

E-PORTFOLIOS EVALUATION REPORT

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Authors:

Maria Toro-Troconis (Senior Learning Technologist)
Ashish Hemani (E-learning Project Manager)

<http://www.imperial.ac.uk/medicine/elearning/eportfolio/>



<http://bit.ly/4B81Un>

Purpose of this document

The aim of this document is to provide the key findings of the e-portfolio evaluation as well as to explain the objectives of the project phase, its scope and the main functionality evaluated.

Document Location

This document is only valid on the day it was printed.
The source of the document can be found at the project's shared folder under the Documents folder.

Revision History

Revision date	Previous revision date	Summary of Changes	Changes approved by

Distribution

This document has been distributed to

Names	Date of issue

EXECUTIVE SUMMARY

E-portfolios address a current and emerging need for students to have an environment in which they can collect, select, reflect upon, build, and publish a digital archive of their activity work. E-portfolios can be classified under three main categories according to Helen Barrett (2004)¹:

- An assessment tool to document progress and the gaining of competences.
- As reflective tools to encourage critical thinking and deeper learning and
- A showcase of abilities and achievements (a product for marketing of the student's suitability for employment).

This evaluation shows an exploration of the requirements needed for an e-portfolio tool for undergraduate medicine providing a detailed evaluation of six different popular e-portfolio systems currently used in Higher Education institutions and the NHS.

The evaluation has taken into account the following technical considerations: value-add to student learning, infrastructure costs, maintenance and support costs, ease of use, choice of back-end technology, ownership of the artefacts and final product, user-support required, setup, maintenance and upgrade costs and portability and interoperability issues.

The e-portfolio systems selected for this evaluation were identified based on the following criteria: their deployment among healthcare providers, their wide use across Higher Education institutions and/or their implementation of interoperability standards. Therefore the following six (6) products were selected for this evaluation:

1. PebblePad - <http://www.pebblelearning.co.uk/>
2. NES (NHS Education for Scotland) - <https://www.nhseportfolios.org/>
3. Mahara - <http://mahara.org/>
4. Giunti Labs - <http://www.eife-l.org/publications/softwarecenter/learnexactportfolio>
5. Premier IT - <http://www.premierit.com/eportfolio-software/>
6. ePET - <http://www.eportfolios.ac.uk/ePET>

In order to provide a systematic evaluation of the different e-portfolio systems selected, a requirements sheet was designed covering all the key aspects. The requirements were divided into ten (10) different sections (see page 10 for more information):

1. **Curriculum related features**
2. **Careers**
3. **Assessment**
4. **Publish/Share**
5. **Analysis Tool**
6. **Access**
7. **Customisation**
8. **Technical Information**
9. **Staffing requirements**
10. **Costs**

The e-portfolio systems: NES, Giunti Labs, Premier IT and e-PET generally speaking, require high levels of customisation from their vendors in order to make the product used across different disciplines. Some of these systems have been created only focused on the requirements of one institution, as is the case of NES and Premier IT aimed to accommodate the NHS requirements. These systems do not comply with e-portfolio standards.

¹ Barrett, H. (2004) Selecting e-portfolio software. In E-portfolios for Learning, June 01, 2004. Retrieved May 15, 2009, from <http://tinyurl.com/nzjosc>

The systems that seem to be covering most of the requirements specified are PebblePad and Mahara. Both systems are LEAP2A, HRXML, IMS e-portfolio 1.0 and HTML conformant. PebblePad and Mahara both offer the same functionality and user experience and in principle either of these products could be selected. However, PebblePad is a commercial product which is easy to integrate with existing tools, having a maintenance model which is covered by annual license costs. Mahara is an Open Source e-portfolio with no software purchase costs. However, ongoing costs involve resolving how to address maintenance and upgrading. Customisation of the product may result in major challenges which may require in-house development resources.

For these reasons, PebblePad is the e-portfolio selected as the best option. It complies with e-portfolio standards; it has a wide community of users in the UK and complies with most of the requirements specified in this evaluation. At the same time, whatever the choices are in designing and implementing an e-portfolio to support medical education, it is important to remember that medical students are 'digital natives'. These students are used to Web 2.0 technologies, mobile phones and devices allowing exchange of data. E-portfolios should be designed and embedded in the curriculum using innovative ways which motivates the students and takes advantage of the different interactive tools already provided within e-portfolio systems.

