Curriculum mapping and ePortfolios: embedding a new technology in music teacher preparation

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Abstract

This paper discusses how ePortfolios, initially introduced to students in a Music Education degree program on a trial basis, are subsequently being integrated into subjects of this degree program. Discussion includes staff perspectives, and covers the varying ways ePortfolio components are utilised in a range of subject areas, issues staff encounter in introducing ePortfolios into their subjects, methods to adapt existing assessment assignments into ePortfolio tasks, and ways in which the inclusion of ePortfolio work leads to changes in learning and teaching practices. Challenges of assessing in an ePortfolio environment are explored, and a map of ePortfolios in the final years of the degree program is discussed. The mapping process, whereby ePortfolio work is perceived as transitioning into the content of this degree program, is explained and demonstrated. The paper covers the design of the map that targets the sequential development of students' ePortfolio skills through subjects in the degree program.

Mapping assessment tasks for any degree program is ongoing, and researchers in this case rely on student products and formal and informal feedback to continue designing assessment tasks in a meaningful way to engage eLearners in developing ePortfolios for use inside and outside this degree program. The process is not about creating more work for students and staff, or re-inventing existing curricula by removing and adding tasks. It is about evaluating existing assessment tasks in this degree program and modifying them to act viably in an information technology environment to reflect and advance student learning.

Key words: ePortfolios; music education; curriculum mapping: assessment

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Introduction

In this article we discuss the mapping of student ePortfolios across the content of a four year undergraduate degree program in music teacher preparation at an Australian university. This is the final stage of a project over the years 2009-2011, in which ePortfolios were gradually integrated into student workloads, and acts as a form of summation of the expectations of the role undertaken by an ePortfolio; it also acts as an interpretation of the significance of this form of IT-assisted learning, and indicates ways in which ePortfolios are changing and enriching students' learning, and informing staff delivery of courses[2]. The process to this stage has consisted of:

1. Introduction to students of the idea of ePortfolio as a task,
2. Discussions with students about what they saw as ideal ePortfolio inclusions,
3. Requirements that students in the early years of this degree program complete basic tasks to produce ePortfolio components in a limited number of subject areas (e.g., writing a statement of personal philosophy of music education),

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4. Design and implementation of more complex ePortfolio tasks (e.g., filming and editing suitable video material to demonstrate specified abilities and skills of music teachers),
5. Provision to students by a technology expert of one-to-one training in the technological aspects of ePortfolio design and compilation,
6. Expectation that final year students are producing a complete ePortfolio suitable for job application,
7. Consideration of how best to integrate ePortfolio tasks throughout relevant parts of the degree program,

and has been reported in various fora (Rowley & Dunbar-Hall, 2009; Dunbar-Hall et al., 2010; Rowley & Dunbar-Hall, 2010; Rowley, 2011).

This listing of the stages of our project indicates its sequential nature. It is also a proactive project, in which, rather than be seen as a reaction to developments in educational uses of technology and coercion to utilize IT-assisted teaching and learning, we position ePortfolios as a welcome way to handle the educational and professional requirements of this degree program. As the following discussion demonstrates, ePortfolios provide sound educational means for assessing the structure and sequencing of this four year curriculum, and delivery of the teaching within it.

The process of ePortfolio introduction and integration discussed here was guided by reference to five conceptual areas. First, growing awareness of 'technography', defined by Woolgar (2005, pp. 27-28) as 'the apprehension, reception, use, deployment, depiction and representation of technologies', in university settings. Second, literature on ePortfolios that was used to provide a pedagogical context, especially on the potential of ePortfolios to address the gaining of generic tertiary education skills and attributes (Aziz et al., 2010), ePortfolios as a site of learning (Stefani et al., 2007; Akcil & Arap, 2009), ePortfolios as encouragement of student reflection on learning (Doig et al., 2006), identity definition through ePortfolio activity (McAlpine, 2005), implications for universities of ePortfolio use (Joyes et al., 2010), use of ePortfolios to encourage peer assessment (Stevenson, 2006), ePortfolios as an adjunct to constructivist learning (Marcoul-Burlinson, 2006), and consideration of current university students as attracted to and adept users of developing technologies for social and educational networking, such as Facebook and Linkedin (Oliver & Goerke, 2007; Hemmi et al., 2009; Gray et al., 2010). A third site of discussion that influenced this project was literature reporting the use of ePortfolios in Australian contexts (e.g., Emmett, Harper & Hauville, 2006; Lawson, Kiegaldie & Jolly, 2006; Botterill, White & Steiner, 2010; Dinmore, 2010), especially in cases of ePortfolios used in creative/performing arts applications (e.g., Dillon & Brown, 2006) which align with our uses of them in their manipulation of multiple forms of digital representation to showcase students' performative abilities, and their attention to linking ePortfolios to creative/performing arts discipline specific knowledge and practices.

