

Developing Interactive Logbook: A Personal Learning Environment

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Abstract

Many universities and further education colleges provide Virtual Learning Environments (VLEs). In recent years a new direction has been to extend these to support Personal Development Planning (PDP) and Student Portfolio management. A major limitation of such approach is that the plans and portfolios are owned by the institution, and do not support learning across institutions or in the workplace. We describe the development of an Interactive Logbook (IL) which provides students with a suite of mobile tools for multimedia note-taking, knowledge sharing, learning management and personal development planning. The IL environment is designed to be owned by the student and offers interoperability with a wide range of existing software for learning and office work.

1. Introduction and Background

Many higher and further education institutions now run Virtual Learning Environments (VLEs), with tools for course management, assessment and group working.

Although they have been widely adopted, VLEs are limited in their support for new methods of teaching and learning such as problem-based learning, informal teamworking, and personal learning management. Nowadays, most learners are no longer confined to a single institution throughout post-school education. The availability of part-time courses, work-based learning and other informal learning activities all contribute towards the attainment of an individual's learning goals. It is expected that people will continue to acquire new skills throughout their lifetime and build a transferable portfolio of competences.

Another trend in tertiary education is towards small group collaborative learning. Students are expected to acquire competences in collaborative working and project management through team projects and group-assessed coursework. In recent years these have typically been mediated by online discussion and coordination. Learners

and tutors may use a variety of informal collaborative tools such as newsgroups, weblogs and instant messaging alongside the tools that are provided by the institutional VLE. This increases the number of logins required by the users as they move from one system to the next, presenting a major challenge to search and retrieve relevant learning materials. In addition, students may use a wide range of overlapping Personal Information Management (PIM) tools such as calendars, contact lists and email, running on computers and mobile phones. The information across these devices and applications needs to be consolidated into one place and directed towards support for learning [1].

A third trend is the requirement on tertiary education to support students in maintaining learning portfolios and personal development plans, as aids to reflective learning and as transferable records of achievement. In science and engineering disciplines there is a long tradition of using paper-based logbooks to record and review learning activities. A problem with the paper-based logbook is that much learning activity is now carried out online, through email, web browsing and word processing. Currently, students have to add these online activities to the paper logs by printing out the documents or transcripts of email and pasting them into the logbook. Activities such as interactive software design and video production can only be included in the logbook as CDROMs or as references to online websites.

New designs for virtual learning environments are reflecting these educational changes, adding tools for collaborative document production, student project management and multimedia presentation, as well as integration with content management, student administration, and examination. However, they are still designed around the structure of the curriculum, rather than the needs of the individual student. Even if the learning can be captured and presented online, this is a taxing process. Students must save and organise their online activities from a variety of sources including tasks carried out on the VLE, email correspondence, and material they may have designed in the form of

documents, presentations, web pages, video, audio, and computer programs.

To address the issues listed above, we have developed a Personal Learning Environment (PLE) to meet the needs of learners engaged in both formal and informal learning. This is also prompted by the new requirement for UK universities to provide a learner progress file – a means for supporting Personal Development Planning (PDP) and Portfolio activities [2]. The Interactive Logbook (IL) is designed to address shortcomings of traditional VLEs through an integrated solution that allows learners to “access, piece together and manage the learning they do throughout their life, in a range of institutional, informal and work-based settings” [3]. The PLE provides each student with a set of learning management tools to run on a wireless laptop or tablet computer. A limited subset of the tools is also available on a mobile phone client.

2. Project Criteria and Evaluation

The system was developed to conform to tight external demands. The national funder required the work to be carried out to high standards of software quality. The system was evaluated by an external assessor to determine whether it met the goals and requirements. Within the time constraints of a six month project the team was able to implement a robust system that met the main goals.

Other criteria set out by the funder include that the project must release its software under open source licensing policy and the software should adhere to open standards (e.g XMPP for chat).

3. Design & Development of Interactive Logbook

The following is a list of high level goals for a system that will support personal learning management in tertiary education [4], derived from interviews with students and academic staff:

- A Personal Learning Environment is needed to manage and consolidate all of the different electronic environments that already exist
- Mobile technology will be widely available, though there may be a number of platforms on which they work. The availability of the mobile phone should be considered.

- People and institutions choose tools and services that suit them best for a wide variety of reasons. A suitable solution should interoperate with other
- ‘best of breed’ tools rather than compete with them.
- The solution will need to integrate with a wide variety of other technologies, particularly online systems. Recognised standards or specification for information exchange will have to be adopted.
- The complexity of engaging with information and communication must be reduced.
- Ownership and management of the system must be personal and individualised.
- For recording of progress, only minimum effort must be necessary.
- Ubiquitous access is required, which for the foreseeable future demands on and offline support
- The solution and its associated costs will need to be scalable and sustainable for the information to be of use to learners throughout their lives and across all their learning contexts.
- Informal and formal learning must be catered for, as must individual and collaborative activities.

