challenging as more forms have been added. From a learning perspective, students looking over just one or two years of forms would have a difficult time locating a specific learning experience. First, they would have to recall if it involved formative or summative assessment. If it was formative, they would need to find the paper form. Storing all assessment data in a VLE would be much more convenient, and more likely to lead to students actually reviewing assessments from clinical attachments.

2.4 Stakeholder Analysis: Teaching Staff

Similar challenges exist for teaching staff. They are particularly interested in making continual improvements to assessments, to assure that students are getting the best learning they can during their clinical attachments. Unfortunately, their efforts are also restricted by the same large system of paper forms. For example, if a teaching staff member needs to review the records of 10 students, it is likely that he or she will spend precious time learning why some data are missing or suspect, due to incomplete paper forms or inevitable data entry errors. And as described earlier, the forms from formative assessments are simplified to a yes or no, indicating if a student observed or completed a particular task, reducing the chance that problems from formative assessment can be resolved before students undergo summative assessment.

2. PROPOSED SOLUTION

The solution is to build on existing efforts that have replaced paper submission with electronic submission, for student reflection papers. As previously stated, these efforts have been modest, but they have also been successful. They have shown that students, markers, and support staff can work within Moodle to process electronic assessments regarding student attachments. The next step, and the focus for the remainder of this bid, is to conduct a trial where paper forms are completed and submitted electronically within Moodle.

2.5 Challenges

Initial efforts to use electronic submission, instead of paper, started with reflection papers because processing these papers is moderately simple. They are MS Word files that students write and submit to a Moodle drop-box. Markers were able to view these papers online using a similar process. The most challenging task for markers was entering marks and comments in the Moodle grade book, but this was solved with carefully written instructions.

Creating electronic submission for paper assessment forms is more challenging. These forms need to be converted into online forms, automatic error checking would need to be created, and a trustworthy system would need to be created for electronic sign-off and storage of online student assessment forms. This solution would also need to address challenges that were previously described, which include having a computer nearby when working with patients, accessing a wireless network, and most important, making the electronic submission system simple and reliable.

2.6 Resources

In recent months and years, SGUL has established relationships and become proficient with technologies that can address the challenges previously mentioned. Each will now be described.

2.6.1 Relationships

One important business relationship involves SGUL and Apple. SGUL is making an iPad app for medical education that Apple is interested in, to the point where they have asked for more information and where they will help market the app. This relationship will allow SGUL to stay informed of any new developments with the iPad. Another relationship SGUL brings to NIMBLA involves a long history in the open-source community. The eLearning Unit at SGUL has participated in many successful projects using open source, including REHASH, PIVOTE, eVIP, and G4. These experiences would help SGUL's eLearning Unit in preparing, implementing, and evaluating many areas of the open-source operating system that is used in tablet PCs.

A final business relationship involves SGUL and the University of London Computing Centre

(ULCC). ULCC has been providing eLearning services based on Moodle since 2005 and is a leading provider of VLE hosting in the UK. It hosts over 100 instances of Moodle for more than 80 customers across a range of learning providers, including Higher Education, Further Education, Adult and Community Learning, Work Based Learning, Schools and Health. Since Moodle is an open source package, ULCC has become familiar with open source tools and made many contributions to open source projects. In May 2011, SGUL purchased ULCC's Moodle hosting service for its post graduate course in medicine. After the Moodle website for this post graduate course is established, SGUL will gradually move all of its Moodle content to servers at ULCC.

2.6.2 Technologies

ULCC has created and implemented many types of assessment in Moodle. One of them is Assessment Manager. It builds on Moodle's existing gradebook, with an emphasis on workplace assessment. Students can also upload evidence, and all this information is automatically available in a standard installation of Moodle. Assessment manager would not be directly used in NIMBLA, but ULCC would create very similar features as they did in Assessment Manager.

ULCC can address many of the software issues needed to collect and submit assessments while students are on the wards, which has previously been done with paper forms. Another challenge relates to hardware, both the computer used to display online forms and access to a wireless network. The recent growth in mobile devices should address this hardware issue, particularly the iPad and tablet PCs. These mobile devices are small enough not to be a distraction to patients, clinicians, or students, yet the screens are large enough to contain a substantive assessment. They can also access a wireless computer network or a 3G network. The eLearning Unit at SGUL has committed funds to the purchase of 40 tablet computers, twenty iPads and twenty tablet PCs with the Android OS, and a 3G data contract for all of them.

