JISC

REMORA

Final Report

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With contributions from the REMORA project team

Created
10-Dec-09

Version

V1.0

JISC

Contents

Figures

Document Control

Current version

VERSION	DATE	AUTHOR	COMMENTS
V 1.0	07/07/2009	Samia Oussena & Balbir Barn	Issued
V 0.2	07/07/2009	Samia Oussena & Balbir Barn	Updates
V 0.1	01/06/2009	Samia Oussena & Balbir Barn	Initial version

This document is the final version. The document will be submitted to David Kernohan for review and feedback from JISC before agreement on wider circulation.

Acknowledgements

The project team is pleased to acknowledge the support of those who have contributed to the project by providing their time, energy and knowledge in helping us deliver this report.

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Executive Summary

Background

In common with many other professions, the training of social workers requires students to be placed in social work settings and to undergo assessment in the workplace. Trainee social workers in England must successfully complete 200 days in a practice setting. Currently the social work professional bodies indicate there is a lack of e-learning support for all stakeholders involved in the placement assessment process to address a number of key issues: Evidence of learning gained in practice – collation, representation, cross referencing to case work and tracking needs to be made easier; Production of final assessment reports by the practice assessor is time consuming (using practice evidence) and shortage of mentors and assessors (trained social work practitioner educators) means that tools to support practice learning would help in attracting staff by reducing the burden.

The Remora project aimed to develop mobile software toolkits that would support student social workers in the planning and design of practice learning assessments and in the collation of evidence towards a final report.

The aims of the project were met by the following objectives:

- The project will utilize and enhance as appropriate the technical architecture and lessons learnt from the MPLAT project
- The project will conduct a detailed business requirements analysis from which applications will be formulated.
- The applications will be evaluated in social work placement settings and a report will be produced evaluating the perspectives of all stakeholders.

Methodology

Using the team's previous experience form the JISC MPLAT project, Remora deployed a creative mix of variety of methodological techniques that draw upon software engineering, social sciences research and usability. A shared understanding of the problem domain was achieved by assigning users as first-class members of the design team (co-design). A variety of elicitation techniques such as questionnaires, persona development, show and tell technology, and modelling techniques were used to specify two tools that were build using extreme programming and rapid application development approaches. Training workshops and on-line manuals preceded deployment of the tools. Post deployment evaluation was conducted using interviews and questionnaires.

Results

The project was successful in designing social software tools to address key challenges such as the non-sharing of social and work-based virtual learning spaces, and a search tool facilitate off-line access to these documents on mobile devices. Our results demonstrate the need for a common repository for placement related learning materials and we built this to support learning. In our tools, we introduced the use of 'tagging' as a useful method in supporting learning of key roles. The purpose of tagging as a model was introduced to help promote shared learning and understanding of the key roles framework. Our study shows that whilst it is important to recognise the role of technology in work-based learning, there are key constraints, for example, rates of digital literacy, the non-mandatory nature of the use of such tools, work pressures, and notions of risk.

The project was less successful in the piloting of the tools. The lack of engagement of students and the practitioner could be seen as reflecting fear on a number of dimensions. Reluctance to engage with the project could be seen as a fear of technology itself and the ability of some individuals to cope with technological demands. Practitioners and students were anticipating possible difficulties in areas such as confidentiality, data protection which in itself prevented them from considering the possible full benefit of the opportunity afforded by the project.

Recommendations

Arising from this work we make the following recommendations.

1. Projects need to pay careful attention to the planning and synchronisation with teaching schedules where experimental evaluation is based on live course schedules.

2. For mobile learning to be effective it is essential that end-users are given extensive opportunity to familiarise themselves with the basic “in-the-box” functionality before being introduced to specific mobile learning applications.

3. Work based learning which requires paper-based evidencing may not lend itself to mobile technology. Early detailed analysis should be undertaken to understand paper based administrative processes.

4. Certain professional bodies and work based learning environments are particularly risk averse. Such risks should be properly understood, as technology introduction to such environments may not be successful.

5. Organizational contexts and the pressure of work therein require senior management support to ensure that workloads of staff can accommodate the introduction of technology. Projects that plan such innovation should ensure that senior management are fully supportive.

The REMORA Project Team comprised the following:

Thames Valley University	Prof. Balbir S. Barn (Principal Investigator) Dr Samia Oussena Dr John Moore Dean Kramer Dan Sparks Andy Lapham
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1 Background

In common with many other professions, the training of social workers requires students to be placed in social work settings and to undergo assessment in the workplace. Trainee social workers in England (those on an accredited social work degree (UG or PG) must successfully complete 200 days in a practice setting. Such placement can occur in different size blocks according to structures and requirements of individual degree programmes.

During the practice learning process, there will be several key stakeholders involved, these include: the student, the practice mentor and assessor, the tutor, service user educators and, the work supervisor. Collectively, these stakeholders determine the skills and knowledge that are required from a given practice setting and those that match the student's immediate needs. They will then be involved in the process by which evidence of those skills will be collected, allocated and organized based on the student's work in the practice setting. At the end of the practice learning, the practice assessor will be required to produce a report with appropriate references to evidence that demonstrates their achievements in the workplace. This report contributes to the final assessment for the student.

A simple scenario from the domain illustrates some of the requirements:

> Selina Gill is enrolled on the BSc Social Work programme and is currently on placement in Social Services section of Walford Unitary Authority. She is currently located in the Children and Families Team. While she reports to Heather Freemason – the head of the team, her Practice Assessor (PA) Freda Flintoff is responsible for her practice learning. At the beginning of the placement, Selina's tutor met with Selina and her Practice Assessor to help Selina formulate a placement learning agreement based on the opportunities available at the practice setting. At this placement, Selina hoped to develop her skills and knowledge in Assessment and intervention with a range of families from a diverse background.
> During the placement, Selina was allocated a number of ongoing cases to resolve under the support of the PA. As Selina worked on the cases, she was careful to document what actions she did and why. The case study details were given to her PA, who then used the information to produce a placement report by assessing the work Selina did in relation to each of the case studies. Although Freda Flintoff is conscientious, Selina is not the only student under her supervision and as a consequence, Freda felt considerably burdened in cross checking the evidencing of skills and competencies requirements with data and material from the case study files. Further, the need to produce both interim and final reports was also a lot of work. Increasingly, Freda feels less inclined to volunteer for these supervisory duties even though she recognises that they are essential for training social workers effectively.