Regular input from students on their concerns, problems, and perceptions of the advantages and disadvantages of ePortfolios as a demonstration of their studies was an important component of the process of implementation, and this provided a fourth body of thought on ePortfolio use. Information in this part of our research was gathered through regular focus group interviews with students involved in ePortfolio production, and through collection of quantitative survey materials on students' ePortfolio inclusions, the range of difficulties of various types of ePortfolio inclusions (e.g., text documents, graphics, sound files, filmed material), and the frequency of student work on their ePortfolios.

A fifth and final source of input for this project was interviews with members of the teaching staff working in the subject areas of ePortfolio use. In a department of five full-time staff

members, of whom two were the grant holders/managers of this project, this meant interviewing the other three staff members about their views on ePortfolios and the relevance of them to the Music Education degree program. The involvement of staff members was a significant difference between this final stage of the process and its earlier stages, which concentrated more on student reactions to ePortfolios and analysis of their ePortfolios, technological acuity, and proposed uses of this medium. Drawing together these five areas of research information, the following discussion focuses on how ePortfolios have been mapped against Music Education subjects in this degree program, necessitating also reference to the expectations placed on ePortfolios, and issues of curriculum design and assessment that arise from their use from staff perspectives.

Expectations of ePortfolio use

To map ePortfolio work across this four year degree program, it was necessary to acknowledge the range of purposes attributed to ePortfolios in this context. As with pre-electronic portfolios (Klenowski, 2001), ePortfolios respond to a range of purposes and expectations. Here, they are intended to show that students have become experts in the generic attributes of university study; that they have successfully gained skills in music as a teaching area; that they are proficient across the range of identities required of music educators – composer, performer, conductor, researcher, pedagogue, community musician, etc; that they can successfully utilise technology to present themselves professionally and comprehensively; that they can respond to official requirements for teacher accreditation mandated by government authorities. While these expectations are music education specific, they align with similar multi-faceted ones in the implementation of ePortfolios in other discipline specific areas of university training, for example teacher education in general (Granberg, 2010), medicine (Botterill, Singh & Moon, 2010), engineering (Botterill, White & Steiner, 2010), and the teaching of English as a second language (Chau & Cheng, 2010). Other, implicit, purposes of ePortfolios in the music education context discussed here are that they model best practice in the use of information and communication technology that students can use in their own teaching, they require students to develop advanced technological literacy, they act as a site of reflection, and they become a learning tool and process, rather than being seen as an outcome of four years of study. These issues relate to how the project managers defined ePortfolios from a student perspective by listing how students were observed working on them and the skills and benefits to be gained from this.

From this listing of expectations of ePortfolios, it can be seen that their use is not unilateral, requiring consideration of at least five areas of application: institutional requirements, teaching staff intentions, student needs, official government accreditation, and technological literacy. Because of the multi-directional aims of their introduction and subsequent usage, ePortfolios provide a rich site for analysis at the same time that they present complexity and ambiguity, a characteristic of the personal learning environments that they provide. Our description of how they are being used draws together a number of these aspects.

