

# JISC DEVELOPMENT PROGRAMMES

## Project Document Cover Sheet

### PROJECT PLAN

#### Project

<b>Project Acronym</b>	ASDEL	<b>Project ID</b>	
<b>Project Title</b>	Assessment Delivery Engine for QTlv2 questions		
<b>Start Date</b>	01 March 2007	<b>End Date</b>	31 March 2007
<b>Lead Institution</b>	University Of Southampton		
<b>Project Director</b>			
<b>Project Manager &amp; contact details</b>	Gary Wills, Intelligence, Agents, Multimedia Group, School of Electronics and Computer Science, University of Southampton, SOUTHAMPTON, SO17 1BJ		
<b>Partner Institutions</b>			
<b>Project Web URL</b>	www.r2q2.ecs.soton.ac.uk		
<b>Programme Name (and number)</b>	<i>JISC Capital Programme 2007 e-Assessment Projects</i>		
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#### Document

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#### Document History

Version	Date	Comments
0a	09 April 2007	Initial Draft of Project Plan
0b	28 April 2007	Corrects after proof reading.



# Assessment Delivery Engine for QTIv2 questions (ASDEL) Project Plan

## Overview of the ASDEL Project

### 1. Background

At last year's JISC/CETIS conference it was recommended that the community needed to 'kick start' the use of the IMS Question and Test Interoperability version 2 (QTIv2) specifications<sup>1</sup>. At this meeting it was felt that in order to achieve this, there needed to be a robust set of tools and services that conformed to the QTIv2 specification. R2Q2 is a recently funded JISC project that successfully implemented a rendering and response engine for a single question (also termed an item), for which there are sixteen types described in the specification and implemented in R2Q2. While this is useful it does not implement the whole of the specification regarding the test process. The specification details how a test is to be presented to candidates, the order of the questions, the time allowed etc.

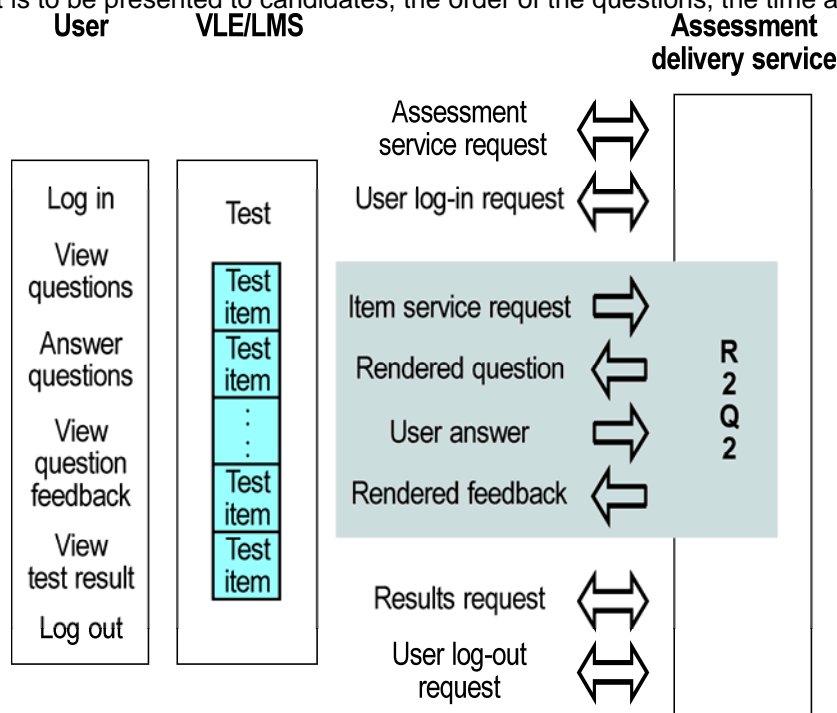


Figure 1 . Overview of the test process.

Formative assessment aims to provide appropriate feedback to learners, helping them gauge more accurately their understanding of the material set. It is also used as a learning activity in its own right to form understanding/knowledge. It is something lecturers/teachers would love to do more of but do not have the time to develop, set, and then mark as often as they would like. A formative e-assessment system allows lecturers/teachers to develop and set the work once, allows the learner to take the formative test at a time and place of their convenience, possibly as often as they like, obtain meaningful feedback, and see how well they are progressing in their understanding of the material.

<sup>1</sup> <http://www.imsglobal.org/question/>

McAlpine: (2002, p6)<sup>2</sup> also suggests that formative assessment can be used by learners to “highlight areas of further study and hence improve future performance”. Steve Draper<sup>3</sup> distinguishes different types of feedback, highlighting the issue that although a system may provide feedback, its level and quality is still down to the author.

The JISC funded reference model for assessment, FREMA, has developed a number of Service Usage Models (SUMs) on assessment, one of which is for summative assessment. This identifies the services required for a complete summative process including many of the administrative functions. Any implementation of e-assessment, if it is to support flexible and tailored assessment for non-traditional and workplace learners as well as those in higher education, needs to provide for both summative and formative assessment. The overall process of taking a test is shown in Figure 1. While the process focuses on formative assessment, it still meets the core requirements of the summative SUM. In this project we aim to build a test delivery engine to the IMS Question and Test Interoperability version 2.1 specifications that can be deployed as a stand-alone web application or as part of a SOA enabled VLE.

