Jennifer Rowley *Editor*

ePortfolios in Australian Universities

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EXPERIENCE
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DIGITAL
MEASUREMENT
FLEXIBILITY
VALUE-ADD
IDENTITY
ROBUST
OPPORTUNITIES
SENSE-OF-SELF
GRADUATE
LOGISTICS

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Foreword: What We Learn from This Portfolio Collection

In the 1980s in the United States and the United Kingdom, *portfolios for learning* were invented and conventionalised. These portfolios were created in print, of course, but they set the stage for current 'e'Portfolio theory and practice and thus for the chapters in this *collection* which, in itself, is something of a portfolio given its curation of chapters and its reflective character. It's worth taking a moment, therefore, to consider what is understood about the portfolio movement internationally before considering what the chapters within this collection have to teach us.

In the United States, teachers of mathematics and writing in the late twentieth century, in classrooms spanning kindergarten to university, began using portfolios in their teaching. The portfolios at this time were defined as collections of work selected from a larger archive and were contextualised and narrated by the student composer (Yancey, 1992). In part, teachers were motivated by the opportunity to bring together teaching and assessment. Portfolios provided a natural site, a unique place, for students to gather and review their work, and the collections they created provided a full, rich portrait of student learning, much fuller and much richer than the portrait provided by standardised tests, single essays, or responses to math problems. In part, teachers were also motivated by the ability of the portfolio to include students' process pieces so that the connection between process and product could be traced. Diverse pieces of work contributing to a final product, much like Picasso's charcoal sketches leading to a finished assemblage, were included in these portfolios. Thus, process texts like rough drafts of essays and beginning calculations for math problems and the final texts to which they contributed, both types of texts included in a portfolio, demonstrated the paths students had taken to their conclusions. In part, teachers liked assessing authentic evidence located in the work students created in the classroom. Students too liked the portfolio, liked the new role they had as 'agents of their own learning' (Yancey, 1998), liked explaining what they had learned, how they had developed, how well they had succeeded … or not.

In the United Kingdom during this time, portfolios were also identified as a mechanism for professional development for teachers. Meeting in groups, for example, teachers could review a portfolio to consider the fit between a student, his or her learning journey, and the curriculum. More specifically, teachers work in

teams we now call professional learning communities (PLC) and study the texts inside the portfolio through the lenses provided by a four-part heuristic: Who is this student?; What resources does he or she draw upon?; What does he or she do well?; and What next steps are possible and helpful? (Dixon, 1991). Educators at the time saw through the frame of the portfolio the mechanics of how a student learned, the kinds of resources that were tapped, and about what next steps might be best. Put another way, in portfolio-based professional development practices like this, teachers learned about the efficacy of their curricula and about ways to support all learners.

Fast forward to 2016: portfolios, whilst maintaining a focus on student learning, have engaged all corners of the world as the print model went electronic, and hence the 'e' in ePortfolio emerged somewhere in the 1990s. In the portfolio of chapters presented here in this collection, we learn specifically about the results of this shift, about ePortfolio practice and research as they have been developed in Australia and internationally, and we find that there is much to learn. In one chapter, for example, we learn about the ecologies hosting worldwide ePortfolio efforts providing the backdrop for Australian models: 'International ePortfolio professional learning ecosystems', 'ePortfolio system-based portfolio professional learning ecosystems', 'Australia-wide ePortfolio professional learning ecosystems', and 'Cross-organisational ePortfolio professional learning ecosystems'. Much like their print cousins, the electronic portfolios here are oriented first to pedagogy: as one chapter puts it, 'the student ePortfolio is pedagogy: it is a way of learning and teaching'.

We learn as well about a range of such models in practice, about portfolios in creative arts and in medical science, about portfolios promoting identity formation and supporting employability, and about portfolios that attempt to do both in the context of a longer, cross-disciplinary history: 'A portfolio as a conveyance of a person's achievements has its professional genesis in the creative arts since the early 1800s. From the 1900s, graphic design, photography, architecture, music, and fine arts have also relied heavily on the use of portfolios for career purposes.' Like their antecedents, the portfolio models and programmes profiled here in this collection are also acts of invention, creating new models of learning that in the current case are especially indebted to the potential of the digital and to the practice of reflection.