Music teacher skills

Having drawn up the list of holistic perceptions of ePortfolios in music teacher training, the ways ePortfolios could be used to present information was considered in relation to the base level skills music teachers need. This resulted in the following way of showing how students could demonstrate their pedagogic abilities:

This skills list reflects types of assignments in this degree, for example, planning, delivering and evaluating classroom teaching is demonstrated through Practice Teaching and the presentation of peer-reviewed seminar work. Due to this, in

many cases ePortfolio assets[3] could be adapted from existing assessment tasks. This can allay staff concerns that ePortfolios would increase already heavy workloads for both staff and students. Three examples demonstrate how this functions. First, an example of an existing assessment task becoming an ePortfolio component is one in which students are required to interview and record/film musicians from non-English speaking backgrounds, to present the findings of interviews, and produce teaching materials based on the understandings they have gained through this process. As students have become accustomed over the past years to submitting their work on this assignment as filmed material, it was not difficult for such material to be adapted and loaded into students' ePortfolios as demonstration of a range of skills and competencies in the area of cultural diversity in music education. Similarly, in a subject covering the running of performing ensembles, assessable musical arrangements, with computer-generated notation, film of the running of rehearsals for the arrangement, and MP3 file of the final product performed by fellow students, could easily become an ePortfolio demonstration of many ensemble-related skills in this area of music education. A third example is in a subject in which students learn ways to teach at the senior secondary school level, where an existing assignment was to present a seminar around a piece of Australian music from the last 25 years (a mandatory topic in the NSW *Music 2 and Music Extension Syllabus* for years 11 and 12, see NSW Board of Studies, 2009), and to do this through involving other students in composition activities leading to performances of musical

3. 'Asset' is the term used for a component/artefact in the commercial ePortfolio program adopted by the University of Sydney.

Table 1: Student skills and ePortfolio components.

Skill	ePortfolio component
Compose original music[1]	MP3 file; graphic of notation; text document of process diary for composition
Perform as a soloist and as a member of an ensemble	Filmed material
Run ensemble rehearsals and conduct	Filmed material
Demonstrate musical abilities through official means	Text documents of performance body examination results (e.g., Trinity College London; Australian Music Examinations Board; etc)
Teach across a range of situations (classrooms; one-to-one studios; etc)	Filmed material
Express personal beliefs in music, music education, and education	Text materials
Plan, deliver and evaluate classroom teaching	Copies of Practice Teaching reports, observation records, lesson/topic plans, personal reflective journal, etc
Research music learning and teaching	Text materials; documentary style film material; photo journal; etc
Demonstrate participation in non-Western music performance[2]	Filmed material
Demonstrate ability to plan and deliver mandatory topics from Australian school music syllabuses[3]	Text documents of sample lesson ideas with links to web sites, sound/film files, etc

Notes:

1 Australian school based music education requires that teachers are able to model, teach and assess composition.

2 It should be noted that in the degree program under discussion, all students take part in performance in a non-Western ensemble as a way of broadening their understandings of music and ways through which it is learnt and taught.

3 For example: Aboriginal and Torres Strait Islander musics; contemporary music styles; music of cultural diversity.

works in progress. Distribution of a one-page seminar outline detailing teaching and assessment strategies is required.

Adaptation in this case was to require that the one-page seminar outline be submitted electronically to the lecturer in a version ready to be uploaded into an ePortfolio, and subsequently to be added to a student's ePortfolio as an example of ability to plan teaching of a mandatory syllabus topic in NSW. In addition to the research involved in locating suitable music; accessing websites, recording/s and notation; devising teaching activities; considering possible learning strategies across creativity, listening, analysis, and performing; listing assessment tasks; and providing a coherent, pedagogically suitable document, students in the ePortfolio adaptation of this task also need to (re)design their handout so that it is visually acceptable; has links to appropriate websites and other resources; includes, where possible audio/film files of teaching materials; addresses syllabus requirements; and will 'make sense' as an educational document to a prospective employer through terminology and pedagogic parameters. By converting a seminar handout into an ePortfolio asset, students become aware of ways of designing, formatting and producing an acceptable e-document; in this way implicit training in understanding aspects of ePortfolio use is provided.

In other cases, new ePortfolio-related assignments were created and added to the assessments of subjects. For example, in the subject, Introduction to Teaching, in the early stages of the degree, a new, ePortfolio-related assessment task was introduced in which students write a personal philosophy of music education and submit this for marking as an ePortfolio task. By creating or converting simple assessment tasks in the early stages of this degree to ePortfolio components, students have assets ready for uploading into their ePortfolios by the time they enter the final years of the degree. At that stage their production of ePortfolio assets becomes more intense, with higher expectations of both content and technology, thus ePortfolio implementation becomes longitudinal and incremental, in which early tasks are the basis of an ePortfolio, and increasingly complex tasks become expected as students move through the degree program.

