JISC DEVELOPMENT PROGRAMMES

Project Document Cover Sheet

FINAL REPORT– DRAFT

Project

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JISC

JISC Final Report Template

Regional Interoperability Project for Progression in Lifelong Learning

(RIPPLL)

Sandra Kingston, Project Manager
March 2006

Table of Contents

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This project was conducted under the JISC Distributed eLearning Programme: Regional eLearning pilot projects (7/04). Project partners were: the University of Nottingham, Nottingham Trent University, City of Nottingham Passport, Atomic Multimedia Consultants Ltd, West Notts College, Broxtowe College and NCN (New College Nottingham).

Technical work was led by Carl Ebrey at the University of Nottingham and Francis Lowry at Nottingham Trent University; we would also like to thank Liz Butterworth and the technical team at West Notts College for their co-operation and advice.

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> Clive Church
> Peter Rees Jones
> Sarah Davies
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Executive Summary

Successful data transfer to support lifelong learning

This project has demonstrated the feasibility of using web technology to support lifelong learning. A limited set of personal data (identification data plus a personal statement) has been transferred between several different systems across a range of institutions in the Nottingham region, using the UK LeaP interoperability standard. Data has been exchanged between different administrative and eportfolio systems so as to support the continuity of individual career journeys across transitions between episodes of lifelong learning, specifically episodes of study or work provided by schools, colleges, universities and an employer.

At the same time, through the development of a range of scenarios built in practitioner workshops, the needs of certain learners at specific stages of 14-19 education/training have been identified, together with the priorities of a wide range of stakeholders, to inform and contribute to the development of specifications of full sets of data required for transition processes, including admission to FE.

Scenarios on part-time study and work placement have been developed by the project. However, direct work with employers has proved more difficult to take forward within a short timescale than work with education providers. The team is applying for further funding and has plans to develop support for progression between study and a range of employers, in a second phase.

Implications for policy

The achievement of continuous technological support will make transition between stages of learning easier and the outcomes of this project are perceived as a positive contribution to the drive to support progression, especially in relation to increasing staying-on rates at 16 and widening participation in HE. The Nottingham demonstration is also cited by the DfES as a reference point for the implementation of national policy on eportfolios and elearning for personalisation.

Successful regional collaboration

The project has shown the great potential for collaboration that exists between technical ICT staff in HEIs and their opposite numbers in colleges in the same region, focused by the issue of interoperability for student progression. Site visits, training sessions and regular technical team meetings, bringing colleagues from all the institutions involved in the project together, face to face, have proved highly productive in terms of achieving the project outcomes and also in forging a unified regional team with significant combined strengths and expertise.

Data standards

Partly in the light of the experience of this project, BSI has published UK LeaP as a draft standard (BS 8788) and undertaken to review it regularly.

The project has extended the previously-accepted boundaries of Shibboleth technology, deploying it on a Microsoft platform as a basis for using web services to access distributed PDP data from a remote site.

Next steps: web services for FE admissions

The next step should be to re-engineer the data-transfer work supporting the new FE admissions process in Greater Nottingham, so that a web services approach can be used. This approach has been advanced by the Nottingham ePortfolio Reference Model project, in relation to the eFramework, and offers more lightweight, more streamlined and affordable solutions. Within the next few months, the FE institutions concerned should have the necessary infrastructure in place to support this development.

Partners and contact

Led by the University of Nottingham (www.nottingham.ac.uk/eportfolio), partners include Nottingham Trent University, Nottingham Passport, Nottingham LA FE institutions, Ufi/**learndirect** (East Midlands) and local employers.

Background

This project has built upon work completed for the University of Nottingham-led JISC MLEs for Lifelong Learning project, 2003-2005, *Specifying an ePortfolio* (www.nottingham.ac.uk/eportfolio/specifyinganeportfolio). The earlier project trialled interoperability between on-line personal development planning (PDP) systems in 14–19 education and HE, demonstrated by transferring sample data from the City of Nottingham Passport (CoNP) and University of Nottingham ePARs system. This was carried out in conjunction with work with UCAS on interoperable data transfer between post-16, UCAS and HEIs to facilitate learners' application to HE, with special reference to the need for enhanced Personal Statements in the context of the Schwartz recommendations for Fair admissions.

RIPPLL was designed to build on this work by studying the requirements of a much wider range of users, including learners on vocational pathways and work-based learners, in order to inform the ongoing development of technical specifications. The existing CoNP-University of Nottingham partnership was extended to include the second Nottingham HEI, Nottingham Trent University (NTU), whose strong track record in Widening Participation and greater number of students following vocational, part-time and sandwich courses complemented the experience of the University of Nottingham as a more traditional academic institution.

With strong track records in Progress Files, Widening Participation and student inclusion, the partnership felt that it had the potential to establish in Greater Nottingham a national demonstration site for cross-sector collaboration in PDP technology to support widening participation and retention, with outcomes which would be transferable regionally and nationally. Nottingham's early practice in linking school-based learning (from Key Stages 3 to 5) into and through HE was identified by European SchoolNet as being of prime interest in the European context.

