

Electronic portfolios in higher education

Stephen Gomez

Summary

The e-portfolio is an emerging technological solution that allows a far more flexible way to assess student achievement in higher education, especially when the student is remote from the university, say on work placement. The e-portfolio also serves as a means of showcasing learning achieved using multimedia evidence. This article provides an introduction to e-portfolios and gives an example where they are used in the UK for work-based learning.

Biography

Stephen Gomez is Principal Lecturer in Human Physiology, Faculty Placements Tutor at the Faculty of Applied Sciences, University of the West of England, and project Director of an FDTL (Fund for the Development of Teaching and learning) Phase 4 project called 'Profile' which aims to assess placement learning for academic credit through e-portfolios. Stephen was awarded a National Teaching Fellowship in 2003.

Keywords

E-learning, e-portfolios, work placements, work-based learning.

Importance of portfolios in education

The term portfolio has long been associated with artists who gather examples of their work together for exhibition or to gain commissions. In the general population, the term is also associated with financial portfolios which can be a collection of investments or which document the accumulation of fiscal capital or monetary assets. Similarly, an educational portfolio documents the learning achieved by a student. Educators, especially in the USA, are showing renewed interest in portfolios for assessment of learning since digital technology has helped transform the humble paper-based portfolio into the electronic – or e-portfolio. Where America leads, we tend to follow and although e-portfolios first made an appearance in the 1990s, the e-portfolio is only now starting to be used on these shores. The subject area has burgeoned enormously and this article serves as a bare introduction to a medium of assessment that has a huge potential to impact on higher education.

From now on in this article the term portfolio is used only within the educational context.

A portfolio is typically a collection of work or 'artifacts' selected by a student to:

- showcase his or her abilities;
- provide evidence that learning has occurred;
- evidence that learning outcomes have been met.

In addition to these artifacts or 'evidence of learning' there is often an element of reflection on the tasks reported. Perhaps the most attractive feature of a portfolio, from an educator's point of view, is the high student involvement in putting together the contents of a portfolio, often through discussion or negotiation with an academic tutor. Arguably,

the portfolio provides a more rounded and reliable assessment of learning achieved than written examinations or essay assignments alone. Because of the ownership of the portfolio by the student, each portfolio is individual and unique. For someone assessing a portfolio there can be a level of enjoyment greater than in marking assessments such as essays where everyone is given the same title and the marker reads almost carbon copies of the same content.

Many other features of portfolios for learning and assessment have already been reviewed by David Baume in an [article for the ILTHE Members Resource Area](#).

Pros and cons of paper-based portfolios

A traditional paper-based portfolio would be contained in a box, folder or ring binder. Typical contents would include text or images on paper, although for a box-type of portfolio videotape and solid objects could be included. The advantages of paper-based portfolios are:

- Portability (depending on the nature and size of the artifacts);
- Ease of display to others;
- No need to rely on complex or capricious technology;
- Because of the point above, this type of portfolio is student-centred rather than technology-centred.

The disadvantages, however, include:

- Lack of security; because artifacts can be unique, they can be lost, stolen or damaged;
- It may be difficult and/or expensive to make a copy of the entire portfolio;
- If there were multiple copies of the portfolio, adding new content would require all copies of the portfolio to be updated also;
- Lack of portability (for larger portfolios) and ability to share accumulating content with the academic tutor;
- The artifacts are limited to physical or paper-based material;
- Shelf-life of some of the artifacts (depending on their nature) might be limited.

Good practice with portfolios

The purpose of a portfolio should be clear to the student, whether it is paper- or electronically-based, and the following points should be addressed:

- The student needs to lay out the aims or goals of the portfolio and therefore needs to understand the ultimate purpose of the portfolio;
- There need to be guidelines or justification for selection of materials;
- Academics should provide feedback which is kept with the artifacts or evidence;
- Portfolios need to allow students to reflect on their learning either at regular intervals or upon completion of the portfolio.
- The student needs to be provided with criteria for how the work will be assessed;
- Students should be given clear guidance about limits to the size and scope of portfolios, so that assessing them does not become unwieldy;
- Examples of appropriate and good work are required as exemplars.

(adapted from <http://electronicportfolios.org/portfolios/planning.html>)

E-portfolios

An e-portfolio should provide a dynamic environment for learners to document and celebrate learning they have achieved. The pedagogy of e-portfolios has been studied and reviewed by Barrett & Wilkerson (2004).

Diversity of content material

One of the most attractive features of e-portfolios is the diversity and richness of artifacts that can be associated with learning. No longer is the student limited to material that fits in a box or can be stuck on a page. If it can be digitised then it can go in an e-portfolio. Examples of such materials include:

- Word or text documents;
- PowerPoint presentations;

- Web-pages with hyperlinks;
- Excel spreadsheets and graphs;
- Scanned images;
- Digital photographs;
- Multimedia audio and video files;
- Results from interactive computer-assessment programs.

