

# JISC DEVELOPMENT PROGRAMMES

## Project Document Cover Sheet

### PROJECT PLAN

#### Project

<b>Project Acronym</b>	AquRate	<b>Project ID</b>	
<b>Project Title</b>	A QTI Authoring Tool		
<b>Start Date</b>	01 March 2007	<b>End Date</b>	31 March 2007
<b>Lead Institution</b>	Kingston University		
<b>Project Director</b>			
<b>Project Manager &amp; contact details</b>	Graham Alsop Learning Technology Research Group Faculty of Computing, Information Systems and mathematics Kingston University Penrhyn Road Kingston upon Thames SURREY KT1 2EE		
<b>Partner Institutions</b>	Centre for Applied Research in Educational Technologies (CARET), University of Cambridge		
<b>Project Web URL</b>	aquarate.kingston.ac.uk		
<b>Programme Name (and number)</b>	<i>JISC Capital Programme 2007 e-Assessment Projects</i>		
<b>Programme Manager</b>	Myles Danson [m.danson@jisc.ac.uk]		

#### Document

<b>Document Title</b>	Project Plan		
<b>Reporting Period</b>			
<b>Author(s) &amp; project role</b>	Graham Alsop (Project manager)		
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#### Document History

Version	Date	Comments
1	28/04/07	Draft of Project Plan
1.1	01/05/07	Proof read and amendments made.
1.2	08/05/07	Filename and email addresses corrected. Job Titles updated. Phase 1 and 2 timings altered to fit with AsDel and Minibix. As a result work packages and GANTT chart changed.





## AQuRate Project Plan

### Overview of Project

#### 1. Background

The AQuRate project will develop an open source, standards compliant and platform-independent tool to enable the authoring of question items conforming to the current IMS QTI 2 Specification.

FREMA (University of Southampton – JISC project) identified the processes used by eAssessment and these can be broadly mapped on to the three components corresponding to the ITT in Circular 4/06: Authoring; Item Banking; and Delivery. This project is based upon these components and will be working closely with their related projects: Minibix and AsDel.

In both the software requirements and specifications phase, and the initial phase of development and testing, consideration will be given to the evaluation of the system against recent JISC Projects in the eAssessment Domain:

- R2Q2, QTIttools (distribution point for JAssess, PyAssess and Migration tool) APIS rendering services for viewing and testing QTI questions
- Utilising the PyAssess and QTITools toolkit for QTI Specification testing
- Utilising SPAID for item banking and packaging
- Utilising TOIA / E3AN for pre-existing QTI content and item banking
- Utilising TOIA for assessment delivery and item exchange
- Supporting the RQP protocol for communicating with other QTI assessment services

#### 2. Aims and Objectives

The aim of the project is to produce a desktop-based system that enables the production of QTI Items that represent as wide a range of QTI 2.1 question types as possible within the project timescale. The system will follow an open source development model and be designed to work on a wide a range of software platforms. In addition the system architecture will allow the core functionality of the software to be extensible – to, either, other user environments and interfaces or to developers who wish extend the system capabilities.

The core functionality of the system will be to:

- Create new QTI 2.1 items
- Edit existing QTI 2.1 items
- Import and Export QTI 2.1 items (from / to other pre-existing systems)
- Package QTI 2.1 Items as IMS Content Packages that are SCORM 2004 compliant
- Use external web services for testing the rendering and response of questions using one or more of Assessment Delivery, Assessment Rendering and QTI validation systems
- Use external web services for depositing and retrieving questions from Item Banks
- Dual layer architecture separating the presentation and core logic components of the system (for extensibility)

The system will be designed with the following aims in mind:

- Offline creation of assessments
- Offline rendering of assessments
- Production of new system interfaces e.g. plug-ins, web services, server pages
- Extension and Development of new System Capabilities e.g. extra question types, use of items with sequenced content, support for custom interactions

### 3. Overall Approach

The project will produce a desktop-based user friendly QTI authoring environment as an alternative to commercial eAssessment software. The project will aspire to support of all QTI 2.1 question types but the focus will be upon the production of a distributable application that provides users with an easy way of creating and editing a core set of the more commonly used question types. Since there is little familiarity with the QTIV2 system among potential users the project will provide authors with guidance as to the potential use of the QTIV2 interaction types by linking the tools provided with the QTITools project which is itself an outcome of previous JISC-supported projects.<sup>1</sup>

This project will work with the other funded initiatives in this call:

- the Item Banking - Minibix (Cambridge University); and
- Delivery of eAssessment items - AsDel (Southampton University)

There will be a shared Advisory Group for these three projects.

The first Phase of development and testing can be informed by the Advisory Group, pre-existing QTI standards and systems and the user requirements of an internal client (as a question author and assessment practitioner). The second Phase will then integrate with the outputs of the other projects and can be tested for interoperability with the community of JISC tools and systems that contribute to the e-Assessment domain. The details of the two project Phases are outlined in the following two sections.