Earlier interoperability trials at the University of Nottingham made use of trial interoperability standards, initially IMS LIP and later UK LeaP (BS8788). *Specifying an ePortfolio* was significant in mapping UCAS data to the UK LeaP standard, which would be incorporated into UCAS's live XML feed in time for the 2007 round of applications. RIPPLL aimed to pick up and develop the work of this earlier project's implications for transitions and data transfers between study and employment and extend this work to trial interoperability between a wider number of different institutions, offering a localised testbed using the draft standard. This work was potentially of international significance.

We also hoped to build on expertise developed through our earlier work with UCAS (part of the *Specifying an ePortfolio* project), by supporting the development of an FE admissions process. This would help identify the 'pattern' for an application/admissions process by enabling us to compare transition processes at two stages of lifelong learning. Part of the project's input into the ePortfolio Reference Model project, this work would, in turn, contribute to the development of the eFramework.

We felt that it was important to tender as an early adopter of Shibboleth, as we saw that this had important implications for verification and authentication issues inherent in ePortfolio work. The two main models for ePortfolio for lifelong learning are that either learners take their data with them across transitions, a mechanism being tested in part by our interoperability and transfer work, or that the data remains distributed, residing at its original institution, and that learners access it remotely from a single point. We felt that Shibboleth technology could play a key part in making this possible. Colleagues at NTU were keen to take this work forward as they saw it had potential usefulness within their in-house electronic PDP system.

Aims and Objectives

The original aims and objectives of the project were as follows:

Aims

- To support progression to HE for widening participation (WP), by making all major existing electronic systems in use in the Nottingham area for study-based Progress Files interoperable, using the UK LeaP interoperability standards
- To pilot the transfer of data directly from the main post-16 PDP system (City of Nottingham Passport - CoNP) into HE PDP systems (University of Nottingham ePARs; Nottingham Trent University PDP) to support learner admissions and transitions, thus joining up successive phases of study, pre-HE and HE
- To develop understanding of further transition processes between study and employment (in both directions) and consider connections with issues of graduate retention in the region
- To contribute to the building of interoperability specifications for systems supporting lifelong learning by providing further development of the UK LeaP open standards and proving their applicability in a number of different environments

Objectives and how they changed during the course of the project

1. To develop 10 new progression/transition use cases reflecting a broad range of learners, including vocational pathway learners and work-based learners, progressing into further study or employment at both school and HE level, and identified in collaboration with at least three FE colleges, with employers and with the regional division of Ufi/**learndirect**.

   Changes: it took longer than anticipated, scoping this work with project partners, to agree a list of proposed use cases and scenarios. In the course of this, we found that the originally conceived profile changed to include a wider range of situations in education and work-related/training contexts balancing a narrower range of examples of progression to employment, partly as a result of our greater success in engaging with educational staff than with employers. This included beginning to think about personalising learning and development of ILP on entry to FE. Furthermore, our agreed understanding of what we meant by these terms also developed: we decided that it was outside the immediate scope of the project to produce narrowly-defined 'use cases' which could lead directly to software development. Rather, we were using the technique to map the future requirements of key stakeholders in the area.

2. To extend interoperability pilots of data transfer between the Passport and the University of Nottingham PDP systems to the PDP system at Nottingham Trent University (NTU), carrying out five mapping exercises and five LIP transfers, responding to the requirements identified in the use cases for the purposes of progression/transition, induction and ongoing PDP.

   Changes: Our work with interoperability pilots extended as the work progressed. Data transfers were originally conceived as taking place between CoNP and the two partner HEIs. However, through the involvement and enthusiasm of members of the technical consortium, including key technical staff from partner FE colleges, it became apparent that it might be feasible to demonstrate a regional Lifelong learner journey following a joined-up pathway, involving multiple institutions and including an HR system.

3. To support the use of UK LeaP in the parallel development (2004-2006) of a post-16 on-line admissions project for Greater Nottingham

   No changes were made to this objective.

4. To scope and document the interoperability issues raised for at least two major employers and for the main commercial supplier of FE systems in the region
    Changes: Due to the difficulties of making sufficiently rapid progress in new partnerships with employers/vendors, the objective in this area became that of constructing good foundations for partnership-working with the vendor (via a client college) and with a number of employers, with a view to completing the original objective at a point beyond 31 March 2006. We have also been able to talk informally with staff from Tribal Technology, who have shown an interest in the project's outcomes.

5. To pilot the use of Shibboleth to facilitate access to learner information deposited at key partner organisations.
    Changes: The project aimed to implement a pilot Shibboleth infrastructure at selected partner organisations in order to develop, test and disseminate a practical approach for implementing inter-organisational authentication and authorisation management services to support access to Learner Information in support of Lifelong Learning. The original plan was that two models would be tested, supporting current thinking about ePortfolios:
    *   On-demand transfer of Learner Information between partner organisations. Learner Information is accumulated and moved on to the next partner organisation. The access relationship governed by Shibboleth permits the transfer of material to partner organisations and permits the generation of an audit trail of data movement.
    *   Generation of aggregated views of Learner Information for authorised users at partnering organisations. Learner Information continues to reside with the originating organisations and Shibboleth is used to control access by users from other partner institutions.

    As the NTU contribution to the project's technical work progressed, it became clear that the interoperability and transfer work was testing the first of the above models (the 'pass the parcel' route). It was felt that Shibboleth was more appropriately applied to the second model, as it was most likely that an authenticating institution would require information from a number of organisations. Shibboleth work therefore concentrated on this, using a set of web services protected by Shibboleth which enabled the collation of distributed remote data sets into a single presentation view, matching the system's functionality to the UK LeaP specification where possible.