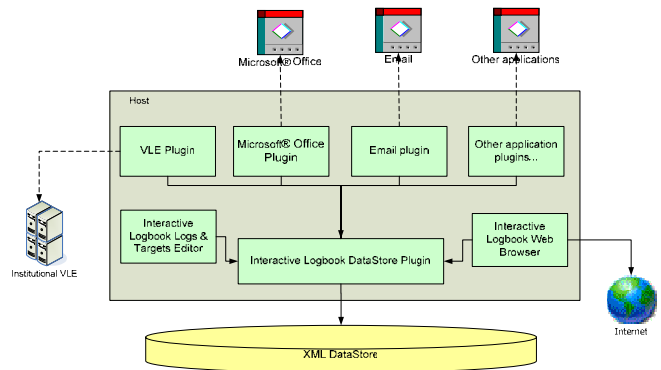


Figure 3.1. Software Architecture of Interactive Logbook

3.1 Software Architecture

The Interactive Logbook Desktop Client consists of three main components: 1) the *Host*; 2) the *DataStore* and 3) *Plugins*. The *Host* coordinates a range of *Plugins* for applications such as a word processor, web browser, chat client, file browser and others. The system can support a range of external services such as a VLE, RSS feeds, blogs and portals, where data can be cached for offline and mobile access, since ubiquitous network access cannot be assumed. The final component is the *DataStore*. Applications and Services *Plugins* will send Logs (Portfolio) and Targets (Learning Plans) information via a *datastore plugin* which acts as a data

adapter and put this information into the *DataStore*. Figure 3.1 illustrates the software architecture.

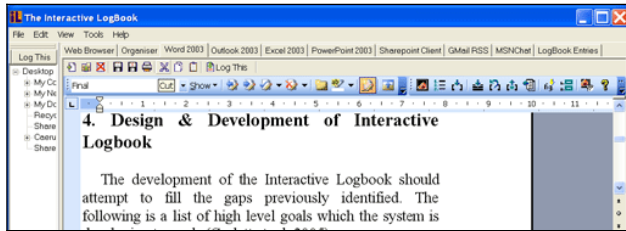


Figure 3.2. Interactive Logbook desktop client showing Log This button, tabs, and Microsoft Word plugin.

From the user perspective, the Interactive Logbook provides an integrated set of tools to support learning, including office, communications and web applications. Rather than replacing familiar packages such as Microsoft Office, IL presents documents, email, spreadsheets etc. within a single frame, with a set of tabs (see Figure 3.2) to switch between them. When a user selects a tab, the frame shows a toolbar for the particular application (such as Microsoft Word) with its main tools and menu items. The system allows the user manage applications from multiple providers, including the Microsoft Office and Open Office suites. IL also supports tablet computers, for note-taking and annotation. A user can switch between tasks with a single click, viewing and editing documents, reading email, or taking notes, which means the system is particularly suited to one-handed use on the move.

The student can create a log entry for each task, either manually, by clicking on a *Log This* button, or automatically when the user performs an operation such as opening a web page or saving a document. The logs have fields for identifier, title, date, links, keywords, and comments. Some of these can be added automatically (e.g. the date and URL link), others can be filled out by the user to assist retrieval of the logged activity. Each log entry can be associated with a learning target (for example, a course assignment, or a personal learning goal) and the learner can organise and view the learning activities associated with each target. Associating log entries with learning targets is a way of organizing learning activities for different purposes, such as for self-reflection or for formal assessment.

There is also a complementary mobile phone client (see Figure 4.3) developed for providing access to a subset of functionalities including email, calendar and news from the desktop version. This offers greater access to Interactive Logbook for the people on the move with limited access to a computer.

4.1 Testing and Evaluation

All development builds of Interactive Logbooks have been tested internally for bugs and usability issues. One milestone build (Beta 1) was also tested with two groups of students from the Birmingham Business School for the perceived usefulness of the software.

The final software output and the development process were evaluated by the external evaluators appointed by the funder in March 2005. The evaluator feedback report indicated that the code was well written enabling it to be easily maintained and that the system was robust and performed well on the PC platform, but that mobile phone compatibility presented problems due to the different implementation of the Java 2 Micro Edition (J2ME) by various phone manufacturers and that users would require specific instructions for different handset. The report also stated that the project website [www.il.bham.ac.uk] presents sufficient information for another developer to pick up the project and develop the system further from the open source code.

5. Summary and Further Work

The Interactive Logbook is available as a robust application that can be developed and adapted by another institution. In addition to the original deliverables the project has also contributed to best practice in the academic community on rapid software development. The University of Birmingham has recently secured a second phase of funding which will focus on deploying Interactive Logbook into tertiary education institutions to evaluate its value in supporting personal learning development with wireless mobile technology.

6. References

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