Smartphones are a final technology that would be trialled in the proposed project. An obvious benefit is that about half of SGUL students have a smartphone, based on an mLearning survey of 411 students in 2011. A challenge of using smartphones is that clinicians may prefer paper forms over using a student's smartphone. This could happen if a clinician needs to report something critical about a student while using the student's personal phone. This issue is further complicated if the clinician is using the student's phone, writing something critical, and has to ask the student a question about using the phone. Other issues with using students' personal phones involve the small screen size and the chance the student will be charged for network access.

From a technological perspective, the goal of this project is to identify strengths and weaknesses of popular and diverse technologies. One technology is the iPad with the proprietary iOS operating system. The second technology is a tablet PC with the open-source Android operating system, and the third technology involves smartphones with a mix of operating systems. This technical comparison may become interesting from an intellectual perspective, but the important issue being addressed is that students are assessed in very diverse environments, spanning dozens of NHS trusts. Some trusts will have wireless networks, some will not, and all will have policies that do or do not allow wireless technology on the wards. This diverse set of workplace learning environments is the reason why three diverse technologies would be used in the proposed project. The results of this project will help clarify which of these three diverse technologies work best in which situations.

The technical benefits are important, but the most important benefit will be pedagogical. At the least, there will be pedagogical benefits from storing all data from both formative and summative forms, but additional efforts will be made to improve the pedagogy of electronically submitting assessments. As described in the next section, paper based forms will not be directly converted into their online equivalents. The forms will be carefully reviewed to consider what SGUL staff have learned from their experience with attachments. This review will also consider many surveys that have been given to students and information from the many NHS trusts that work with SGUL. The pedagogical goal is to use this technical change as an important opportunity to implement pedagogical change. This pedagogical change is well positioned to influence the entire university, since the problem with paper is growing and any solution that increases electronic submission of

assessments affects the last three years of the largest course at SGUL.

3. OUTCOMES

The aim of NIMBLA is to improve the efficiency and quality of assessments when students are on clinical attachments. Efficiency improvements will come from using electronic submission for assessing students on clinical attachments instead of paper assessments, which number in the tens of thousands each year. Quality improvements will come from error-checking on electronic forms, from improving the content of assessment documents, and from using technology to improve the response time and content of feedback for students.

3.1 Objectives

The objectives below were created using the ADDIE model.

1. **Analyse:** Review past and current assessment efforts to clarify four key issues: 1) Evaluations of past efforts, 2) Stakeholder views of assessing attachments, from students, support staff, teaching staff, and clinicians; 3) Error rates when using paper assessment; 4) Current costs when using paper assessment.
2. **Design:** Identify and prioritise pedagogical improvements in clinical assessment in terms of importance and the likelihood to be successfully implemented into the curriculum. Clarify each.
3. **Develop:** Replace approximately 10 paper forms used during clinical attachments with improved electronic equivalents.
4. **Develop:** Pilot-test early versions of the electronic forms in the same clinical environments where they will be used, revising the forms or mobile device configurations accordingly.
5. **Implement:** Conduct brief training sessions and materials for students and clinicians who will use the mobile devices, including a plan to use if the mobile devices fail.
6. **Implement:** Distribute all mobile devices to students for field trials, where the devices will be given to students for assessment during clinical attachments.
7. **Evaluate:** Collect evaluation data about how much data were successfully submitted electronically, if differences existed for different mobile devices in different clinical attachments or for different people.
8. **Evaluate:** Analyse data from current field tests and create formative reports on improvements that can be made, changes in efficiency, pedagogy, student feedback, and other key findings.
9. **Evaluate:** Analyse data from formative reports and create summative reports that can be shared at SGUL, other UK medical schools, and medical schools worldwide.

4. DELIVERABLES

Deliverables from this project are described below. In the next section, the workplan shows which objective numbers will relate to which deliverable letters.

- A. **Project Websites:** One website will be added to JISC's website and a second website will reside at SGUL.
- B. **Updated Project Plan:** Contains a revised project plan and includes detailed plans for evaluation, QA plan, dissemination, and exit/sustainability.
- C. **Reports of current and past practice:** Describes the outcomes and lessons of previous initiatives with assessing clinical attachments and providing feedback to students, at SGUL and other medical schools. Also includes recommendations to further refine NIMBLA and to create baseline reports.
- D. **Design Document:** Summarises key features needed and the output created in the online forms, including drawings of what the forms should look like, using ideas from rapid prototyping².

² Allen, M. W. (2003). *Michael Allen's guide to e-learning: Building interactive, fun, and effective learning programs for any company*. Hoboken, N.J: John Wiley.