The project will be developed in two phases. The first is the technical development of the engine in accordance with the IMS specification and based on the IMS schema. It will provide for: delivery of an assessment consisting of an assembly of QTI items, scheduling of assessments against users and groups, delivery of items using a web interface, including marking and feedback, and a Web service API for retrieving assessment results. The second phase will integrate with the other projects in this call on item banking and item authoring.

## 2. Aims and Objectives

The aim of this project is to provide a test delivery engine to comply completely with the IMS QTIv2.1 specification, to integrate with the other JISC funded project from this call on item banking and item authoring, and to support projects that may be funded under the April 2007 circular. While not required for this implementation, the software will be developed to be extensible with a view to supporting future provision for sequencing and adaptive logic in assessments and other enhancements.

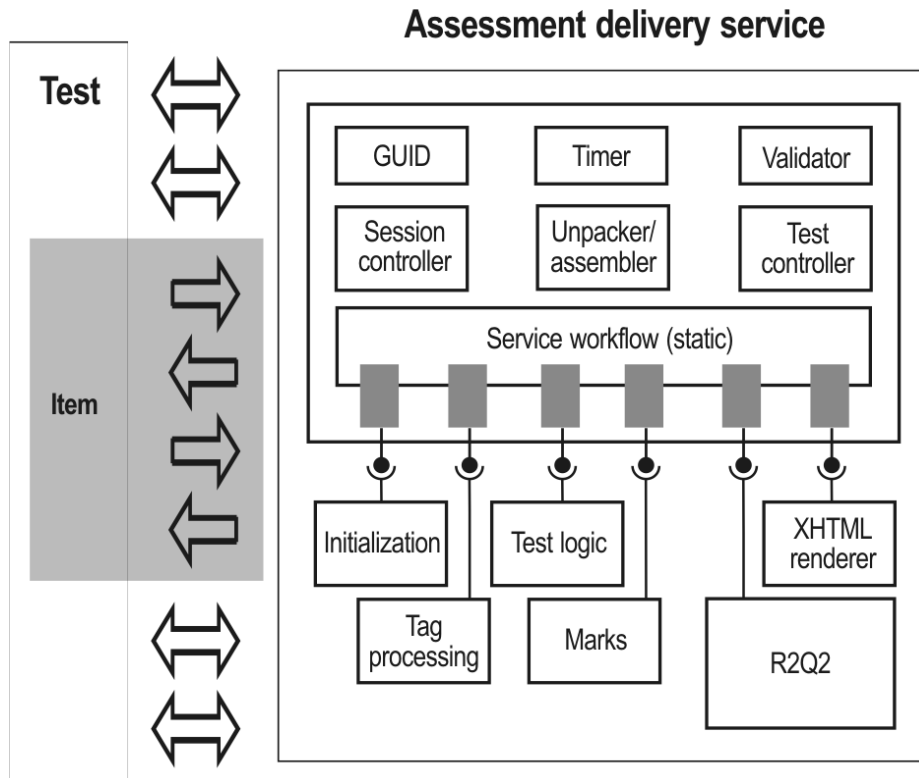
We will liaise with the two other projects involved in the Assessment call II of the e-Learning Programme to agree collaboration and form a Projects Steering Group. These projects are AQuRate: Item Authoring (Kingston) and MiniBix, Item Banking (Cambridge). The project will be developed in two phases.

Phase 1 is the technical development of the engine in accordance with the IMS QTIv2.1 specification and in accordance with the JISC e-framework approach of using web services in a Service Oriented Architecture (see Figure 2). The engine will take in a test as an IMS Content Package. The engine will unpack the content package and assemble the items into an assessment test. The engine will import any additional material (images, videos, etc) required by the test, and it will then process the xml and deliver the test as scheduled to the candidate via a Web interface. Feedback will be given to the candidate and the marks processed in accordance with the schema sent to the engine. The results can be retrieved through the engine API. Throughout Phase 1 we will ensure liaison and coordination with the Item Authoring and Item Banking projects. At the end of Phase 1 we will have a 'Show and Tell' event, possibly at a CETIS Assessment SIG.

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<sup>2</sup> Mhairi McAlpine: (2002) Principles of Assessment, *Blueprint Number 1CAA Centre, University of Luton, February.*

<sup>3</sup> STEPHEN W. DRAPER (2005) FEEDBACK, A TECHNICAL MEMO DEPARTMENT OF PSYCHOLOGY, UNIVERSITY OF GLASGOW, 10 APRIL 2005: [HTTP://WWW.PSY.GLA.AC.UK/~STEVE/FEEDBACK.HTML](http://www.psy.gla.ac.uk/~steve/feedback.html)



**Figure 2.** Architecture for the Assessment Delivery system.

Phase 2 will integrate the deliverables from the AQuRate: Item Authoring (Kingston) and MiniBix, Item Banking (Cambridge) and produce an integrated demonstrator. At the end of Phase 2 we will provide a second 'Show and Tell' of the integrative demonstrator to a wider JISC audience. In Phase 2 we also intend to use existing outputs from JISC projects (such as PeerPigeon) to provide user and group information. As part of this phase the project will include the use of standards to ensure integration, such as IMS Enterprise Services Specification 1.0 for group information, and search and retrieval of questions from item banks using SRU/CQL and RQP. The work package descriptions provide further details.

### 3. Overall Approach

The project will take an agile approach to developing the ASDEL System and the language of choice is Java.