These needs can be summarized as: Firstly, students need software tools that support their planning requirements as they seek to acquire the skills that determine social work competencies and learning outcomes. Secondly, students need support tools to help in the production of reports with appropriate reference to evidence based learning. Thirdly, there is need to support practice teachers in the administration of the work based learning undertaken by student social workers.

Currently there are upwards of eighty universities offering the social work degree that leads to professional registration as a social worker. In many geographical areas such as Greater London, universities compete with each other to access practice learning opportunities for their students. If the work of the practice mentors and assessors were made easier, this competition for places would be less intense allowing resources to be used more effectively for other purposes.

1.1 Aims and Objectives

The Remora project aims to develop mobile software toolkits that will:

- Support student social workers in the planning and design of practice learning assessments and in the collation of evidence towards a final report.
- Support practice assessors by reducing their administration requirements.

The aims of the project will be met by the following objectives:

- The project will utilize and enhance as appropriate the technical architecture and lessons learnt from the MPLAT project [9]
- The project will conduct a detailed business requirements analysis from which applications will be formulated.
- The applications will be evaluated in social work placement settings and a report will be produced evaluating the perspectives of all stakeholders.

2 Methodology

The team had previous experience of using a co-design process for developing mobile applications [3]. We adapted this approach to suit the needs of our project. Thus the project deployed a creative mix of variety of methodological techniques that draw upon software engineering, social sciences research and usability.

Understanding requirements effectively demands that we work with intended users of the system in collaborative and equal manner. Thus the intended users were treated as first-class members of the design team in order to establish a shared understanding during the co-design process.

The Shared Understanding phase of the project included an initial questionnaire with students to review their their familiarity with technology related to the mobile devices. To support this, we also interviewed tutors to have an understanding of the placement process; the process was modelled using BPMN [2]. The process model laid out clearly the activities, roles and dependencies and ordering of activities.

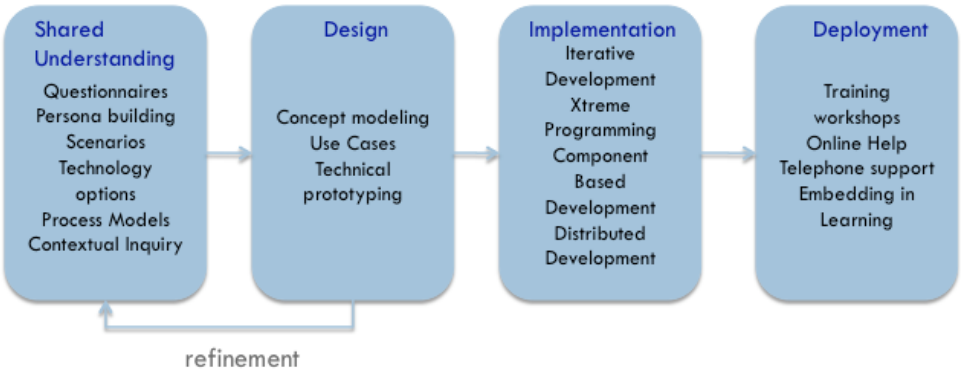

Figure 1 Methodology stages

A series of co-design [3] participative workshops with key stakeholders (trainee social workers, academic tutors, and workplace mentors) were organised to specify the requirements of the mobile application. These workshops allowed us to develop Personas of potential users of the system (A persona describes a user, their job, their age profile and technological awareness). At these workshops it was also possible to present technical options e.g. physical devices that might form part of the solution. The workshops focused on determining possible requirements to support elements of the business process identified at the beginning of the analysis process. To provide a more detailed understanding of a student's role in the work place, a contextual observation of a student/assessor meeting was also undertaken.

The Design phase focused on outlining potential solutions and reviewing them with the intended users. UML Use Case models were constructed and used as a basis of discussing the functional requirements. Part of the design phase was dedicated to developing some technical prototypes to tease out technical issues that might have a significant impact.

In the Implementation phase we applied XP/RAD approaches where possible. We did this while co-ordinating a distributed development team; this was a necessary measure as the team members were working in different locations and different institutions. Additionally we employed a number of distributed development strategies and used a number of remote work tools such CVS[1] and dotProject [2] - a web project management software.

The Deployment phase was done in an iterative fashion. There were two deployments and a further one is planned. Tool deployment was initiated by workshops that detailed how the tools worked. Users were allocated equipment and encouraged to use the tools in the workshops. On-line tutorial guides were available via the website and further telephone and email support was also provided to support the deployment.

[1] http://www.nongnu.org/cvs/

[2] http://www.dotproject.net/

3 Implementation

Following some general discussion that included specific comment on the nature of communications between stakeholders, the requirements of the tools that would provide the placement process support were identified. These applications have been a recurrent theme in all the co-design sessions indicating some general consensus. The tools can be seen as three functions or as layers of sophistication / functionality. We were also aware that the tools should be process agnostic. The main functionalities of the tools can be categorised as research, share and tag.

- A **research tool,** which will allow users to select content from a variety of sources and upload them to their phone/device. Documents, PDFs and, website links will be able to be synchronised onto a device. Once on the device, search capabilities (using text strings) will allow rapid searching of the content for subsequent viewing. Having information on the device will avoid the need for (expensive) data access. However when there is a need for web access, the inbuilt capabilities of the phone will allow Internet access either via phone connection or via a local broadband connection.

- A **share tool** focused on delivering functionality that will enable the user to make documents for others to see/edit. Collaborative editing in a shared space will also be possible. Through blogging the tool is also able to support the reflection needs of students Some of the communication mechanisms may include social networking capabilities and shared spaces will also support user control and restrictions.

- A **tag tool** provided functionality to enable students and practice assessors to tag content according to the key skills and their sub-skills. Documents / reports / evidence presented by students can then subsequently be searched and analysed according to the defined tags.