Academic stakeholders will use this information to embed the online assessments into the curriculum. Developers will use the information to create the online forms.

- E. **Online Forms:** Approximately 10 online forms will be created, pilot-tested, implemented, evaluated to replace their paper equivalents.
- F. **Evaluation report:** Describes quantitative and qualitative results from pilot tests and field-trials, with many comparisons. The comparisons will include strengths and weaknesses of different mobile devices, for different online forms, during different types of clinical attachments, and in different NHS trusts.
- G. **Guidance and Support Materials:** A few types of support materials will be needed for this project. For example, brief training sessions and related hand-outs will be needed for students and clinicians using tablet PCs and online forms for the first time, in a fast-paced environment.
- H. **Range of assets:** illustrating the evidence of NIMBLA's impact on assessing student attachments. This will include a range of assets, such as case studies, audio clips, or video clips of key stakeholders talking about their experiences and reflections. Relevant strategies or other documents could also be included.

5. WORKPLAN

Project management will be based upon Prince2 methodology. The work packages (WP) are listed below, in addition to their associated objectives and deliverables. The abbreviation PM is used if a WPs focus on project management, instead of objectives or deliverables. Rows shaded in grey will be repeated at multiple field-tests, at different NHS Trusts.

5.1 Work Packages

WP ID	WP Description: Abbreviation & detailed description	Related Objective	Related Deliverable
WP1	Start-Up: Form project team, conduct start-up meetings, & clarify project to team.	PM	
WP2	Website: Create project websites & identify range of assets that will eventually appear on that site.	PM	A
WP3	Update Plan: Update the project plan after considering past efforts & baseline reports. Include additional plans described in Deliverable B.	1	B, C
WP4	Refine Design: Refine, prioritise, & more fully specify how the online forms will appear. Create criteria for project success.	2	D
WP5	Create forms: Create online forms.	3	E
WP6	Pilot Test: Pilot-test online forms & mobile devices, in the actual clinical environments where devices will be used.	4	F
WP7	Revise: Revise online forms & the configuration of mobile devices.	4	F
WP8	Train: Train students & clinicians to use forms & mobile devices.	5	G
WP9	Field Trials: Conduct field trials of mobile devices & online forms, for assessing students during clinical attachments.	6	E
WP10	Collect Data: Collect & organise evaluation data from electronic assessments during field trials	7	F, G
WP11	Formative Report: Review data from field tests as they are completed & write formative reports, with an emphasis on criteria for success.	8	F
WP12	Summative Report: Review data from formative reports, create summative reports, & disseminate results internally & externally. Summarise current & on-going sustainability efforts.	9	F, H

5.2 Timetables for Work Packages & Deliverables

The table below shows a timetable for the two years of NIMBLA, please note that work packages 7-11 are repeated during two field trials/clinical attachments, that are a year apart.

Package	Start	Finish	Deliverables	Finish
WP 1: Start-Up	02/09/11	15/09/11		
WP 2: Website, for JISC	01/09/11	28/09/11	A: Project website-JISC	29/09/11
WP 2: Website, for SGUL	01/09/11	23/11/11	A: Project website-SGUL	24/11/11
WP 3: Update Plan	01/09/11	28/09/11	B: Updated project plan C: Reports of current & past practice	29/09/11
WP 4: Refine Design	29/09/11	12/10/11	D: Design document	13/10/11
WP 5: Create forms	13/10/11	02/11/11		
WP 6: Pilot Test	10/11/11	16/11/11	E: Online Forms	03/11/11
WP 7: Revise	17/11/11	30/11/11		
WP 8: Train	01/12/11	14/12/11	G: Guidance & support materials	15/12/11
WP 9: Field Trials, 2012	16/01/12	06/07/12		
WP 10: Collect Data	16/01/12	13/07/12		
WP 11: Formative Report	18/07/12	1/08/12		
WP 7: Revise	2/08/12	17/08/12	H: Range of assets, milestone	13/08/12
WP 8: Train	20/08/12	24/08/12		
WP 9: Field Trials, 2013	27/08/12	05/07/13		
WP 10: Collect Data	27/08/12	12/07/13	F: Formative evaluation report	27/07/13
WP 11: Formative Report	16/07/13	27/07/13	F: Draft summative report	27/09/13
WP 12: Summative Report	28/08/13	25/10/13	F: Final summative report	25/10/13

6. WORK PLAN METHODOLOGY

Key issues with the work packages and deliverables are described here.

