eCert Project Plan Cover Sheet

Project Information			
Project Acronym	eCert		
Project Title	A framework of a secure e-qualification certificate system		
Start Date	4th January 2010	**End Date**	17th December 2010
Lead Institution	University of Southampton		
Project Director	Dr. David Argles		
Project Manager & contact details	Lisha Chen-Wilson Address: LSL, ECS, University of Southampton, SO17 1BJ Email: lcw07r@ecs.soton.ac.uk Tel: 023 8059 5749 Fax: 023 8059 3218		
Partner Institutions			
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Programme Name (and number)	Access and Identity Management IDINN001		
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eCert Project Plan

Overview of Project

1. Background

Portfolios have been in use in education in the UK for a number of years, particularly for the teenage sector of the population. They provide a useful way for these young learners to document their academic achievements, along with other achievements which could be of interest to potential employers. Recently, the development of a personal ePortfolio system has been encouraged, with the intention that such a system should ultimately replace the current paper-based system.

ePortfolios offer a number of advantages.
• They allow for the inclusion of a rich set of source materials
• They can be more easily accessible remotely
• They can be accessed more rapidly
• They aid learner feedback
• They encourage learner reflection
• They encourage learner involvement in developing a personal development plan
• They can be updated and shared more quickly
• They offer the potential for third party verification of qualifications

Whilst such an approach is good for the younger learner group, it can also be of enormous help to lifelong and distance learners with frequent minor portfolio updates encouraging such learners to persevere.

Abrami[1] notes that it is difficult to authenticate the evidence in e-Portfolio. The study of how we can engender trust in our on-line versions of certificates/qualification records, and making sure that our sensitive data are not being misused, is still at an early stage. Currently, there are methods, projects, and commercial systems present in the related domain, such as digital signatures, eCert[2], and Europass[3]. However, in each case, they provide limited functionality, and therefore are insufficient to satisfy our requirements.

In order to solve these problems, it is necessary to implement an electronic version of qualification certificates (e-Certificate). Research at the Learning Societies Lab at the University of Southampton has noted that potential security loopholes exist in the validation of paper qualifications, and that an e-Certificate system offers the possibility to improve security in this area. This project will based on its previous work and ongoing to explore possible mechanisms for transferable e-Certificates in a user-centric context.

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1 Abrami, P.C. & Barrett, H. *Directions for Research and Development on Electronic Portfolios.* Learning and Technology, 2005. 31(3)

2 Chen-Wilson, L et al, *Secure Certification for ePortfolios*, in ICALT: International Conference on Advanced Learning Technologies, 2008. IEEE: Santander, Spain

3 European Communities. *Opening Doors to Learning and Working in Europe.* Available from http://europass.cedefop.europa.eu/europass/home/hornav/Introduction.csp

2. Aims and Objectives

The aim of the project is to implement an electronic version of a Qualification Certificates System, which will overcome the authorization problems that we are facing in ePortfolios. This eCertificate system will be at least as valid as the paper-based certificates, and will be usable either as a standalone application or fitted within other applications, such as e-Portfolios. It will be easy to use and suit all levels of students while including high security methods to prevent forgery. The students will have control over the usage of such e-Certificates, and a verification method will be provided. We need to secure the e-Certificate system, not just the e-Certificate.

3. Overall Approach

This project will progress through four phases. It will begin by working with representatives of the community to establish suitable use case scenarios. This design will be verified in the second and third phases by building a demonstrator, and then testing the demonstrator within the group. The results of this investigation will then be published and disseminated through the usual routes within the JISC community and elsewhere.

The project will seek to solve the problem by particularly focusing on issues identified via the HE enrolment process, although the solution should be prove to be generic.

The test-bed demonstrator will facilitate the trialling of approaches and the clarification of the issues at stake in such a system, thus enabling the development of policy in this area. It will take the form of an interoperable web service which is based on a code library. This will enable others to build a variety of eCertificate services and applications based on this code library, which will be placed in the public domain.

