EPICS – OUTCOMES OF A REGIONAL EPORTFOLIO INITIATIVE TO SUPPORT LIFE-LONG LEARNING

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Background

The facility to transfer portfolio data between different systems has the potential to provide greater continuity in life-long learning and may help put more emphasis on continuous development, rather than fragmented and episodic learning. Transferring portfolio data may also deliver other educational benefits such as the explicit recognition of prior learning, achievements and existing skills. However, there are many challenges to overcome in achieving this transfer of data (technical, pedagogic, legal/ethical etc.).

The EPICS[ii] project is a regional ePortfolio collaboration in the North East of England, funded as part of the JISC Distributed e-Learning Programme, which aims to address some of these challenges. The partners include the OWL consortium of Further Education colleges and five Higher Education institutions (Universities of Durham, Newcastle, Northumbria, Sunderland, and Teesside), which collectively use a diverse range of ePortfolio applications, including ePET[1] and Blackboard CMS[2]. The partners have a history of working closely together and, following extensive dialogue, chose to prioritise learner needs as a key area of work, acknowledging other collaborative work, and complementary proposals in response to this project. EPICS builds on a number of previous projects developing ePortfolio technologies and pedagogy.[3,4,5] Within the region a number of different ePortfolio systems are used for a diverse range of purposes across the educational continuum, ranging from supporting PDP to assessment.[6,7]

The project itself used a methodology designed to develop, test and evaluate a practical approach, building on existing tools, to implement a region-wide infrastructure for the easy transfer of individual progress file, ePortfolio and PDP information across a range of agencies and institutions. Enhancing the learning experience by supporting the individual needs of each learner is at the heart of this development, along with permanently embedding collaboration in regional activity.

Aims and Objectives

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[i] The OWL Consortium is a collaboration between the local colleges in the Tyne and Wear area (City of Sunderland College, Tyne Metropolitan College, Gateshead College, Newcastle College and South Tyneside College).
[ii] Regional collaboration on ePortfolio Progression Pathways with Illustrative Case Studies (EPICS)

The aim of the EPICS project was to collaborate with representative institutions of North East educational sectors (within and between FE/HE), to extend the regional partnership through active engagement and dissemination of illustrative case studies, and to learn from parallel activities elsewhere.

The project's objective was to establish a regional collaboration to:
- Identify the conditions necessary to create a framework within which a single ePortfolio PDP, directly linked to the individual learner, can be followed through its full lifecycle from the final secondary school years to A level and FE, through foundation courses and degrees to graduating from HE and on into the workplace, whilst providing a seamless experience to the individual learner
- Develop a suitable technical framework to deliver the transfer of learner ePortfolio information (which may be different in each institution) between a range of educational institutions, and web based interfaces to enable access from learners' homes, educational establishments and the workplace
- Implement an agreed base-level technical schema to test the portability of learner ePortfolios.
- Examine the regional, legal, political and cultural issues which need to be addressed in order to offer a full progression pathway
- Evaluate the integrated use of ePortfolio tools to support widening participation and lifelong learning, by developing 5 model case studies to illustrate how local, regional and national systems will work together to provide coherent access across educational institutions to learner portfolio information
- Disseminate the practical outputs of the project to other regional partnerships and the JISC via the website, documentation (including a handbook and case studies), and events

Potential Barriers

There was a degree of difficulty in engaging with multiple colleges and universities across the region. The EPICS Project involved close collaboration between the five Universities in the North East – Newcastle, Northumbria, Sunderland, Durham and Teesside, and with a number of Further Education Colleges including City of Sunderland College and Stockton Riverside College. One key issue this raises is the geographic spread, as the distance between institutions made any collaboration significantly more difficult. In a bid to address this, the monthly project meetings were held at different locations throughout the region and a project management website was established using the Basecamp[8] software package to facilitate online collaboration between partners. This allowed partners to engage with one another without having to travel between institutions.