Methodology

Scenarios and use cases

This work built on the experience and expertise of key project staff in the 'Specifying an ePortfolio' project, which made use of the scenario and use case building resource pack produced by Peter Rees Jones as part of the Lifelong Learning Support Project for phase II of the JISC Managed Learning Environments programme. We used this resource as a basis for a series of workshops to gather information from those with knowledge and expertise in specific areas, beginning with academic project staff at NTU, who were inducted into the methodology through a 'learning-by-doing' approach, guided by University of Nottingham staff, and produced scenarios and use cases on progression from HE to part-time work and to work placement. Building on their own experience, these staff and University of Nottingham staff were able to conduct further workshop exercises with staff beyond the project team. City of Nottingham Passport staff also used this resource to conduct workshops with training providers. NTU staff were able to customise the original resource pack materials in the light of their experiences, taking ownership of the process for use in further work.

Our practice has been to gather staff to conduct an initial workshop drawing on the expertise of a group of informed practitioners, using the experience of the project team in

scenario and use case writing. Project staff have then drafted scenarios and/or use cases using the guidelines, which have then been circulated to those involved in the workshop for further consultation and ratification, and to allow input by further colleagues who may have been unavailable at the time of the initial workshop meeting. These comments have been incorporated into a further draft, which is published on the project website for wider consultation.

Technical interoperability work

Mapping and transfer work within the project used the methodology developed and tested by University of Nottingham technical staff in earlier interoperability work. This uses the following stages of development:

   I.   Research systems at both ends
  II.   Map proposed outputs from generating system to UK LeaP
 III.   Produce mapping document
  IV.   Generate source XML
   V.   Produce XSLT file to convert output data
  VI.   Load into destination system using transformation code.

In parallel with pedagogic work, technical staff from both HEIs conducted site visits to partner institutions to draw on local expertise about systems and infrastructure in order to scope possible data transfers and to build mappings between systems as a basis for writing code.

As *Specifying an ePortfolio* had demonstrated the value of meetings involving technical staff across partners, it was agreed to set up a technical group for this project which would meet quarterly to facilitate discussion, review progress and seek consensus on specific technical issues. This would also enable the project manager to maintain direct contact with the technical team.

The project has extended the partnership between the University of Nottingham and the LEA to include NTU and local colleges and this in itself represents a valuable resource for future work. Work beyond education is less mature, but we have a achieved a much better mutual understanding with employers and believe that it should be possible to develop joint project work between education and employment in the medium term deploying our existing technical expertise in a new context.

We were able to use Carl Ebrey's experience of working with UK LeaP at the University of Nottingham to provide consultancy, first to train NTU staff and then to work with staff at FE colleges. We were also able to build on his existing relationship with Atomic, the company which developed the City of Nottingham Passport and was working on its successor system, Passportfolio.

A summary of the technical approach taken at NTU is included in the team's technical report at www.nottingham.ac.uk/rippll/keydocuments/FL%20tech%20report.pdf.

We were fortunate in engaging the services of Clive Church of Edexcel and the CETIS Lifelong Learning SIG as external evaluator to the project. He was able to attend formal progress and steering group meetings; further to this we invited him to participate in as many workshops and informal meetings as possible, which both enabled him to gain a first-hand view of the project work and to contribute valuable insights and suggestions drawing on his own knowledge and experience in the area, both as an FE practitioner and representative of an awarding body. The project is indebted to Clive for his continued interest and support coupled with impartial and informed advice.

Implementation

Our original proposal was to work with three specific FE colleges. Technical staff from these were involved in technical team meetings; however we found it more difficult to collaborate

with specific pedagogic staff at these institutions. Fortunately we were able to work with the Nottingham Passport team who, as representatives of the LEA, were in contact with the whole of FE in the region. This collaborative approach, with Nottingham Passport staff acting as intermediaries, has enabled us both to work with and to disseminate project findings to a far broader range of FE staff than would otherwise have been feasible.

Pedagogic work

A major activity on the pedagogic side of the project was the development of scenarios and use cases. As the work progressed, on-going developments in thinking about the nature of scenarios and use cases informed the team's understanding of exactly what we were producing. The project manager instigated and then attended a training day provided by the COVARM Reference Model Project/CETIS Enterprise SIG on UML and derived from this the idea of a much leaner, 'thinner' concept of a use case, which could be exemplified using the UML notation, and a better sense of the range of acceptable definitions of a use case common in the software development industry. An informed decision was taken by the project team to continue with the practice of writing 'fat' use cases/'sub-scenarios' rather than drilling down further to produce 'thin' UML use cases as a basis for specification, as it was felt that it was not within the scope of the project to produce specifications for specific toolkit software and that this work would best be carried out in the context of a future development project.

Our original work plan allowed for two distinct phases of use case development (study to study, then study to employment or training). In practice, we found it more practical to overlap these. Initial training sessions in the scenario and use case methodology were held with pedagogic partners at NTU. They then drafted initial use cases which were revised and amended by the immediate project team with input from Peter Rees Jones. On this basis, NTU staff were able to conduct further workshops with staff within the wider institution, drawing in the experience of staff offering information, advice and guidance, including careers staff and representatives from the Students' Union as part of NTU's 'Task Group Z'.