4. Project Outputs

Deliverable 1: Problem analysis, use case scenarios, requirements analysis and specifications made available on project website.
Deliverable 2: Design document made available on project website.
Deliverable 3: The demonstrator interface
Deliverable 4: The code library.
Deliverable 5: The eCertificate demonstrator
Deliverable 6: Record of experimental results
Deliverable 7: Reflective report
Deliverable 8: System documentation

5. Project Outcomes

The primary focus of this project is the exploration of mechanisms that allow the student to maintain control of their award certificates whilst moving from a paper-based system to an online version, with a view to establishing suitable policy. With the focus being on the HE enrolment process, it is expected that such an investigation will be of considerable interest to the entire HE community, and to be of similar interest to FE, since similar problems exist there also.

This project meets the identified need of authenticating transferable certificates. The lack of currently established authentication methods is impeding the progression of an integrated system, with the danger that sub-optimal approaches could be taken in the interim, making it harder to unravel such implicit structures in the future. Recommendations on policy and process from this bid will shape the direction new technology takes.

Since the project will require the development of a demonstrator to achieve its aims of investigating the core issues, this demonstrator will be implemented as a Service Orientated implementation, using

open standards for maximum interoperability. This will allow our demonstrator – or the code library- to be utilised by future JISC e-Framework projects if that proves to be appropriate.

6. Stakeholder Analysis

Stakeholder	Interest / stake	Importance
University of Nottingham	ePortfolios and eFramework	High
EdExcel	Certificate related issues	High
HE	Use cases	High
wider community	Case studies and evaluation	Medium

7. Risk Analysis

Risk	Probability (1-5)	Severity (1-5)	Score (P x S)	Action to Prevent/Manage Risk
Imperfect stakeholder or developer understanding, or disagreement between stakeholders and/or developers, during design and development.	3	4	12	Participatory- and Co-design are well understood concepts in the design of effective user system, aiming to breakdown the communication barriers between developers and users. Experts do not always agree, so the PI will make a final choice
Under-performance of policy or technical team (either in terms of quality or schedule), or drop out of allocated investigators.	2	5	10	The team understands the current JISC agenda and direction. There are a number of reviews planned and where work is not completed satisfactorily other staff can be employed to pick the work up and resources redistributed.
Requirements volatility and excessive changes in project objectives	2	5	10	Project management meetings throughout the project will ensure no inadvertent moves away from the plan agreed. Intended changes arising from lessons learnt as the project progresses will be discussed and confirmed at the review meetings
Resulting policy, or demonstrator & services, are inappropriate for the wider audience, or are based on incorrect assumptions.	3	3	9	Participatory design is a well understood concept in the design of effective user systems and will be used with those involved. This will ensure that what is developed and decided upon will meet the intended needs.
Estimates of budget and schedule, expectations, or constraints unrealistic	2	4	8	The investigators and the institution enjoy considerable experience of successful bidding for JISC grants and running JISC projects. Every effort has been spent in using this expertise to check the budget for realistic costs
Personnel lack adequate experience, competence, or	2	4	8	By ensuring that project knowledge and rationale is shared and

show low morale				captured within the project (meetings, blogs, etc) the effect of a person leaving the project will not bring it to a complete stop. It may take time to replace that person but should not stop the project delivering on time.
Gold plating', inadvisable, unnecessary implementation features	2	4	8	The purpose of participatory design and traditional design reviews are set up for this purpose; to detect and stop unnecessary work.
Community engagement programme activities receive poor ratings from attendees.	2	4	8	Review of ratings and attendee comments by Support project to address issues. Escalate to JISC if necessary.

8. Standards

Name of standard or specification	Version	Notes
'Web 2.0'		This is the main technology used to enhance creativity, secure information sharing, collaboration and functionality of the web.
WAI		The Web Accessibility Initiative This is the main stand used to make the Web accessible to people with disabilities and is available at http://www.w3.org/WAI/gettingstarted/Overview.html
OAI		The Open Archives Initiative This is the interoperability standard used to facilitate the efficient dissemination of content and is available at http://www.openarchives.org/
WAI		The Web Accessibility Initiative This is the main stand used to make the Web accessible to people with disabilities and is available at http://www.w3.org/WAI/gettingstarted/Overview.html
Simple Object Access Protocol (SOAP)	1.2	This is the protocol used to communicate between Web services and is available from the W3C at http://www.w3.org/TR/soap/
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 http://www.w3.org/TR/wsdl

9. Technical Development

The technological level involves identifying the key issues in establishing a suitable mechanism for the inclusion of eCertificates within the ePortfolio structure by building a demonstrator. This involves a relatively conventional 'analyse, design, prototype, evaluate' methodology, involving the end user from the start as we have used and developed over a number of JISC projects (mPLAT, Peer Pigeon, Faroes), namely through co-design, agile development, and co-deployment.