The cultural and historic differences between the institutions proved to be as large a barrier as the geographic disparity. From the beginning, the partnership was delicately balanced with a dichotomy between the institutions that wanted the project to explore the pedagogical, political and legal aspects of ePortfolios and those who were more involved in the technical components of the project. The project plan required both sides, exploring the barriers to ePortfolio usage and progression to provide the foundations on which to build the technical framework.

Most partners have been very keen to involve their institution throughout the two areas, although it proved more difficult to achieve the necessary buy-in from other key parts of their universities and colleges. For example, a number of institutions approached their ICT department and found an unwillingness or inability to co-operate on the technical developments required. It was agreed that only the institutions that were willing and able to collaborate on a technical level would need to be involved in these aspects of the project. This was to the benefit of the project as the small numbers of technical staff involved could work closer together than would have been possible had all partners been involved.

It was recognised that pedagogical and technical elements are of equal importance, but that the pedagogic may be the more intractable. To counter this, a regional PDP forum was established, chaired by Jamie Thompson from Northumbria University. This proved to be one of the key outcomes of the project, and

was recognised early on as an important group, and many of those who were more interested in the pedagogical elements of the project believed that the EPICS project should have been a similar group, looking at the more strategic usage of ePortfolios, with less emphasis on technical issues. The establishment of this forum has ensured that the project has engaged with all partners, without losing any momentum.

Pedagogy and Governance

Regional Forum

As part of the EPICS activities a Regional Forum has been established to share good practice for Personal Development Planning (PDP) and ePortfolios within the region. Given the relatively large number and diversity of partners this has been a major achievement with productive workshops leading to a closer community of practice within the region, while maintaining links with national and international initiatives.

From early in the project a consensus emerged around the need for EPICS to develop a practice reference group, a 'process and practice' forum to explore the broader issues involved in PDP / ePortfolio activities at a regional level.

The emergent Regional Forum organised its activities in workshops around three key themes central to the development of transferable ePortfolios to support PDP. The workshops identified common practice, differences and served to shape some shared understanding and vision.[iii] Following the workshops a Regional Symposium was held where the results of the workshops were disseminated to a wider audience[9] and from which the Forum was given a clear steer for its future activities. Three key proposals emerged from the symposium;

The Forum should include and embrace the student voice as an integral part of its activity.

The Forum should reach out to the wider stake-holding community and into its member institutions to involve and engage a wider range of people.

Building on the useful foundations established the Forum should undertake a specific project; to identify portfolio templates acceptable to each institution to be used to pilot large scale transfer of ePortfolio between institutions and systems. There will be at least three such templates identified[10]

Drawing significantly on the Evaluation workshop and the Symposium Forum partners have subsequently designed a matrix situating PDP / ePortfolios in relation to their purpose (as mirror, as map or as sonnet) and to the different stakeholder perspectives (student, lecturer, employer, institution etc)[11]. This work will provide a framework for two significant projects over the next year. First it will inform the development of the three regional portfolio templates and the piloting of concurrent and contrasting evaluation strategies for those templates in practice. Second it will provide an underpinning rationale for a national research pilot to explore the meaning, delivery, outputs and outcomes of personal development in tertiary education and employment. This research project will be led by a collaborative partnership between HEIs and the Extended Lifelong Inventory (ELLI) at Bristol University and will seek to build on the work done by ELLI principally in the school sector.[12]

The work undertaken to date and lively and exciting future planned for the Regional Forum reflect the rigorous pedagogic debate that has underpinned and continues to underpin the technical developments.

Governance Tool Kit

Governance relates to the distribution roles, responsibilities and accountabilities across stakeholders. A 'toolkit' has been produced as part of the project to increase awareness of governance issues relating to the transfer of portfolio data across institutions. The toolkit aims to inform new projects on getting a good alignment of technology, management and pedagogy in order to reduce the risk of failure. The toolkit is

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[iii] ie. The Philosophy and Meaning of PDP, PDP Practice and Evaluating PDP

structured around '5 Ps'; Principles and Values, Policies and Strategies, Processes and Systems, Practices and People, and Politics and Participation.