- Using an agile or iterative approach relieves the 'bottle neck' of the water fall approach suggested by the work package plan, in that coding can start before the design is finished or technology demonstrators built. However, there is still a strong quality assurance element to the agile approach, in that a test plan must be written before the coding starts and programming standards are to be followed.

This choice of Java as a language is mainly to allow for cross platform deployment.

- It can be argued that it does not matter what the system is written in (because it is a web service) and it should not matter that it is called by a system on a platform different from the platform on which the Web service is running. In some cases .NET is a quicker and easier environment for developing Web services. However, we have found that having the original code in Java will allow the users to choose the platform.

The project will use a Service Oriented Architecture (SOA) when designing the ASDEL system.

There are two interoperability issues to be faced:

- The integration with VLEs and portal frameworks. We have found that you cannot just call a service from a portal framework, but code needs to be written to manage these calls to and information from the Web services. The project will develop an abstract class and a number of

exemplar classes to help people integrate and use the ASDEL service. The generic name for such a piece of code is an adaptor (see the EFSCE project<sup>4</sup>)

- The integration in Phase two with the AQuRate: Item Authoring (Kingston) and MiniBix, Item Banking (Cambridge). We believe that writing the adaptors and using a portal framework to integrate the different projects will alleviate any potential integration problems.

The major boundary for ASDEL and its scope is the QTIv2 specification. We will not be considering anything beyond that specification within this project.

## 4. Project Outputs

### **WORK PACKAGE 1: SYSTEM ANALYSIS**

Deliverable 1: Use case, scenarios, and wider issues related to the use of ASDEL.

The wider issues may not necessarily be realised in this project but will add to the body of knowledge on assessment.

### **WORK PACKAGE 2: DESIGN**

Deliverable 2: Scoping document made available on project website.

This is the focused design for the ASDEL project.

### **WORK PACKAGE 3: SOA AND WEB SERVICE DEVELOPMENT**

Deliverable 3: Software and where applicable the WSDL description of the services.

### **WORK PACKAGE 4: ADAPTER DEVELOPMENT & ASDEL DEPLOYMENT**

Deliverable 4: Adaptors for Liferay.

Deliverable 5: Installation package.

Deliverable 6: Quick Installation guide.

Deliverable 7: Demonstrator Client with online User guide for the User Interface Demonstrator.

### **WORK PACKAGE 5: INTEGRATION WITH JISC'S AUTHORING AND ITEM BANKING TOOLS**

Deliverable 8: Demonstrator of all three projects working together.

### **WORK PACKAGE 6: EVALUATION**

Deliverable 9: Evaluation of the assessment delivery engine, and on the processes and practices involved in all three projects working together.

## 5. Project Outcomes

The outcome of this project will be the first open source test delivery system for tests written in the QTIv2 format. ASDEL will be freely available to those working in the FE and HE sector in the UK. The test engine will be designed to work either as a stand alone Web service or could be integrated into a Virtual Learning Environment (or other Web based course delivery systems)

It is envisioned that such a system as ASDEL will enable early adaptors of, and those researching into, assessment for e-learning an opportunity to experiment with alternative ways of presenting tests afforded by the QTI specification.

Currently there is no test authoring tool available to the community as a whole, but QTIv2 will allow for the sharing of items and test amongst the community. This will break the 'chicken and egg situation', in that people will not write a QTI test until there is a delivery system and ASDEL will now provide that system. So hopefully the community can start to write tests and share these amongst specific communities of practice (academic disciplines).

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<sup>4</sup> EFSCE project Web page <http://www.efsce.ecs.soton.ac.uk/overview>

## 6. Stakeholder Analysis

Stakeholder	Interest / stake	Importance
CETIS SIG on Assessment and e-learning assessment early adopters	JISC are funding this project to provide a complete test engine service to run tests written using the QTIv2. The ASDEL system is to be part of the e-framework and hence is built using Web services.	High
JISC & Wider UK HE and FE Community	This is the first complete test engine for processing tests written in QTIv2 format. To those in JISC and the wider UK HE and FE community. they will be able to deliver tests written in QTIv2 format	Medium
Researchers on assessment.	Can be used to allow other researchers to carry out investigation of hypothesis without having to build their own engine	Medium

## 7. Risk Analysis

Risk	Prob (1-5)	Severity (1-5)	Score (PxS)	Action to Prevent/Manage Risk
Staffing	2	3	6	There is always a risk to the start of the project by a delay in the recruiting and retaining of staff. This is offset by using existing staff, who have worked on similar projects. Also if require the academic staff can completed the first work package. Also by using good practice to ensure that all design/implementation rationales are capture, the effect of a person leaving the project will not bring it to a complete stop.
Organisational: Authoring or Item Banking not available at the start of Phase2	2	2	4	There is a risk that the other successful bids in this call may not be ready at the start of Phase 2. In this case we would used existing authoring tool and item banks ( <i>i.e.</i> E3AN) to show an integrative demonstrator.
Technical	1	5	5	The team understands design principles and no one member of the team has any vital piece of knowledge not understood by the others. The team were involved in the development of R2Q2, and a similar design approach will be used in ASDEL. Also we will use the FREMA methodology for designing services for which the team are completely familiar with (as they worked on the project).
External suppliers	1	2	2	There is a risk that the consultants cannot deliver as expected. While we value their input. If necessary the project team can be asked to do the work, although the quality/quantity may be reduced.
Legal	1	1	1	We are not using other people code or ideas, so there is a minimal change of any legal issues stopping the development of this system.

