

Interactive Logbooks – JISC Circular 3/04 eLearning Tools for Learners and Teachers

Overview of Project

1. Background

The University of Birmingham has long recognised the importance of Personal Learning Environments and has been developing systems in a research context since 1998. The latest system, codenamed 'Interactive Logbook' promises to offer what no current product does – a productivity environment specially engineered for learners.

Our previous projects such as the Student Learning Organiser (Corlett *et al*, 2004) have recognised the gulf between the design of products aimed at office workers, and the needs of learners.

A student's paper-based logbook or lab book is a personal learning environment. In it, one records actions and results, carries out brainstorming activities, keeps notes of important dates and contacts and then extracts from it the elements for assessment. It can also be used for archiving and for personal reflection. However, learner activities are increasingly carried out through Virtual Learning Environments (VLEs), on the Internet, with email and chat, using computer simulations and more, so it is anachronistic to expect the use of paper and pen to record all these activities. Furthermore, the paper logbook does not easily facilitate search, concurrent projects or peer collaboration. It would therefore be beneficial if all of these electronic activities could be mediated and captured through one PLE.

To offer much of the flexibility of the paper logbook, any such system must afford easy interaction and complete mobility. Student ownership of mobile devices (phones, laptops, games consoles, PDAs etc) is increasing steadily, and so it is important that the Interactive Logbook targets these technologies.

The Interactive Logbook takes many of the native productivity tools of the host environment (including chat, word processing, time management, email, presentation tools) and makes them available through an interface that specifically supports learner activities (including project planning, collaboration, lecture attendance, submitting assessment, timetable planning). In addition, it provides some unique tools such as showing the physical location of members of a given team or group. Through the client, the learner has access to records of all their learning activities and learning content. These can be used in the creation and maintenance of a portfolio and/or PDP.

This project seeks to develop two versions of the Interactive Logbook – one a desktop client, the other a mobile device client implemented using the open J2ME platform. Each will provide access to the same information sets, but will offer a different range of productivity tools appropriate to the platform. Both systems will be based on a common, open plug-in architecture, with plug-ins defined using XML. The appeal of the desktop client is the potentially unlimited functionality, whereas the benefit of the J2ME client is the anywhere/anytime access to key learning toolsets at very low cost. The open plug-in architecture will ensure that future developments for other platforms can reuse many of the existing packages.

Development will be based at the University's Centre for Educational Technology and Distance Learning, a world-leading facility for research and development in e-learning. It provides a focus for innovation and a showcase for new technologies and teaching methods. CETADL is run as a club of innovators, with University departments and research projects paying an annual fee for membership, for which they gain access to all its facilities including online learning environments, a multimedia development suite and its unique "flexible learning room". Between CETADL and the Educational Technology research group, Birmingham is involved in a number of high-profile e-Learning and mobile learning projects including the EC 5th Framework MOBlearn project.

2. Aims and Objectives

Aims

The project aims to build on previous Interactive Logbook development, to provide a Personal Learning Environment that can be of use to students in Higher Education across the UK.

The IL is a personal tool that allows the user to access individual and group support tools, organising content according to **activities** (e.g. calendar, note-taking), **group membership** (formal and informal) or **courses** (relevant to specific modules or units of study).

Objectives

The following developments are planned and will be carried out under this project to create a toolset that is of immediate value to the HE community, extending the Personal Learning Environment to operate across a wider range of platforms, in multiple institutional contexts to more fully support the process of Lifelong Learning:

Reimplementation

- A version of the client will be built on the J2ME platform together with the same plug-ins for connection to institutional web services as above. The interface will be designed appropriately for the devices likely to host this implementation, and will take advantage of the native tools that may be available on the devices (email, SMS, WAP or web browsing).
- The Windows client will be improved to allow for an open plug-in architecture. The current implementation draws on the functionality of Microsoft Office tools. The open architecture will allow users to substitute other applications including open source tools. This client will be built on the .NET architecture, and may also be tested on the Mono platform (open source .NET platform for Linux and Mac OSX. see: <http://www.mono-project.com/>)
- Tools currently unique to the IL will be reconfigured for the plug-in architecture, allowing them to be changed for better/more appropriate ones as they become available.