From these specifications we started looking at potential implementations of possible mobile tools. One of the architectures we examined is using a local search engine on the handheld device. This approach allows us to provide a standard interface across different devices. The user is unaware of the back-end process-taking place and is able to use a familiar web browser interface to locate documents. This technique has become more feasible on handheld devices due to increases in storage and processing power. The device will need some kind of synchronisation to a server that will help aggregate documents. Once synchronised the user has all the content available “in their pocket” and does not require a net connection to lookup information. In terms of development, this approach solves one potential difficulty when supporting different mobile devices - the interface: This can take place via a web browser and requires no native GUI development.

Before settling on architecture, we looked at potential mobile devices, as this is the main constraint on the design. We also reviewed a number of devices the summary of this comparison that was undertaken can be viewed in the table below:

Device name	Operating system	Architecture	Screen size	Touch screen	Keyboard	Cellular connectivity	GPS	Unit cost	Contract cost	Total cost
iPhone	OS X	ARM	3.5-inch	Yes	No	2.5G	No	269	630	899
iPod touch	OS X	ARM	3.5-inch	Yes	No	Not available	No	199		199
Nokia Tablet°	Linux	ARM	4.1-inch	Yes	Yes	External	Yes	285	405	690
OQO model 2°	XP Tablet	Intel	5-inch	Yes	Yes	External	No	955	405	1360
Fujitsu Siemens ST5010D°	XP Tablet	Intel	12.1-inch	Yes	No	External	No	675	405	1080
HP Pavillion TX2050EA°	Windows Vista Home	Intel	12.1-inch	Yes	Yes	External	No	700	405	1105
HP iPAQ 214°	Windows Mobile 6.0	ARM	4-inch	Yes	No	External	No	230	405	635
HP iPAQ 614	Windows Mobile 6.0	ARM	2.8-inch	Yes	No	3G	Yes	112	495	607

HP iPAQ hx2490 Pocket PC°	Windows Mobile 5.0	ARM	3.5-inch	Yes	No	External	No	285	405	690
HTC TyTn II	Windows Mobile 6.0	ARM	2.5-inch	Yes	Yes	3G	Yes	210	495	705
HTC Advantage	Windows Mobile 5.0/6.0	ARM	5-inch	Yes	Yes	3G	Yes	300	540	840

*Unit available without phone contract
Note, external cellular connectivity means it should be possible to interface to another device to provide an Internet connection. In these examples an unlimited data plan contract has been included in the cost.

Table 1 Comparing handheld devices

At the time of this study the most adequate mobile device was the iPhone /iPod touch and therefore it was decided that the iPhone was the best device to use during the project; however it did present a few problems near the debut of the project: Apple had recently started releasing beta versions of their SDK and the development community was also in its infancy compared to the better-established mobile devices. Therefore normal developer practices such as posting to technical forums, using mailing lists and Internet Relay Chat (IRC) provided limited success. In general, even a simple web search resulted in a low signal to noise ratio. Mobile products are traditionally "locked down" to satisfy the stringent requirements of telecommunication network providers. To lift some restrictions the community developed solutions, which allowed the iPhone to be "unlocked" and also allow community driven software to be installed. Through these mechanisms, it was then possible to port large C based software such as Hyper Estraier [7] and install it on to the iPhone and iPod Touch. A cross compilation tool chain was setup on a PC running Ubuntu to build all the dependencies and Hyper Estraier itself; this process of setting up the tool chain and getting the build to succeed for the various dependencies proved challenging. Cross compilation can be difficult without established mechanisms in place to deal with shared library dependencies, it was concluded that building the Remora search tool for platforms supported by Open Embedded would be a simpler method when comparing it to the process of completing it by hand.

The remote search CGI needed to be developed from scratch; options were needed in terms of development language. High-level languages like Ruby or Python provide a flexible way to carry out Rapid Application Development (RAD) on a mobile device, as well as removing the need for cross compilation. A disadvantage of this approach is they require additional software to exist on the device in order to run even the smallest script. These dependencies can lead to maintenance issues when various software are updated. An initial approach taken was to develop the remote search in Ruby on a PC and simply install Ruby on the mobile device and then use the same scripts. Although there was no problem getting Ruby running on a selection of Linux based mobile devices, the iPhone proved to be different. It was possible to cross compile Ruby and install it to the iPhone, yet running anything other than a basic script caused programs to crash out with bus errors. Searching the community for a solution proved fruitless, finally the approach was dropped in favour of a hybrid solution involving a mixture of interpreted script code and a compiled C code. This approach would utilise existing libraries and programs on the device.

After the search tool was implemented one of the main constraints of implementing the shared tool were the time constraints. We therefore took the decision not to implement the tool from scratch but to build the tool on an existing one. The requirement of the share tool is to enable practice students to exchange information and to share learning resources with their practice tutors (Assessors). A shared space and repository is therefore the main requirement so that students and tutors are able to update learning progress information and receive feedback promptly. In this context, making use of the features of social network services was a viable solution for the share tool. Elgg[3] is used as the platform and a number of web-based services are built upon it such as document sharing, and tagging learning resources.

Although the IPhone provides a very good user interface, it is not as easy to use when entering data. We therefore looked at suitable hardware for interacting with the social networking application Elgg. One of our options arose out of the interest in the use of Internet devices such as the Asus Eee PC: a lightweight and scaled down laptop with the primary function of providing internet use, email, word

[3] http://elgg.org/

processing etc. However, currently, the 3G/HSDPA is not equipped with the means to connect to the UK's mobile network in any version of the Eee PC, it is possible to overcome this by using a USB 3G/HSDP dongle modem that can be plugged into the Eee PC in order to enable network connection; hence a mobile device is still being supplied. Following further evaluation we elected to use this device and the additional modem.