## 8. Standards

Name of standard or specification	Version	Notes
IMS Question and Test Interoperability (QTI)	2.1	This is the main stand that the project will be using and is available at <a href="http://www.imsglobal.org/question/">http://www.imsglobal.org/question/</a>
IMS Enterprise Services Specification	1.0	<i>IMS Enterprise Services Specification</i> <a href="http://www.imsproject.org/es/index.html">http://www.imsproject.org/es/index.html</a>
Simple Object Access Protocol (SOAP)	1.2	This is the protocol used to communicate between Web services and is available from the W3C at <a href="http://www.w3.org/TR/soap/">http://www.w3.org/TR/soap/</a>
Web Services Description Language (WSDL)	1.1	This is the protocol used to describe a Web services in a machine readable manner and is available from the W3C at <a href="http://www.w3.org/TR/wsdl">http://www.w3.org/TR/wsdl</a>
<i>Lightweight Directory Access protocol (LDAP)</i>		<i>This is a possible standard we may use when integrating the services in phase two:</i> <a href="http://en.wikipedia.org/wiki/Ldap">http://en.wikipedia.org/wiki/Ldap</a>
<i>SRU/CQ L protocol</i>		<i>This is a possible standard we may use when integrating the services in phase two:</i> <a href="http://www.loc.gov/standards/sru/">http://www.loc.gov/standards/sru/</a>

## 9. Technical Development

The project will take an agile approach to developing software and the language of choice is Java. This choice of JAVA as a language is mainly to allow for cross platform deployment. The project will use a Service Oriented Architecture (SOA) when designing the ASDEL system. In house coding standards developed in the lab will be adopted to ensure readability, testability and installability. The in-house standards are:

1. System Design documentation will be the definitive documents, will be expressed in UML, and will be available from the project website.
2. Coding practice
  - Test plans to be written before coding
  - Code should be modular and packaged according to the design.
  - The code should be well commented, with clear header description for each class; classes should be reasonably small and self descriptive.
  - Good code structure to ensure reusability, maintainability, readability, and extensibility.
  - Error handling mechanics.
  - Code will be unit tested using Junit (or equivalent)
3. Tools for software development cycle
  - An IDE will be used to develop Web services.
  - Compliance with SOAP will be assured using an appropriate testing package (e.g. SOAPscope).
  - Subversion – version/source control will be used for Java code. It is a repository to record the history of source files and documents, and it allows developers to easily roll back to earlier versions of source code.
  - Flyspray will be used to record all issues and design decisions.
4. Changes to code and software and documentation are controlled, authorised and auditable
  - Use of an issue log (e.g. Flyspray) which records relevant issues, requests for change and software faults / off-specification
  - Decision/actions are documented.
5. Full account will be taken of issues relating to accessibility of Web-based systems and software and the outputs of this project will conform to published standards and guidelines, For instance the W3c Web Accessibility Initiative (WAI). <http://www.w3.org/WAI/>

## 10. Intellectual Property Rights

While the code will be made available under an appropriate open source agreement (Creative Commons licences) for use within any educational establishment and in conformance with JISC's requirements, the IPR will also remain with the University of Southampton thereby allowing Southampton to further exploit the IP.

There is one piece of background IPR and that is the R2Q2 system, which was developed by the same group developing ASDEL. The group see ASDEL as an extension of R2Q2 and give free permissions for the R2Q2 design and code to be reused in the ASDEL system.

## 11. Project Partners

The lead institution is Learning Society Lab, School of Electronics and Computer Science, University of Southampton.

The projects consultants are:

**e-Services Integration at Hull** will provide consultancy to the project in the form of the time of Robert Sherratt & Dr Steve Jeyes, who have experience in such projects at the steering and technical implementation level.

**Dr Graham Smith** has been closely involved with QTI for many years, and will provide expertise in both the QTI standard and in the implementation of assessment systems.

As the project only has consultants there is no partnership agreement.

## 12. Project Management

Project management will take place at three distinct levels of direction and responsibility.

**Projects Steering Group.** At the highest level, a Projects Steering Group will be established with the two other projects involved in the Assessment call II of the e-Learning Capital Programme: these projects are AQuRate Item Authoring (Kingston) and MiniBix, Item Banking (Cambridge). The steering Group will comprise of the three Principal Investigators, the three project managers, and those members of the project teams and co-investigators as may be required at particular times. It is intended that the Steering Group will meet at the start of the project, at the end of Phase 1/start of Phase 2, and at the end of Phase 2. A separate memorandum of understanding is being drawn up for this steering group.

**Local Project Management group.** Within the Assessment Delivery project, a Project Management group will meet monthly, comprising the principle investigator, co-investigators, the project manager, and the project technical team.

**The Project Technical team** will have weekly project meetings chaired by the project manager and involving any investigators as required. These monthly and weekly meetings will monitor progress against objectives, consider and decide upon project plan adjustments, and make recommendations to the Steering Group as necessary.

The project will be located within the **Learning Societies Lab at Southampton**. It will retain a senior researcher (Soton RF) to manage the project day to day, to organize the liaison with the wider community, to arrange the dissemination, and to take responsibility for reporting. The project will employ programmers to work on implementation.