It is suggested to identify an academic area in which PebblePad could be piloted covering no more than 500 users for one year. A rollout programme should be in place to be taken forward upon the completion of the pilot involving subsequent years. The costs to support the PebblePad pilot for one year can be covered by the money provided by the E-learning Committee. However, it is recommended ICT and the Faculty of Medicine discuss future financial implications in order to establish how the e-portfolio system will be supported once the pilot project has been completed.

1. Background

E-portfolios address a current and emerging need for students to have an environment in which they can collect, select, reflect upon, build, and publish a digital archive of their activity work. E-portfolios can be classified under three main categories according to Helen Barrett (2004)²:

- An assessment tool to document progress and the gaining of competences.
- As reflective tools to encourage critical thinking and deeper learning and
- A showcase of abilities and achievements (a product for marketing of the student's suitability for employment).

The common understanding of what an e-portfolio consists of is summarised by Lorenzo and Ittelson (2005)³:

“...a digitised collection of artefacts, including demonstrations, resources, and accomplishments that represent an individual, group, community, organisation, or institution. This collection can be comprised of text-based, graphic, or multimedia elements archived on a web site or on other electronic media such as a CD-ROM or DVD.”

The use of e-portfolios as a reflective tool has its theoretical roots in ideas such as ‘constructive alignment’ (Biggs, 2003)⁴. The idea of this constructivist theory is based on the notion that everything in a curriculum, including the assessment task(s) and the teaching methods, should be aligned with the intended learning outcomes. In an e-portfolio this can be visually demonstrated by means of tables that show the student exactly where a quiz, clinical skill, etc. fits into the skills base or conceptual framework that the unit, module or course is intended to develop. Student can then reflect on how s/he is meeting, exceeding or failing to meet these standards of competencies, an mentor(s) can support the students providing feedback and guidance (Ward, MH., Ellis, R., 2007)⁵.

In the area of medicine, one of the aims of a clinical e-portfolio is to promote structures for reflection on clinical experiences, designed to replace the paper logbook. This clinical practice support tool may include the following features:

- Storage and display of Clinical Learning Objectives, records of clinical practice, and placement-specific learning opportunities.
- Portfolio based approach allows much comprehensive clinical tracking by both the students and the tutors.

E-portfolios can also be used in many ways for both formative and summative assessment. According to Lorenzo & Ittelson (2005)² and others, e-portfolios can be used to:

- Assess students against specified learning objectives using a rubric to assess against a matrix of performance criteria.
- Help students analyse patterns in their own learning.
- Measure against state-based standards.
- As a collection of “digital artefacts” plus reflective essay all of which receive feedback from tutors.
- As part of a learning plan with analysis of evidence and outcomes.
Provide students on work placements and their supervisors a place to journal and give feedback on skill acquisition.

² Barrett, H. (2004) Selecting e-portfolio software. In E-portfolios for Learning, June 01, 2004. Retrieved May 15, 2009, from <http://tinyurl.com/nzjosc>

³ Lorenzo, G. and Ittelson, J. (2005) Demonstrating and assessing student learning with e-portfolios. ELI Paper 3: Educause Learning Initiative. October 2005, Educase. Retrieved May 15, 2009, from <http://tinyurl.com/m5ql7b>

⁴ Biggs, J. (2003) Aligning teaching for constructive learning. Discussion paper from the Higher Education Academy, UK. Retrieved May 15, 2009, from <http://tinyurl.com/mo8ob3>

⁵ Ward, M., Ellis, R. (2007) E-portfolio report. USyd eLearning. June 2007. Retrieved May 15, 2009, from <http://tinyurl.com/l14hm7>

2. Project Aim and Objectives

This project aims to investigate the different e-portfolio systems implemented across different educational institutions in the UK. It also aims to identify the e-portfolio functionality required for the adoption of an e-portfolio system for Undergraduate Medicine at Imperial College.

This evaluation phase aimed to look at different e-portfolio systems which aim:

- To assess students against specified learning objectives.
- To record clinical observations and practice.
- To map clinical observations with clinical skills.
- To map clinical observations and skills to learning outcomes.
- To help student analyse patterns in their own learning.
- To measure against state-based standards.
- To support reflective practice.