As these examples imply, levels of technology are implicated in the conversion of existing assessment tasks into ePortfolio assets by students. This was another area that staff commented on for successful production of ePortfolios. Staff agreed that in most cases, as students could be considered 'digital natives' (Staff interview, 24 November 2011), were already using Facebook and/or similar social websites, had access to technological equipment (if not personally, through the technology suites of the faculty), were used to filming events as they unfolded around them (one lecturer cited the example of students capturing seminar events on mobile phones), had come from or had completed Practice Teaching in schools with their own intranets and with smart-boards in classrooms, were probably already utilizing 'cloud computing' and 'cyber lockers' (in which electronic databases are conceptualized as repositories of information in varying media such as websites, blogs, YouTube, etc), and were used to producing sound and film files for assessment tasks, making an ePortfolio was not a difficult task – provided that it did not require the expenditure of additional time for staff or students. Adaptation of technology skills was seen by staff as an advantage of ePortfolios, a 'meta-level of skills required for individual units of study' (Staff interview, 24 November, 2011) above required subject content knowledge.

These examples of use/adaptation of assessment tasks, creation of new, ePortfolio-devised ones, and the implications of technology, explain ways in which staff can add ePortfolio related work to individual subjects of this degree program, and this aligns well with staff comments that

a potential problem with the introduction of ePortfolios is increase in student and staff time in producing and assessing ePortfolio components. What is also important to consider is relationships between ePortfolio use and the degree as an holistic educational experience.

The whole picture: how ePortfolios function across the degree program

Mapping ePortfolios across this degree is a form of curriculum design, as it helps in 'clarifying the conceptual/philosophical lines along which . . . curriculum choices' are made and justified (Vallance, 1999, p. 51). Figure 1 shows ePortfolio tasks assigned across parts of this Music Education degree program. It indicates how assessment tasks/ePortfolio assets move from simple to complex, and how a sense of sequence can be embedded into assessments.

By collating ePortfolio tasks against the degree template in this way, a range of curriculum decisions can be shown. First, that tasks cover different ways of demonstrating skills (audio file, film, text document, graphics, etc), require a range of technological activities (recording, editing, designing, uploading, etc), and allow students to represent themselves as the multiple identities that constitute music teachers. The

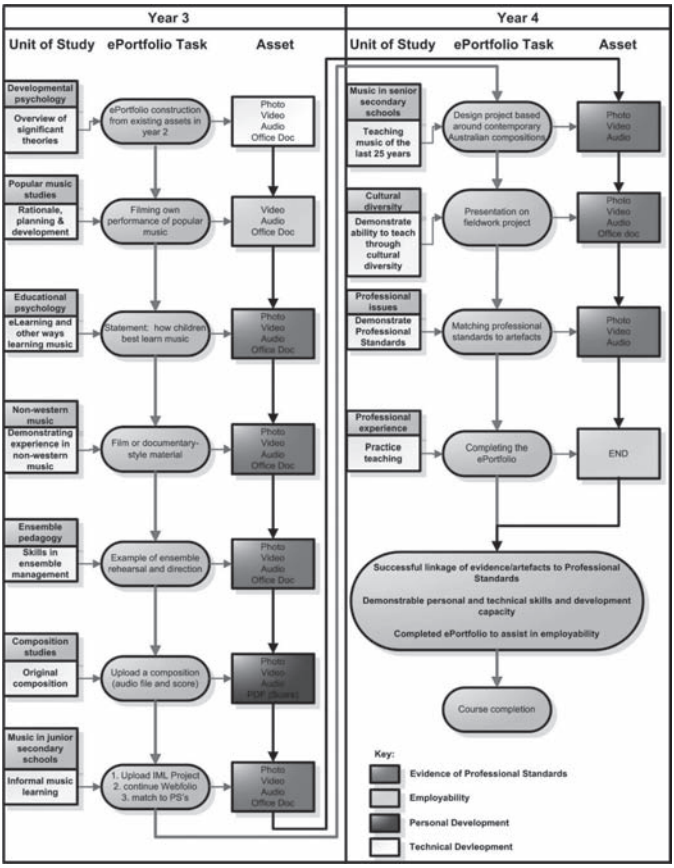

Figure 1: The final two years of the degree program showing ePortfolio tasks.