Technical Interoperability

The technical elements of the project were designed to look at how the contents of an ePortfolio record could follow a student as they progressed through their academic career and beyond. This involved moving student data from an ePortfolio system at their previous college or university into their new ePortfolio at their future institution. For example, student may go from school to college to university and then into postgraduate education or work. Their portfolio record from each previous stage is very likely to be useful within each future stage.

The Faculty of Medical Sciences Computer Services at the University of Newcastle developed the ePET ePortfolio system.[1] Originally developed as part of a collaborative FDTL-4 project[13], the portfolio become synonymous with 'ePET' after the JISC funded ePortfolio Extension Toolkit (ePET) project which followed on from this. The original ePET project created an additional component that allowed ePortfolio data to be extracted from the ePortfolio in XML in a variety of interoperability schemas. A modified version of this was used in the EPICS project.

The ePET portfolio system is component based and easily customisable. It is structured in such a way that institutions can easily create and adapt tools to meet their own pedagogical requirements. It is built using open source technologies, principally Zope and MySQL. ePET is in used in a number of institutions, including Newcastle University[6], and was trialled at Teesside University throughout the duration of EPICS.

Blackboard is the market leading Virtual Learning Environment (VLE), used internationally by a wide range of customers, including some of the EPICS partners. To meet growing demand for portfolio systems, they have produced an unstructured tool that allows students to develop a web-based portfolio. The ePortfolio system is an add-on to the main VLE, and unlike the structured design of ePET, it is more of a file repository and a way of creating personal webpages. The City of Sunderland College has purchased this module, and has been using it successfully for a number of months.

The unstructured nature of the Blackboard ePortfolios means that they are able to blend format, resources and text very effectively. For example, within Blackboard, it is possible to have a page with text referring to the images displayed adjacent to it, all formatted according to the user's wishes. This requires very little know-how, as the What-You-See-Is-What-You-Get (WYSIWYG) editor is fairly straightforward to use. However, because of the unstructured nature, these associations are not defined in the HTML source code, and as such will not be seen to exist by a machine reading the source code; and this poses significant issues for transferring portfolio data between Blackboard and other systems.

Interoperability Case Studies

The technical interoperability study involved transferring real and mock student data between ePortfolio systems, replicating the progression pathways that real students might take, while testing the options and possible solutions to the transfer of data between systems. A series of Case Studies were put forward following discussions with representatives of the partner organisations. This was documented in a series of case studies, and the actual tests involved transferring data from:

ePET ←→ ePET (Newcastle and Teesside)
ePET ←→ Blackboard (Newcastle and CoSC)

Case Study 1

A Full-time CoSC student, 16-18 year old, studying AS levels in Biology, Chemistry and Maths, who has also studied French, General Studies, Citizenship and Keyskills. They intend to go on to the University of Newcastle upon Tyne to study Medicine. Data would be transferred from Blackboard to ePET.

Two real-life CoSC students were asked to allow the transfer of their data, and although they did not fit exactly into the student model suggested when determining this Case Study, they provided invaluable real life data, thereby helping to bring into focus the relevance of data transfers, and as such of the EPICS project as a whole.

The system at CoSC had only recently been implemented, and as such the portfolios were quite new and undeveloped, meaning that they lacked the diversity of content that could be expected from a mature portfolio. In particular they lacked examples of multimedia, with the only examples of binary data stored in their portfolios being a JPEG photograph and a CV in Microsoft Word format.