4 Outputs and Results

The results and outputs of Remora can be mapped in the following areas:

- BPMN model of the social worker placement process
- Technology profile of social worker student, assessor and, tutor
- Tools for supporting students on placement
- Tools deployment

4.1 Placement process

The process of work placement involves many different activities, these include the planning and selection of the work-placement, undergoing case study work at the placement, reporting on the work-placement and finally, reporting on the outcomes of the placement to relevant exam boards that have been captured in BPMN process. The analysis model is available at: http://samsa.tvu.ac.uk/remora/uploads/workplacementprocess.pdf.

The model indicates the complexity of the placement process and need for considerable administration support. While the focus of the workshops indicated tools from the student perspective – the work placement process identifies a different set of needs such as:
The placement process reveals a number of key issues:

- Collation, representation, cross referencing to case work and, a simplified method of tracking;
- Production of final assessment reports by the practice assessor is time consuming (using practice evidence);
- Planning of key skills, learning outcomes and competencies to be gained in the practice setting;

4.2 Technology profile

A set co-design workshops was held at Royal Holloway, where a number of students, tutor and assessors were present. The aim of the workshops was to understand the working process of social workers and develop personas and scenarios by end-users to highlight the problems, and therefore identify areas that could be improved by tool support. Results from workshop were then analysed further by undertaking direct observation.

A summary of a profile for students, tutors and assessor is shown in the table bellow. Their main requirements are highlighted:

- Time management and planning
- Access to internet for information and other resources (handbook, placement learning agreement etc.) and keep up to date
- Evidence collection link to case study

User	Characteristic	Need
Student	• Use most functions of mobile devices • Wary of cost • Likes pushed emails from academic staff • Synchronise outlook with desktop	• Time management and planning • Wants to be able to Link theory to practice • Likes pushed emails • Would like access to internet for information • General info (university) and keep up to date • Support to collect and evidence information as case study progression

		• Would like a digital home • Share and organise texts of report • Link key roles to case study • Reflective commentary with practice assessor • Maintain portfolio • Access programme handbook/notes/PLA effectively
Academic Tutor	• Uses most functions of mobile devices and a variety of different devices ranging from laptops to ipods • Wary of cost • Lots of time potentially lost on visits • Would prefer to do research • Use of Moodle to push data to students	• Placement learning agreements on pda • Programme Handbooks on the device (for reference and as an aide memoir) • Reading Wizards • Quick recording (summary/notes) on what is going on • Internet access
Placement Assessor	• Uses most functions of mobile devices and a variety of different devices ranging from laptops to ipods • Wary of cost	• Access programme handbook/notes/PLA etc. effectively (maybe on PDA) • Internet access • Map key roles to case studies • Note taking facilities • Share and organise texts of report • Support to direct observation of practice
Practice Tutor	• Varies in the use of mobile devices • Wary of cost • Use of phones as a “pager” • Provides additional “teaching” support • Writes the report	• Uses agency specific forms for skills checking • Note taking facilities • Sharing and organising text of reports with students • Collecting of evidence, collating of evidence

These profiles or personas were used to inform the design of the tools.

4.3 Remora Tools

Based on the co-design, a potential application that combines mobile technology and Social Software was identified to share and organize information efficiently (notes, handbook, PLA, thoughts, links, observations, etc) in the context of the social work competency model involving key roles, units and, elements.

The share tool was focused on delivering functionality that would enable the user to expose documents for others to see/edit, provide for collaborative editing in a shared space and support (via

generally available tools) blogging the reflection needs of students. The social book-marking method typically in the form of tags could be used here to help link key roles to leaning documents.
Shared spaces would support communication/collaboration requirements between students, between students and practice tutors and between other stakeholders.
Social work students were expected to refer to particular Internet sites such as those relevant to mental health issues in the UK and to cache popular resources locally on the device to be read off-line. To facilitate off-line access to these documents, a search function was built and deployed on mobile devices. The search engine included scalability and the ability to locate documents through their contents rather than their file name.
The search function taught students about best practice searching behaviour and allowed them to differentiate between different types of resource (legislation/guidance and local practice) in order to contextualize their practice.
Figure 2 shows the architecture of the applications.

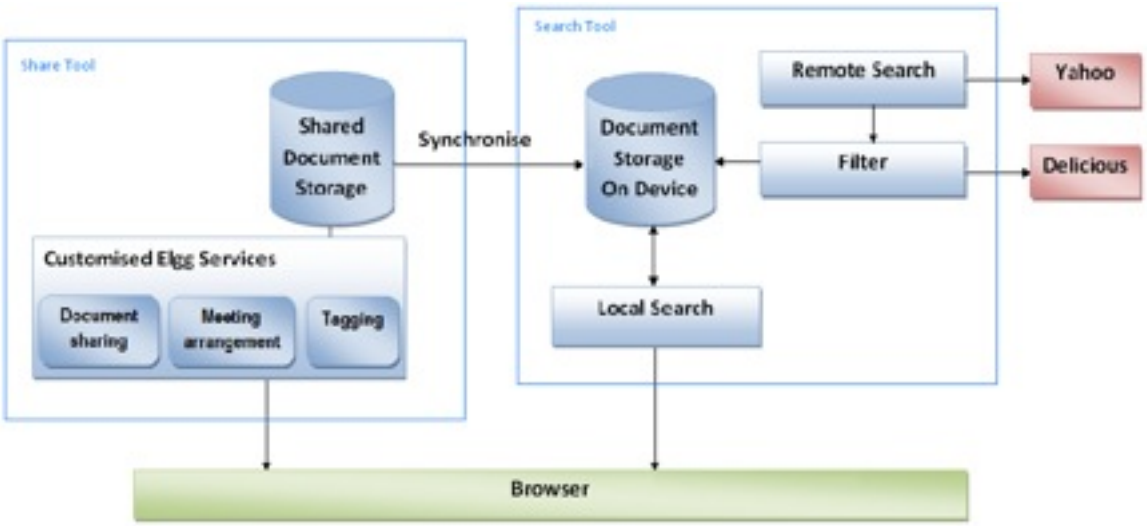

Figure 2 Remora tools architecture

4.3.1 Search Tool

The search tool application was implemented by a web server that runs on a mobile device with a web interface, and two software applications supply the Remote Search and Local Search functionalities. Remote search calls the Yahoo! web search API and filters the results by the user's Delicious bookmarks. The filtering mechanism allows the system to emphasize the general search results. Domain specific results are highlighted to enable users to select contents they have interest in and cache them locally on the device, which can be searched by the Local Search function. Figure summarises the architecture of the Remora search tool. It represents the server side components that reside on the mobile device. The main components include:

- Document repository
- Remote search
- Local search
- Bookmarks

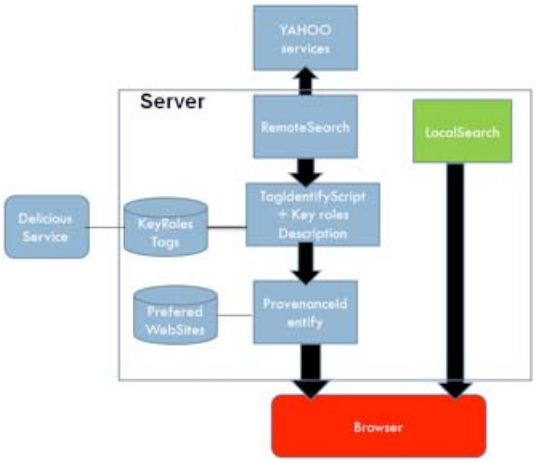

Figure 3 Search tool architecture

A search engine was ported into the mobile device carrying out the Local Search that enables users to search off-line documents without worrying about the location or the name of the required documents. The mobile web server Lighttpd was installed on an iPod and the search engine Hyper Estraier was ported to the mobile devices; this was done by firstly “jailbreaking” the devices, which is needed to be able to run community written applications.

The search engine was used to allow text searching for the local files, and an application was written to firstly run the searches using Yahoo! Web Services and filter the results based on our Delicious tags. The results of the live search are then shown to the screen with documents that can be stored (pdf) on the device. On the device, A CGI program running on the mobile server will call the php script to generate locally an XML file and then a program written in Objective C is called to parse the XML file. At the save time, another CGI program is executed to save the document on the local file repository, once any pdf files are located which can later be searched by the Local Search.

Social work students were expected to refer to particular Internet sites such as those relevant to mental health issues in the UK and to cache popular resources locally on the device to be read off-line. To facilitate off-line access to these documents, a search function was built and deployed on mobile devices. The search engine included scalability and the ability to locate documents through their contents rather than their file name. Potentially thousands of documents could be stored on the device and located using familiar keyword searches. The intention also was to teach students about best practice searching behaviour and allowed them to differentiate between different types of resource (legislation/guidance and local practice) in order to contextualize their practice.

Figure 3: Remote Search Figure 4: Local Search Figure 5: Connection Figure6: Synchronization

Figure 3 shows the Remote/live Search user interface. The user opens a web browser to access the mobile web server running on IP 127.0.0.1 to do the Remote search. The remote search CGI script calls the Yahoo web search API. The results from the Yahoo! Search are filtered by the user's Delicious bookmarks which are maintained as an XML file and the domain specific sites listed in the Delicious bookmark are highlighted. Users can update their Delicious bookmarks and refresh the XML file on the mobile device. We are also able to see that the specific Mental Health website is highlighted, indicating that it has been bookmarked. This approach could remind users of important domain specific sites when they are doing general web searches. We can also see that a PDF icon appears under the search result, which means the located sites are of a pdf format and can be saved in the local document repository by clicking the PDF icon. The saved file can then be searched through the Local Search.

Figure 4 shows a user interface when a Local Search has already been completed. Hyper Estraier is a powerful search engine that examines the contents of documents in order to identify those that meet the users' search criteria. From Figure 4 we are able to see that the search term "mental" locates the document even though its file name is uk.pdf.

A youtube video illustrating the use of the search tool can be found in http://www.youtube.com/watch?v=MKKlkcZ6vYo .The source code for the search tool can be found http://remora.sourceforge.net/

4.3.2 Share-Tool

The share tool focused on delivering functionality that would enable the user to expose documents for others to see/edit, provide for collaborative editing in a shared space and support (via generally available tools) blogging the reflection needs of students. Social bookmarking method typically in the form of tags could be used here to help link key roles to leaning documents. Shared spaces would support communication/collaboration requirements between students and practice tutors. These can be summarised by the following functional requirements:

- **File management**: Using the tool, the user has a private workspace where the user can save and view files that have been saved. Saving files to the private workspace can either be a file located on the machine or a URL. When a file is saved the file can be tagged, stored files can then be shared with other students, a tutor or an assessor. All working spaces are preloaded with placement files such as Placement Learning Agreement or placement handbook.

- **User Diary**: The main purpose of the Diary is to help students in storing notes and key experiences of their placement, which then can allow the students to reflect and gather evidence for their assessments.

Figure 4 Diary Functions

- **Arranging and managing meetings**: The main purpose of the Meeting is to aid the user in organizing and arranging meetings with Students/Assessors/Tutors which can then be updated with minutes and actions.

Figure 5 Meeting functions

- **Tagging:** This function can support linking key roles to case studies which help the student's future production of reports. Users can also define their shared common tags which could be shared and reused with other types of files

For the implementation of the tool, we looked at adapting an existing open source tool, and decided to use Elgg Social Networking Platform in which a number of customized applications were built to the architecture. Furthermore, Elgg has a mature file repository and sharing feature, therefore, Elgg provided the ideal platform for building the share tool. We developed the shared tool in two iterations, one of the iterations used Elgg version 0.9 and then the second iteration conversely used Elgg 1.0.
The implementation was done by developing Elgg plug-ins and the architecture of the share tool is shown in the figure 5. The plug-ins were developed in two ways; one way by customising existing Elgg functions and another one by developing a new Elgg component.