#### 3.1 Phases

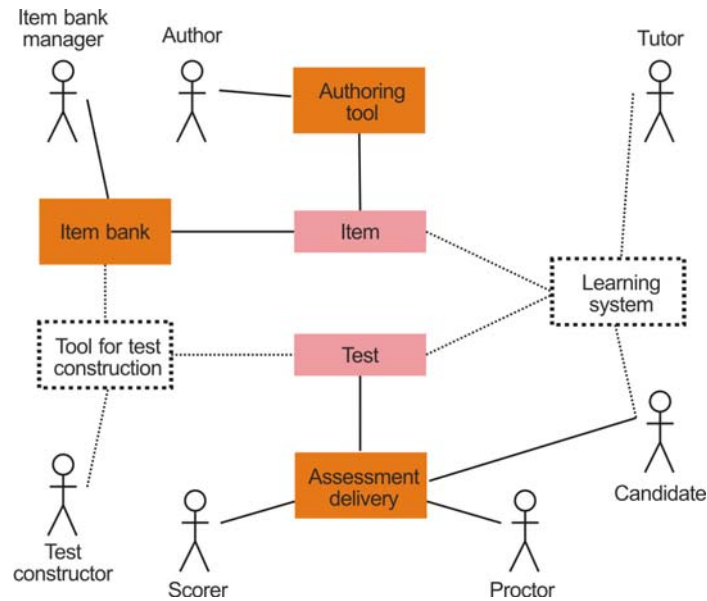
The project is divided into two phases that are approximately each six months in duration. Phase 1 (Development Phase) is the development of the core desktop author. Phase 2 (Testing and Integration Phase) is the system testing with the outputs of the Item Banking and Assessment Delivery projects.

The key milestones in Phase 1 are: the setting up of the internal AQuRate project team including system developers; the setting up of the Projects Advisory Group in conjunction with the other successful projects in this call; the production of the first version of AQuRate for presentation at a, targetted 'Show and Tell Event' (such as an Assessment SIG) with the other project teams. Phase 1 is primarily about technical development, although the development methodology dictates that user testing will go on throughout this phase. The details of the technical component of Phase 2 that relates to the development of the QTI Authoring tool is outlined in section later.

A strategy for Phase 2 Integration was discussed with the AsDel and Minibix Projects. This was based upon the Use Case from the QTIV2 specification and would it could therefore be applicable irrespective upon which bids are actually successful.

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<sup>1</sup> The JISC-supported PyAssess project has been extended by the Jassess QTIV2 demonstration and XML testing systems. These three aspects have been combined by Steve Lay and Graham Smith into the QTITools project. All the code of these projects is open-source.



**Figure 1: Phase Two -- Integration of the successful bids from the assignment domain**

Figure 1 shows a modified diagram of the Use Case, demonstrating how the different tools and system in this ITT related together. It clearly shows where the dominant boundaries between the delivery system, authoring tool, and item banking lay. 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, but formats and stores the items in an interoperable standard such as QTIv2. By using QTIv2, allows these items to be stored and exchanged with other compliant systems, not developed by the same vendor.
2. Users can select items from the questing 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 out put the test in a QTIv2 compliant format.
3. By having the Test and Item in the way specified by 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 leaning environment to direct to their internet browser.
4. The candidate can now take the test, and the results will be reported in a consistent manner.

## 4. Project Outputs

*Please see Appendix B for details contained in workpackage descriptions.*

## 5. Project Outcomes

- Software available under GPL license, freely available to HEFCE institutions and conforming to the JISC e-Learning framework.
- Desktop editing tool being complemented by the outcomes of the other two related projects: AsDel and Minibix. This will begin the offering of a suit of tools to support the creation, editing and deployment of tests using QTI ver 2.
- The practical use of a Question creator and editor in a real educational environment by staff and subject to evaluation.
- Dissemination of understanding gained through the project both internally in Kingston University and externally to JISC and the wider academic community

It is hoped that these outcomes will have impacts both within Kingston University and in the wider community:

- That the deliverable software will be adopted by teaching staff.
- That the results and experience of the project will have an impact on the relevant JISC and CETIS Special Interest Groups and will stimulate further collaboration and cross-fertilisation with other projects in this area.
- That the collaboration between project parties continues beyond the timespan of the project.

## 6. Stakeholder Analysis

Stakeholder	Interest / stake	Importance
JISC	high	high
Partners and collaborators	high	high
Educators (academics, teachers, para-academics (librarians etc.))	high	High
Central computing support departments	low	medium
Students	high	high
Faculty of Computing, Information Systems and Mathematics	medium	
Learning Technology Specialists (e.g. ALT, Assessment SIGS etc.)	medium	high

## 7. Risk Analysis

Risk	Prob'y (1-5)	Sev'ty (1-5)	Score (P x S)	Action to Prevent / Manage Risk
Staffing (Staff leaving because of short-term research contracts).	2	4	8	Where possible allocate existing university research staff and extend employment time beyond the due date of key project deliverables.
Organisational (Keeping to timescale and meeting milestones)	2	3	6	Project advisory group to meet with the project team once a month.
Technical (technical problems with the institutional infrastructure which inhibits development)	1	5	5	Involve a representative from central computing on the project advisory group. Agree modus operandi before commencement of the project.
Incompatible / untimely outputs from toolkit developers	2	4	8	Split workpackages into components that are not critically dependent on external outputs. Acquire source code so that resources can be re-allocated and modifications can be made in-house if required
Legal complications	1	3		University Solicitor to draw up contracts with any sub-contractors or suppliers.

## 8. Standards

Name of standard or specification	Version	Notes
IMS QTI	2.0	Open standard for Questions and Testing
IMS Content Packaging	1.1	Open standard for packaging of Educational Content
IMS Simple Sequencing	1.0	Open standard for navigating through Educational Content
SCORM	2004	Open standard for sharable content
CVS	2.0	Software version control

## 9. Technical Development

### 9.1 Technical Approach

QTI 2.1 is an extensive and sophisticated specification that allows the creation of diverse and complex question items. The development plan for a QTI authoring tool will need to analyse and prioritise the components of the specification in order to provide maximum benefit for the community, and provide the complementary projects with the tangible results at a sufficiently early stage to allow successful integration and joint demonstrations. Below, three main aspects are identified for prioritised development, along with some further considerations, which follow.