The CoSC portfolios were downloaded from Blackboard using the standard download tool. This allows the web pages forming the portfolio, along with any supplementary files to be downloaded into a zip file. The original data is safely archived in this zip file for future use, and allows the student to browse their portfolio locally as static HTML. This zip archive was uploaded into ePET using the date transfer module that allows zip files to be imported into the system. It reads any folder structure within the zip file and recreates that in the ePET file repository, storing the files in the corresponding folder. The contrasting nature of the structured ePET portfolio, and unstructured Blackboard portfolio meant that the design of the pages was lost in the transfer, although the original pages were kept in the archive.

During the zip file upload process, ePET reads through the uploaded archive attempting to locate any XML file. If an XML file is found it checks to see if it will verify against IMS-LIP[14], and if so will parse that data inserting records based on the XML into the database structure. As Blackboard creates HTML and not XML, any text data stored within the HTML files in the zip archive could not be transferred into the relevant text boxes of the ePET portfolio. Some initial ground work was conducted to investigate how to achieve this and it was determined that for numerous reasons this was unlikely to be successful. The Blackboard WYSIWYG HTML editor allows so much flexibility that it was very difficult to program a system to take into account all the various possible permutations. This was exacerbated because the templates in use by CoSC did not produce valid XHTML, meaning that standard HTML parsing libraries available to ePET could not read the Blackboard HTML in the way expected.

To transfer text data into the relevant ePET fields a 'cut and paste' technique was actually the most straightforward method, even though this was effectively a manual transfer. The student uploaded their zip file, and then went through the rest of their portfolio copying from their Blackboard portfolio and pasting into the most relevant area of their ePET portfolio. Although not automated, it was noted that this form of transfer empowers the user, in that he or she is in control of the data and its processing, which bypasses some of the more difficult legal issues around data ownership and data protection.

Case Study 2

A Part-time mature CoSC student on a vocational course studying Music is interested in taking the Popular and Contemporary Music BMus Hons (W301) course at the University of Newcastle upon Tyne. Data would be transferred from Blackboard to ePET.

The unstructured nature of the Blackboard ePortfolios means that they are able to blend very effectively format, resources and text. As a music student, this was very important as their portfolio was multimedia-rich, containing sample music files and potentially videos of their performances.

A fictitious student record was created within Blackboard. For expediency, it was decided to use a sample portfolio exported from ePET which was imported into Blackboard, modified to add multimedia, and subsequently re-exported, and uploaded into ePET. This actually replicated closely the sort of information that we would expect such a student to have recorded, although it also meant that the exported web pages were XHTML compliant, and mapped very closely to the IMS-LIP XML standard used by ePET for data importing and exporting. These web pages remained virtually unchanged during the importing and exporting process.

As the web pages were produced in a standard format, it was possible to map the data structure of these pages to the data structure of ePET. During the process of converting the XML downloaded from ePET to HTML, <div> tags were used to surround the required content, and these were given class attributes relating to the relevant tags within the IMS-LIP schema. Some work was undertaken to map these attributes to the ePET database, and on uploading the zip file, ePET could take a large proportion of the information within the HTML files and place them into the relevant area in its database.

The file transfer was quite quick, given the size of files being transferred. However, this could become a huge barrier if an institution has a slow bandwidth, because there is a possibility that the file could grow to a size that would time-out during a standard HTTP transfer, especially if the student has graduated from a four-year, multimedia-intensive course.

This process could only work as well as it did because the original source of data was a structured one, ie ePET. If the data had been extracted initially from an unstructured source (ie Blackboard) it would have been much more difficult to extract the data, as was shown in Case Study 1, which required the student to copy and paste from one portfolio into the other.

Case Study 3

A University of Teesside Student, studying Midwifery, wishes to go onto the University of Newcastle to complete the MBBS. Data is transferred from ePET to ePET.

The University of Teesside have been piloting a number of ePortfolio systems as part of the EPICS Project, including ePET and Pebblepad. Although no midwifery students are involved in the pilot, it is very likely that the School of Health and Social Care would actively take on board one of these ePortfolio systems. Medical students studying on the MBBS Course at Newcastle have access to an ePET portfolio through their Learning Support Environment (LSE).