New tools

- A tool will be added to the collection, in plug-in form, that enables learners to create a profile containing their PDP and portfolio. The process of building the profile will be as informal as possible, reducing the cognitive load and sense of obligation, whilst at the same time creating a complete, evidence-based record that could be presented formally when required. This tool will be IMS LIP compliant (<http://www.imslobal.org/profiles/index.cfm>) ensuring integration with other PDP/portfolio systems that may be used by the institution. This development will be made in tandem with the University's ePDP and Student Portal projects. (http://www.ppd.bham.ac.uk/progress_files/pdp.htm)
- A set of plug-ins will be generated that provide direct access from the IL to various institutional learning functions such as WebCT Vista, Microsoft SharePoint and SCT Luminis Portal (built on uPortal).
- Where web services do not exist (and are not in development) for key learning functions of the above institutional systems, where practicable, web services will be built on those systems' APIs.

Distribution

- Documentation will be produced to accompany the open source code that will not only provide adequate end-user guidance, but also all the information necessary for developers at other institutions to build client plug-ins for other web services and applications.
- The web site will play host to a code exchange, where developers in the community can find and share new plug-ins, clients for new platforms, and improvements to existing code.

3. Overall Approach

Methodology

The Interactive Logbook is already being developed under the Socio-cognitive Engineering Methodology (Sharples et al, 2002). This ensures a thorough, user-centred approach to development, through iterative design and evaluation. Theories of use (in this case, usability and pedagogy) inform the task model, together with field studies that elucidate the practical nature of the general requirements. This leads to an iterative cycle of system design and testing.

The method has been used for major learning technology projects including the IST Framework 5 MOBIlearn project.

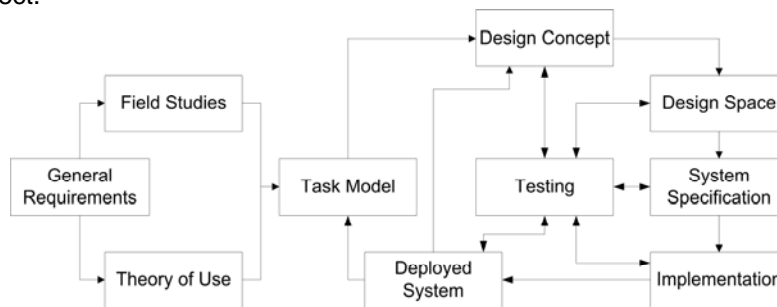


Figure 2: Flow diagram of the Socio-cognitive Engineering Methodology

Important Issues

Important issues that will need to be addressed by the project are:

- **Requirements** – the requirements of a Personal Learning Organiser. These have already been well explored and documented by earlier projects, but must continue to be re-evaluated in the light of user testing.
- **Scalability** – the extent to which the system can be extended to meet the needs of students at multiple institutions, each with its own student management systems, VLEs and communications tools.
- **Collaboration** – it is important that lessons learnt from other projects in this area, in particular other JISC-funded projects, are incorporated into the design of the system. It is also vital that potential contributors from other institutions are encouraged to participate from an early stage to ensure that the perspectives of as many potential user groups as possible can be taken into account.
- **Interoperability** – the right approach to interoperability and open standards needs to be taken, in order that the system may have the widest application and the lowest possible barriers to use, including cost.

Scope and Boundaries

The project does not seek to create an exhaustive suite of plug-ins for all potential tools or services owned either by students or institutions. It will ensure that key services and tools available to students at the University of Birmingham are catered for, whilst the architecture will remain open and documented for other tools to be created by third-party contributors during or following this project.

Despite this, a great number of the tools provided will be generic and should still give value to any user from any institution.

As e-PDPs (Personal Development Plans) are still in early phases of design across the UK, this round of development will certainly focus on the University of Birmingham's perspective on this subject. However, it is important that commentators/contributors from other institutions are brought on board at the earliest opportunity to provide a wider, multi-institution design.

Critical Success Factors

The critical success factors for this project can be summarised as:

- **Community of potential developers.** For the project to have success anywhere outside the University of Birmingham, it is vital that external parties see the value and potential of the system, and are willing to contribute knowledge, suggestions and even code to the project. An active community, built around the evolving system will ensure opportunities for growth.
- **Implementation in the Birmingham context.** In the first instance, the system will be most widely used within the University of Birmingham, and it is here that success or otherwise will be first realised.
- **Scalability, sustainability.** Success will be evident if the system, by its design and documentation, allows other institutions to easily add and modify plug-ins to suit their local context. To this end, the code must be open and well-documented, in addition to adhering to relevant standards.