6.1 Planning, Development, & QA

WPs 1-4 will set the foundation for NIMBLA, adjusting the plan for inevitable changes in policy, technology, and related issues. By the time of WP5, all of the deliverables will be used to create electronic versions of the paper forms, particularly item D: Design Document. To address QA and as a precaution against losing student assessments, the online forms will store data in two locations and an error message will be shown if problems arise with storage in either location. After the forms are created, QA will continue to be addressed by conducting a pilot-test. This pilot will occur in a clinical environment by the project team, students, and clinicians. In WP7, pilot test results will be used to improve the online forms and mobile devices.

6.2 Training

In WP8, all students and clinicians participating in NIMBLA will be trained how to use the online forms, with the mobile device they will use in the field trials. This training will emphasise that any problems with the mobile devices should not interfere with the students' learning or assessment. Specifically, if technical problems occur, paper assessment forms should be used. Data about the field trials will be gathered in WP10, described in more detail below. As data are gathered, improvements will continually be made to the online forms and mobile devices, which is WP7. This WP will primarily occur in November 2011 and August 2012, since there will be two sets of field trials. Similarly, WPs 8, 9, 10, and 11 will be repeated for each field trial.

An important part of training will be explaining to students what will happen if a device is damaged or lost. This is one of the most challenging issues involved with mobile devices in workplace

assessment. During training sessions, students will be told the importance of being careful with the mobile devices. Students will also be told that a small investigation will be conducted of any such incident. At the least, students will be asked to give a verbal and written description of what happened. If a device is lost and the situation is suspicious, a more elaborate investigation will be applied. The project team chose not to apply more harsh measures, like asking students to pay for a lost or damaged device because this could penalise students choosing to participate in NIMBLA.

6.3 Field Trials

The field trials of the mobile devices will occur in the third year of students' clinical attachments. By this time, students are familiar with attachments, so they should be able to more easily incorporate a device into their routine. Many of the attachments occur at five NHS trusts in southwest London: St George's, St Helier, Croydon, Kingston, and Epsom. When choosing the trusts for field trials, a few factors will be considered, such as having at least 5 devices in each trust for data validity, conducting field trials in as many trusts as possible, and having confidence that leadership in a trust is comfortable with the use of mobile devices.

6.4 Evaluation

WPs 11 and 12 involve evaluation, which will analyse changes in efficiency and quality, from a few perspectives. These include quantitative data, qualitative data, data from different NHS trusts, different groups of students, and different mobile devices performed in different trusts. As patterns emerge from formative assessment, WP11, any benefits will be used to expand the integration of mobile devices into other attachments and other courses at SGUL.

6.4.1 Evaluation of Assessment Efficiency

Efficiency will be evaluated with comparisons of speed, cost, and accuracy of data from electronic and paper forms, including data from baseline reports. Additional data from paper will be collected during NIMBLA. Speed can be measured by comparing the time a form, paper or electronic, was completed to the time the data were ready for review by students, support staff, and teaching staff³. Cost can be measured by multiplying speed by staff time, by materials handled and consumed, and by the cost of storing data. Accuracy will be measured by the number of reported errors from staff and students and from a review of data submitted electronically and with paper forms. A final measure of efficiency will be how well different types of mobile devices performed at different NHS trusts. This paragraph has focused on quantitative data. Qualitative data will be collected by surveying students, who did and did not use a mobile device, and with interviews.

6.4.2 Evaluation of Assessment Quality

Quality will be evaluated primarily with qualitative data, using an emergent design. Initially, data will be gathered by surveying staff and students to get their opinions about electronic submission, changes in efficiency, and the ability to view data from formative assessments, which is not stored electronically on paper assessments. After analysing this survey data, prominent themes will emerge, be identified, and written as interview questions for individuals and focus groups.

6.5 Open Standards

All of the deliverables will apply open-standards. As previously mentioned, SGUL's eLearning Unit and ULCC and have much experience using and creating open source materials. ULCC will create the forms from existing open source resources, and when the forms are complete, they will make them available to the open source community.