This is an exploratory project, however issues such as institutional transformation as identified in the JISC22 'Innovating e-Learning' online conference, in particular engagement with senior management, using champions and involving students, will be addressed wherever appropriate.

10. Intellectual Property Rights

While the code will be made available under an appropriate open source agreement as used within any educational establishment and in line with JISC's requirements, the IPR will also remain with the University of Southampton thereby allowing Southampton to further exploit the IP.

Sustainability of the code produced is through ensuring other universities and JISC projects have access to the code and documentation for the system, through LGPLM or GPL licences (the code being published in Source Forge). Quality factors built in to the work packages will ensure successful Open Source life through achievement of a good OSMM rating, community engagement, and community stated need.

All reports, tools, and code from the project will remain on the project server for a minimum period of 2 years and will be archived in the institutional repository (E-Prints) and appropriate JISC repository, for instance Jorum.

Project Resources

11. Project Partners

School of Electronics and Computer Science, University of Southampton: Development of the eQualification certificate system throughout the project, such as issues addressing, existing system and use cases studies, gap analysis, co-design, implement, testing and evaluation

The International ePortfolio Development centre, University of Nottingham: consultant, use cases, co-design, and evaluation of the system

EdExcel: consultant, use cases, co-design, and evaluation of the system

12. Project Management

The project will be managed at the strategic level through four major formal project review meetings involving all staff allocated to and employed by the project, at the major stage boundaries: Initiation; design completion; completion of the demonstrator; and final report. These major review meetings will consider the highest-level project issues, in particular relating to decisions about the project phases and the activities involved. They will be chaired by the PI and involve the project staff.

At the operational level, the project will be managed through bimonthly meetings of relevant staff allocated to and employed by the project. As necessary, additional meetings may be arranged by the PI and the Project Manager if there are particular issues which require such attention and which are not resolvable at the routine weekly management meetings described below.

Tactical project management will be undertaken on a weekly basis. The project team will meet every week, chaired by the PI or the Project Manager.

The project will use the JISC guidelines on quality assurance, project management, and open source software development. Where appropriate, quality and project management will include the development of project standards for documents (e.g. requirements specifications, project glossaries; non-functional requirements); version, configuration, and change management; requirements tracking; quality reviews of software, models, and documentation (including design reviews and code walkthroughs); and maintenance of an issues log and tracker.

Throughout the project, team members, investigators, and participants (staff and students) will be required and encouraged (respectively) to contribute to the project Web site, by way of constructing

project pages, blog, or wiki entries particularly focussed on their experiences as the JISC eFramework projects and services are integrated and used, and as other projects and the Support Project in this programme provide insights and suggestions.

Project reviews and evaluations will also include feedback to the Support Project on the effectiveness, and further refinement and development, of the e-Framework.

Project team

Project Manager - works 1 day per week (20% utilisation),

Lisha Chen-Wilson
Research Fellow
Learning Societies Lab
University of Southampton
SO17 1BJ
Tel: 023 8059 5749
Fax: 023 8059 3218
lcw07r@ecs.soton.ac.uk

Project Director

David Argles
Senior Tutor
University of Southampton
SO17 1BJ
Tel: 023 8059 2698
Fax: 023 8059 3218
da@ecs.soton.ac.uk

Research Assistant

Tao Guan
Researcher
University of Southampton
tg2@ecs.soton.ac.uk

Project Co-Investigators

Gary Wills
Senior Lecturer
University of Southampton
gbw@ecs.soton.ac.uk

Lester Gilbert
Lecturer
University of Southampton
lg3@ecs.soton.ac.uk

Andy Gravell
University of Southampton
amg@ecs.soton.ac.uk

Project Consultants

Angela Smallwood
Associate Professor

School of Education
University of Nottingham
Angela.Smallwood@nottingham.ac.uk

Clive Church
Development Manager
University of Nottingham
clive.churc@edexcel.com

13. Programme Support

The main support beyond the usual programme support may be in facility meetings to arrange the use of software developed in other projects under JISC programmes. Also facilitate meetings between projects with similar interests.