This evaluation was started in January 2009 and finished at the end of May 2009. Although this evaluation was lead by Undergraduate Medicine, different representatives from other Faculties and areas of College were invited to attend different demonstration sessions (see Distribution List on page 2). Feedback was received covering different aspects of the e-portfolio functionality required, not only from a clinical point of view but also from an assessment and reflective view point.

3. Technical and other considerations

The evaluation has taken into account the following considerations:

- Value-added to student learning.
- Infrastructure costs: integration, sustainability (cost-effectiveness).
- Maintenance and support costs.
- Ease of use, including ability to transfer grades to and from an LMS into the e-portfolio system.
- Choice of back-end technology and tools.
- Ownership of the artefacts and final product.
- How the data will be managed and user-support required.
- Setup, maintenance and upgrade costs (especially costs of maintaining space for students over the life of their studies and for some time after graduation).

The evaluation has also looked at the range of student artefacts that could be housed in the e-portfolio systems. For example:

- Actual marks/grades
- Detailed tabulation of practical training/clinical skills etc. against a matrix.
- Reflective work (e.g. blogs, comments on assessments, responses to peer mentor, or faculty reviews).
- Presentation of particular achievements, e.g. graphic designs, artwork, creative writing.
- Video/audio of student-patient interactions with reflective commentary.
- Peer reviews of joint projects.
- Faculty feedback on any of the above.

Portability and Interoperability

According to Grant (2009)⁶, the LEAP2A specification has been developed to support interoperability between e-portfolio tools and similar systems and the portability of information between them. There are existing specifications which overlap to some extent, but those in common use have a different focus, with a great deal of complex detail that is superfluous for e-portfolio use. HR-XML, for example, deals with information held by employers about their employees, typically managed by Human Resources departments. Similarly SIF – recently aspiring to be the "Systems" and not just the "Schools" Interoperability Framework, deals with information held by schools about their pupils. Neither HR-XML nor SIF focus on the information *managed* by learners, whether created by them, or recognised by them as potentially useful for presenting to others.

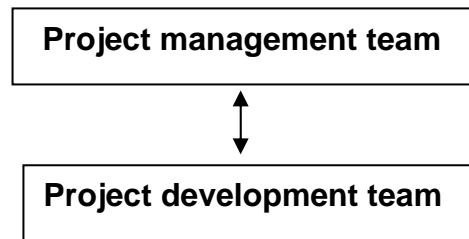
⁶ Grant, S. (2009). LEAP2A: A specification for e-portfolio portability and interoperability. ALT Online Newsletter. Retrieved May 15, 2009, from http://newsletter.alt.ac.uk/e_article001402921.cfm?x=b11.0.w

In the UK, those involved with e-portfolio systems knew that they wanted a simpler, more straightforward specification, more in keeping with the nature of e-portfolio information. In particular, items of portfolio information are related to other items in many ways, and while every system may build these relationships into their own hierarchical structure, there is no one such structure that suits everyone. Thus, rather than IMS LIP's hierarchical model, what was needed was a relational model for portfolio information.

A central principle of LEAP2A, upheld by the development partners, was that the specification should only cover what was currently available in e-portfolio systems, and it should not speculate about what might be there in the future. In this way, the number of items in the specification was kept as low as practical, contributing to the ease of understanding and ease of implementation. In every case, all ideas were subject to consensus approval by all the project partners. One of the early points of consensus was that the specification would be built on top of the *Atom Syndication Format*, which is very widely used, and itself easily extensible.

The final "A" in LEAP2A refers to Atom. The Atom Syndication Format was deemed suitable as it is designed for representing blog feeds, and portfolio items are generally things written by learners, just as their blog entries are. Often, e-portfolio systems include some kind of blogging facility, and those entries can therefore immediately be represented in LEAP2A.

4. Project structure



Project Management team

The Project Management team has had overall responsibility for the educational evaluation of the different e-portfolio systems. Its responsibilities are:

- To ensure that the project is managed effectively to meet the agreed objectives and the identified milestones/ project phases;
- To assist with the management of Risk as part of the agreed escalation process;
- To consider any proposed significant changes to the project

The team will meet when required or at the end of a project phase, or when a decision is required as per the project plan.