### 9.2. Application Environment

The terms of reference state that a desktop application is required. This will be able to be deployed on a range of platforms (of hardware and operating systems). The application could be stand-alone and create/save as content package without reference to an outside service, but since it will need to interact with remote item banks; and possibly also a rendering and processing facility a non-stand-alone option will additionally be considered. This interaction will use standard protocols such as Web Services, and the standard will use the API developed and published by the Item Banking project for adding new items (and editing and updating existing items).

Nevertheless, in Phase 1, a stand-alone application will be developed, interfacing with local repository of content-packaged items. This interface will be designed with consideration to the development (in Phase 2) of a web-service interface for remote item banks.

The terms of reference also state that the design of the Desktop Application should support extensibility, to e.g. allow an authoring component to be 'plugged in' to the 'Eclipse' integrated development environment. The requirement for extensibility suggests that an 'authoring API' should be identified and abstracted from the Desktop Application, to be used in (as yet undetermined) extended environments such as an Eclipse plug-in, an authoring web-service or possibly Server Pages to allow a Web-Based Authoring tool. This architecture is illustrated in Figure 2.

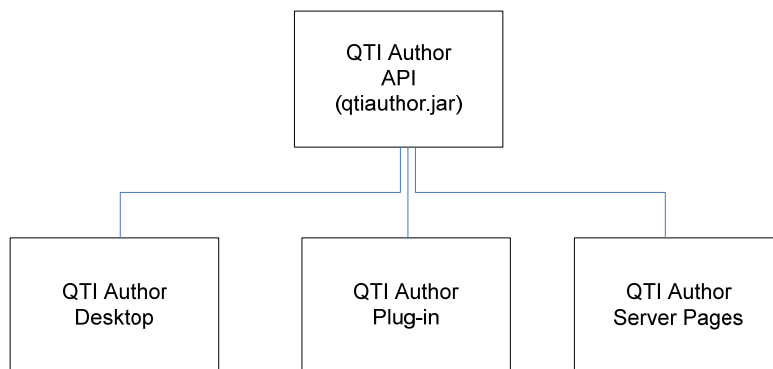


Figure 2: An Authoring API would allow extensibility in addition to a standard Desktop Application.

### 9.3 Question Types

There are a total of 21 Question Types in the QTI 2.1 standard. It is proposed to divide this set into first and second priority, for implementation in the authoring tool. The first ('core') subset will be implemented in the first phase of development. This will allow a reasonable diversity of question types to be supported by the authoring tool by the start of Phase 2, but also allow Phase 1 development time to be spent on other aspects of the specification such as Shared Material and Composite Items. The proposed division into first and second priority types is shown in Table I, although this may be subject to change after consultation with the relevant stakeholders.

<i>Phase 1 (core set)</i>	<i>Phase 2 (extended set)</i>	
<i>Choice</i>	<i>Match</i>	<i>Graphic Gap Match</i>
<i>Order</i>	<i>Simple Associable Choice</i>	<i>Position Object</i>
<i>Associate</i>	<i>Gap Match</i>	<i>Media</i>
<i>Inline Choice</i>	<i>Extended Text</i>	<i>Drawing</i>
<i>Text Entry</i>	<i>Hot Text</i>	<i>Upload</i>
<i>Hotspot</i>	<i>Select Point</i>	<i>Custom00</i>
<i>Graphic Order</i>	<i>Graphic Associate</i>	
<i>Slider</i>		

Table I: Showing proposed prioritised development of the QTI 2.1 Question Types.

The conjunction of the three aspects of development discussed above (application environment, item bank location and types of question) is illustrated in Figure 3. Further aspects, not shown in the diagram, include: capacity for shared material and composite items (a Phase 1 activity); and MathML, templates and adaptive items (a Phase 2 activity). Phase 1 will provide a Desktop application with a local item bank supporting core question types. Phase 2 will extend the application environment, location of item bank and range of question types, through collaboration with the Item Banking and Assessment Delivery projects. There are several further issues about the specification of the authoring tool, which are discussed below.

**9.4 Further Technical Considerations**

The QTI 2.1 specification makes reference to several further features. A fully compliant Authoring tool would need to support them all. Some remarks on a provisional prioritisation are bulleted below:

- Shared Material and Composite Items. These features allow multiple items to refer to the same material (such as a figure or text fragment); and for an item to have multiple components of interaction. These are considered to be popular and important features, and at least one will be included in the Phase 1 development. Another reason for early adoption of this feature is that the inclusion of shared material informs the requirements for the data model architecture, which can then be designed accordingly.

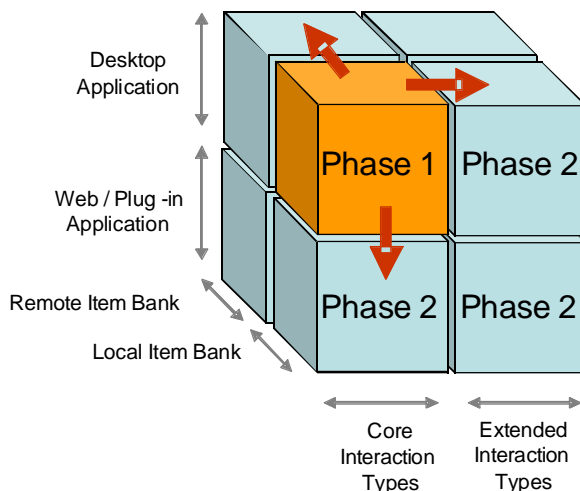


Figure 3: Diagram showing three aspects of the prioritised development. Phase 1 will address core components of all required aspects; Phase 2 will extend development in each dimension.