4. Project Outputs

Expected Date	Actions	Deliverables
1 st September 2004	Project Start	
End September 2004		Web site
		Project Plan
		Original IL (Windows alpha client)
End November 2004		Windows beta client
		Plug-ins suite alpha for Windows client
		J2ME alpha client
End December 2004		Progress Report
		Plug-ins suite alpha for J2ME client
End January 2005		J2ME beta client
		Plug-ins suite beta for Windows client
		Plug-ins suite beta for J2ME client
1 st March 2005		Final Report
		Windows client Release Candidate 1.0
		J2ME client Release Candidate 1.0
		Complete documentation 1.0
End March 2005		Completion Report
		All code Release Candidate version 2
		Complete Documentation v1.1
	Project End	

5. Project Outcomes

List the outcomes you envisage, including their impact on the teaching, learning, or research communities, and what change they will stimulate or enable.

Outcomes	Impact
Learners	
Learners able to participate offline, off campus and while mobile	The flexibility of a mobile and offline/online solutions means that learners will be able to choose how and when they make use of electronic learning resources.
Learners enabled to organise learning better and across multiple institutions	Consolidation and coordination of timetables, deadlines, assignments and projects within and across institutions will enable learners to plan and carry out their learning more efficiently and with a better overview of their learning path.
Learners better able to create and update portfolios and Personal Development Plans	Electronic learning resources can be created, downloaded, personalised and organised all in one place. Events and communications can be combined with these to create an ongoing log of learning activity. By a combination of automatic and manual logging, learners can produce a complete portfolio. This will not only help them plan for their own learning needs, but also present a complete picture of their achievements to others. It is hoped the system will assist the uptake of development planning and recording amongst students.
Learners able to collaborate more fully with peers	The Interactive Logbook supports collaboration and peer learning. Learners can manage, communicate with and share work-in-progress with multiple teams, both formally and informally. It is hoped that this will not only increase team activity, but also provide the basis for richer interactions within teams.
Learners can create personal learning objects of higher value.	Learning objects in the Interactive Logbook may include photographs, video, sketches, web material, and other rich media. By combining personally-created and institution-provided materials, students will gain learning objects of greater quality, durability and sense of ownership.
Faculty / Institution	
Improved communication with learners	The increased level of ownership of the Personal Learning Environment, over a Virtual Learning Environment, coupled with the flexibility of use is expected to increase students' participation in course discussion, email, blogging and other communications.
Increased participation from learners	Increased participation from learners may be as a result of more frequent or higher quality communication, as well as deeper engagement with learning materials.
Increased support for mobile learners	There are an increasing number of students with access to mobile and personal technology, and there is a growing expectation that institutions will enable learners to use the technology in their studies. Integrating with existing institutional services, the Interactive Logbook could help to make an important step in that direction.

6. Stakeholder Analysis

Stakeholder	Interest / stake	Importance
Design Team	Success of the project will impact on progression and retention for members of the team. The team will want and need to 'own' the project to ensure high success.	High
Educational Technology Group / Centre for Educational Technology and Distance Learning	The project is of importance to these entities as part of their portfolio of mlearning and elearning projects. Members of each will wish to advise and review progress of the project.	High
Engineering Department	The engineering department in which this project was incubated has a desire to see improved use of learning technology and to promote better teaching and learning. As a testbed for delivery and deployment, it will be critical in developing models for wider acceptance.	High
Information Services, E-Learning Team	IS is fully aware of the need to provide offline and personal capability to users of the institutional VLE. Providing such resources will strengthen the success of the iVLE. IS will therefore be keen to cooperate and support the development.	Medium
CETADL members and wider community	CETADL member schools and projects are always keen to use the best that technology can provide to enhance their teaching and learning provision. Several of them will follow Engineering in the adoption/promotion of the system. One member will also act as a trial site.	Medium
Students / Guild	As the tools will be delivered for <i>personal and informal</i> use, it is possible that the Birmingham Guild may be a suitable department-independent body through which student testers may be recruited, as well as distributing the tool to students.	Low/Medium
Education PC retailers	CETADL already has good relationships with suppliers of mobile and desktop solutions for the education market, who in turn have relationships with certain universities in the UK. Possibilities around bundling the software could be investigated.	Low/Medium
National Union of Students	For distribution of the Interactive Logbook at a later stage, the NUS may be a good partner to work with. At a minimum, a watching brief will be kept.	Low/Medium
JISC	JISC clearly has much at stake, financially and in reputation. Naturally, close links will be kept with the JISC Project Manager to ensure development is kept to time, budget and specification.	High