The membership of the Project manager team includes:

Head of Year 3, School of Medicine
Head of Assessment
ICSM President, Undergraduate Medicine Office
Year 6 student
Year 6 Curriculum Assistant
Clinical Curriculum Administrator
Learning Technologist
e-learning Project Manager
Senior Learning Technologist

Project development team

The Project development team has overall responsibility for the technical evaluation of the different e-portfolio systems. Its responsibilities are:

- To ensure all the required information is collected.
- To ensure all the technical questions and other important issues mentioned under section 3 have been taken into account for each system analysis.
- To gather feedback from other members of the Project Management team.
- To produce the final document reporting on the project evaluation findings.

The membership of the Project development team includes:

Senior Learning Technologist
Learning Technologies Support Co-ordinator
Senior E-Learning Support Officer
Learning Technologist
E-learning Consultant

4. Evaluation Methodology

The e-portfolio systems selected for this evaluation were identified based on the following criteria: their deployment among healthcare providers, their wide use across Higher Education institutions and/or their implementation of interoperability standards. Therefore the following six (6) products were selected for this evaluation:

7. PebblePad - <http://www.pebblelearning.co.uk/>
8. NES (NHS Education for Scotland) - <https://www.nhseportfolios.org/>
9. Mahara - <http://mahara.org/>
10. Giunti Labs - <http://www.eife-l.org/publications/softwarecenter/learnexactportfolio>
11. Premier IT - <http://www.premierit.com/eportfolio-software/>
12. ePET - <http://www.eportfolios.ac.uk/ePET>

Two other systems were looked at: [Pan-Surgical Electronic Logbook](#), and *Aspire*.

Aspire is based on the LUSID Open Source Software. *Aspire* is used at Oxford University. Two main pages sets are available: *Aspire* for Undergraduates and Taught Masters students and *Aspire* for Research Postgraduates and Contract Research Staff. The Undergraduate system concentrates on 'transferable skills' where as the Postgraduate version is based on the Joint Skills Statement.

Both systems look very user friendly. However, they are not customisable restricting the users to only those types of templates already implemented. These systems have not implemented any interoperability standards as yet.

The e-portfolio systems evaluated have been *commercial product options*. Mahara has been the only *Open Source* product evaluated. Demos of the different products selected were presented at various occasions and invitations were sent to different members of College, including the Library and Careers (See Distribution List on page 2).

In order to provide a systematic evaluation of the different e-portfolio systems selected a requirements sheet was designed covering all the key aspects. The requirements were divided into ten (10) different sections:

- **Curriculum related features:** this section looked at issues related to opportunities for reflection, tagging to make information discovery easier, categorisation linking to learning objectives, opportunities to upload files in different format as evidence, blogging capabilities, setting up deadlines, notifications, print and exporting facilities, etc.
- **Careers:** this section looked at issues related to opportunities for recording training activities, grades and marks, presentation of achievements as a profile or CV and opportunities to customise CV output.
- **Assessment:** in this section ability to provide feedback on each artefact as a validation process from more than one tutor (double marking) was looked at.
- **Publish/Share:** this section looked at issues related to access permissions (for internal and external users), possibilities for sharing artefacts as web links, management of user control over the e-portfolio giving users control over who may view their artefacts, ability for one single user to belong to more than one group, different customisable views, group work, multiple portfolios within the same user account, search facilities and syndication options.
- **Analysis Tool:** these sections looked at tracking aspects, such as being able to generate an activity log, options of having a general overview or summary of their activity (dashboard), digital rights acknowledgement by students and privacy/security issues.
- **Access:** this section looked at any accessibility restrictions in terms of infrastructure implemented.
- **Customisation:** this section looked at levels of customisation.
- **Technical Information:** relevant technical information was gathered in this section related to: server and Operating System requirements, user interface used, database details, opportunities for integration with Virtual Learning Environments (VLEs), such as Blackboard, interoperability and exporting facilities, possibility of integrating feeds to and from College systems such as Student Management Systems for grades and assessment

information, portability of the e-portfolio, single sign on system, browser compatibility, accessibility conformance (W3C, section 508 standards), storage management options.