We have made provision for consultancy input to the project:

**e-Services Integration at Hull** will provide consultancy to the project in the form of the time of Robert Sherratt & Dr Steve Jeyes, who have experience in such projects at the steering and technical implementation level.

**Dr Graham Smith** has been closely involved with QTI for many years, and will provide expertise in both the QTI standard and in the implementation of assessment systems.

The project training needs will revolve around the training of the programmers in the 'good practice' procedures for code development within the lab. This training will form part of the induction training given to each new member of staff to the Learning Societies Lab, and the weekly technical meetings and code reviews.

The details of the Southampton Technical team and the consultants are:

## **Principle Investigator**

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## **Local Project team**

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## **Consultants**

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## **13. Programme Support**

The main support beyond the usual programme support may be in the facility meetings to arrange the use of software developed in other project under JISC programmes.

## **14. Budget**

The budget is as agreed in the project proposal, see appendix A.

## Detailed Project Planning

### 15. Workpackages

The project comprises five work packages (W1-W5) and nine deliverables (D1-D9). The deliverables are described in the work package that creates them. Phase 1 is represented by WP1-3 and Phase 2 WP4-5. The work plan is reflected in the Gantt chart (see Appendix B).

There are two milestones in the first phase of the project represented by a ♦ in Figure 4 Gantt Chart for the ASDEL project. The first is the signing-off (agreement) of the design documents. The second is the completion of all the Web Services and review for OSMM evaluation.

#### **WORK PACKAGE 1: SYSTEM ANALYSIS AND IDENTIFICATION OF ISSUES**

Within the project team and in writing this bid we have set out a number of requirements. The first stage of this project will be to verify these. The other part of this workpackage is to identify the wider issues surrounding the potential uses of the ASDEL system. This will be achieved by a desk study and possible interviews with representatives of people in the HE and FE sectors. This is a long thin workpackage and will be continuing through out Phase 1.

Deliverable 1: Scenarios, and identification of wider issues made available on the project website.

#### **WORK PACKAGE 2: DESIGN**

The purpose of this workpackage is to produce the design documentation for the project. We will take the agile approach developed and refined by the JISC funded project FREMA on designing and documenting services. The design will be suitable for both summative and formative assessment workflows. The aim is to design a delivery system that will completely adhere to the QTI v2 specification. The design will be refactored iteratively, to identify internal Web services. As with R2Q2, the processing of the tags from the QTI specification will be designed in such a way as to ensure that the engine may be changed easily as the specification or requirements change in the future. Independently of the design, a number of QTI v2 tests will be generated to act as a both a test of the engine and as exemplars for others. Included in this work package will be:

- Appropriate UML diagrams (Service Usage Module (SUM), SRC, interaction diagrams).
- The designs for the system and services.
- Review of reusable component availability.
- The test plans for the system as a whole and the individual services. Included in this will be exemplar test questions.

Deliverable 2: Scoping document made available on project website.

#### **WORK PACKAGE 3: ASDEL DEVELOPMENT (SOA AND WEB SERVICE)**

This work package will implement the services design from WP2. We will take a similar agile approach as already used on the R2Q2 project. Standards will be used to ensure interoperability, for instance IMS Content Packaging; SOAP and WSDL for security. The work package will develop

- Provision of a web service API for retrieving assessment results.
- The public interface to the service using a SOAP interface.
- The work flow for passing around the various components of a Test in QTIv2.1.

It is intended that the outcomes from WP1-3 will be presented to the community, probably as part of a Cetus Assessment SIG event, and their feedback will inform Phase 2 of the project.

Deliverable 3: Software and the WSDL description of the services.

#### **WORK PACKAGE 4: ADAPTER DEVELOPMENT & ASDEL DEPLOYMENT**

This work package will develop the adaptors for integration of ASDEL into a VLE or portal framework. Adaptors are the piece of code required by the portal framework (or VLE) to manage the calls to and information from the Web services. The project will develop an abstract class and a number of exemplar classes to help people integrate and use the ASDEL service.

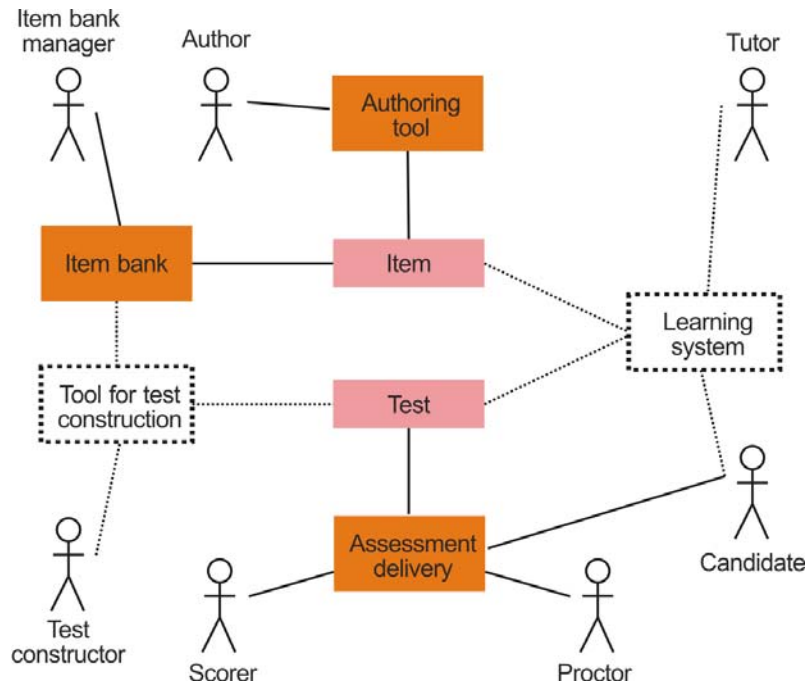
The ASDEL system will be packaged to be easily deployable and configurable on a range of platforms.