- Item Templates; Adaptive Items. These features are considered to be more easily incorporated at the Phase 2 development stage.
- Usage and other Meta-Data. The IEEE Learning Object Metadata can be used to describe the item: with General, Lifecycle, Metadata, Technical, Educational, Rights, Annotation and Classification categories. The authoring tool will provide the means to set these fields on a global and per-item basis. However, the Usage Data is considered to be outside the scope of the item authoring application, since they are generated by another means and are scenario-specific.
- The application development will be in Java, thus providing a convenient software development platform for interface with existing work (such as R2Q2) and the deployment of multi-platform applications.

## **10. Intellectual Property Rights**

*These are dealt with in the consortium agreement made between the 3 related projects under the call (an unsigned copy is included in Appendix C).*

## ***Project Resources***

### **11. Project Partners**

Centre for Applied Research in Educational Technologies (CARET), University of Cambridge.  
Related projects: AsDel and Minibix. An agreement is being made between all three projects

### **12. Project Management**

An iterative approach will be taken using the Dynamic Systems Development Method ([www.DSDM.org](http://www.DSDM.org)) to ensure management, user and stakeholder involvement and the delivery of work on time. MoSCoW rules will provide the basis on which decisions are made over the entire project, and during any Timebox. This complements the Action Research approach being used in workpackage 4.

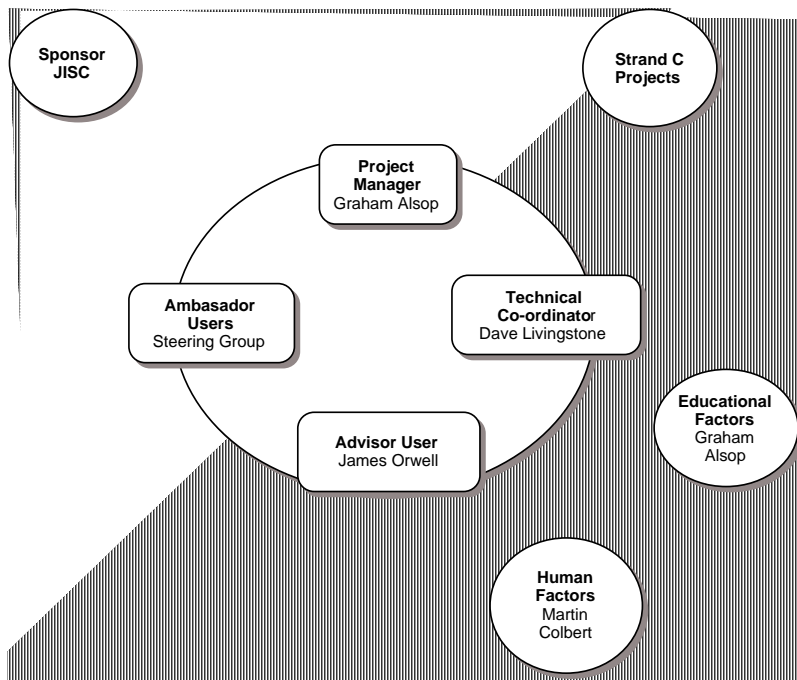


Figure 4: Depiction of Management stakeholders.

The principle researchers will be taking on the Project Management and Technical co-ordination roles. Meetings in workpackage (WP) 6 will enable Sponsor, Ambassador Users and Stakeholders in related projects to input. WP 2 and 4 allow for Advisor and Specialist input. Timeboxes will encompass deliverables that overlap packages, but packages will form the basis of progress reports. WP 6, Phase 1 events will effectively be high level facilitated workshops to ensure Phase 2 compatibility is maintained.

Brief weekly meetings take place among the project team.

There is a weekly time slot for the Project managers from AQuRate, Minibix and AsDel to tele-conference.

Decisions are primarily made on the basis of consensus agreement.

#### Project Team, Roles and Contact Details

Name	Role	Email	Telephone
Graham Alsop	Project Manager	g.alsop@kingston.ac.uk	02085477889
James Annesley	Research Associate	j.a.annesley@kingston.ac.uk	02085472000
Alicia Campos	Assistant Researcher	a.campos@kingston.ac.uk	02085472000
Martin Colbert	Human Factors	m.colbert@kingston.ac.uk	0208547200 x62955
Dave Livingstone	Technical Manager	d.livingstone@kingston.ac.uk	0208547200 x62655
James Orwell	Advisor User	james@kingston.ac.uk	02085477858

### 13. Programme Support

We request that JISC consider some ongoing dissemination about the potential of the projects funded under this call. There is a need to move the community along with the development of these tools to ensure their use.

### 14. Budget

See Appendix A.

## Detailed Project Planning

### 15. Workpackages

See Appendix B.

### 16. Evaluation Plan

This is presented in work package 4 (see appendix). It is summarised here.

Timing	Factor to Evaluate	Questions to Address	Method(s)	Measure of Success
Phase 1	Usability		observation	CIF used
Phase 1	Educational use of existing solutions	To be decided with participants/co-researchers	Action Research	Identification of issues for design of new tool
Phase 1	Educational use of existing solutions	Examination of the differences in use	Phenomenography	Identification of differences in use that need to be considered
Phase 2	Educational use of new solution	To be decided with participants/co-researchers	Action Research	Confirmation of issues identified during previous evaluation have been designed for

N.B. Through the use of DSDM there will be a continuing input from users.

