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The use of E-portfolios to enhance student learning: a Faculty-level strategy and experience

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Abstract
This paper describes the approach taken in initiating student electronic portfolio use in the Faculty of Life Sciences, RMIT. The work was commenced as a strategic project to investigate e-portfolio systems as a means of advancing learner centred assessment, elevating student information interaction skills, and creating a progressive form of documenting professional accomplishment. We report on the experience of implementing a Faculty-level framework for e-portfolios in two undergraduate programs.

Keywords
e-portfolio, information interaction design, electronic identity, assessment, online delivery, portfolio, implementation experiences

Introduction

It is acknowledged that electronic media, specifically the WWW, is well suited to portfolio use and development. Electronic Portfolios (hereafter e-portfolios) are being used increasingly as an online assessment tool and as a general record of student achievement (Batson, 2002). An e-portfolio allows students to integrate text and the full range of digital media, including photos, illustrations, data sheets, audio and video recordings. Importantly, the format provides a fluent means for collating drafts and cross-referencing content via the use of hypertext protocols. The strategic importance of e-portfolios as part of the student learning experience in the Faculty of Life Sciences, is built on the concept of Shedroff's (1999) "information interaction design", and is reflective of the information interaction and architecture skills that are a growing requirement across Life Sciences disciplines. In response to the pedagogical potential of e-portfolios and the elevation of expectation by employers that graduates are skilled at creating meaningful experiences for others via the organisation and contextualisation of information, the Faculty initiated a strategic project on e-portfolio development in 2002.

Our specific aims in implementing an e-portfolio development project across two programs in the Faculty of Life Sciences were to:
- establish the capacity for students to present their abilities, knowledge and attitudes as outcomes from their online learning experiences within an extendable e-portfolio format, that is maintained throughout their degree program and provides a resource to demonstrate career readiness.
- refine, through student and staff experience, effective strategies and curricular designs that enhance student learning within the e-portfolios
- establish transferable ICT skills in Life Sciences students, of use within their educational program and beyond.
- identify, and address, the legal and security related implications of e-portfolios
- provide opportunity for the re-prioritisation of staff time in educational delivery and assessment practice.

A Faculty-level implementation provided opportunity for the introduction of a common framework for

the use of e-portfolios that could be deployed Faculty-wide. The project initiated the use of e-portfolios in two programs, Physical Education and Medical Radiations. The rationale for the use of e-portfolios varied between the two programs, however it was considered that conjoint development of e-portfolios in both programs would provide a greater breadth of understanding of implementation issues.

The implementation of e-portfolios in the Physical Education program (Temple, 2003) aimed to introduce the capacity for students to work in portfolio format when preparing evidence for the employment selection process. The e-portfolio assessment for the Physical Education student cohort was introduced in a fourth year course, and students were asked to create an e-portfolio addressing specifically: professional responsibilities, content of teaching and learning, teaching practice, assessment and reporting of student learning, and interaction with the school and broader community. The flexibility of portfolio format assessment was used to extend the assessment to address employment selection by requiring that the students' e-portfolios contain a response to an advertisement for a hypothetical teaching position, and include a curriculum vitae. The outcomes from this work are described by Temple (2003).

The e-portfolio implementation in the Medical Radiations program was aimed at establishing a portfolio-type assessment tool that could be readily used in clinical workplace assessment, and available for student use through all years of the program. A secondary aim was to reinforce the ICT skills of students in this discipline, given the professional dependency on ICT in all Medical Radiations based modalities. The e-portfolio was introduced to a cohort of 120 first year undergraduates, as the singular means of assessment in a course on Medical Informatics. All learning materials, including instruction on portfolio formation, were provided to the students via online courseware and direct academic support was provided by a learning facilitator during on-campus fortnightly sessions of two hours duration. During these sessions, each student had individual access to a workstation and could work singularly or collaboratively.

The students presented all output from their learning exercises in their personal e-portfolio, and were responsible for all elements of its design.

E-portfolio implementation

E-Portfolio based assessment provides the advantage that students can, of their own volition, apply their creativity and expand the scope of material presented in assessment as demonstration of their growth and competence. The hyperlink and multimedia capabilities of HTML-based Webpages allow students to structure text and all major media objects in an inter-linked format representing a portfolio-type response to assessment criteria. In response to the evident potential for the use of e-portfolios in online courses, the Faculty of Life Sciences, determined that the generation of e-portfolios in the project would be created and maintained exclusively in HTML format, to provide students with the full flexibility of this form of information representation within a common framework of learning expectations.

As part of the e-portfolio project, online generic portfolio development modules were written and, delivered in both courses. The decision to require HTML publication skills as a requirement for the production of assessable material, necessitated the incorporation of a standardised training on base HTML publication skills as part of both the Physical Education and Medical Radiations courses. Experience with introducing student groups to HTML authoring software indicated that uniform base publication skills could be most readily obtained using MS-Word or MS-Frontpage to create the relevant webpages. Upon completion of the introductory online module on HTML publication, students were free to work with the HTML publication software of their choice.