Deliverable 4: Adapters for Liferay.

Deliverable 5: Installation package.

Deliverable 6: Quick Installation guide.

Deliverable 7: Demonstrator Client with online User guide for the User Interface Demonstrator.



**Figure 3. Phase Two: Integration of the successful bids from the assessment domain<sup>5</sup>.**

#### **WORK PACKAGE 5: INTEGRATION WITH JISC'S AUTHORIZING AND ITEM BANKING TOOLS**

This work package will integrate with the other projects in this call: AQuRate Item Authoring (Kingston) and MiniBix, Item Banking (Cambridge).

Figure 3 shows a modified diagram of the Use Case from the QTI v2 specification, demonstrating how the different tools and system in this call relate together. It clearly shows the boundaries between the delivery system, authoring tool, and item banking. A general scenario would be:

1. A lecturer/tutor will write questions (items). The authoring tool will provide a user interface appropriate to the end user, and format and store the items using the QTI v2 standard. By using QTIv2 these items may be exchanged with other compliant systems not developed by the same developer.
2. Users can select items from the item bank and place the items in a pool ready for constructing into a test. The test construction system, like the item authoring tool, will use an appropriate user interface and behind the scenes output the test in a QTI v2 or IMS CP compliant format.
3. By having the test and item adhere to the QTIv2 specifications, the deployment of items, item banks, and tests from diverse sources can be delivered through the test delivery system to candidates via a learning environment or directly via their internet browser.
4. The candidate can now take the test, and have the results reported in a consistent manner.

The integration in this workpackage may be best achieved by using a using a portal framework to integrate the different projects.

Deliverable 8: Demonstrator of all three projects working together.

<sup>5</sup> IMS Question and Test Interoperability Overview, Version 2.1 Public Draft (revision 2) Specification [http://www.imsglobal.org/question/qtiv2p1pd2/imsqti\\_oviewv2p1pd2.html](http://www.imsglobal.org/question/qtiv2p1pd2/imsqti_oviewv2p1pd2.html)

**WORK PACKAGE 6: EVALUATION**

This work package will involve detailed coordination and planning with the other projects in this call on authoring and item banking. It is intended that the steering group will provide the detailed statement of activities and actions for evaluation, which are likely to include a community “Show and Tell”.

Deliverable 9: Evaluation of the assessment delivery engine, and on the processes and practices involved in all three projects working together.

## 16. Evaluation Plan

Timing	Factor to Evaluate	Questions to Address	Method(s)	Measure of Success
March- April 2007	System Design	Have we incorporated the lessons learned from previous designs, i.e. R2Q2	Focus Group: Local management and technical team	Design documentation (UML) that is understood by the whole team.
May -June 2007	Services	Design and Implementation rationale	System testing (Black Box) against design	Successfully passing all tests
June- August 2007	Complete system	Does the ASDEL system work in the way it was intended.	Testing against specification and test plans. Currently there are no bench mark QTIv2 tests. These are to be independently written by Graham Smith (a consultant on the project)	Successfully passing all tests. Able to delivery the test devised by Graham Smith without error.
September- October 2007	Documentation: Installation, user guide	Can the end users use the system	Interviews and Focus groups. Get other projects in the lab to install and others to integrate it into their portal frameworks.	Qualitatively determine if users found the system easy to install and could understand the documentation without the need to refer to the team for advice.

## 17. Quality Plan

<b>Output</b>					
<b>Timing</b>	<b>Quality criteria</b>	<b>QA method(s)</b>	<b>Evidence of compliance</b>	<b>Quality responsibilities</b>	<b>Quality tools (if applicable)</b>
March/April 2007	System design (Adherence to standards)	Design Review	Minutes kept and design signed off	Project Manger	UML
March-September 2007	Fitness for purpose (Adherence to standards)	Internal quality Review	Minutes of Meetings	Research Fellow	Flyspray for issue tracking
March-September 2007	Coding/installing ASDEL services	best practice for processes	Logbook update, code deposited	Research Fellow	Subversion/SOAPscope
March-September 2007	Test Plan (Adherence to specifications)	Unit test	Sign off testplan (with a record of the results)	Research Fellow	Junit/ Flyspray
March-September 2007	Test Plan (Adherence to specifications)	System test	Sign off testplan (with a record of the results)	Research Fellow	Subversion/ Flyspray
March-September 2007	JISC Open Source Policy	Licence Check	Creative Commons Licence and source code published in SourceForge	Project manger	Subversion
March-December 2007	Test Plan (Adherence to specifications)	Accessibility test	Sign off testplan (with a record of the results)	Research Fellow	Subversion/ Flyspray
March 2007-March 2008	Terms of reference	Peer review	Feedback from steering group	Project Manager	
March 2007-March 2008	JISC Report Guideline	Proof Reading	Sign off	Project manager	Template