In parallel with this, University of Nottingham staff conducted workshops with FE pedagogic staff and representatives of Ufi/**learndirect**, and City of Nottingham Passport staff were able to work with representatives of FE and training providers, drawing on their experience in this methodology from previous collaborative projects. All the resulting scenarios are published on the project web site www.nottingham.ac.uk/rippll/keydocuments.

Technical work at NTU

Previous work as part of the 'Specifying an ePortfolio' project meant that we were able to draw on mappings to relevant fields in the University of Nottingham ePARs and SATURN systems. This work could not be immediately transferred to NTU, however, as at the outset of the project their electronic PDP system resided in a series of stand-alone Microsoft Word templates which had to be downloaded and stored locally by the learner. If the learner needed to share these further, they needed to be either printed out and circulated as hard copy or emailed as attachments.

It would be difficult to demonstrate data transfer using this system, not least because of the insufficient granularity of the large blocks of text stored in the document files; while it might be possible to aggregate incoming data and feed it into these, it would be significantly more problematic to move data out again into another system. Staff at NTU have therefore begun work on remodelling their online PDP system with UK LeaP compliance in mind. The first sections (skills analysis and a CV builder) are now reworked as online HTML forms, input from which is stored in a database in format with a high degree of granularity, thereby facilitating future interoperability and transfers of data. Extensive work has been carried out on the rest of the system, much of which is expected to go live in the next few months.

A summary of technical work at NTU is at www.nottingham.ac.uk/rippll/keydocuments.

Mappings and transfers

As a training and familiarisation exercise, the technical team at NTU led by Francis Lowry carried out an initial test transfer of data from the Nottingham Passport, replicating earlier work to move this same data from the Passport into the University of Nottingham system. This was a valuable experience which exposed a number of misunderstandings about the nature of the work, and resulted in an increased awareness of what working with UK LeaP requires.

As with the original plan for pedagogic work, we had initially conceived two phases of interoperability trials: study-study and study-work, transferring isolated data sets between pairs of partners. Carl Ebrey held an initial workshop for developers on working with UK LeaP in July 2005 as preparation for this work. As it became evident that it would take far longer than anticipated to set up such exercises with employers, this plan was revised to include transfers between a wider range of educational institutions. The enthusiasm of the technical community for this exercise was such, however, that it became clear that it might be possible to demonstrate an entire mini lifelong learner journey, as we could move data from KS4 through FE and HE and then possibly on into employment. Although we have begun dialogue with a number of employers, including some initial scoping work for a web service development with the technical developer at the Toyota-Lexus Academy, we need more time to build employer partnerships to the point where actual exchange of data will be able to take place. As an interim compromise, we agreed to use the HR system at West Notts College as an employer representative. We hope to work further with a wider range of employers as part of the extension to this project.

We were able to hold a series of meetings attended by technical representatives from a number of partner institutions: these acted as informal dissemination opportunities, allowing us to brief technical staff on the progress of pedagogic work, as well as a forum for discussion about the direction and nature of the technical work.

At a project technical meeting, it was agreed that the practical minimum dataset for transfer between the systems involved would be identity data and a personal statement; this would be developed and aggregated at each transition to show the learner's development. Francis Lowry and Carl Ebrey were then able to agree and define a standardised set of XML documents to be used.

Our close awareness of the thinking behind the ePortfolio Reference Model project created initial interest in using web services to transfer data. We found, however, that there were political issues around this plan, as the FE colleges involved did not yet have the appropriate hardware and systems in place to pass data around in this way. The final code was therefore run using desktop systems at this stage. As the colleges are expected to have appropriate infrastructure in place by September 2006 in order to participate in the new electronic FE applications process, it should then be possible to implement a web service approach, as part of an extension to the project. NTU work in this area is reported at www.nottingham.ac.uk/rippll/keydocuments/FL%20tech%20report.pdf. University of Nottingham technical work is reported at www.nottingham.ac.uk/rippll/keydocuments.

The project has, however, been able to engage with some web services work. A collaboration between Nuventive and the University of Nottingham resulted in creation of a demonstration web service to pull live data from the University of Nottingham SATURN system into Nuventive's iWebFolio system, demonstrated at the EIfEL ePortfolio Plugfest in Cambridge in October 2006. (A Flash file showing this demonstration can be downloaded from www.nottingham.ac.uk/rippll/keydocuments/importdemo_05.zip.) Portions of this code were designed to be reusable to export data from the University of Nottingham as part of the lifelong learner demonstration transfers for this project. Furthermore, as part of the Shibboleth work run at NTU the team were able to set up a demonstration web service to call distributed data into a dummy account. (See www.nottingham.ac.uk/rippll/keydocuments/Shibboleth%20Final%20report.pdf for further details.)

FE applications process

As agreed in the original objectives for the project, the team collaborated with the City of Nottingham Passport team and representatives from FE colleges in both the City and County to progress the implementation of the electronic application to FE via an agreed common application form to be located within the Passport's successor, Passportfolio. The FE Admissions Working Group of the Greater Nottingham 14–19 Strategy Group identified criteria for admissions to FE colleges and devised a common application form, supported by Principals of all FE colleges in the Greater Nottingham area, thus giving a major political drive to the development.