The e-portfolios developed by students participating in the project constituted a website, and as such could be delivered from either a University or public Web server. The project aimed to create a legally robust e-portfolio system, and hence open web distribution of e-portfolios, was not considered viable due to the difficulty in ensuring that all elements of student e-portfolio content complied with Australian Copyright Law at all times, and that the University maintained its obligation to protect student Intellectual Property. Given the legal issues, and the intrinsic requirement that all students be given a readily accessible, publication site for their assessable material, the presentation of e-portfolios was constrained to the Faculty Novell Intranet. The use of an intranet for e-portfolio publication provided students with a continuously maintained and archived e-portfolio directory space, viewable by staff, but not by other

students without permission, and not publicly accessible. This limitation on inter-student collaboration was intrinsic to the software environment and will be surmounted upon the availability of more sophisticated learning management systems which incorporate collaborative publishing tools. Students contributed to their e-portfolios on campus and at home, with the assessable version presented on the Faculty Intranet. At the completion of assessment the e-portfolios were copied to professionally produced CDs, suitable for use in representing student capability to potential employers.

The project sought to exploit the open-framed and inherently creative nature of learning output in e-portfolios, by providing a common structure, into which the learning output would be interpreted by the student. As an example, in the Medical Radiations program, online courseware provided the following :

The framework for your e-portfolio:

Your e-portfolio must be in HTML, and contain, at a minimum, links to the following off your e-portfolio Home Page:

Aim: *(Your Learning Aim for Medical Informatics and your Aspirations for your professional work in this area)*

Learning Sessions: *(Your response to the exercises in the online Learning Sessions)*

Interest Area: *(This is your core interest area or theme, that you choose to explore in your e-portfolio. Discuss with your facilitators the latest areas of development in Medical Radiations Informatics, that you can incorporate into your Interest Area)*

Development: *(This link leads to a directory that contains all of your development work, and constitutes a record of how you produced your e-portfolio)*

Collaboration: *(Email links to other students, and Organisations/Websites that have contributed to your work)*

Digital Subtraction Angiography Program: *(A link to your coding of the DSA software)*

This framework was diversely interpreted by the students. A consistent basis for assessment was obtained within the specific assessment outputs for the Learning Sessions and the creation of Digital Subtraction Angiography software, other areas of output were assessed as a portfolio submission.

E-portfolios offer significant potential in linking the student's electronic identity, to their program experiences and vocational outcomes, and this was reinforced by requiring students to use their names for all principal labelling in the e-portfolios. Additionally, students were informed that they were creating one portfolio to be developed through their academic experiences at RMIT, within which they were required to present their personal aspirations and explore the contemporary status of the relevant professional area of most value to them.

It was considered essential that the intrinsic expectation of academic integrity be structured within the student learning experience in the development of e-portfolios, as the students were creating assessment output in a web format, and therefore working in a medium that facilitated direct reproduction of web content. The requirement of academic integrity was highlighted by an online courseware module of support material on the topic, including full details on the correct means of attribution of web-sourced content. Evidence of originality was reinforced via the inclusion of a Development component in the e-portfolios, with this area being used for presenting development work undertaken in creating the final form of the e-portfolio.

E-portfolio experiences in Medical Radiations

The e-portfolios produced by the Medical Radiations students were assessed twice during semester and narrative feedback was provided against clearly defined assessment criteria. Assessment specifically addressed expertise in Medical Informatics, with no marks awarded for non-functional beautification, though media use was encouraged. Importantly, a mid-semester assessment of 20% fractional value, was used to ensure that all students had a workable e-portfolio, were fluent with HTML, and had the capacity to use online tools to create a self-maintained learning resource. Final assessment occurred at a Workstation with the student presenting the e-portfolio to a learning facilitator. At the completion of the course, but prior to notification of results, students undertook a Web-delivered survey on their experience in the subject (Gray, 2002). The survey response rate was 40%, with 67% of the respondents indicating

that subject had offered valuable knowledge and 13% indicating that the subject did not offer them valuable knowledge. Student responses covered a range of opinions, with the diversity illustrated by the qualitative feedback from the open-ended questions:

I think that the expectation on people being computer literate is huge and unfair in some instances.

This response was typically related by mature-age students, who commenced the course with notably lower ICT literacy than the other students. Key aspects in meaningfully addressing the equity issue intrinsic to the expectation that all assessment be undertaken by e-portfolio, was the expanded access to learning facilitators in the first weeks of the course, and the guidance given in the initial assessment. All students were able to produce e-portfolios readily in the weeks following the initial assessment.

It was quite fun to put together the e-portfolio. The assessment of this course also makes things less stressful on us.

Once the requisite publishing skills had been mastered, students enjoyed the capacity to individualise the e-portfolios, and in general, invested disproportionate time in graphics representation, despite the fact that it was not rewarded in assessment.
Staff perspective: It was clear that with appropriate support, student imagination, creativity and intrinsic interest in discipline areas can result in innovative solutions to problems, expressed in an e-portfolio format. The non-prescriptive framework for e-portfolio creation and development, whilst allowing and encouraging students to take control of their learning, created initial uncertainty for some students who expected substantial external direction in their learning activities. This was overcome as HTML skills advanced and collaborative e-portfolio generation occurred. It was also found to be important to contextualise the e-portfolios within the overall program experienced by the student, and it was apparent that effective team teaching is necessary in order that students gain the full benefit of their portfolio creation skills in subsequent years of their program.

Conclusions

The project described above has proven to be a positive starting point for student-centred /learning oriented assessment practice with e-portfolios in the Life Sciences Faculty. We anticipate that as e-portfolios play an increasingly strategic role in academic programs, teaching staff will require relevant professional development activities, and advice on redesign of curriculum and learning experiences. We have commenced this support by creating an 'E-portfolio How To' for Faculty staff based on practical aspects of this project. It has been evident from the experiences gained in this project that the structure used for e-portfolio representation described above can be used to organise, document, and reflect learning outside of the direct program experiences, and to further reinforce student accomplishments in a progressive communication form to potential employers.

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