Reading across the chapters, we encounter common experiences echoing lessons learned in other ePortfolio contexts. Implementation of ePortfolios, one chapter asserts, is hard and raises unanticipated difficulties and challenges, among which, another chapter claims, is 'the perception of increased workload', a challenge posing as a 'prevalent barrier to using ePortfolios'. Key to successful ePortfolio efforts, according to another chapter, is identifying and clarifying the portfolio's purpose: 'Without understanding the purpose, introducing ePortfolios is largely without merit.' In other words, as a genre the portfolio is located in its purpose, an observation that is true for higher education portfolios as for portfolios in other fields: it's a function of the genre rather than being a culturally specific issue. Not surprisingly, students and staff find exemplars helpful, in part because the genre of ePortfolio is new to some, so still in development. Indeed, much of what is described in this

collection of research case studies is synonymous with what many researchers have discovered globally when challenging curriculum renewal, introducing innovative pedagogy, and considering the enhancement of students' learning.

Embedded in these discussions, of course, is the issue of technology. Worldwide, it's not uncommon for technology to focus ePortfolio efforts, but in these chapters, technology is a support, a critical one, but not the focus. In one chapter, for example, we learn that students resist 'institutionally provided proprietary software platforms' and that they prefer platforms supporting more of their learning and their agency. At the same time, for ePortfolios to flourish, students do need to know how to use the ePortfolio technology, which they can practice alongside learning about reflection: the 'issues of workload and need for reflective writing coaching were mitigated by training the tutors to more closely support students in reflective writing and to ensure all students were introduced to the technology within a compulsory unit tutorial session'. Ideally, as reported in one chapter, the technology provides a 'student-owned and student-managed' space that offers a future: it 'remains fully supported for students after graduation through alumni access'.

The provision for such a future is in fact a distinguishing feature of ePortfolios. Print portfolios, modelled on a book (Yancey, 2004), are closed texts, with beginnings and conclusions; in contrast, ePortfolios, much like galleries or studios, offer many spaces for work to be displayed and, if designed to do so, continue to be open and available for future work. Moreover, we know from research (e.g. Hilgers & Stitt Bergh, 1999; Robinson & Burton, 2010) that when students understand that their work has a future and that what they are learning can provide a pathway to that future, they are better motivated, and in some cases, the quality of the work itself improves. What is also needed for learning to flourish, as is made plain here, is reflection. Brandsford et al.'s (2000) book *How People Learn* suggests that reflection is critical for securing learning, and again, in this collection we see all of these components come together in the QUT model which, like other models seen globally, explained and illustrated encounters with technology as the first obstacle, but as a lesser one to reflection, which provides the real challenge and the real reward.

We read throughout this collection of how the ePortfolio (as an online tool) can provide an electronic space that has the potential to enhance higher education graduate capabilities and employment skills. This personal learning space provides students with their own canvas to create and curate evidence of learning. This feature is buoyant and goes beyond the single opportunity of a portfolio to store files. Portfolios were, at first, widely perceived as a collection (or archive) of experiences, achievements, and evidence. It was only as the portfolio emerged as a valuable learning tool that educators saw the potential for these collections to be developed through critical reflection. Despite early emphasis on use of the 'technology', the chapters here in this collection demonstrate how it was recognised that the process of critical reflection, required to create and curate the ePortfolio, presented students and academics with a challenge at least as great as the technology. Furthermore, a consensus about best ePortfolio practices internationally and in Australia is emerging. These practices include the ideas that, as one chapter explains, ePortfolio

pedagogy must drive the technology and not contrariwise and that students require structure and scaffolding to develop reflective writing skills.