## 18. Dissemination Plan

<b>Timing</b>	<b>Dissemination Activity</b>	<b>Audience</b>	<b>Purpose</b>	<b>Key Message</b>
1 <sup>st</sup> month and continuing there after	Project Web site with a blog and RSS feed	General and technical audience	Awareness, Inform, Engage, and Promote	About ASDEL and it developments
1 <sup>st</sup> month and other mandatory meetings.	JISC Kick off meetings and subsequent project meetings	Technical Audience	Inform and Engage	ASDEL developments and feedback
Each mile stone	Deliverable reports an software	Technical audience, and wider informed research and educational research community.	Inform	ASDEL developments
Throughout the project	Conference papers (CAA conference), workshops and/or posters. Also the JISC-CETIS Assessment SIG	Technical audiences, and wider informed research and educational community.	Engage and Promote	ASDEL development
Throughout the project	Demonstration to institutions and organisations.	technical	Awareness, Inform, Engage, and Promote	About ASDEL and it developments

## 19. Exit and Sustainability Plans

Project Outputs	Action for Take-up & Embedding	Action for Exit
All Reports	Will be posted on the project website and in the institutional archive. Minimum period of 3 years and archived in the institutional repository (E-Prints)	<b>Access</b> – The School of Electronics and Computer Science will host the server. <b>Preservation</b> – All reports will be archived in the appropriate JISC repository <b>Maintenance</b> – The server will come under the maintenance policy of the School <b>Intellectual property</b> . All report will be copyrighted.
Software: Implementation of Services	The program code will be freely available for any Higher or Further education institution. Minimum period of 3 years and archived in the institutional repository (E-Prints)	<b>Access</b> – The School of Electronics and Computer Science will host the program code for downloading. <b>Preservation</b> – The program source code will be archived in the appropriate JISC data centre. <b>Maintenance</b> – The system will be free to use by HE and FE establishments. All supporting documentation (specification, user manuals, and technical manuals) will be freely available via the project website. No free on going maintenance will be available for the project after the closing date. <b>Intellectual property</b> – To install their own version of the demonstrator institutions will need to buy their own licences for 3rd party components.

Project Outputs	Why Sustainable	Scenarios for Taking Forward	Issues to Address
The ASDEL System	The outcome of this project will be the first open source test delivery system for tests written in the QTIv2 format. The test engine will be designed to work either as a stand alone Web service or could be integrated into a Virtual learning environment (or other Web based course delivery systems)	ASDEL will enable early adaptors and those researching in to assessment for e-learning an opportunity to experiment with alternative ways of presenting a test that QTIv2 offers.	ASDEL will be freely available to those working in the FE and HE sector in the UK. Ensuring HE/FE staff have access to the code and documentation for the system.
Internal ASDEL Web services (code and demonstrator)	Can be used by other JISC projects, developers and researchers	The Web services can be used by others, allowing them to concentrate on their projects and not on the test delivery.	Ensuring HE/FE staff have access to the code and documentation for the system.

## Appendix A. Project Budget

Directly Incurred Staff	March July 07 £	August 07 March 08 £	Total £
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
<b>Non-Staff</b>			
Travel and expenses	3,600	6,000	9,600
Hardware/software	5,000	2,400	7,400
Dissemination/sustainability (see travel) other	720	845	1,565
[REDACTED]		[REDACTED]	[REDACTED]
<b>Total Directly Incurred Non-Staff (B)</b>	9,320	19,965	29,285
<b>Directly Incurred Total (A+B=C)</b>	<b>31,823</b>	<b>51,704</b>	<b>83,527</b>
<b>Directly Allocated</b>			
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Estates	10,000	15,980	25,980
Other			
<b>Directly Allocated Total (D)</b>	17,170	27,450	44,620
<b>Indirect Costs (E)</b>	31,474	50,362	81,836
<b>Total Project Cost (C+D+E)</b>	80,467	129,516	209,983
<b>JISC Contribution</b>	<b>38,222</b>	<b>61,520</b>	<b>99,742</b>
<b>Institutional Contributions</b>	42,245	67,996	110,241
<b>Percentage Contributions over the life of the project</b>	<b>JISC</b>	<b>Partners</b>	<b>Total</b>
	%		
	47.5	52.5	100

## Appendix B. Workpackages

The project comprises five work packages (W1-W5) and nine deliverables (D1-D9). The deliverables are described in the work package that creates them. Phase 1 is represented by WP1-3 and Phase 2 WP4-5. The work plan is reflected in the Gantt chart (see Appendix B).

<i>Phase, WORKPACKAGES</i>	1 March 2007	2 April 2007	3 May 2007	4 June 2007	5 July 2007	6 Aug 2007	7 Sept 2007	8 Oct 2007	9 Nov 2007	10 Dec 2007	11 Jan 2008	12 Feb 2008	13 March 2008
	Phase 1							Phase 2					
Phase 1, WP 1:	█	█	█	█	█	█							
Phase 1, WP 2: <b>Design</b>		█	█	◆									
Phase 1, WP 3: Development				█	█	█	█	◆					
Phase 2, WP 4: Adapter development & ASDEL deployment						█	█	█					
Phase 2, WP 5: Integration								█	█	█	█	█	█
Phase 2, WP 6: Evaluation										█	█	█	█