- **Staffing requirements:** this section looked at the training options available and required, options for technical support and professional services.
- **Costs:** this last section looked at costing issues: installation, licensing, maintenance and upgrades.

The following table (See Table 1) provides an overview of the different products evaluated under the requirements specified above. From the information presented in Table 1 the systems that seem to be covering most of the requirements specified are PebblePad and Mahara.

PebblePad

Most of the functionality required is available in PebblePad. However, there are few requirements which are not fully functional at the moment. For example, options for *setting up deadlines* and *notifications/alerts via email* are limited. At the moment, individual actions within an action plan can have deadlines as can outcomes for meeting records. Other asset type deadlines are not currently available although from summer 2009 every item can have a reminder set. This will email the user with a message to return to the item for reflection and/or further action.

The ability to *export to PDF* is not currently supported by PebblePad. This requirement is actually not met by any of the providers except Giunti Labs. *Digital Rights acknowledgement* by students is not currently available in PebblePad. This facility may be built into the sign up process. This is a facility not currently available in any of the systems evaluated except Mahara. One of the key requirements was based on interoperability and conformance with current e-portfolio standards. PebblePad supports LEAP2A (from July 09), HRXML, IMS ePortfolio 1.0 and HTML. PebblePad does not offer a perpetual license.

Mahara



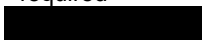

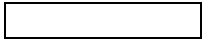

Most of the functionality required is also available in Mahara. However, the few requirements not available at the moment are: an activity log and the possibility of comparing records of achievements with Learning Outcomes or Objectives which is partially implemented. Mahara is also strong in relation to interoperability and conformance with current e-portfolio standards. It supports LEAP2A, HRXML, IMS ePortfolio 1.0 and HTML.

Others

The other systems looked at: NES, Giunti Labs, Premier IT and e-PET generally speaking require high levels of customisation from their vendors in order to make the product flexible enough as to be used by different disciplines. Some of these systems have been created only focused on the requirements of one organisation, as is the case of NES and Premier IT aimed to accommodate NHS requirements. These systems do not comply with e-portfolio standards.

Table 1. E-portfolio requirements – General evaluation

Requirements	PebblePad	NES	Mahara	Giunti Labs	Premier IT	e-PET
Curriculum related features						
Tagging: Detailed tabulation of practical skills/training						
Reflection: on curriculum and extra curriculum activities						
Categorising: Link to Learning Objectives or skills at a course/unit level						
Internal Linking						
External Linking						
File upload (Word, PDF, audio, video.. etc.)						
Blogging						
Goal Setting						
Setting up deadlines on each artefact						
Notifications/Alert by emails (e.g. before deadlines of achieving goals, etc)						
Users should be able to browse a library of all uploaded files, to search for specific files, and to select groups of files to present in mini-portfolios						
Users should be able to annotate uploaded files						
Users should be able to sort items in a portfolio by any of several criteria, which may include: learning outcomes; date created/updated/etc.; course; status of work. Other criteria may be desired						
Validation Process (Tutor able to approve work of students online)						
Ability to create and customise templates						
Ability to export/print each artefact separately						
Ability to export output (entire e-portfolio) to PDF, Word, HTML, CD,DVD, Memory stick, etc.						
Careers						

 Function partly available
 Bespoke development required
 Function not available
 Not known
 Please refer Appendix
 Function fully available

Requirements	PebblePad	NES	Mahara	Giunti Labs	Premier IT	e-PET
Record of training						
Grade and Marks						
Presentation of achievements						
Links to Publications or awards						
Ability to generate CV						
Ability to get customise CV output for applying to different Job requirements						
Assessment						
Ability to provide feedback on each artefact from peer/Faculty (Feedback from more than 1 Tutor - Double Marking)						
Publish/Share						
Access permissions (internal and externals)						
Share artefacts to Web (for any Web User)						
Users should have control over who may view the mini-portfolios they create.						
Ability for a single user to belong to more than one user group						
Different customisable Views						
Group Work (Users can create access groups to share content with certain groups only)						
Multiple portfolios within same user account						
Searching files/Folder within their e-portfolio						
Syndicate (RSS/External Content)						
Analysis Tool						
Activity Log						
Summarising (like My Dashboard)						
Comparing (e.g. with set learning outcomes, objectives etc)						
Digital Rights Acknowledgement by Students						
Privacy/Security						
Access						
Accessible in NHS hospitals						
Accessible by NHS employees						
Customising the Product						