Interestingly, much like print portfolios, but perhaps even more so, electronic portfolios need to be integrated into students' curricular lives. Learning requires scaffolding, and the purpose of the portfolio and the ways that it fits and supports the curriculum should be transparent. Again interestingly, although electronic portfolios permit and support multiple kinds of modalities for reflection (e.g. video and maps), reflective *writing* is privileged here, as it is in the United States (Yancey 2009; Kahn et al., 2015): indeed, how to define reflective writing, how to teach it, and how to understand it epistemologically is a subject of considerable attention in the United States, not only among writing studies faculty but also among ePortfolio practitioners and scholars (see, e.g. Yancey, 2016). As important and as defined in this collection, electronic portfolios, like reflection, are *social* (Yancey, 2014), involving not only faculty assessment but also peer assessment which is an important point and a promising practice that especially merit attention. Taken together, these ideas, in addition to mapping Australian ePortfolio theory, practice, and research, are both helpful and welcome to those of us outside Australia as well.

Indeed, the idea of ePortfolios as a social practice, as it is explained in this book, is a particularly compelling one: what does it mean to create a portfolio in a company of one's peers? Here, I'm reminded of what Etienne Wenger (1998) calls a community of practice. As Wenger explains, a community of practice is organised by commonalities, rituals, rules, conventions (including various kinds of interactions), and ideologies, and a primary mechanism for regulating and supporting a given community is peer review. We see this in action in this collection with professional writing students who, like Julie Hughes' (2009) teacher candidates in the United Kingdom, find a blogging space hospitable for individually and collectively making a transition from the academy into the workplace. We see this in action as well with medical science students developing so-called soft skills like 'contribution, collaboration, and role play', especially as they develop these through reflective practice. In this chapter, the medical students were introduced to peer evaluation as an important aspect of teamwork and a part of the process for students to practice reviewing the work of their peers and give feedback. 'We believe this is a first stage to building professional skills for medical science students that will have lifelong benefits, which can be easily adopted to support other skills development and applied in other programmes.' Here, what's particularly valuable is the way that the ePortfolio hosts, situates, and contributes to a community of practice. Logically, it makes sense to do so, but we as an international ePortfolio community of practice have not attended to the linkage between the two, at least in the ePortfolio literature, until recently.

Which is yet another reason this collection that follows is such a welcome contribution to the ePortfolio field. As we learn about Australian ePortfolio theory, practice, and research, we learn as well about more generalised ePortfolio issues globally such as ways of supporting reflective writing; the importance of an ePort-

folio technology responsive to the needs and aspirations of students; peer review and its role in an ePortfolio community of practice; and the ePortfolio as site of different kinds of learning journeys and critical transitions which affects all of us globally interested in learning with and supporting students.

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Preface

It's not new. Portfolios have been around for many, many years (see Blom & Hitchcock this anthology) in areas such as architecture, dress design, dance, visual arts, engineering, nursing, and teaching, just to name a few. All disciplines have asked at one time for evidence of skills, achievements, and qualifications that one has capacity to undertake a role. This is more than showcasing what you can do or presenting what you have done – it is a visual and robust story of who you are.

This anthology presents a view of the electronic portfolio through the eyes of experienced practitioners who have had the word ePortfolio in their vocabulary for many years. As educators, the authors of the 12 chapters presented here have their own story to tell about learning and teaching, institutional challenges, implementation, opportunities, and communities of practice in Australia and globally. The world of higher education is one that expects a vigorous robust investigation into the benefit of new technologies and the effectiveness on student learning. The authors have boldly entered the digital space of Portfolios and present advice, caution, and success stories of their research into enhanced learning and teaching. This book is important as we continue to journey further into the world of accountability for our craft and remain dedicated to providing the optimal learning experience for our students.

To begin, there is a short historical account of the Portfolio emerging as a digital tool internationally and how Australian higher education saw this form of pedagogic practice as essential for developing graduate qualities for a better-prepared graduate. It explores the ecology of ePortfolios with a snapshot of past, present, and future uses (see Miller this anthology) to continue the emerging community of practice that allows full-bodied discourse through what is known as the ePortfolio Australia network.