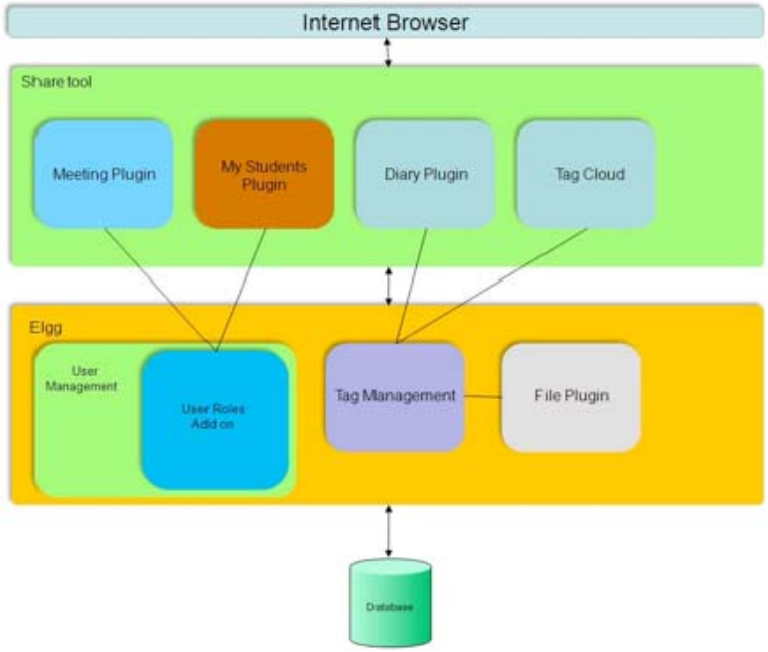

Figure 6 Share tool architecture

4.3.2.1Diary Plug-in

An example of a customised plug-in is the diary component. It is a customisation of the Elgg blog plug-in. The customisation was cosmetic, this involved changing the name on the menus and adding new functions such as:

- **Diary Export Function;** this allows the diary entries to be published in a pdf file and therefore could be used outside the tool. The PHP library, called FPDF, implemented this.
- **Privatising all entries by default:** Because originally this module was a blog, it came with a choice of viewing rights. Ideally the diary should not be shared but be kept private. We remove the choice of viewing rights and defaulted the rights to private, making all entries viewable only by the author.
- **Create a Diary widget** This widget was created to give a precise and concise look at the entries that the user has entered into the system. The widget shows the diary title and how long ago it was entered, it is ordered by newest first.

Figure 7 My Diary

4.3.2.2 My students plug-in

We also customised the file widget by showing shared files on the user's dashboard instead of only showing files the user created (see My Files widget in Figure 7). We think this gives users a direct view of all the files that are accessible to them. In addition the tutors will see a list of all their students. For each student they could view the files, meeting that they are sharing with that particular student.

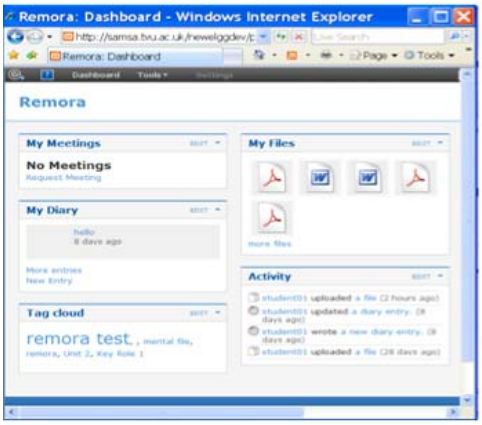

Figure 8 Home page

4.3.2.3 My meeting plug-in

Elgg did not support the meeting management and therefore it was developed as an extra plug-in. The My Meetings widget is shown in the upper left of Figure 8, this allows students and tutors to arrange their meeting times. Whilst still looking at Figure 8 we are able to see the meeting request application, once a meeting is allocated the meeting minutes and actions can be added and saved online. If students or tutors want to check the meeting contents later they have the capability to login and access the meeting details should they desire.

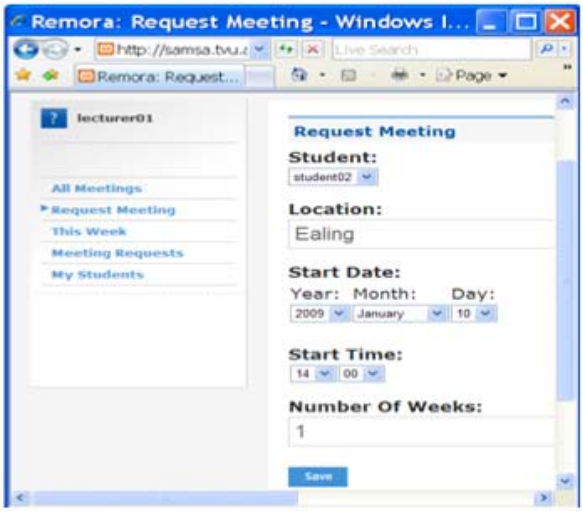

Figure 9 My meeting

4.3.2.4 Tag cloud

We also customised the tag cloud widget to refer to the key skill roles. When users upload a file they are able to link tags with this file by free text tagging or select tags based on learning outcomes like Key Roles and Units. This function supports the linking of key roles to case studies which help the student's future production of the final report. Users can also define their shared common tags (My tags column), which could be shared and reused with other types of files. Figure 9 shows the tagging application when uploading a file. Using the tag cloud, documents including study reports and evidence presented by students can then subsequently be searched and analyzed based on the defined tags.

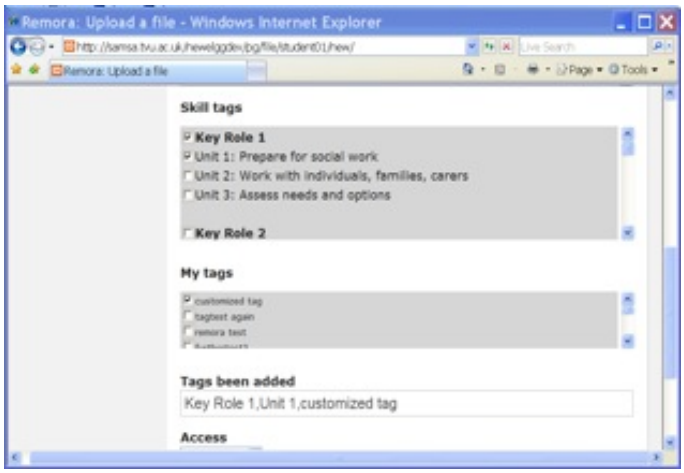

Figure 10 Tagging

4.3.3 Storing files from the shared tool repository to device

Using the shared tool, users upload documents on the shared repository, which could be saved as private or be shared within their communities. Users can also search online and save documents that they are interested in on the device document repository, the documents uploaded to the shared repository are very valuable to a user on the move without connectivity. In order to support this we implemented a synchronisation module and the architecture is can be seen in figure 10. On the server side, a PHP script was written to query the file repository and return all the file information including the title, description and url to it. On the device side, a CGI program running on the mobile server calls a PHP script that will then subsequently generate an XML file. This file is then passed to a program written in Objective C that will display all the files that could be moved to the device. At the save time, another CGI program is executed to save the document on the local file repository.