map also allows staff to see where the stress points for assessment might occur, providing a way to plan around an holistic view of subjects at one time. As is standard in curriculum mapping, this also provides a way for staff to check that assessment tasks and types of assessment are not being duplicated across different subject areas. By listing assets, the 'authentic' nature of assessment could be verified (Mueller, 2011). That is, assets are planned so that they show students in real life teaching situations – playing in groups, running rehearsals, conducting bands and other types of ensembles, teaching, conducting fieldwork research, and engaged in relevant international activities. As assets must reflect regulatory teaching abilities and knowledge areas for accreditation of students once they become teachers, the map shows the reality of students' learning activities and how these respond to expectations of music teachers expressed as rubrics for the seven officially mandated areas ('elements') in which beginning/graduating teachers must be able to demonstrate abilities:

1. Teachers know their subject/content and how to teach that content to their students
2. Teachers know their students and how students learn
3. Teachers plan, assess and report for effective learning
4. Teachers communicate effectively with their students
5. Teachers create and maintain safe and challenging learning environments through the use of classroom management skills
6. Teachers continually improve their professional knowledge and practice
7. Teachers are actively engaged members of their profession and the wider community

(New South Wales Institute of Teachers, 2011).[4]

An example of this can be shown by adding these accreditation rubrics to the skills and abilities shown in Table 2.

Mapping an additional layer of expectations onto ePortfolios (as demonstration of teacher accreditation criteria) also provides a way for students to see how the individual subjects of this degree program respond to government requirements of beginning teachers. In this way providing an implicit rationale for the contents of the degree. That an ePortfolio could act as an indicator of degree expectations was commented on by staff, who noted that due to its longitudinal nature, an ePortfolio could be cumulatively representative of student skill development, and that through working on one a student would need to consider the sequential nature of the degree, in this way 'help make the intentions of the degree more explicit' (Staff interview, 24 November 2011).

It is worth noting that the accreditation rubrics (column 3) are shown as the outcome of assessment tasks (column 2) and our expectations of the skill set for music teachers (column 1), rather than this order of expectations appearing in the reverse manner. This establishes an important point in our ePortfolio work: that they are used to show student abilities based on staff beliefs of the needs of beginning teachers related to these rubrics, rather than the rubrics being used to design the tasks. This emphasises the fact that existing degree expectations and assessment processes could be adapted to the parameters of ePortfolios, an important point for the staff members interviewed, who were keen that ePortfolios not lead to the creation of new workload expectations or reconceptualisations of the aims of the degree prorgam, but be introduced so they utilised existing work expectations and

4. A similar, national, set of criteria for assessing graduating teachers' abilities was released in 2010 by the Australian Institute for Teaching and School Leadership (www.teacherstandards.aitsl.edu.au). The Music Education degree program discussed in this article currently addresses the NSW Institute of Teachers Professional Standards framework as a necessary part of the degree program's official accreditation at state (NSW) government level.

could respond to staff music education ideologies; in this way becoming an adjunct to existing assessments and furthering student involvement with staff prioritisations of music learning and teaching strategies, styles and applications.

Because ePortfolios were being assessed through their individual tasks in an ongoing way, they act as a formative assessment process throughout the four years of this degree. At the same time, as a capstone achievement, they are also summative. Whether they should be assessed in some holistic way was a question posed to students during this project. Opinions on this varied, but the over-riding one was that the assignment tasks throughout the degree that had produced ePortfolio assets had already been assessed individually in the subjects to which they belonged, so to re-assess them was unfair and unnecessary. Additionally, the commercial ePortfolio software mandated for students by the University was not linked to the University's eLearning site (making assessment through ePortfolios unviable), and University policy was against ePortfolios being used as a form of assessment.

What did emerge from the project, however, was that integrating ePortfolio work across the degree program became a form of assessment of the curriculum for staff, of its ability to deliver expectations by covering many areas of study, and of ePortfolos themselves to address the range of purposes originally theorised for them. As Conkling (2002, p. 129) notes, through their dissemination they act as a form of 'public accountability' allowing university preparation of teachers to be 'seen as rigorous and intellectual instead of merely instinctual.' Their ability to act as

Table 3: Student skills, ePortfolio components and accreditation criteria.