Project start date: 01-03-2007

Project completion date: 31-03-2008

Duration: [13] months

Figure 4 Gantt Chart for the ASDEL project

Workpackage and activity	Earliest start date	Latest completion date	Outputs (clearly indicate deliverables & reports in bold)	Milestone	Responsibility
YEAR 1					
<b>WORKPACKAGE 1: System Analysis and identification of issues</b> <b>Objective:</b> to verify the original intentions of the bid and identify the wider issues.	Mar 2007	Sep 2007	Deliverable 1: Scenarios, and identification of wider issues.		
1. Literature review of the area, identify reusable component and Lessons Learnt from similar projects.	Mar 2007	Apr 2007	Internal Report to be made available on the project Web site		Research Fellow
2. Identification of wider issues for the potential use of ASDEL	Mar 2007	Sep 2007	Internal Report to be made available on the project Web site		Project manager & Team
3. Report findings	Apr 2007	Sep 2007	<b>Deliverable 1: Scenarios, and identification of wider issues made available on project website..</b>		Project manager
<b>WORKPACKAGE 2: Design</b> <b>Objective:</b> to produce the design documentation for a delivery system that will completely adhere to the QTI v2 specification	Apr 2007	May 2007			
4. Detailed design	Apr 2007	May 2007	Appropriate UML diagrams		Research Fellow
5. Test Plans for the ASDEL system	Apr 2007	May 2007	Test plan		Research Fellow
6. Generation of QTI tests adhering to the specification	Apr 2007	May 2007	QTI v2 tests using the different features of the QTIv2 specification		Graham Smith (consultant)
7. Design Report	Apr 2007	May 2007	<b>Deliverable 2: Scoping document made available on project website.</b>	<b>1</b>	Project Manager

Workpackage and activity	Earliest start date	Latest completion date	Outputs (clearly indicate deliverables & reports in bold)	Milestone	Responsibility
<b>WORKPACKAGE 3: ASDEL Development (SOA and Web Service)</b> <u>Objective:</u> his work package will implement the services design from WP2.	Jun 2007	Sep 2007			
8. Detailed Component/service Design	Jun 2007	Sep 2007	Appropriate UML diagrams		Research Fellow
9. Test Plans for the components/services	Jun 2007	Sep 2007	Test plan		Research Fellow
10. Code the components/Services	Jul 2007	Sep 2007	Code in subversion		Research Fellow
11. test components/Services	Jul 2007	Sep 2007	Completed plans in Subversion		Research Fellow
12. software and WSDL uploaded to the web site and made available fro down load.	Sep 2007	Sep 2007	<b>Deliverable 3: Software and the WSDL description of the services (available fro down load from the Web site)</b>	<b>2</b>	Project manger
<b>YEAR 2</b>					
<b>WORKPACKAGE 4: ADAPTER DEVELOPMENT &amp; ASDEL DEPLOYMENT</b> <u>Objective:</u> This work package will develop the adaptors for integration of ASDEL into a VLE or portal framework. The ASDEL system will be packaged for easily deployable and configurable on a range of platforms.	Aug 2007	Oct 2007			
13. Development of Adapters	Aug 2007	Oct 2007	<b>Deliverable 4 Adapters (available from project Website)</b>		Research Fellow
14. Write installers fro Microsoft and Linux platforms	Aug 2007	Oct 2007	<b>Deliverable 5: Installation tools (available from project Website).</b>		Research Fellow
15. Write installation guide	Aug 2007	Oct 2007	<b>Deliverable 6: Quick Installation guide (available from project Website).</b>		Research Fellow
16. Develop demonstrator Client	Aug 2007	Oct 2007	<b>Deliverable 7: Demonstrator Client with online User guide for the User Interface Demonstrator (available from project Website).</b>		Research Fellow

Workpackage and activity	Earliest start date	Latest completion date	Outputs (clearly indicate deliverables & reports in bold)	Milestone	Responsibility
<p><b>WORKPACKAGE 5: Integration with AQriteltem Item Authoring (Kingston) and MiniBix, Item Banking (Cambridge)</b></p> <p><u>Objective:</u> This work package will integrate with the other projects in this call: AQriteltem Item Authoring (Kingston) and MiniBix, Item Banking (Cambridge).</p>	Oct 2007	Mar 2008			
17. Joint design framework fro integration	Oct 2007	Nov 2008	design on project website		Research Fellow
18. Jointly develop framework	Oct 2007	Nov 2008	Feedback on project website		Research Fellow
19. Joint testing of the framework	Oct 2007	Nov 2008	Feedback on project website		Research Fellow
20. Write Joint report	Oct 2007	Mar 2008	<b>Deliverable 8: Demonstrator of all three projects working together.</b>		Project manger
<p><b>WORKPACKAGE 6: Evaluation</b></p> <p><u>Objective:</u> This work package will involve detailed coordination and planning with the other projects: AQriteltem Item Authoring (Kingston) and MiniBix, Item Banking (Cambridge).</p>	Dec 2007	Mar 2008			
21. Steering group will provide the detailed statement of activities and actions for evaluation,	Dec 2007	Dec 2008	Feedback on project website		Project manger
22. community "Show and Tell"	Dec 2007	Mar 2008	Feedback on project website		Project manger
23. evaluation of the three projects working together	Dec 2007	Mar 2008	Feedback on project website		Project manger
24. Write joint evaluation report	Dec 2007	Mar 2008	<b>Deliverable 9: Evaluation of the assessment delivery engine, and on the processes and practices involved in all three projects working together.</b>		Project manger