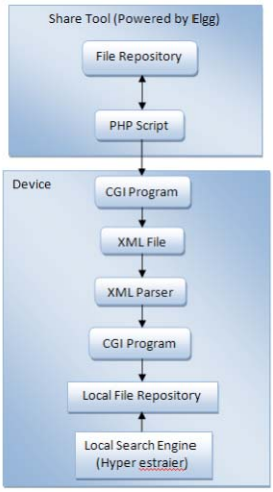

Figure 11 Synchronisation module

The figure below shows the user interface for the synchronisation module. The users login with their Share Tool username and password. All the users' files on the shared repository will be listed on the page, and any results that links to a PDF file will be labelled by a PDF icon. The user is then able to click on the PDF icon to save the file to the device. Once they are saved on the device, they can later be located and searched by the local search tool.
A video illustrating the use of synchronisation can be found in http://samsa.tvu.ac.uk/remora/index.php?page=presentations.

Figure 12 Synchronisation module interface

4.4 Tool Deployment

We employed a combined approach to the deployment of the devices to the students. This was done in two stages: In the first stage, the users must become familiar with device and its basic function before they used to support their work. This first step is essential, as it builds confidence in the users in the use of the tools. Once they are comfortable with the devices and the tools, it is then possible to embed the tools in their processes.

For the first stage, we ran a workshop with all the participants of the pilot. The aim of the workshop was to introduce the users to the devices and tools and also the information on student/assessor grouping. The information was then used to set up the accounts on the share tools. Each student was issued with an iPod Touch and an Eee pc. The tutors and assessors were only issued with an Eee pc as they were mainly going to use the share tool to support their students and so would not need the iPod.

Some simple exercises were set up for familiarisation with the device. They were also issued with a questionnaire; we were trying to gather the early feedback on the tools and devices. The participants were then asked to go away for 2 weeks and try different features of the devices and tools (search/share), and then to proceed to fill in a questionnaire of their first impressions.

At the second workshop students reported some interesting issues, most of them relating to the assessor engagement with the project. Some practice assessors were concerned with information confidentiality; others were concerned about the time it takes to train on the new system. We therefore took the decision to have two groups: One group with students and assessors, and the second comprising of just students. This means that the student will still have access to the tools but would not use the communication functionality.

Some basic initial feedback more specific to the tool was also given. Some users mentioned that because the Eee pc gives the access to a share tool, the iPod didn't bring any additional benefits that could be merited. Other feedback generally related to the iPod Touch's screen, it was claimed that it made typing website URLs and other information a particularly difficult process.

We also noticed that not all users were on the same level of technological knowledge, this became apparent when some students had not realised that they could access the share tool independently of the agency network where the placement is taking part. However there was positive feedback, students were generally content with the conveniently small size of the Eee pc and how mobile and practical this made it.

After this stage we had some withdrawals from the current users as well as some new users from the undergraduate course to counteract the withdrawals. Some students also wanted to use the tools without having the devices. In order to have more feedback on the tools and also preparing students

for the second pilot, we used the tools at Royal Holloway, University of London in order to support this more teaching focussed module. In this new context, the interaction was became mainly one between the student and tutor.

5 Outcomes and Implications

The Remora project set out to develop and implement mobile technology to enhance and support work-based learning in social work. The project involved collaboration between social work educators, students, and computer science academics in three higher education institutions.

The project's principal outcomes were the various tools that were built and their deployment outcomes. Two software tools were built:

- The search tool was a mobile application that was developed in a portable way using a web-based approach to allow deployment on a range of mobile hardware and devices. Information sharing and organizing between students and tutors was an essential requirement in the context of social work competency model.
- The share tool was a web application that focuses on a collaborative-shared space and documents viewing/editing, which help students, and tutors communicate in an effective way and receive update information on time.

Social work students were expected to refer to particular Internet sites such as those relevant to mental health issues in the UK and to cache popular resources locally on the device to be read off-line. In order to facilitate off-line access to these documents, the search tool was built and deployed on mobile devices. The search engine included scalability and the ability to locate documents through their contents rather than their file name. The search tool support students in learning about best practice searching behaviour and allowed them to differentiate between different types of resource (legislation/guidance and local practice) in order to contextualize their practice.

5.1 Implications

From the development and deployment of these tools a number of implications arise:

5.1.1 Programme phase – project lifespan:

Our experience suggests that the project lifespan does not accommodate or align with the course structure and schedule where the deployment is planned.. We were not able to deploy the tools to the students at the start of their placement. Partly this was due to course schedules but further mis-alignment problems were exacerbated when there delays in the development phase.

A related issue is the need for continuity of users that were part of the co-design workshops and then further part of the deployment. Time demands on these users made such continuity difficult to achieve. At the co-design workshop we were talking to students undertaking their placement that believed that would likely be finished by the time of deployment. Another issue is that students do not know their assessor before the start of the placement, and so this naturally limits the time needed for an engagement process.

5.1.2 Focus on basic technology:

It is essential that users are provided with the technology in its most basic form as a first step. This allows less technically savvy users to familiarise themselves with technology before being introduced to the specific applications. While we had tried to accommodate that, we still under-estimated the lack of technical awareness despite the notions of the "google" generation that exist currently.