³ Nicol, D.J. & Coen, M. (2003) A model for evaluating the institutional costs and benefits of ICT initiatives in teaching and learning in higher education. *ALT-J - Association for Learning Technology Journal*. 11(2), 46-60. (Version submitted to ALT-J)

7. ENGAGEMENT WITH THE COMMUNITY

The NIMBLA team will engage with local, national, and international communities to share what we learn. In local terms, the team will participate in all events JISC holds as a part of this funding call. The team will also participate in communities in SW London, such as the Southwest Academic Network (SWAN) and the South London Health Innovation and Education Cluster (HIEC). National dissemination will occur by submitting presentation proposals to conferences, such as ALT-C or the Association for the Study of Medical Education (ASME) Annual Meeting. International dissemination will occur by submitting conference proposals to the Association for Medical Education in Europe (AMEE). Additional engagement with all communities will be attempted by submitting manuscripts to journals, such as ALT-J, British Journal of Educational Technology, or Medical Teacher.

7.1 Exit and Sustainability

As mentioned earlier, reducing the amount of paper used in clinical attachments is a high priority at SGUL, due to the cost of paper, mistakes in data entry, and the intentional omission of data from formative assessments. Therefore, even a moderate degree of success, as determined in WP4, in this project will increase the chance that SGUL will fund efforts in electronic submission. However, strong efforts will be made to show the financial value of electronic submission, as described in the evaluation of assessment efficiency. The exit of NIMBLA will either result in additional mobile devices being purchased, or a continual increase in the amount of paper being processed and stored. In the latter case, it should be a matter of time before the lessons of NIMBLA are applied.

7.2 Summary of Qualitative and Quantitative Benefits

All communities that learn more about NIMBLA will discover qualitative and quantitative benefits. The simplest qualitative benefit should be reduced errors on forms used to assess students during clinical attachments, by including error-checking on the online forms. At the least, fewer parts of the forms should be empty. At the most, careful instructions and prompts should lead to more detailed feedback. A final benefit is that formative assessments conducted during student attachments will be fully recorded in a database, which has not the case with formative assessments on paper. This allows students to easily view their progress, and teaching staff to identify problems early.

The strongest quantitative benefit should be that data will be automatically submitted to a database, instead of entered by hand. This will further decrease errors and reduce the time needed to view assessment results. Another quantitative benefit will be reductions in the quantity of paper, which should lead to reductions in cost, due to less storage and processing.

8. RISK ANALYSIS

A student drops or loses a device.	This is an important and fundamental challenge of using mobile devices in workplace learning, see the training section of the Work Plan Methodology.
iPads, tablets, or phones cannot work in NHS trusts that are selected for field trials.	Three diverse types of devices are being used in NIMBLA. If one type does not work, attempts will be made to use the others. If no device works, this is a convincing case that some trusts will still need to use paper assessment.
Wireless and 3G networks are unavailable in NHS Trusts.	A different type of device will be used, in case the problem is with the reception of a mobile device. If no solution is possible, this shows a situation where paper assessment is appropriate.
Electronic assessments are not stored properly.	Data integrity will be monitored hourly, to quickly identify problems with data storage. If any problem with data integrity arises, a message will appear on all tablets telling the students to use paper assessments.
Clinicians prefer familiar paper forms over mobile devices.	Initial conversations with the leaders of NHS Trusts will seek some kind of formal encouragement for NIMBLA.

9. PROJECT TEAM & PREVIOUS EXPERIENCE

The project team is centred on SGUL's eLearning Unit. This group has successfully delivered many JISC project, including G4, REHASH, REVIP⁴, and PREVIEW. This unit has also led a large scale European programme eViP, and the common standards group MedBiquitous Europe. One of its strengths is in having trained (Prince2) manager/developers who hold degrees in bioscience, have experience as technical developers, conduct qualitative and quantitative evaluations.

Project and Research Manager: Dr. Steven Malikowski: Dr Malikowski a Lecturer in E-Learning and Staff Development. Previously as an Associate Professor at St. Cloud State University, a university with 15,000 students in the USA, he managed Statistical Consulting and Research Support, a group that served the entire university. Since 1993, he has created and researched e-learning at the University of Minnesota, Indiana University, and Walden University, which exclusively offers courses online. His primary role at St. George's is to identify learning needs that can be resolved with technology. He also develops and implements strategies for evaluating e-learning.

Project Director: Dr Terry Poulton: Professor Poulton is Associate Dean for e-Learning in the Dept of Medical Education and Head of the e-Learning Unit at St George's University of London. He is Project Director for a number of major grants between 2004-2007, totalling more than £2 million; these include ADAMs, REHASH, REVIP, the SGUL lead for PREVIEW (all JISC) Clinical Skills Online (HEA), the European multi-centre eViP project (EC), for which he received the Medbiquitous Innovation award in 2008, and a number of smaller projects. He founded the European healthcare standards group, Medbiquitous Europe. He has had more than 40 publications in his career.