This is followed by a chapter that describes how one Australia university embraced the research behind ePortfolio process and products and implemented it institutionally. This was managed as a result of the commissioned research project into the benefit of ePortfolio practice for students learning incrementally over a period of time, and the centre of excellence continues today as a centre for the institutionally managed ePortfolio. The original instigators of the Australian ePortfolio

project from 2008 are still dedicated to this endeavour (see McAllister and Hauville this anthology).

Applying the idea of incremental introduction of new pedagogy is better serviced when staff have been afforded training and resources. The chapter by Strampel, Sibson, and Main details the identification of key stakeholders and the professional development workshops that were designed to empower the teachers of students who would be the beneficiaries of the introduction of ePortfolios into their degree programme.

Introducing a new pedagogy and a new tool into any faculty requires some form of 'buy in' from staff, and the story of ePortfolios embedded into a medical science degree programme is verified by the number of authors who contributed to the chapter. The lead academic saw the need for teamwork to be a part of the curriculum and rallied colleagues to embed ePortfolio and reflection into the 10 subjects within the 4-year degree programme with a vision to enhance learning for the students who were encouraged to reflect on their achievements of working in teams. As an intentional curriculum designed to develop the graduate skill of teamwork, the ePortfolio was introduced as assessment task throughout the 4 years to encourage teamwork and collaboration.

Both Strampel et al. and Polly et al.'s chapters refer to and use the AAACU (American Association of Colleges and Universities) as a model for their work in measuring standards-based approaches to assessment. In fact, many authors in the anthology use ePortfolios for assessing and for developing graduate skills in the belief that both the process and products generated by the Portfolio assist in developing a work-ready graduate for a future career.

Most introductions of new pedagogy are often questioned for its effectiveness; the chapter by Bennett and Robertson clearly indicates good pedagogy coupled with robust research can create a valuable impact for students. They detail the community of practice that developed through using ePortfolio with students at their university with a clear vision of improving career identity. The story of the writing students' approach to embracing the portfolio as a pedagogic tool for increasing career awareness is one that demonstrates the power of student enjoyment in a process.

The academic staff at a music faculty wanted to promote metacognition and critical thinking whilst encouraging the development of reflective practice and so carried out research over 5 years into differing students' views of the ePortfolio practice. Depending on degree specialisation, the music students all had a view on the benefit and challenge of the ePortfolio design and value and soon realised that the affordances of the system created wider opportunities. It was evidence from this longitudinal research that ePortfolio was not a teaching and learning tool to everyone's taste or benefit. The music education students were the most receptive as they could see the aim was not only for them to demonstrate their skills against the graduate teaching standards, but to curate learning experiences over their degree and develop a philosophy of teaching.

Brooks introduces the reader to the term 'chronicle' to explain the purpose of the ePortfolios by describing the similarities and differences between two cohorts of

teacher education students who were introduced to the ePortfolio process and platforms. An initial idea to use an ePortfolio to record evidence against graduating teaching standards for students studying in the Bachelor of Music (Music Education) evolved into a richer and pedagogically healthy process supporting teacher development. The students studying to be primary teachers had a simpler technology to navigate yet experienced different challenges and similar barriers to the technology tool.

Newly introduced graduate teacher standards saw the need for a way to capture and record evidence against the standards. In the chapter by Munday, we see teacher education students actually using the ePortfolio to help them to build a professional identity and sense of self and to showcase this because it's purposeful. Asking appropriate and pertinent reflective questions and making students assemble their knowledge and their experience in a meaningful way means making them really focus on self-control through the creation of the portfolio product. This increases their self-identity and their self-awareness and gives them a self-determination.

Returning to the medical science field, we are introduced to a story of blended learning for medical sonographers who were incrementally introduced to the process of assembling evidence of their skills development through the ePortfolio. As this programme had international students who were not able to benefit from face-to-face teaching, the challenges and successes of the ePortfolio for managing a learning environment are detailed.