5.1.3 Evaluation Limitations

The outcomes from running the pilot are:
The first pilot of our software with social work students and tutors in placement has taken place at both undergraduate and postgraduate level. We have encountered two main problems; one is that the uptake has been limited, and the second is that the users on the pilot had a limited interaction with the tools.
The initial evaluation was in the form of questionnaires, but here, as well, the response has been very limited. We are conducting further evaluations in the form of interviews, which will allow us to collect more qualitative empirical data. Early indications are that whilst there are key constraints, for example the rates of digital literacy, the non-mandatory nature of the use of such tools means that these tools are not used to the extent that they could be.

5.1.4 Issues of Risk

The study has implications for the development of the use of technology in a profession which is working in high risk areas. There has been considerable interest within the social sciences in developing ideas related to risk. Beck in his seminal text Risk Society (1992) argued that the "technisisation" of risk derives form the omnipresence of technology. In the risk society individuals are waiting for the next technological development to catch up with the perceived risks and often negative consequences of the previous one. For Beck and other writers in social science scientific institutions which have symbolized progress have brought the planet to the point of near catastrophe. Fear and uncertainty are now the driving forces in a post industrial society. Beck argues

'The driving force in the class society can be summarized in the phrase I am hungry ! The movement set in motion by the risk society , on the other hand is expressed in the statement I am afraid' Beck, 1992: 49).

The findings of this study could be seen as reflecting fear on a number of dimensions. Reluctance to engage with the project could be seen as a fear of technology itself and the ability of some individuals to cope with technological demands. This is in contradistinction to the objectives of the study, which was to provide assistance and efficiency to social workers.

The social work task is in itself high risk and high profile and the use of technological devices for training purposes could be seen as representing a 'reflexive' form of risk.

The findings of the research could also reflect what has been called the 'precautionary principle'. Practitioners and students were anticipating possible difficulties in areas such as confidentiality, data protection which in itself prevented them form considering the possible full benefit of the opportunity offered by the project. The nature of these forms of risk perception in relation to the project should be further explored. The role of risk in the response to the research would appear to have been critical.

5.1.5 Paper driven processes

The role of paper processes are also critical here: The nature of the assessment process, the demands of the professional body for Social Workers (GSCC) and the type of activity conducted by students all embody a strong focus on evidence that is located on physical paper. This places a large administrative burden that is difficult to alleviate because of the constraints and models of working that govern the Social Work profession. Consequently more attention needs to be afforded to existing processes and their dependency on paper trails.

5.1.6 Organizational culture and pressure of work

This type of project requires significant management buy-in and support to work. For a truly worthwhile evaluation, tools need to be used "in the wild" – but in such contexts the target users are faced with competing demands upon their time. Thus it is essential that management provide time in individual workloads in order to allow users to engage with such tools and technology. Shortage of time and the risk-averse nature of the activities undertaken by the profession means that support from management is essential. Moreover, with the introduction of integrated service provision the multi-disciplinary nature of social work is an additional component where a diverse range of organisational cultures would need to be considered in the context of 'information sharing' [9.10]

5.1.7 JISC and the purchasing of equipment

Experimentation and evaluation of mobile technologies and their subsequent success is more likely to be achieved if JISC could review how it tenders for equipment. Mobile technology and its deployment by projects is governed by the type of purchasing possible (pay-as-you-go versus contract) and its implications for data costs. This issue is further compounded by the individual institutional purchasing policies. Collectively, these have an impact on the deployment and usage of mobile technology possible by a project. JISC should consider how it can support projects in purchasing of equipment where there are such requirements.

6 Conclusions and Recommendations

The Remora project aimed to provide mobile software toolkits to support work-based learning and assessment for social work practice educators. A user centred design approach was used to work closely with stakeholders to ensure that the applications developed were based on actual needs. It was envisaged that appropriate applications would be developed and that these would be subject to an extensive evaluation in terms of usability by social work students and practice educators.
The project engaged key stakeholders – student social workers, university tutors, and practice educators in co-design workshops to gather requirements and perform a detailed needs analysis. Appropriate software tools were developed from this elicitation phase. On completion of the development of the software tools, there was an evaluation of usage of the tools; a quantitative and qualitative methodology was employed to generate data. This included self-completion questionnaires, focus groups, and semi-structured interviews with key stakeholders.

The project was successful in designing mobile tools to address key challenges such as the non-sharing of social, work-based virtual learning spaces, and off-line access to these documents on mobile devices. Our results demonstrate the need for a common repository for placement related learning materials and we built this to support learning. In our tools, we introduced the use of 'tagging' as a useful method in supporting learning of key roles. The purpose of tagging as a model was introduced to help promote shared learning and understanding of the key roles framework of the Social Work profession. Our study shows that whilst it is important to recognise the role of technology in work-based learning, there are key constraints, these included: the rates of digital literacy, the non-mandatory nature of the use of such tools, work pressures, and notions of risk.

The project was, however, less successful in the department of piloting the tools. The lack of engagement of students and the practitioner reflected fear onto a number of dimensions. Reluctance to engage with the project could be seen as a fear of technology itself and the ability of some individuals to cope with technological demands. Practitioners and students were anticipating possible difficulties in areas such as confidentiality and data protection; this in itself prevented them from exploring the full benefit of the opportunity that was being offered by the project.

None the less, the project provides key lessons on how mobile learning may be used and suggests areas of further research.

Arising from this project we make the following recommendations.

1. Projects need to pay careful attention to the planning and synchronisation with teaching schedules where experimental evaluation is based on live course schedules.
2. For mobile learning to be effective it is essential that end-users are given extensive opportunity to familiarise themselves with the basic "in-the-box" functionality before being introduced to specific mobile learning applications.
3. Work based learning which requires paper-based evidencing may not lend itself to mobile technology. Early detailed analysis should be undertaken to understand paper based administrative processes.
4. Certain professional bodies and work based learning environments are particularly risk averse. Such risks should be properly understood, as technology introduction to such environments may not be successful.
5. Organizational contexts and the pressure of work therein require senior management support to ensure that workloads of staff can accommodate the introduction of technology. Projects that plan such innovation should ensure that senior management are fully supportive.

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