Skill	ePortfolio component	Accreditation criteria
Compose original music and be able to teach through creativity	MP3 file; graphic of notation; text document of process diary for composition	Know subject content and how to teach it (Element 1)
Perform as a soloist and as a member of an ensemble	Filmed material	Know subject content and how to teach it (Element 1)
Run ensemble rehearsals and conduct	Filmed material	Communicate effectively (Element 4)
Demonstrate musical abilities through official means	Text documents of performance body examination results (e.g., Trinity College London; Australian Music Examinations Board; etc)	Know subject content (Element 1)
Teach across a range of situations (classrooms; one-to-one studios; etc)	Filmed material	Know how students learn (Element 2); Create and maintain learning environments (Element 5); Communicate effectively (Element 4)
Express personal beliefs in music, music education, and education	Text materials	Demonstrate active engagement with the profession (Element 7)
Plan, deliver and evaluate classroom teaching	Copies of Practice Teaching reports, observation records, lesson/topic plans, personal reflective journal, etc	Plan, assess and report for effective learning (Element 3); Communicate effectively (Element 4); Create learning environments (Element 5)
Research	Text materials; documentary style film material; photo journal; etc	Know subject content (Element 1)
Demonstrate participation in non-Western music performance	Filmed material	Know subject content and how to teach it (Element 1): Improve professional knowledge (Element 6)
Demonstrate ability to plan and deliver mandatory topics from Australian school music syllabuses	Text documents of sample lesson ideas with links to web sites, sound/film files, etc	Know subject content and how to teach it (Element 1)

a site of learning, to affect students' perceptions of music teaching, and to act as a location for presentation of multiple identities were also issues that came to be scrutinised as the mapping took place.

Conclusion: implications of the mapping process

From a staff perspective, the curriculum mapping process of integrating ePortfolios becomes a way of evaluating the design and delivery of this four year degree program, as it forces attention onto its coverage of musical and educational skills, its design in relation to expectations of Australian music education, its incremental nature, and whether it is comprehensive in its delivery of teacher preparation. By making explicit various requirements of students, for them it begins to draw attention to the requirements of the degree and its government accreditation in a more emphatic way. Through requiring students to produce their own ePortfolios, it draws attention to students' technological capabilities, the need to consider how material is presented, and ways in which technological skills already possessed by students can be transferred and adapted to educational settings; the need to provide training to students became obvious, leading to an added component of the project in the provision of expert technological support and one-to-one teaching.

While adaptations of assignments can in many cases be handled with little trouble, the possibilities of ePortfolios to present students' work provide new ways of assessing that work, adding and highlighting a level of professional applicability to it above its original academic correctness. It adds an additional level of assessment through requirement that work is technologically well produced and utilised. In a way, without this being an original purpose of ePortfolios, this became an assessable component of them almost without this being noticed. Keeping students up to date on technology as it relates to teaching is expected in their training, and ePortfolios allow high levels of this, affecting both student learning and staff teaching practices.

Another implication of the integration of ePortfolios across this degree program is that by making the outcomes of individual subjects into visible objects, and providing a way to link these in the one electronic location, an ePortfolio increases focus on the professional aspects of this degree, and can lead to greater understanding of how the pieces of this academic jigsaw relate to each other and fit together.

Mapping of the ePortfolio against the degree relies on identifying assessment products, and converting these into positive statement of professional ability. Understanding of assessment throughout the degree program and its significance in this process are crucial, for both students and staff. Thus, mapping of ePortfolios into the degree program is achieved by utilising assessment tasks and re-theorising them as visible demonstrations of student outcomes. This, in a return process, leads to reviewing the role and range of assessment across the degree to ensure that it is equitable, varied and individualised, and can be represented technologically. Technological requirements impose their own assessment criteria in addition to content specific ones relating to music and music education. In this way, levels and types of assessment are re-iterpreted through the mapping of ePortfolios across the degree, and assessment becomes an unseen player in the implementation of the ePortfolio project.

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