The new Passportfolio system is radically different from the existing City of Nottingham Passport, being more of a genuine ePortfolio system and less of a PDP-driven progress file. However, release of the Passportfolio has been delayed; so, as an interim measure, the Nottingham LA decided that the existing Passport system be extended and improved, with the new version not planned to go live until after Easter 2006, whereas we had originally expected to have access to the new data structures by Christmas 2005.

Once obtained, agreement on and commitment to a common application form which would automatically draw on information held within a learner's Passport files provided a crucial driver for this process. Our contribution to initial meetings scoping technical and pedagogic requirements with FE staff resulted in our advice that initial proof of concept exercises would best be conducted using email (as a known reliable mechanism) to transfer completed application forms as pdf files. This would be possible as all the colleges had established email systems and while it offered a limited solution, could begin to effect the cultural change within FE institutions necessary for further work.

The application form was included in the revised City of Nottingham Passport system in December 2005. Tests of the interim process are to be conducted in late March/early April 2006, with feedback from colleges taken into account in the next stage of development. However, colleges still need to transfer data from the pdf files manually into their internal systems: the next stage is to support automation of the process.

Preliminary work has suggested that it is possible to mark most of the form using UK LeaP elements to produce an applications profile for the FE application process, with only a small subset of extension elements. The size of data chunks in the current form is, however, too large to do this efficiently. A revised form is now being designed to use a much higher degree of granularity of data, and will be included in the new Passportfolio system, to be tested in Easter 2006.

Meanwhile, University of Nottingham technical developers held a series of training workshops with FE development staff, introducing the concepts of UK LeaP and the transfer of data using XML and web services. The slides from these presentations are published on the project web site. University of Nottingham staff will mark the new electronic FE application form up as UK LeaP and provide initial mappings between fields in the form and the three main MIS systems identified as being in use in Greater Nottinghamshire Colleges.

Further preparation work is needed by individual colleges before this work can be progressed further. This includes ensuring that staff have a fuller understanding of how their own MIS system imports and stores data, including whether it uses holding tables and how these interact with the underlying database structure, and provision of a secure outward-facing web server. Project team support and collaboration for this is part of a bid for extension work for this project. We have identified three main MIS systems in use in the Nottingham area: Distinction, Tribal and Unity (Capita). The vendors supplying these systems are watching our work with interest and we plan to engage them more directly as work progresses and we are able to offer them feedback.

Shibboleth

The bulk of the support structure and documentation for Shibboleth is predicated on its being run in a Unix environment, whereas at NTU the aim was to implement the system on a Microsoft platform. This needed to be reflected in the time taken over the initial desk research phase. We planned to follow this with an iterative cycle of coding and testing, first on one server and then using two within a closed environment, before passing data outside the institution. By setting up a dummy test server within NTU and passing data between two internal systems, it was hoped to gain a clearer understanding of what was happening at both ends of the process, originator and receiver.

A report on Shibboleth work by NTU development staff is at www.nottingham.ac.uk/rippll/keydocuments. This work is indebted to support from the MATU Support Service, who have acknowledged the issues we have experienced. They have informed us that expect issues of this kind to continue to arise as more project teams explore the use of the technology.

Outputs and Results

Use cases/scenarios

10 transition points were identified as the basis for developing scenarios/use cases. Draft 'fat' use cases have been developed for the following and are published on the project website for consultation:

- KS4 to work/training
- Y11 student applying to FE
- FE college use of data from an electronic application process
- Use of an ePortfolio to support personalising learning in FE
- Use of an ePortfolio to maximise the student learning experience in HE from a period of work placement
- Use of an ePortfolio to maximise student learning experience in HE for part-time learners
- Use of an ePortfolio to facilitate post-qualification transfer from HE to full-time employment

The last three above are supported by an overarching scenario:

- Use of an ePortfolio to support transitions between HE and the workplace

Preliminary workshops have been held for the following and some draft material produced. Further work is still needed to create versions for wider consultation:

- W Notts FE to work/training
- HE (UG) to HE (PG): early work suggests that this may become two scenarios, one where the learner applies for postgraduate study at the same institution and another where the application is to a different institution.

Initial contact has been made for the following: we are in the process of setting a workshop date:

- Employment to University of Nottingham (MBA route).

We will roll forward some unspent money to complete these.

Technical work

A major output of the project's technical work has been demonstration of interoperability along a sample lifelong learner journey. After investigation of the MIS systems at partner institutions, it was agreed to transfer a limited dataset to include identification data and a personal statement. This was transferred from the CoNP into the MIS at West Notts College (a Distinction system), then from West Notts to NTU, from NTU to University of Nottingham and then from University of Nottingham back into West Notts College, but this time into the HR system (the subject now being an employee, rather than a student). Mappings, sample code and screenshots from these are available on the project website. The technical report

from NTU also contains mappings and code from the initial test transfer carried out between the Passport and NTU.

Preliminary transfer work has begun with the application system at the Toyota-Lexus Academy, and it is hoped that further progress will be made with this in an extension to the project. Work has also begun with NCN, an FE college using an ILP system based on web services, and as part of the project extension work we plan to transfer ILP-specific data between systems.