14. Budget

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

Detailed Project Planning

15. Workpackages

See Appendix B for the Work Packages.

16. Evaluation Plan

Timing	Factor to Evaluate	Questions to Address	Method(s)	Measure of Success
January – March 2010	eCert protocol	What are the eCert issues and requirements? Has the protocol met the requirements?	test the protocol against design and requirements Run the first workshop to collect feedbacks for adjustments	Successfully passing all tests There is no big missing issues or requirements to be found that would affect the whole design structure
March-August 2010	Demonstrator	Does the system work in the way it was intended?	Testing against specification and test plans.	Successfully passing all tests.
August 2010	System Documentation	How was it designed? How does it work?	Get others to read and test the system.	The documentation can be understood without the need to refer to the team for advice.
August – September 2010	Validation	Does the design solve the problems identified?	Review against issues and requirements	Satisfy main requirements.

September 2010	Project as a whole	Has the project achieved its aims?	Run the second workshop for evaluation	Aims have been met

17. Quality Plan

Output					
Timing	**Quality criteria**	**QA method(s)**	**Evidence of compliance**	**Quality responsibilities**	**Quality tools (if applicable)**
Jan – Mar 2010	Fitness for purpose	Internal quality Review	Minutes of Meetings	Project team	
Mar – Apr 2010	System design	Design Review + workshop	Minutes kept and workshop report	Project team	UML
Apr - Jul 2010	Coding	best practice for processes	Logbook update, code deposited	Project Manager and project technical assistant	
Aug 2010	Demonstrator test	Unit test + system test	Test plan + record of the results	Project Manager and project technical assistant	
Aug 2010	System test	Accessibility test	Test plan + record of the results	Project Manager and project technical assistant	Subversion
Sep 2010	JISC Open Source Policy	Licence Check	Creative Commons Licence and source code published in SourceForge	Project manager	Subversion
Sep – Oct 2010	System design evaluation + Technical improvements	Design Review + workshop	Workshop report	Project team	
December 2010	JISC Report	Proof Reading	Sign off	Project manager	Template

18. Dissemination Plan

Timing	**Dissemination Activity**	**Audience**	**Purpose**	**Key Message**
1st month and continuing there after	Project Web site	General and technical audience	Awareness, Inform, Engage, and Promote	About eCert and it developments
1st month and other mandatory meetings.	JISC Kick off meetings and subsequent project meetings	Technical Audience	Inform and Engage	eCert developments and feedback
Each	Deliverable reports and	Technical	Inform	eCert

milestone	software	audience, and wider informed research and educational research community.		developments
Throughout the project	Conference and Workshop	Technical audiences, and wider informed research and educational community.	Engage and Promote	eCert development
Throughout the project	Demonstration to institutions and organisations.	Technical audiences, and wider informed research and educational community.	Awareness, Inform, Engage, and Promote	About eCert 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)	**Access**– The School of Electronics and Computer Science will host the server. **Preservation**– All reports will be archived in the appropriate JISC repository **Maintenance** – The server will come under the maintenance policy of the School **Intellectual property**. All report will be copyrighted.
Software: Integration 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 It will also be available on source forge	**Access–** The School of Electronics and Computer Science will host the program code for downloading. **Preservation–** The program source code will be archived in the appropriate JISC data centre. **Maintenance–** The system will be free to use by HE and FE establishments. All supporting documentation will be freely available via the project website. No free ongoing maintenance will be available for the project after the closing date. **Intellectual property**– 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 eCert System	Sustainability of the demonstrator and code library is ensured by providing access to the code and documentation for eCert through LGPLM or GPL licences. Quality factors built in to eCert will ensure successful Open Source life through achievement of a good OSMM rating and meeting community stated needs. Advice from JISC's OSS watch will be ongoing throughout the project to ensure that the project is up to date with any changes regarding open source licensing.	While the demonstrator code will be made available under an appropriate open source agreement as used within any educational establishment and in-line with JISC's requirements, the IPR will also remain with the University of Southampton thereby allowing Southampton to further exploit the IP.	The open source service model may apply here.

Appendixes

Appendix A. Project Budget

Appendix B. Workpackages