### 17. Quality Plan

Output					
Timing	Quality criteria	QA method(s)	Evidence of compliance	Quality responsibilities	Quality tools (if applicable)
End of Phase 1	Check validity of output for core questions	Validate against QTI 2.1 schema	Compliance tables published on web site	Technical manager	Xml spy validation function
End of Phase 1	Check semantic consistency for authoring of core question	Usability expert walk-through	In a timebox report	Human factors expert	N/A
End of Phase 2	Check validity of output for extended questions	Validate against QTI 2.1 schema	Compliance tables published on web site	Technical manager	Xml spy validation function
End of Phase 2	Check semantic consistency for authoring of extended question	Usability expert walk-through	In a timebox report	Human factors expert	N/A
During Phase 2	Conform to the specification of client behaviour for Minibix web	Unit testing against web service specification	In a timebox report	Technical manager	Prototype Minibix implementation (if available)

	service			
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## 18. Dissemination Plan

Timing	Dissemination Activity	Audience	Purpose	Key Message
April 2007	Production and Maintenance of CVS	Project developers and associates	Documentation and code tracking and exchange	Security, integrity and transparency
May 2007	Production and Maintenance of Website	Wider community, stakeholders and other interested parties	Information, publicity and feedback	Commitment and engagement
September 2007	Phase 1 Report	JISC	Progress and audit	Validation
April 2008	Final Report	JISC, wider community and stakeholders	Completion and audit	Validation
tba	Dissemination Event	Stakeholders and local institution	Dissemination of technology and pedagogy	Engagement and proliferation
tba	Conference Paper	Wider Community	Dissemination of ideas and pedagogy	Research and publication

## 19. Exit and Sustainability Plans

Project Outputs	Action for Take-up & Embedding	Action for Exit
Project Documentation	Regular maintenance during project lifetime	Reports lodged with JISC
JISC Website	Regular maintenance during project lifetime	Finalised and lodged with JISC
Desktop editor	Source code and application available as open source, versions available as the project develops	Lodged with SourceForge and further development contingent on community uptake and/or further funding
Consortium archive	Regular maintenance during project lifetime	Project documentation hosted at University of Southampton for 3 years after project end.
Source code repository	Regular maintenance during project lifetime	Source code hosted at University of Cambridge for 3 years after project end.
Research Papers	Presented at Conferences and Published in Journals	Published after project end.

Project Outputs	Why Sustainable	Scenarios for Taking Forward	Issues to Address
Desktop editor	Ongoing uptake by community	Publicity and encouragement to be involved during project	Involvement during project

**Appendixes**

**Appendix A. Project Budget**

	"March 07"	"April 07-March 08"	Total
<b>Non-Staff</b>			
Travel and Expenses	600	600	1200
Hardware/Software	2000	0	2000
Dissemination	0	600	600
Evaluation	0	1500	1500
<b>Total Directly Incurred Non-Staff (B)</b>	<b>2600</b>	<b>2700</b>	<b>5300</b>
<b>Directly Incurred Total (A+B=C)</b>	<b>7277</b>	<b>59509</b>	<b>66786</b>
<b>Directly Allocated Staff</b>			
Estates	1592	17508	19100
Other	0	0	0
<b>Directly Allocated Total (D)</b>	<b>4142</b>	<b>45560</b>	<b>49,702</b>
<b>Indirect Costs</b>			
Indirect Costs (University)	6024	66268	72293
Indexation	0	2355	2355
<b>Total Indirect Costs (E)</b>	<b>6024</b>	<b>68623</b>	<b>74647</b>
<b>Total Project Cost (C+D+E)</b>	<b>17443</b>	<b>173692</b>	<b>191135</b>
<b>Amount Requested From JISC</b>	<b>9827</b>	<b>89916</b>	<b>99743</b>
<b>Institutional Contributions</b>	<b>7616</b>	<b>83776</b>	<b>91392</b>
<b>Percentage Contributions Over Life of Project</b>	<b>JISC</b>	<b>Partners</b>	<b>Total</b>
	52	48	100

## Appendix B. Workpackages



<b>WORKPACKAGES</b>	<b>Month</b>	<b>Mar 07</b>	<b>Apr 07</b>	<b>May 07</b>	<b>Jun 07</b>	<b>Jul 07</b>	<b>Aug 07</b>	<b>Sep 07</b>	<b>Oct 07</b>	<b>Nov 07</b>	<b>Dec 07</b>	<b>Jan 08</b>	<b>Feb 08</b>	<b>Mar 08</b>
	Phase	1	1	1	1	1	1	2	2	2	2	2	2	
<b>1: Project Management and Reporting</b>	All													
<b>2: Software Requirements and Specification</b>	1 + 2													
<b>3: Software Development</b>	1													
<b>4: Usability and Testing</b>	1 + 2													
<b>5: Software Integration</b>	2													
<b>6: JISC Programme Activities</b>	1 + 2													

Project start date: 01-03-2007

Project completion date: 31-03-2008

Duration: [13] months

Workpackage and activity	Earliest start date	Latest completion date	Outputs (clearly indicate deliverables & reports in bold)	Milestone	Responsibility
<b>YEAR 1</b>					
<b>WORKPACKAGE 1:</b> <b>Project Management and Reporting.</b> <u>Objective:</u>	1/3/07	31/3/08	<b>JISC Project Plan, Project Website, Project Infrastructure Complete, JISC Progress Report, JISC Final Report</b>		GA
1. Project Initiation: Resource and Internal Staff Allocation	1/3/07	1/5/07	This will encompass essential tasks including: the purchase of equipment, allocation of staffing, management of staff, liaison with related projects (and JISC, CETIS etc.), budget administration, organisation of meetings, production of project reports and maintenance of the project plan. The project size does not merit the management of a advisory group, but as mentioned it is envisaged that a shared advisory group across the three assessment projects would be sustainable and be able to provide advice and guidance throughout the life of the project.		GA/DL
2. Collaboration with JISC and Associated Projects	1/3/07	31/3/08			GA
3. Project Plan and Documentation	1/3/07	1/5/07			GA
4. Project Progress Report	1/7/07	1/10/07		<b>3</b>	GA
5. Project Final Report1	28/2/08	31/3/08		<b>3</b>	GA
<b>WORKPACKAGE 2:</b> <b>Software Requirements and Specification</b> <u>Objective:</u>	1/3/07	28/2/08	<b>System Requirements and Design: Use Case Scenarios, Interfaces and System Diagrams</b>		DL