As part of the project's support for the Greater Nottingham FE applications process, moving data from CoNP to FE College MIS using an agreed Common Application Form, Carl Ebrey held workshop sessions for developers on web services, XML and UK LeaP (see slides at www.nottingham.ac.uk/rippll/keydocuments/workshop-20050715.PPT and www.nottingham.ac.uk/rippll/keydocuments/workshop-20060213.PPT).

Dissemination

Events
The project has been represented at a number of events, including:

- Workshop at the JISC RSC East Midlands eFair, University of Derby, June 2005
- Workshop for DeL projects and CETLs, University of Nottingham, July 2005
- Web services demonstration, EIfEL plugfest, Cambridge, October 2005
- Presentation at EIfEL ePortfolio conference, Cambridge, October 2005
- LIFE conference, Cambridge, October 2005
- JISC-CETIS conference, Edinburgh, November 2005
- OSPI conference, Edinburgh, November 2005
- Presentation to AOC/NILTA East Midlands meeting, November 2005
- EDUCA, Berlin, December 2005
- CETIS Enterprise SIG, Crewe, December 2005
- JISC Programme Meeting, York, December 2005
- Presentation to BSI IST/43 group, University of Nottingham, February 2006
- JISC-SURF discussion meeting, Amsterdam, February 2006
- Presentation at PDP4Life conference, Dartington, March 2006
- Half-day workshop/demonstration for representatives of JISC and SURF, Nottingham, March 2006
- Presentation to RSC National Curriculum Group, Nottingham, March 2006

A collaborative event between this project, the East Midlands RSC, NILTA and the CETIS Lifelong Learning SIG to showcase ePortfolio developments in Nottingham and inform key staff in FE nationally will be held in Nottingham on 8 May 2006.

A programme of events to disseminate the findings of the team working on Shibboleth is being planned. This will include an event at NTU in July 2006.

Publications
- The project website has been continually updated with the latest news and used as a platform to publish documentation and presentation material
- The project produced a poster for the July 2005 Programme Meeting in Cambridge. A pdf is available on the website
- The project supported production of and is represented in the University of Nottingham Centre for ePortfolio Development brochure *ePortfolios: Mapping the future* (a pdf file of this is available at www.nottingham.ac.uk/eportfolio/ePortfolios.html)
- Planned publication on the outcomes of the project with Elizabeth Hartnell-Young, Research Fellow, Learning Sciences Research Institute, University of Nottingham, in *Collaborative E-Support for Lifelong Learning*, special edition of the *British Journal of Educational Technology* (37:6), 31 October 2006.

Outcomes

The following sections are based upon the External Evaluator's report, available in full at www.nottingham.ac.uk/rippll/keydocuments.

'The project was successful in developing (with other projects in Nottinghamshire) a model of ePortfolio implementation that has been of value not only to the project partners but to both the DfES and Becta, who have been charged with developing guidelines and standards for schools and FE in England. It has been a prime test bed for the implementation of the BSI UK LeaP standard for transferring personal data. Experience from the project will influence the production of the next generation of standards.

'It has also been exemplary in its engagement with its partners. The university-based teams have provided support both to the Nottingham LEA and, significantly, through workshops for the technical staff at the FE college partners. This pro-actively supported partnership has embraced all types of learners including those who proceed to employment. Although it is too early to judge how well the project has affected 'Widening Participation', the processes and data models (in addition to contributing to the meaning of ePortfolios) will provide a contribution to the systems that will support a partnership of institutions delivering Foundation degrees. The project has contributed to the debate concerning the use of standards, demonstrating that through data mapping partners can develop their own application profiles to meet their particular needs. Like all projects there have been problems so far in meeting some outcomes fully (employer involvement, number of completed use cases) but on balance the project has made a major contribution to the knowledge of ePortfolio implementation and the development of standards and services that underpin them.'

Project achievements against the aims and objectives set

Aim	Evaluation
To support progression to HE for widening participation (WP), by making all major existing electronic systems in use in the Nottingham area for study-based Progress Files interoperable, using the UK LeaP interoperability standards	'The project's links with the developments in the Nottingham LEA for seamless transfer of student application data from school to college ensured that real applicable solutions were achieved. The Nottingham LEA link also ensured that other agencies such as Connexions became involved and that the transfer points for data to satisfy the progression routes with Nottingham Trent University and Nottingham University were implemented to meet real needs. The use of the UK LeaP standard provided major input into that's standard's review. Its status as a published draft standard has been in some part due to the experience gained from this project'
To pilot the transfer of data directly from the main post-16 PDP system (City of Nottingham Passport - CoNP) into HE PDP systems (University of Nottingham ePARs; Nottingham Trent University PDP) to support learner admissions and transitions, thus joining up successive phases of study, pre-HE and HE	'This has been achieved using UK LeaP as a standard. An important output has been the development of a methodology for converting existing mechanisms of data transfer to one that employs UK LeaP and XSLT. See technical report on http://www.nottingham.ac.uk/rippll/keydocuments/ FL%20tech%20report.pdf on work conducted at NTU'
To develop understanding of further transition processes	'Understanding of transition processes between study and employment has been increased. The

between study and employment (in both directions) and consider connections with issues of graduate retention in the region	engagement of Connexions as a gatekeeper between schools (and FE) and work-based learning was valuable. Major employers in the region have been very interested in the benefits of standardised transfers of data but have not engaged as much in the technical work as was hoped. It is too early to judge the impact on graduate retention in the region.'
To pilot the use of Shibboleth to facilitate access to learner information deposited at key partner organisations	'Shibboleth successfully piloted by Nottingham Trent University to access information at West Notts College and the University of Nottingham. This has implications for its potential use by the Passportfolio system.'
To contribute to the building of interoperability specifications for systems supporting lifelong learning by providing further development of the UK LeaP open standards and proving their applicability in a number of different environments.	'As indicated earlier this project has been one of the few attempts to implement UK LeaP. The outcomes of the project have identified that the underpinning philosophy behind LeaP is correct but that there is a clear need for simplification and the remedying of implementation anomalies. It has demonstrated that LeaP is applicable in a wide range of environments.'