A student record was created within Teesside's portfolio system that was designed to simulate what information a real student might store against their record. This information included CV-based data, a SWOT analysis and a number of Microsoft Word documents. The 'XML Transfer' option of their Newcastle Portfolio allowed them to move this data from their Teesside portfolio. Teesside University was selected from a list of institutions and to request that information they simply entered their username and password from Teesside. An XML-RPC request was sent from Newcastle to the Teesside server, where the request (including username and password) was verified. The contents of the Teesside portfolio were transferred into IMS-LIP v1.0 XML, and were transferred back to the Newcastle server, which read through this XML document and wrote the data found into the database.

This was a very quick process, and the majority of information recorded in their Teesside portfolio was passed between the two servers in less than a second. This would make life very simple for the student, and it may even be possible to transfer this data using a batch process before the student even joins their new college or university. A request could be sent listing all the users required, and the returned data could update multiple user records.

The main barrier to this kind of transfer is that it requires an agreement between the institutions involved to ensure that the data being moved is validated. It is hoped that the advances in Shibboleth could validate this process, but this is unlikely to remove the core debates between institutions regarding ownership and data protection.[15]

A small amount of data was not transferred. Some was as a result of data not being mapped to the IMS-LIP schema. We found that many parts of the ePortfolio, mainly assessment related data, could not adequately be mapped to IMS-LIP. This issue was increased because in turn, a number of the key elements used by IMS-LIP could not be mapped to ePET in any way that would have been meaningful to external systems. The information that was not transferred included the SWOT analyses, action plan records, reflections against learning outcomes and comments made about the content of the portfolio. These items were all very much related to the Teesside course and how the student had performed while studying at Teesside. In many ways this information was no longer useful, and may even have been considered 'baggage'. In the case of reflections made against learning outcomes, it may even have had a negative effect on the new portfolio to transfer this information. The learning outcomes on the two courses are very unlikely to be the same and, without changes being made to the ePET database, recording reflections against these would cause conflict with any future claims, and would have produced nonsense records.

There was one additional reason why some information was not transferred, and this was because the Teesside server used a previous version of the data transfer software to the Newcastle version. Although this proved to be backwards-compatible, in that data mapped to Teesside was transferred, it meant that some key portfolio data did not move between servers. The most important of this information being the files the student had stored.

It was felt that the biggest point to note from the work involved in creating this case study was that although some information must stay within a student's portfolio as they progress through their educational life, a large proportion of portfolio information has a definite 'shelf-life', and is not necessary after a certain point. However, this raises the question as to who decides which elements are important and which are not?

It was agreed that the most important information to keep within a portfolio are the documents created outside of the portfolio itself. Examples of this include Word documents containing essays and assignments, multimedia information created during the course and scanned copies of artwork. In many ways these are the items that would form a traditional 'artist'-type portfolio. Generally, students will want to take with them anything that will help them in their new course or career. Reflections against learning outcomes, SWOT analyses, and meeting records recorded electronically as part of an institutional or course-specific portfolio are unlikely to be relevant to any new courses the student will be studying. Often students see moving to a new course or institution as a 'fresh start', and may not want data relating to previous assessments storing within their new portfolio.

One possible solution would be for ePortfolio providers to move towards using external web services to provide some of the data within ePortfolios. For example, a blog tool could use the blogger.com API to allow students to record this information. It would then be accessible via their portfolio and by logging in to blogger.com. When the student changes institution, they simply tell their new portfolio to use their existing blogger.com profile. The number of students joining academic institutions who currently have a web presence through a blog or social networking service is increasing annually, and by utilising these tools it is ensures that students are familiar with the service on offer and are more like to engage with this.