6. Interaction Design	1/4/07	1/6/07	Interaction design will carry forward the best of existing solutions by subjecting existing applications to artefact analysis and usability inspection. Models of the question authoring task will be developed through observation and represented as Hierarchical Task Analyses. General purpose styleguides for PC applications will ensure consistency and match user expectations. The User-Centred Requirements Specification will state the qualities of tutor interaction with AQuRate (notably efficiency, and satisfaction) in measurable terms, and with respect to the authoring of different types of question. The User Interface Specification will be in the form of paper prototype, that will show all primary and secondary windows, the graphical components of each window and the consequences of each user input action.		DL
7. Interoperability Specification: Assessment Components Interface Requirements	1/4/07	1/7/07			DL
8. Use Case Scenarios	1/4/07	1/6/07			DL
9. Application Design and Specification	1/4/07	1/7/07			DL
10. Software Integration Requirements and Refactor	1/9/07	28/2/08			DL
<b>WORKPACKAGE 3: Software Development.</b> <u>Objective:</u>	1/4/07	31/8/07	<b>Desktop QTI Author Software, Phase 1 Development Phase Complete, Extended QTI Author Software, System Source Code and Documentation</b>		DL
11. Desktop Author for Core QTI Question Types	1/4/07	31/8/07	Throughout the duration of the project QTI 2.x content will be developed to cover all types of QTI 2.x items that are supported by the QTI Author question and all supported marking services. QTI 2.x items will be derived from the QTI 1.x Migration tool and tested for compatibility with the QTI Author. The content will be tested for use in SCORM-2004 compliant IMS Content Packages. This will involve	3	DL
12. Extensible Author for Core QTI Question Types	1/11/07	1/1/08			DL
13. Incorporation of additional question types	1/11/07	1/1/08			DL

			the creation of QTI 2.x authoring system that allows the creation and editing of key QTI 2.0 question types either from scratch or by conversion from QTI1.x using the PyAssess QTI migration tool.	
<b>WORKPACKAGE 4:</b> <b>Testing</b> <u>Objective:</u>	1/8/07	1/3/08	<b>Usability Test Report and Redesign Recommendations,</b> <b>Field Demonstration Report and Recommendations,</b> <b>Test Report and Recommendations</b>	GA/MC
14. Usability Lab. Test of Author Tool	1/8/07	1/9/07	This workpackage will follow the Common Industry Format (CIF) Standard for conducting and reporting usability tests. The tests will occur in Kingston's Usability Laboratory, so that a complete audio and video record of interaction's with the tool can be made. To ensure consistency, conversations between the usability engineer and participant will be scripted. A time-stamped log of informative sequences of behaviour will be maintained and later analysed. To prioritise redesign, a representative sample of 9 users will participate. Test tasks will be devised using data gathered during WP 2.  During Phase 1, to complement the usability tests, an educational study will be undertaken of the existing solutions by taking an Action Research (AR) approach that will be complemented by a Phenomenographic (PG) study. The AR study will allow for the users to be co-researchers in the process. The PG work will allow for an analysis of the differences between their learning experiences to be	MC
15. Field Demonstration of Author Tool: Target User Event	1/9/07	1/10/07		MC
16. Round-trip Field Trial: Testing of Integrated System	1/1/08	1/3/08		MC
17. Educational Study	1/6/07	1/3/08		GA

			identified. In the first phase this will be by using existing packages with staff and students in the module team delivering and studying a level 1 2nd semester java programming module respectively. One outcome will be a set of questions that can be used in the pre-requisite for this module. The AR approach will then continue into Phase 2 where the use of the new tool will be studied. After this analysis of the authoring tool, an examination of the delivery and use by students using the questions written in Phase 1 in the pre-requisite module will take place.		
<b>WORKPACKAGE 5: Software Integration.</b> <u>Objective:</u>	1/9/07	1/3/08	<b>Integrated QTI Author Software, Authored QTI Items, Integration Test Report, Phase 2 Development Phase Complete</b>		DL/JO
18. Deposition of Authored Items into Item Bank	1/9/07	1/11/07	Phase Two: will integrate with the other projects in this ITT on Item Banking and Assessment Delivery. and this process will be guided by the Projects Advisory Group and a 'Show and Tell' Event that will occur at the end of Phase 1. Planning for this work will occur in workpackage 6. Some of the issues that will need to be discussed are the possible need for: An elementary Test Construction Tool; using a common code repository, common tools (e.g. xml parsing), and common test scenarios among the three projects.; and the evaluation of the Phase 2 integrated protoype/demonstrator.	3	
19. Rendering and Testing of Authored Items using R2Q2	1/9/07	1/1/08			
20. Web-based Authoring Interface (if appropriate)	1/1/08	1/3/08			

<b>WORKPACKAGE 6:</b> <b>JISC Programme Activities</b> <u>Objective:</u>	1/9/07	31/3/08	<b>JISC ‘Show and Tell Event’ Phase 1, Phase 1 Development Phase Complete , JISC ‘Show and Tell Event’ Phase 2</b>		GA
21. Phase 1 SIG ‘Show and Tell Event’ – including Project Advisory Group and Assessment Projects	1/9/07	1/10/07	Phase 1 will begin with a start up ‘event between the successful projects funded under this strand. This will take place at a central location and allow for the planning of a second meeting towards the end of the phase. This second meeting will comprise of a private strand meeting after a public showing of the outcomes to date. This will allow for input from the wider community to be taken into account in the work for Phase 2. There will then be one further strand meeting before project closure to enable loose ends to be tied off with a final show and tell event for the wider community. All of these meetings will allow input from the advisory group. Written outputs will include a final report, and there is a commitment to two research papers at this stage. A website of project documents will also be maintained.		
22. Phase 2 Open Access ‘Show and Tell Event’	1/2/08	31/3/08			
23. Publication of Project Outputs	1/8/07	31/3/08		<b>3</b>	