Subject Matter Expert in Assessment: Dr Judith Ibison: Dr Ibison is a GP and a Senior Lecturer in Primary Care at SGUL. Her responsibilities include the assessment of undergraduate medical students in all clinical placements, and the personal and professional development theme of the curriculum. She is interested in the integration of e-learning technologies to improve the learning and assessment experience of health care students, and optimising quality assurance of teaching for those students through e-learning communication and training to teachers at disparate sites.

Technical Developer: Luke Woodham: Luke Woodham is a Technical Developer in the SGUL's e-Learning Unit. His work is mostly based around Virtual Patients and their technical implementation. He has been involved with the JISC-funded PREVIEW project to take Virtual Patients into Second Life, and contributed to the open-source system created for the project, PIVOTE. He has also been involved with the EC-funded projects eViP and mEducator, and is a member of the working group that developed and maintain the ANSI/MEDBIQ VP.10.1-2010, MedBiquitous VP standard.

Learning Technologist: Supriya Krishnan: Supriya Krishnan is an e-Learning Technologist for SGUL's e-Learning Unit. Most of her projects involve new learning strategies for mobile learning. In this work, she has found creative solutions to accommodate the diverse mobile devices that students own. Similarly, she has a lead role in helping students solve technical problems with their mobile devices. A final part of her work involves the development of an Apple iPhone/iPad APP to author and view Virtual Patients, one of the leading simulations for medical students.

Penultimate Year Coordinator: Yusuf Ozkizil: Yusuf Ozkizil is responsible for the planning, organisation, and implementation of the MBBS Penultimate (P) Year. This includes managing and coordinating clinical attachments in P Year, across a variety of attachments and hospital sites, and the integrity of the Professional Behaviour and Clinical Practice Domain assessment (PBCP). After analysing the resources involved in running this assessment and the risks from dependency on such a paper heavy assessment system (50'000 items a year) he has provided input to Committee groups, informed by first-hand experience of administrating the PBCP assessment.

⁴ REVIP – Repurposing Existing Virtual Patients, <http://www.elu.sgul.ac.uk/revip/>

10. BUDGET

Directly Incurred Staff	August 11– July 12	August 12– July 13	August 13–July 14 (Strand A only)	TOTAL £
Post, Grade, No. Hours & % FTE	£0	£0	£0	£0
Etc.	£0	£0	£0	£0
Etc.	£0	£0	£0	£0
Total Directly Incurred Staff (A)	£0	£0	£0	£0
Non-Staff	August 11– July 12	August 12– July 13	August 13– July 14 (Strand A only)	TOTAL £
Travel and expenses	£0	£0	£0	£0
Hardware/software	£0	£0	£0	£0.00
Dissemination	£2,000	£3,120	£0	£5,120.00
Evaluation	£1,000	£1,000	£0	£2,000.00
Other	£	£	£0	£0
Total Directly Incurred Non-Staff (B)	£3,000.00	£4,120.00	£0	£7,120.00
Directly Incurred Total (C) (A+B=C)	£3,000.00	£4,120.00	£	£7,120.00
Directly Allocated	August 11– July 12	August 12– July 13	August 13– July 14 (Strand A only)	TOTAL £
Staff: Dr Steven Malikowski	£15,624.61	£14,715.45	£0	£30,340.06
Staff: Prof Terry Poulton	£7,686.53	£7,244.35	£0	£14,930.88
Staff: Dr Judith Ibison	£3,663.78	£1,726.89	£0	£5,390.67
Staff: Luke Woodham	£8,447.64	£3,978.04	£0	£12,425.68
Staff: Supriya Krishnan	£4,564.65	£2,952.14	£0	£7,516.79
Staff: Zinatual Karim	£1,711.52	£1,615.85	£0	£3,327.37
Staff: Yusuf Ozikil	£1,715.68	£1,615.85	£0	£3,331.53
Directly Allocated Total (D)	£43,414.41	£33,848.57	£0	£77,262.98
Indirect Costs (E)	£40,988.02	£30,279.20	£0	£71,267.22
Total Project Cost (C+D+E)	£128,387	£94,347	£0	£222,734.00
Amount Requested from JISC	£102,710	£75,477	£0	£178,187.00
Institutional Contributions	£25,677	£18,870	£0	£44,547.00
Percentage Contributions over the life of the project	JISC X %80	SGUL X %20	Partners X %	Total 100%
No. FTEs used to calculate indirect and estates charges, and staff included	No FTEs 1.0118			Which Staff All directly allocated staff