Types of e-portfolio

The e-portfolio comes in different varieties. If you have just basic computer skills, you can still produce an e-portfolio of your own by keeping text and image documents in a dedicated folder on your hard disk. At the other extreme, there are professionally produced web-based e-portfolios which are highly structured and integrated with online databases. The format of e-portfolios can therefore be open-ended to encourage creativity and flexibility in what is evidenced on a more prescriptive system where a set of competences (say, prescribed by a professional body) need to be fulfilled. In between these extremes are text-based forms or templates that can be downloaded, completed in a free-form way and then placed within the e-portfolio.

The best e-portfolio for you

Consider the following points:

- The purpose, audience and type of content for the portfolio.
- Can the evidence you wish to archive or present be digitized and is it best stored in digital format?
- Is it to be a reflective portfolio and if so what is to be reflected upon, when and how?
- Do you wish to produce a 'standalone' or 'connected' (through the web for example) e-portfolio, say with hyperlinks?
- What is the eventual purpose of the e-portfolio: submission for assessment, publishing, sharing or storage?

(adapted from Helen Barrett's presentation on developing e-portfolios in US High Schools:

<http://electronicportfolios.org/portfolios/ACPE2003.pdf>)

	e-portfolio	Assessment Management system
Purpose:	Multiple: learning, assessment, employment	Single: formative and summative assessment
Data structure	Varies with the tools used to create the portfolio; most often data formats (documents converted to HTML or PDF)	Most often uses a relational database to record and report data
Primary type of data	Qualitative	Qualitative and quantitative
Data storage	Multiple options: CD-ROM, videotape, DVD, WWW server, LAN	Primarily on LAN or on secure WWW server
Visual design and hyperlinks:	Most often under control of portfolio developer	Most often controlled by database structure
Technology skills:	Higher	Lower

	e-portfolio	Assessment Management system
Focus:	Student-centred	Institution-centred

Table comparing the salient features of a 'simple' e-portfolio system with a more complex managed system

Features of the e-portfolio

Portability

Being able to carry around a paper-based portfolio has numerous advantages, especially if it serves to showcase a person's abilities. At one time, a digital version of a portfolio would have been difficult to transport. However with the ubiquity of computers, the mobility of laptops, the emergence of diverse but standardised and inter-convertible file formats, and the availability of internet access and mobile connectivity through wireless LAN (local area network) and mobile phone technology, the idea of a portable e-portfolio is now not only a credible but an attractive prospect. When evidence is digitised it can be compressed (if the file sizes are particularly large) and copied to CD-ROM or DVD. The relatively low cost of this type of storage medium allows the contents of e-portfolios to be updated without the expense of making further paper-based copies. CDs and DVDs can be left with tutors or prospective employers to assess at their leisure whereas this could be more difficult with a paper version. The contents can also be searched and, if indexed properly, can be catalogued in different ways to emphasise the context of the presentation and the interests of the person reviewing the portfolio.

Location of the e-portfolio

The digital nature of the e-portfolio medium allows great flexibility in where the portfolio is stored. As mentioned above, the e-portfolio can be kept on a personal computer's hard drive and backed up on a separate hard disk or large-capacity drive. Because home internet access often comes with personal web-space the e-portfolio can easily be uploaded onto the web. The author of the e-portfolio can allow others to view the material by producing a personal website or use the web-space as a repository for holding the material, although such material is effectively in the public domain. Some virtual learning environments (VLEs) allow students to upload files into a private storage space where access is more restricted. With professionally produced e-portfolios, web-forms are completed online and the material stored on internet servers.

When an e-portfolio is web-based then people can view it remotely. Instead of the student having to physically take the portfolio to a client or tutor, he the latter can see it over the web at a time that best suits them. Where the material is being used for academic assessment, the tutor can provide feedback to the student while the portfolio is still in development.

Restricting access to material in an e-portfolio

If you want certain people to view restricted parts of e-portfolio then this is relatively easy. For a comparatively simple, home computer-based e-portfolio you can password protect files. The Windows operating system offers some of this functionality but there are shareware or freeware programs that can be downloaded from the internet which offer this specific function. If the e-portfolio is web-based then a subset of the portfolio can be copied into a separate part of the web-space and you can give that web-address to anyone you wish to view that subset. In the more sophisticated online e-portfolios, a login is required.

Managing the contents of an e-portfolio

For those who are fairly adept at using computers, managing digital files can be simpler than paper documents. Although electronic files can go 'missing' just as easily as paper documents, the search tools on computer operating systems are able to scan disks looking for key words in the filename or within the text. Files can be organised by file-types, say text files, image files or video files, and this will narrow the search options to one particular file type. Back-up software can also be used to protect against accidental deletion.

If key attributes are associated with files, then educational e-portfolios can be organised in various ways. For instance, files can be tagged with attributes such as 'goals', 'tasks', 'evidence', 'reflection'. These tags can then serve for organising the contents.