7. Risk Analysis

Risk	Probability (1-5)	Severity (1-5)	Score (P x S)	Action to Prevent/Manage Risk
Staffing				
<i>Difficulties in recruitment or retention</i>	2	4	8	Only one FT member of staff needs to be recruited and has already been identified. A pool of expert developers work for or with CETADL and can be drawn upon if required.
Organisational				
<i>Failure to coordinate programming efforts by team</i>	1	4	4	The modular nature of the design, together with the expertise of the senior developer will reduce this risk. Early release of versions will indicate if this is a problem.
<i>Slippage</i>	3	3	9	Regular, timed releases of code will indicate whether this is a problem.
<i>Size of project underestimated</i>	3	2	6	A review at the halfway point will be conducted. Project is highly modular, so efforts will be concentrated to ensure a useful, demonstrable and extensible system is in place, even if it is incomplete.
Technical				
<i>Misinterpretation of standards leads to delays or incompatibilities</i>	4	1	4	Standards are complex and may be misinterpreted. Reference will be made to projects/people with prior expertise. Impact will be low, since replacement plug-ins can be developed at a later time.
<i>J2ME development raises unexpected challenges</i>	4	3	12	It is likely, given the infancy of this platform and the small number of ambitious developments, that some expected functionality will not integrate as hoped, and may vary from one device to another. The contractor who will develop this application is experienced in solving such problems on mobile devices and will advise on alternative strategies, where necessary
External Suppliers				
<i>External Contractor difficulties</i>	2	3	6	The external contractor works frequently and well with the team, and holds important contracts with the University. Therefore, no greater risk is envisaged than would occur within the team.
Legal				
<i>Intellectual Property</i>	1	1	1	There are no perceived intellectual property risks involved with the project. All IPR is owned by the University.
<i>Licensing</i>	2	2	4	It is possible that components may need to be licensed, where for example, particular problems are experienced in the J2ME client. However, use of these components will be made optional to the user/distributor, and for the purposes of the project, would be covered under the consumables budget.

8. Standards

The following standards will be used in the project. Since the project is designed to create an extensible environment, it is necessary that these standards are adopted, so that further development by third parties can be facilitated.

- Any chat client developed for use in the IL will be XMPP compliant.
- Web services consumed by the IL will be SOAP/WSDL/WSDD compliant. Where these web services are not WSRP compliant, an intermediate service will be built and hosted on the project's web server both for direct consumption and for distribution.
- Calendar plug-ins and services will implement the iCalendar protocol.
- File sharing applications may be based on the WebDAV specifications.

9. Technical Development

Technical Development will be led by a Technical Development Manager, reporting to the Project Manager. In consultation with the team, he will set the development schedule and appropriate standards for the code team to adhere to.

The open plug-in architecture will be refined and completed as a first priority, after which all development can be separated out into functional components, independent of one another. Each developer will be responsible for delivering specific plug-in components, and all code will be managed through a central version control server.

Development will follow an iterative cycle of design-build-release-test, with frequent releases ensuring the greatest possible test surface. The Project Manager together with the Development Manager will coordinate the voluntary contributions to testing and design by members of the public and the HE community, as well as that being conducted in-house.

10. Intellectual Property Rights

There are no specific IP rights issues envisaged. It is possible, though not desired, that in order to achieve the intended functionality of the J2ME client, some (particularly communications) modules may need to be sourced and included. Purchase would be made via the consumables part of the grant. Where it is not possible to buy or secure a free academic licence (this being the preferred outcome), such parts of the system as depend on the modules would be made optional to the end user.

Development of the PC client will be carried out in the .NET environment. The finished system will be free to distribute, and all code generated by the project will be made available. Native .NET libraries used by the project are distributable in binary but not source format.