Satisfaction of objectives

Develop 10 new progression/transition use cases reflecting a broad range of learners, including vocational pathway learners and work-based learners, progressing into further study or employment at both school and HE level, and identified in collaboration with at least three FE colleges, with employers and with the regional division of Ufi/**learndirect**	'10 transition stages were identified as the basis for writing uses cases. 7 are written; 3 others still under development. 3 specific Further education colleges were involved. The engagement with external employers was less than anticipated. Essentially because of resource implications for tool developments. Staff changes at Ufi/learndirect led to little engagement with this partner, although contact has been recently remade. It was recognised, though, that the educational partners in the bid are major employers themselves and this project would influence work within their Human Resource departments.'
Extend interoperability pilots of data transfer between the Passport and the University of Nottingham PDP systems to the PDP system at Nottingham Trent University (NTU), carrying out five mapping exercises and five LIP transfers, responding to the requirements identified in the use cases for the purposes of progression/transition, induction and ongoing PDP	'The data transfers were successfully completed. 5 mapping exercises were involved with 5 transfers of LeaP data.'
Support the use of UK LeaP in the parallel development (2004-2006) of a post-16 on-line admissions project for Greater Nottingham	'A major success. The engagement with and support given to the LEA on-line admissions project provided a milestoned focus for the work. The outcome of planned further work this summer should provide a show case and model for the use of standards (LeaP) for the transfer of ePortfolio

	data'
Scope and document the interoperability issues raised for at least two major employers and for the main commercial supplier of FE systems in the region	'The interoperability issues have been scoped and have been documented for West Nottinghamshire college as an employer. These results have been passed to other MIS vendors. Dialogue has also taken place with the Toyota Lexus Academy to ensure subsequent developments of the work can interface with their training and HR facilities.'
Pilot the use of Shibboleth to facilitate access to learner information deposited at key partner organisations.	'Nottingham Trent University have successfully implemented Shibboleth for authorisation and authentication of PDP-related data from West Notts College and the University of Nottingham. Subsequent advice by Becta to DfES that Shibboleth should be considered for government eLearning developments makes this experience important.'
Reference implementations: Transfer of personal statements between institutions Providing transcripts within a presentational ePortfolio	'Documented web services based examples provided in partnership with Nottingham LEA for transfer of application data between schools and FE colleges and Connexions.'
National and international ePortfolio Network	'The networks created and maintained by partners of this project are a significant output. The credibility of links with high-profile stakeholders has led this project to be a source of expertise on ePortfolios within the educational community.'

Who will benefit from the work, how, and why
A significant number of national and local stakeholders will benefit from the project's work.

- Nationally, organisations such as BSI and CETIS have shown an interest in our work using UK LeaP. Nottingham's experience using the standard was a major influence in the BSI IST/43 group's decision to formally release BS8788 as a draft standard; at our request this is to be regularly reviewed.

- Becta and the new DfES Technology Unit have shown an interest in the project as an example of regional collaboration around ePortfolio. Vendors, both of FE MIS systems and independent ePortfolio systems, have indicated a clear interest in the outcomes of our work and its implications for interoperability in practice. MATU have benefited from our experience using Shibboleth in a Microsoft development environment. The JISC ePortfolio Reference Model project has been able to make direct use of the findings and contacts made by RIPPLL.

- Locally, the support and work of the project is making the electronic FE application process within Nottinghamshire possible. Admissions officers will benefit from the timely and accurate information this will provide, as well as from access to richer data which will allow earlier preparation for incoming students. This should in turn support Widening Participation and retention by supporting applications to FE and allowing communication between pre-HE and HE systems. This process is also informing the work which the JISC ePortfolio Reference Model has been doing with UCAS. Learners will benefit from the seamless transition of data to support lifelong learning.

- The electronic applications process is also influencing a change in thinking in FE: once staff have seen that they can get reliable MIS data much earlier, they are keen to extend work to enable earlier access to ILP-specific data.

- The collaborations within the project and the resulting communities of developers and pedagogic staff are helping to break down the barriers between FE and HE locally.

- A major contribution has been made to the skills development of technical staff, both at NTU and in the FE colleges. The project has also been responsible for building capacity within partners: the strategic challenge is how to make this self-sustaining in long term. By supporting development of the infrastructure to enable FE to employ web services, we will also be enabling them eventually to write their own.

- Within NTU, workshop activities have supported dissemination internally and support for the electronic PDP system, including some joining up of initiatives within the institution, for example between the careers service and the student union. The enhancement of the PDP system to meet the objectives of this project is a bonus for the institution. The change in approach by technical developers has led to a re-examination of the file structures and input methods used.