Requirements	PebblePad	NES	Mahara	Giunti Labs	Premier IT	e-PET
The system can be customised for an organisation at installation covering general features (e.g. University logo, Branding guidelines, Policies, etc.)						
Authorised users may configure the system, adding or removing available functions as required.						
A variety of reports can be generated by authorised users and can be exported to Excel, CSV format.						
Technical Information						
Server and Operating Systems (OS) requirement						
User Interface (Frontend)						
Database (Backend)						
Integration with VLE (Blackboard)						
Interoperability and exporting facilities (Extract data in LEAP2A ,HRXML.. Etc)						
Feed to and from College systems such as Student Management System (includes grades, other information..)						
Portability (Mobile devices like PDAs..)						
Ability to sign on using College login details (Single Sign-on)						
Browser Compatibility						
Accessibility Standards (W3C, Section 508 standards)						
Storage (Can Admin assign individual storage space for each account?)						
Other Software requirements for Windows/Macintosh (MAC)						
Staffing Requirements						
Orientation/Training/Help						
Technical Support						
Professional Services						
Costs						
Installation (Hosting will be on Imperial College Server)						
License cost per User						
Perpetual License Available						
Maintenance and support, Additional Upgrades and requirements						

5. Conclusions and Recommendations

This evaluation shows an exploration of the requirements needed for an e-portfolio tool for undergraduate medicine providing a detailed evaluation of six different popular e-portfolio systems currently used in Higher Education institutions and the NHS.

The e-portfolio products that met most of the requirements were PebblePad and Mahara. In comparison, both systems offer the same functionality and user experience and in principle either of these products could be selected. However, PebblePad is a commercial product which is easy to integrate with existing tools, having a maintenance model which is covered by annual license costs. Mahara is an Open Source e-portfolio. For Open Source options there are no software purchase costs, set up costs include an operating system installed on a server, integration costs and customisation costs. However, ongoing costs involve resolving how to address maintenance and upgrading, as well as customisation of the product may result in major challenges which may require in-house development resources. For these reasons, PebblePad is the e-portfolio selected as the best option. It complies with e-portfolio standards; it has a wide community of users in the UK and complies with most of the requirements specified in this evaluation.

In planning and implementing an e-portfolio, an action plan should be created that involves the following elements⁷:

- Vision – provide a clear vision for the role of electronic portfolios for the overall programme.
- Skills – provide adequate professional development for all stakeholders.
- Incentives – provide appropriate incentives to motivate stakeholders.
- Resources – provide adequate resources for full implementation.
- Work with early adopters during the early exploratory stages. Keep in mind that a lack of structure or defined process may be frustrating, at either portfolio or technology implementation.
- Find the natural leaders and engage them in the planning and initial implementation.
- Assess the competencies of all the staff who will be doing the full implementation, to determine the targeted staff development needed.
- Organise training activities based on the needs and readiness of the individuals.

Whatever the choices are in designing and implementing an e-portfolio to support medical education, it is important to remember that medical students are 'digital natives'. These students are used to Web 2.0 technologies, mobile phones and devices allowing exchange of data. E-portfolios should be designed and embedded in the curriculum using innovative ways which motivates the students and takes advantage of the different interactive tools already provided within e-portfolio systems.

It is suggested to identify an academic area in which PebblePad could be piloted covering no more than 500 users for one year. A rollout programme should be in place to be taken forward upon the completion of the pilot involving subsequent years.

The costs to support the PebblePad pilot for one year can be covered by the money provided by the E-learning Committee. However, it is recommended ICT and the Faculty of Medicine discuss future financial implications in order to establish how the e-portfolio system will be supported once the pilot project has been completed.



<http://bit.ly/4B81Un>

⁷ Barrett, H. 2004, Professional Development for Implementing Electronic Portfolios. Retrieved May 15, 2009, from <http://electronicportfolios.com/teachers/profdev.html>