By using external tools to host personal information, the academic institutions only need to be concerned with the development and hosting of course-related or academic elements of the portfolio. As these are unlikely to be required by the student as they move on, this would effectively remove any data protection issues, and would mean that in most cases the student would have full control over the personal elements of the portfolio, even when their employer or academic institution did not provide them with a portfolio. The exception to this would be where the home institution or a third party asserts ownership. An example

would be evidence of a project created during an industrial placement. This is a governance issue, and the onus is on the data owner to provide details of what information they do not wish the student to share with additional third parties.

Case Study 4

University of Newcastle student studying Dentistry wishes to go on to study a Taught D Prof in advancing clinical practice at the University of Teesside. Data would be transferred from ePet to ePet.

A student record was created within the Newcastle University ePET system replicating the kind of information a real student might record in their portfolio. Information recorded included CV data, a SWOT analysis, web links and some Microsoft Word documents.

The student chose to download this information from their portfolio into a zip archive. Students can download their portfolios as zip files at any time by navigating to the 'XML Transfer' part of the portfolio and clicking on the link to download their file store. The zip file this creates contains all files stored in the portfolio and a valid IMS-LIP XML document, which stores the text data from their ePortfolio in a format recognisable to other portfolio systems.

This zip file could have been stored on CD-ROM, DVD, or even a USB Flash drive until a time when the student needed the information. By compressing the data within a Zip archive, the download time was reduced and the space required to store this information was greatly reduced. The actual zip file used in this transfer was little over 1MB in size and as such downloaded in a matter of seconds. There may be an issue with download times when using larger archives, especially if the bandwidth being used is not particularly high. The student may be required to download the portfolio in sections, or the institution may have to provide the downloaded portfolio for the student.

It was felt that if the university provided the portfolio, and did so using reusable media, such as a Flash Drive, there could be a relatively inexpensive marketing opportunity. The drive could be branded with the college or university logo and after graduation the student is very likely to reuse that media in future education or work. The costs associated with such devices has been decreasing over the last few years and given the economies of scale associated with the number of drives a college or university would require, the cost per student could be as little as £10.

By navigating to the same page in their Teesside portfolio from which they downloaded their Newcastle portfolio, the student was given the option to upload their portfolio in zip or XML format. The XML option allows text data to be transferred using IMS-LIP. If a student uploads a zip file, the system automatically looks through the files stored within it and if it finds any XML documents that validate against the IMS-LIP schema, will upload them to the database. On this occasion the student simply uploaded the zip file created when downloading their Newcastle portfolio. The IMS-LIP document allowed their portfolio data to be transferred, and the system read through the documents stored in the archive, transferring them into the student's Teesside portfolio.

This demonstrated quite nicely an alternative method of transferring the data from institution to institution. The alternative, using a HTTP (XML-RPC) transfer requires an agreement between the institutions involved to ensure that the data being moved is validated. This alternative system ensures that the student takes responsibility for the information, selecting for themselves what gets uploaded and what gets downloaded.

Some data was not transferred, and again this was the information that could not easily be mapped to the IMS-LIP schema. There is no obvious place to store information such as SWOT analyses, without causing compatibility issues with other portfolio systems. It is possible that IMS-LIP is not the most appropriate

XML schema to use when transferring portfolio data and the ePET development team are currently investigating the other options available, such as UK-LEAP[16] and IMS-ePortfolio[17].

The question as to what information should and should not follow a student as they progress through their academic life was raised during this case study. It may be that the designers of IMS-LIP have developed the schema with this in mind, as it does seem to fit quite nicely with the information that the student is most likely to need to transfer. However, institutions need to agree what information they choose to allow students to transfer and what information they choose to keep. There are many factors in making this decision, mainly related to ownership of that information and data protection legislation.

Case Study 5

A Full-time overseas student studying the MBBS course at the University of Newcastle by day is also undertaking a part-time course at City of Sunderland College to gain a European Computer Driving Licence on an evening. Data would be transferred from ePET to Blackboard.