Project Resources

11. Project Partners

One subcontractor will take part in the project. A fixed fee will be agreed for a given set of functionality, likely to amount to a notional 60 days of code writing. The contract will be drawn up shortly into the project for work to commence within the first month. This will follow the standard procedure for external collaborators at the University of Birmingham.

12. Project Management

The Project Manager (d.j.corlett@bham.ac.uk), working 20%FT on the project will coordinate the project for the University. He will be the main contact for JISC and will be responsible for securing staff contracts, handling issues of finance and day-to-day running of the project. He will ensure that all aspects of the project – design, development, testing, reporting, documentation are being carried out

and are in synchrony. The PM reports to the Director of CETADL(m.sharples@bham.ac.uk), and the CETADL steering committee.

The Technical Development Manager (i.h.ting@bham.ac.uk), working full time on the project will coordinate all aspects of technical effort, and will be responsible for delivery of the technical outputs to the Project Manager. He will also be actively involved in code writing. On all technical matters, the technical team will report to him, whilst on other matters they will report to the Project Manager.

One full time Research Associate (chantks@bham.ac.uk) will work on design and development, together with the external contractor (oliver@westmancott.co.uk). A further team of interns, recruited through a scholarship scheme will be available both as coders and testers of the system and as advisors to the team, following their involvement in the initial Interactive Logbook.

Other student testers will be recruited to the team on a cyclic basis and technical assistance will be provided to the team by the CETADL Systems Manager, covered under the CETADL membership fee.

The local committee will consist of the Project and Technical managers, the Research Associate and the Director of CETADL, and will in turn refer to the CETADL Steering Committee.

13. Programme Support

It has been indicated in the bid document, that the project, where possible will refer to and work with other relevant projects, especially those already funded by JISC. It would therefore be of great help if the JISC team would provide contacts and introductions to them, where contacts have not already been made.

14. Budget

The budget can be found in Appendix A.

Changes from the proposal are as follows:

Appendixes

Appendix A. Project Budget

	JISC Contribution Requested			Institution Contribution			Total
	YR1	YR2	YR3	YR1	YR2	YR3	
Staff (list all staff with FTEs and salary scale range)		0	0	0	0	0	
<i>Project manager 0.2 FTE (OR Grade 2, £22,507-29,128) 7 months.</i>	4,540	0	0	0	0	0	4,540
<i>Technical Development Manager 1.0 FTE (OR Grade 3, £30,363-£35,883) 7 months.</i>	22,699	0	0	0	0	0	22,699
<i>In-house postgraduate designer/developer 1.0 FTE (Research Grade 1B, £19,460-£21,640) 7 months.</i>	15,295	0	0	0	0	0	15,295
<i>Internship programme and honoraria</i>	15,000	0	0	0	0	0	15,000
<i>External contractors, 80 days capped</i>	20,000						20,000
Travel & Subsistence (including attendance at relevant programme meetings and to liaise with relevant project teams)	2,000	0	0	0	0	0	2,000
Equipment (specify individual items over £10k) See details below under 'other'.	0	0	0	0	0	0	
Dissemination activities	0	0	0	0	0	0	
Evaluation activities	0	0	0	0	0	0	
Other		0	0	0	0	0	
<i>Consumables, to include copying, media (CDs and evaluation booklets for distributing test system), postage and stationery for full-time staff.</i>	1000	0	0	0	0	0	1000
<i>3 J2ME/3G mobile phones for testing and demonstration.</i>	1500	0	0	0	0	0	1500
<i>Server to host 'sandbox' institutional services for testing and to act as code library. University to provide all necessary software licences under campus agreement.</i>	1500	0	0	2000	0	0	1500
<i>3 Tablet/laptop PCs to loan to student testers and as demonstration machines. University to provide all necessary software licences under campus agreement.</i>	4500	0	0	2000	0	0	4500
<i>Mobile GPRS subscriptions (3 1-year contracts at £23.50/month). To include data quantities necessary to allow testing.</i>	846	0	0	0	0	0	846
<i>Student testers (100 hours at £10/hr)</i>	1000	0	0	0	0	0	1000

<i>Membership to CETADL as a project, providing web hosting, team portal server and code management server. Access to multimedia development machines and full range of professional development support tools and software.</i>	2500	0	0	0	0	0	2500
Total	92380	0	0	4000	0	0	96380
Total requested from JISC	92380	0	0	0	0	0	92380