Members of Project Team:

GA=Graham Alsop  
MC=Martin Colbert  
DL=Dave Livingstone  
JO=James Orwell

## Appendix C. Consortium Agreement

# Agreement for Collaborative Research and Development:

## AsDel, MiniBix, AQuRate projects

THIS AGREEMENT is made the 21<sup>th</sup> day of February 2007 BETWEEN THE UNIVERSITY OF SOUTHAMPTON and THE UNIVERSITY OF CAMBRIDGE, and KINGSTON UNIVERSITY (hereinafter referred to individually as a “**Party**”, collectively or in groups as “the **Parties**”)

### INTRODUCTION

- A. In response to the JISC Circular 4/06 “JISC Capital Programme” the Parties to this Agreement have submitted successful proposals to the JISC to undertake a group of three projects in the area “Technical development projects to produce and test open source software tools implementing the QTI 2.1 specification, that deliver an Item Authoring Tool (Kingston: AQuRate), Item Bank Software (Cambridge, MiniBix), and Assessment Delivery Tool (Southampton, AsDel)”. The Parties are hereinafter collectively referred to as the **Consortium**.
- B. The Consortium intends to co-ordinate the work which is described in the bids submitted to the JISC (hereinafter referred to as the **Projects**).
- C. The Consortium aims to use the project outputs to provide open source software tools implementing the QTI 2.1 specification for Item Authoring, Item Banking, and Assessment Delivery under a common license. The tools are hereinafter referred to as “**Deliverables**”.
- D. This Agreement sets out the details of the relationship between the Parties.

## IT IS HEREBY AGREED AS FOLLOWS

### 1. *Purpose of the Consortium*

The purpose of the Consortium is to co-ordinate the Projects and the publication of the Deliverables as described.

### 2. *Commencement and duration*

The Consortium was formed with an effective date of 1st March 2007 and will terminate on 30th April 2008, unless otherwise agreed in writing by the Parties. These dates coincide with the start and end dates of the Projects.

### 3. *Over-riding conditions*

In all instances, conditions laid down by the JISC or its successor will override any agreement between the Consortium members.

### 4. *Consortium Management*

#### 4.1 Identification

The Parties agree that each will appoint a person to manage their project (“the **Project Manager**”) and that this person will act as the main point of contact with the **Consortium**. The Project Managers, the Principal Investigators of each Project, and such others as may be invited from time to time, will form the **Joint Management Committee** to co-ordinate the activities of the three projects.

The Consortium agrees to create an **Advisory Group**, to be convened by Dr Hugh Davis (University of Southampton). The Advisory Group will be made up of: the Principal Investigators of each Project; one of the Co-investigators of each Project as nominated by the relevant Principal Investigator; Dr Hugh Davis (convener) and other parties with an interest in the project outputs as agreed by the Joint Management Committee. The following people were identified in the project proposals and it is agreed that they will be offered places on the Advisory Group: Niall Sclater (Open University VLE Programme Manager); Myles Danson (CAA Manager, Loughborough); Steve Jeyes (University of Hull); Helen Ashton (Heriot Watt University); Mhairi McAlpine (SQA); Dick Bacon (University of Surrey and HEA consultant); and James Everett (Strathclyde).

#### 4.2 Responsibilities of the Joint Management Committee

The Joint Management Committee is responsible for co-ordinating the activities of the Projects and for the operational management, coordination, and communications of the Consortium. It will have responsibility for determining the technical standards to be adopted by the Projects, in particular agreeing the APIs and technical interfaces (including web-services). The Joint Management Committee will also provide a forum for agreeing the use of shared resources (including external consultants).

The Joint Management Committee will usually meet monthly either through face-to-face meetings or through the use of teleconferencing facilities. Additional meetings may be called by two or more Parties. The Joint Management Committee may choose to take advice from third parties as is required. Joint Management Committee meetings will operate under the following rules:

- the chairman of the Joint Management Committee is Steve Lay.
- Joint Management Committee members may nominate a representative to attend meetings on their behalf;
- decisions will be taken on the basis of consensus defined as the absence of sustained objection ;

### 4.3 Responsibilities of the Advisory Group

The Advisory Group will advise on the overall nature of the Projects and their strategic direction, provide feedback on progress and help formulate recommendations for future work beyond the project end dates.

The Advisory Group will meet three times during the life of the Projects with one meeting funded by each of the Parties from Project funds. The Advisory Group may choose to take advice from third Parties as is required. The Advisory Group may be requested to give advice to the Projects through email requests from the Joint Management Committee.

Advisory Group meetings will operate under the following rules:

- the convener of the Advisory Group is Hugh Davis.
- the convener will schedule all three meetings by the end of April 2007, with at least 14 days notice of the first meeting;

### 4.4 Responsibilities of the Parties

Each Party undertakes to use all reasonable endeavours to:

- share promptly and openly relevant plans, project documentation and progress information under appropriate creative commons licenses
- share software and source code throughout the life of the projects under the agreed open source license (see Annex 1)
- participate actively with other Parties where necessary;

### 4.5 Changes in Membership of the Consortium

Institutions may be invited to join the Consortium only by the unanimous decision of the Joint Management Committee and on the condition that the new institution becomes a Party to this Agreement. A Party may withdraw from the Consortium only in the event of irremediable breach of this Agreement or through premature termination of their project by the JISC and with the unanimous agreement of the remaining Parties.