As in Case Study 4, the student exported data from ePET as a zip file containing all their uploaded resources and an IMS-LIP XML data file, essentially producing a self contained record of the data to be transferred. Unfortunately Blackboard is not readily able to import XML data into a meaningful and easily displayable/editable format, which meant that the IMS-LIP data contained within the ePET export could not be uploaded. The solutions put forward to solve this issue were a manual 'cut and paste' and the use of XSL transforms to change the IMS-LIP XML document into XHTML that could be uploaded into Blackboard as web pages. Although such transforms do not currently exist within Blackboard, this was deemed the most appropriate option, and appropriate transforms were created by EPICS project officers to facilitate this Case Study.

To transform data using XSL, two approaches can be taken, either the original XML data is kept, and is viewed using the XSL to format the page in a more 'friendly' manner, or the data is permanently converted to XHMTL replacing the XML tags with XHTML formatting tags. The first approach is the most pure, in that all the data is kept untouched. This means that the data is kept in a usable XML format. However, it is also very difficult to edit as an XML editor package is needed, and various skill levels are required from the user depending on the quality of the XML editor used. The alternative generates XHTML pages, which if properly crafted can keep most of the information held in the IMS-LIP XML data, but which users would find easier to edit than raw XML code. Blackboard uses a WYSIWYG HTML editor, which cannot read XML but could be used to edit the uploaded XHTML document. The main issue with permanent changes is that some data loss can ensue, as it is difficult to convert all the information held in the raw data format into something that is visually appealing once displayed. Although both conversion options had benefits, it was decided to use the transforms to permanently convert the data to XHTML pages prior to import, largely because of the compatibility issues that this might have with Blackboard's WYSIWYG editor.

Separate XSL transforms were created for each of the key 'top-level' elements of the IMS-LIP schema, such as 'identification', 'affiliation', 'goal' and 'activity'. A DOS batch file was created that ran the series of transforms against the IMS-LIP document, creating a series of web pages that could then be uploaded into Blackboard. The XHTML used was carefully created to ensure that the data remained within meaningful tags, using <div> elements for layout, with id attributes mapping exactly to the corresponding tag from IMS-LIP.

By maintaining these attributes, the XHTML could be transformed back into an IMS-LIP XML format, and used for data exchange once again. This was tested by exporting a record from ePET in IMS-LIP XML format, transformed into XHTML by the XSL transforms, imported into Blackboard and incorporated into an ePortfolio, and subsequently exported and imported back into ePET. Although this is still in the developmental stage, the results were promising, and the HTML parsing libraries available to ePET could readily parse the XHTML generated by the XSL transforms with no data losses.

A clean portfolio was created within Blackboard, and the Web Folder facility was used to upload the new web pages and additional resources into the Content System. A new folder was created into which all the relevant files were copied into this folder, including the newly created web pages, the supplementary data stored in the zip archive, and the original IMS LIP XML data which could be used to archive the old portfolio. Once the files were successfully uploaded, they needed to be incorporated into a Blackboard portfolio. Each imported page had to be individually linked using the 'add content' facility to ensure that they were accessible from a link in the navigation frame of the created Blackboard portfolio. A link was added to the newly created folder, setting the permissions for the contents of that folder, making the uploaded portfolio visible to third parties with whom the portfolio was shared.

A key benefit of the XSL transforms was that data from additional ePortfolio systems could be uploaded into Blackboard using the same scripts. It was hypothesised that any portfolio system that allowed an export in IMS-LIP XML format could use these XSL transforms to create data accessible to Blackboard. This was tested and found to be successful with data exported from several systems, with the only errors being raised by data exports that mapped their data to UK-LEAP rather than IMS-LIP. This would be a relatively straightforward addition to the XSL transforms, but was unfortunately outside the scope of the project and was not taken forward.