The American experience

The American Association for Higher Education (AAHE) considers electronic portfolios as a powerful tool for teaching, learning and assessment and has been engaged in the work of creating e-portfolios as alternative means of assessing learning. The Association has produced a publication called 'Electronic Portfolios: Emerging Practices for Students, Faculty, and Institutions' (ed. Barbara L. Cambridge). Nineteen practitioners from a range of disciplines and institutions describe the construction of electronic portfolios (<http://webcenter1.aahe.org/electronicportfolios/index.html>).

There is a wealth of information on the use of e-portfolios in primary, secondary and tertiary education in the United States and the links at the end of the article provide some initial references describing examples of e-portfolio use or papers reporting its pedagogic value.

Example of an e-portfolio system in UK HE

In the Faculty of Applied Sciences (FAS) at the University of the West of England (UWE), Bristol we put great emphasis on the practical and practitioner side of the education of science under- and post-graduates. We have been offering four-year Sandwich degrees for almost three decades and work-based learning during the placement year plays a major part in preparing our students for the world of work in their chosen career path.

As the Placements Tutor for the Faculty I am well aware of the benefits of placement experience but it has always been problematic to track learning while the student is away from the University. As placement students are away for a whole year there is a need to ensure that they are learning and are aware of their learning during this period.

The geographic separation between the student and the tutor, however small, is often a barrier to assessment. The Faculty arranges high quality placements with university research departments and commercial companies that offer a rich learning environment and because of this we have recently moved to assessing the students' placement learning for academic credit.

Learning on placement lends itself perfectly to a portfolio-based assessment system as the work-experience and learning achieved varies between placement opportunities. Viewing the portfolio as it is being produced and providing feedback are demands that would overstretch a paper-based portfolio system. For these reasons, Dr David Lush, a colleague from FAS, and I have developed a web-based e-portfolio system called Profile (www.profile.ac.uk). We are using the system initially with our science students, but because Profile is a generic system and is being funded by FDTL Phase 4, it will shortly be freely available to all HE institutions.

Features of Profile

- Profile offers placement students a secure, password controlled, web-based e-portfolio into which they upload evidence of learning while on placement.
- Employers or work supervisors are given password read-only access to their placement student's e-portfolio. The work supervisor signs off the evidence electronically in the portfolio as confirmation that the student has performed the work and that it is of a satisfactory standard as far as the employer is concerned.
- The placement student is assigned an academic tutor who also has read-access to the e-portfolio and signs off the work electronically against academic criteria.
- Each time the student uploads evidence or artifacts into his or her e-portfolio, email alerts to the work supervisor and tutor are generated to make them aware of new material in the portfolio.
- Profile contains a communication text tool, called Trialogue, in which student, work supervisor and academic tutor communicate with each other and the discussion is captured. This helps provide an audit trail and a reminder of previous communications.

In this way students continue to be assessed by the academic tutor who can steer their learning on placement through review and feedback. Consequently, the student can integrate academic engagement with the world of work at a level which was previously difficult to achieve, while at the same time strengthening the link between industry and academia.

Create your own electronic portfolio

Profile.ac.uk is available free of charge (contact profile@uwe.ac.uk for details) but if you would like to create your own e-portfolio then the following link to 'Using Off-the-Shelf Software to Showcase Your Own or Student Work' by Helen C. Barrett will be of help (<http://transition.alaska.edu/www/portfolios/iste2k.html>).

Some useful links

Barrett, H. (2003). Supporting electronic portfolios in High Schools: definitions, decisions and dilemmas. (<http://electronicportfolios.org/portfolios/ACPE2003.pdf>)

Barrett, H. (no date given) Collaborative Planning for Electronic Portfolios: Asking Strategic Questions (<http://electronicportfolios.org/portfolios/planning.html>)

Barrett, H. (2003). e-Portfolios: Issues in Assessment, Accountability and Preservice Teacher Preparation (<http://electronicportfolios.org/portfolios/AERA2003.pdf>)

Barrett, H. & Wilkerson, Judy. (2004) Conflicting Paradigms in Electronic Portfolio Approaches. Choosing an Electronic Portfolio Strategy that Matches your Conceptual Framework. (<http://electronicportfolios.org/systems/paradigms.html>)

Bergman, T. (no date given). Feasible Electronic Portfolios: Global Networking for the Self-Directed Learner in the Digital Age (http://www.mehs.educ.state.ak.us/portfolios/why_digital_portfolios.html)

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Electronic portfolio decision considerations (no date given) (<http://electronicportfolios.org/pt3/EPPlanning.pdf>)

Gibson, D. & Barrett, H. (2002). E-Portfolio Directions I Directions in Electronic Portfolio Development (<http://electronicportfolios.org/EPDirections.pdf>)

Young, JR (2002). Creating Online Portfolios Can Help Students See 'Big Picture,' Colleges Say. The Chronicle of Higher Education. Thursday, February 21, 2002 (<http://chronicle.com/free/2002/02/2002022101t.htm>)