## 5. Data Management

### 5.1 Data collection

Documents and files created or collected by the Parties in the course of the Consortium's work, including meeting papers of the Advisory Group and JMC, are to be sent to the AsDel Project Manager and stored in an archive at the School of Electronics and Computer Science, University of Southampton ("**the Consortium Archive**"). Each Party agrees to ensure that all data submitted to the Project Archive are accompanied by documentation detailing the origin of the data, together with any necessary consents.

CARET, University of Cambridge will provide a suitable repository for source code, including all code published under the terms of the agreed open source license detailed in Annex 1 ("**the Source Code Repository**"). Each Party agrees to submit source code developed during the Projects to the Source Code Repository incorporating a copy of the license terms in each source code file.

### 5.2 Data maintenance

The School of Electronics and Computer Science, University of Southampton hereby undertakes to maintain the Consortium Archive for the duration of the Consortium and for a period of at least 3 years after the end of the Projects. This period is subject to extension if the JMC so decides.

CARET, University of Cambridge hereby undertakes to maintain the Source Code Repository for the duration of the Consortium and for a period of at least 3 years after the end of the Projects. The period is subject to extension if the JMC so decides.

### 5.3 Confidentiality

Each Party hereby undertakes to the other Parties that it shall procure that its employees, agents and students shall:

- (a) keep confidential all information of a confidential nature (whether written or oral) concerning this Agreement and the business affairs of other Party that it shall have obtained or received as a result of the discussions leading up to or entering into or performance of this agreement (the "**Information**");
- (b) not without the prior written consent of the relevant other Party disclose the Information either in whole or in part to any other person save those of its employees, agents and students involved in the implementation or evaluation of the research who have a need to know the same for the performance of their duties;
- (c) use the Information solely in connection with the implementation of the Projects and not otherwise for its own benefit or the benefit of any third party.

These provisions (a), (b) and (c) above shall not apply to the whole or any part of the Information to the extent that it can be shown by the receiving Party to be:

- (i) known to the receiving Party prior to the date of this Agreement and not obtained directly or indirectly from any other Party; or
- (ii) obtained from a third party who lawfully possesses such Information which has not been obtained in breach of a duty of confidence owed to any Party by any person; or
- (iii) in the public domain in the form in which it is possessed by any other Party other than as a result of a breach of a duty of confidence owed to such other Party by any person; or
- (iv) required to be disclosed by legal process, law or regulatory authority.

Each Party hereby undertakes to the other Party to make all relevant employees, agents and students aware of the confidentiality of the Information and provisions of this clause 6 and without prejudice to the generality of the foregoing to ensure compliance by such employees, agents and students with the provisions of this clause 6.

## 6. *Intellectual Property*

### 6.1 Ownership

With regard to the ownership of intellectual property, the Parties agree as follows:

- all Materials not incorporated into a Deliverable shall be owned by the Party generating the Material.
- all Deliverables, and the Materials contained therein, shall be owned jointly by the contributing Parties.

### 6.2 Marking

The Parties agree that all Deliverables shall be clearly marked identifying that the copyright is owned by the contributing parties.. The Parties agree to use the **Open Source License** (provided as **Annex 1**) acknowledging the involvement of the Parties and the ownership of the copyright, and that this license shall appear on all copies of the Deliverables and Products.

## 7. *Publication and press releases*

Procedures for publications and press releases relating to the Consortium shall be agreed between the Parties through the Joint Management Committee.

## **8. Liability**

The work associated with the Projects will be carried out by each Party in accordance with the highest academic standards and reasonable endeavours will be made to achieve the degree of reliability and accuracy appropriate to work of this kind. However, no Party has control over the use to which the results of the work may be put by other Parties and each Party will therefore be deemed to have satisfied itself in every respect as to the suitability and fitness of the work for any particular purpose or application. In no circumstances will a Party, its servants or agents accept any liability however caused arising from any error or inaccuracy in any opinion, advice, report or Deliverable arising from this work nor for any resulting damage, loss expenses or claim, except to the extent that such can be shown to be caused by the wilful negligence of the Party.

## **9. Miscellaneous**

**Assignment:** No Party will be entitled to assign this Agreement nor all or any of their rights and obligations hereunder without the prior written consent of the others.

**Disputes/Arbitration:** All disputes or differences which will at any time hereafter arise between the Parties in respect of the construction or effect of this Agreement or the rights duties and liabilities of the Parties hereunder or any matter or event connected with or arising out of the Projects will be referred in the first instance to the Joint Management Committee. If the Joint Management Committee is unable to resolve the dispute it shall select an independent third party to act as arbitrator.

**Relationship:** Nothing in this Agreement will create or be deemed to create a partnership or the relationship of employer and employee between the Parties.

**Law & Jurisdiction:** This Agreement will be governed by the laws of England. This Agreement is subject to the exclusive jurisdiction of the English courts to which the Parties hereto submit. This clause does not prevent a Party from seeking interim relief in any court of competent jurisdiction.

## **AGREED BY THE PARTIES THROUGH THEIR AUTHORISED SIGNATORIES**

For and on behalf of the University of Southampton:

Signed.....

Dated .....

Name: .....

For and on behalf of the University of Cambridge

Signed.....

Dated .....

Name: .....

For and on behalf of Kingston University

Signed.....

Dated .....

Name: .....

## Annex 1

### **Open Source License**

Copyright (c) <Year>, <Name of Institution>.

All rights reserved.

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