Recommendations

An agreement needs to be made between institutions as to what information should be transferred. This includes further investigation of the data protection and data ownership regulations. Ideally a common ground should be found whereby all institutions involved agree to passing the same information around. This could be quite limited as very little of the information stored within a portfolio system is required by the student on a long-term basis. Some information must always be available to the student, including any files/documents uploaded to the portfolio and personal (CV) data, and possibly transcript information if available, but most course or institution-specific data is not necessary as it is likely to have little relevance to the student's future studies.

In some circumstances, no data needs to be transferred from one academic institution to another. During the process of developing the case studies, it became apparent that that the data that users were most likely to want to transfer was less complex than had originally been supposed. For example, records of meetings would be of little future use, but CV and documentary evidence (in any media) would be desirable. This did have the effect of simplifying and making more manageable the technical requirements.

The use of web services could allow the core 'transferable' information to be held in external systems outside of the college/university and simply plugged in by the student when they move to their new institution. Course-specific data could then be managed and developed by the relevant institution. Some data would still need to be transferred (document uploads), but managing this would be much more straightforward than using the existing XML method. This could even be linked in to an external or centrally-held document repository, referenced by the student from within all of their portfolio systems.

A barrier to transferring data is the disparate systems in use, as often these will be incompatible or have inconsistencies in the way data is store or managed. For example, ePET uses a very structured database, whereas Blackboard is relatively unstructured, and without some degree of structure it is impossible to map data stored in Blackboard to the database field in ePET. As such, the benefits of transferring data between such seemingly different systems are minimal and it might be more worthwhile to simply provide the file store data.

In terms of the data standards investigated by EPICS, IMS-LIP may not be the best method of transferring ePortfolio data. Other standards are available including IMS-ePortfolio and UK-LEAP, and these are under investigation by the EPICS partners. Additional standards such as HR-XML[18] or Europass[19] (for CV data)

may allow each of the key portfolio components to be transferred more easily by using a specific schema to transfer data from each separate tool.

EPICS tested using an automatic data transfer (using XML-RPC), a download/upload facility and a copy and paste option, all with a good degree of success. Therefore, taking a step back from the more technically advanced part of the work done, it is possibly more useful from the student's perspective to give the student the option of downloading and uploading the data in the format they prefer. As previously mentioned, their portfolio data could be stored on a flash drive with a dual purpose of marketing the institution. This would make transferring data from ePET to any other system (such as Blackboard, Pebblepad, Lucid etc.) more straightforward, and would place the onus on their 'new' institution to provide the ability to incorporate this data into the student's portfolio.

Conclusion

The EPICS project was a great success, providing case studies from Further and Higher Education to demonstrate that portfolio records can follow a student as they progress on their lifelong learning journey. The project looked at various techniques and methods, ranging from fully automated solutions through to relatively 'low-tech' user-initiated techniques. In addition to these technical achievements, the project has given significant insight into the complex pedagogic and socio-legal issues surrounding the use of and transfer of portfolio data. There are a relatively large and diverse group of partners within EPICS, the establishing of a regional PDP Forum is therefore an important outcome of the project, providing mutual understanding and sharing ideas and concepts for the spectrum of ePortfolio/PDP practices. Also, the 'Governance Tool Kit' produced as part of the project draws on some of the learning from EPICS in relation to the social, legal & ethical issues related to ePortfolios.

The EPICS partners are keen to continue to build on the achievements from the EPICS project, and to take forward the work that has been done. The first step in this is to keep the existing partnership in place and to build on the regional networks, such as the PDP Forum, in collaboration with other national and international initiatives. This will help answer some of the difficult questions raised by EPICS, such as what data should and should not be transferred, and what the legal and political implications of transferring student data are for the institutions and individuals involved. In terms of the technical work, continuous development is taking place to enhance the data transfer techniques, by investigating further the use of additional XML schemas such as UK-LEAP and IMS-ePortfolio, and the use of web services to host student data.

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