- By joining up systems and supporting development, the project is contributing to the long-term sustainability and embedding of the City of Nottingham Passport/Passportfolio. We plan to work closely with Connexions as part of the extension of the project, looking at services for Information, Advice and Guidance; at the same time, this partnership is a significant one, as Connexions may well have a key role to play in sustaining the Passportfolio. The Chief Executive of Connexions Nottinghamshire is now on the project Advisory Board.

- There is a developing relationship between the University of Nottingham Centre for International ePortfolio Development and the JISC East Midlands RSC, exemplified by the planned joint event in Nottingham on 8 May 2006.

<u>Lessons learned</u>
We found education staff easier than representatives of employers to engage in this work. Difficulties with engaging employers arose through changes of personnel and competing internal agendas. We found that we needed to allow more time to build relationships and to obtain buy-in at a senior level, not relying on an excellent relationship with an individual employee, since their role could change at very short notice. It has been useful to identify influential intermediaries to facilitate collaborations: the Nottingham LA Passport team has facilitated work with FE colleges very helpfully and scheduled discussions with regional organisations, including the RDA, look promising in terms of opening up greater access to employer partnerships in future.

Conclusions

Our technical interoperability work has demonstrated that UK LeaP works, but is actually rather cumbersome and needs refinement to provide a practical solution for the future. While we have pioneered 'reduced' application profiles for particular situations, there is still work to be done in developing the standard further into a more lightweight solution. The findings of the RIPPLL project's technical work were presented to a meeting of the BSI IST/43 committee responsible for UK LeaP, hosted by the University of Nottingham. The committee then confirmed a formal request from CETIS that UK LeaP be published as a draft for development rather than as a full standard. The expertise of the RIPPLL team could make a valuable contribution to the development of a tighter, lighter version of UK LeaP designed for implementation. Consultants from Becta have also reviewed this work.

There is still a significant amount of work to be done on finding solutions to the problems of moving more complex PDP data between locations. Our initial focus on moving data

between points of transition has developed to become a realisation that the distributed data model can be realised, and that it can be supported by web services and use of Shibboleth technology.

Implications

A key technical finding was the importance of working at a fine level of granularity if the information within the source ePortfolio is to be imported, using UK LeaP or any other format, in a useable form into a system residing at another institution. The keys to interoperability are the application profiles of these data, especially for future work toward an approach founded on web services.

Our experiences using UK LeaP are being made available to the wider technical community. There is now scope for other practitioners to replicate and build on these, and to feed findings back to those responsible for further development of the standard.

The practical experiences of the RIPPLL project have informed the more theoretical work of the JISC ePortfolio Reference Model project. This suggests that there is a possibility for a wide range of other DeL projects to do the same.

The support our work has given to ensuring an infrastructure for FE to develop web services as part of the FE application process has longer-term implications. By building a local community of practice, we are making it possible for FE colleges to, in time, extend the work we are doing with them and begin to specify and build further web services of their own.

Recommendations (optional)

The following recommendations are taken from the External Evaluator's report, available in full at www.nottingham.ac.uk/rippll/keydocuments.

- Continuation of engagement of the development of standards in this area. The LeaP model has generally been accepted but urgent work is required in obtaining a full and continuing consensus amongst users. Implementation needs to be trialled further in the medium term.
- Continuation of engagement with and support to the Nottingham LEA Passportfolio project. The new system is to be launched this summer and the credibility of the application of current data standards and web services definitions is dependent upon it. Although many of the partners are outside the JISC community, failure in this work will have damaging implications for all of the educational sectors.
- A greater focus on web services and how they relate to a dynamic JISC e-Framework. More work is needed to enable the work so far to contribute to a generic pool of services at all levels that can be shared by others.
- Launch pilots that engage other communities in the identification and application of 'their components' within the LeaP data domain. Work-based learners and the recipients of information, advice and guidance (IAG) are just two of the communities that would benefit from an extension of this work.
- Development of an 'architectural framework' within the ePortfolio domain that will enable all subsequent projects in this area to conform to common rules and standards.
- Greater engagement required with vendors, especially in the area of use of LeaP (and derivatives) and the identification of Application Program Interfaces that will facilitate the production of 'connectors'.

References

All supplementary documentation is published on the project website at www.nottingham.ac.uk/rippll.

Appendices

Glossary of acronyms

Becta	British Educational Communications and Technology Agency
BSI	British Standards Institute
CETIS	Centre for Education Technology Interoperability Standards
DeL	Distributed eLearning Programme (JISC)
DfES	Department for Education and Skills
EMDA	East Midlands Development Agency
ePARs	electronic Personal and Academic Record system (University of Nottingham)
FE	Further Education
HE	Higher Education
ILP	Individual Learning Plan
IMS LIP	IMS Learner Information Package (precursor of UK LeaP)
MATU	Middleware Assisted Take-Up service
MIS	Management Information System
NCN	New College Nottingham
NTU	Nottingham Trent University
PDP	Personal Development Planning
PG	Postgraduate
RDA	Regional Development Agency
RSC	Regional Support Centre (JISC)
SIG	Special Interest Group
UG	Undergraduate
UK LeaP	BS8788 draft standard
UML	Unified Modelling Language
VLP	Virtual Learning Portal (NTU)