Blom and Hitchcock present a model that activates a developmental process for those starting with an ePortfolio. Their exploration of two cohorts of music students demonstrates the ease with which some can manage the learning space and the challenges that others face when the technology becomes a barrier to learning. The story they report explores some of the valuable use of the ePortfolio process and student perceptions of those who have traditionally used portfolio practice where the technology was insignificant to them … showing us that there is not a simple answer to any journey of engaging students in their learning.

Returning to the track of institutionally introduced ePortfolios is the story of a more recent introduction into a regional university who researched thoroughly the journey of their implementation across degree programmes by reflecting on what was needed and how to best manage the staff and students who were to benefit from the personal learning space that the portfolio platform, PebblePad, afforded them.

We finish this anthology back at the beginning concept where the ePortfolio is described as a developmental ecosystem and defined as a function for building professional capabilities. The concept of an ecosystem implies a growth that has multiple components, and this final chapter contains student comments that support the final chapter's model and its description of the ePortfolio's impact on the development of a work-ready graduate. In fact, we conclude by claiming that it is during this developmental phase of students' learning that they are developing their professional identity through the acquisition and practising of graduate capabilities.

It is becoming clear that the 'e' in 'ePortfolio' may become redundant as we live in an electronic world where literacy is only digital. Through the presentation of the portfolio ecosystem model, we see the immortalising of the portfolio technology

tool that represents the story of how it is that you choose to present your educational capacity.

As a member of a vibrant ePortfolio community of practice, I have had the absolute pleasure to engage and work with many of the authors of this book who are dedicated and committed educators and hold high the belief in research into good teaching and learning practice is of benefit to students. I thank them for their commitment and shared vision for engaging students in a real-world experience, where the value of learning is predominantly surrounded by thorough research, supportive colleagues, and strong convictions of education. This book is dedicated to all who have entered the domain of exploring pedagogic practice for the benefit of enhanced student learning.

This book would not have come about without the mentoring and encouragement of a colleague, Associate Professor Dunbar-Hall who was instrumental in supporting my entrance into ePortfolio research many years ago. I thank Peter for his belief that striving for excellence and good pedagogic practice is a worthwhile endeavour.

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Contents

Chapter 1
Professional Learning Ecosystem Support for ePortfolio Use in Australian Higher Education: An Historical Perspective

Allison Miller

Abstract Professional learning can be defined as the diverse learning opportunities undertaken by educators to improve their individual professional practice with the aim of creating beneficial learning environments for their students. Supporting educators wishing to implement, and ultimately embed, the use of ePortfolio practices into their teaching programs requires the support of an ePortfolio professional learning ecosystem. This is created when educators come together to share established practice and research, are given opportunities to participate in reflective dialogue and private reflection, and have the opportunity to apply and refine their ideas and practices. An ePortfolio professional learning ecosystem cannot rely on one source of input, such as a university's professional development and networking opportunities. Rather, it requires the support of a wider, collaborative community of practice to create exemplary ePortfolio practice for learners. Such an ecosystem also requires the support of established users of ePortfolio in educational programs to share their experiences, both positive and negative. ePortfolios Australia was established in 2008 as one such professional learning ecosystem to provide experienced educators with a means to support their continued ePortfolio professional learning, and to help refine and seek validation of their own ePortfolio practices. This chapter explores the evolution of ePortfolio professional learning ecosystems at international, national, system and local levels through an historical perspective, and outlines the impetus of ePortfolios Australia as a contributor, its current status, and how and why this has supported Australian higher education's use of ePortfolio.

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Introduction

Hallam, Harper, Hauville, Creagh and McAllister (2009, p 2) through the Australian ePortfolio Project – Stage 2 (AeP2) found that a professional learning ecosystem in a community of practice (CoP) "was seen to be an important initiative that would help consolidate current levels of interest and foster and strengthen the networking and relationships that are already emerging amongst those involved in ePortfolio learning". Hallam et al. also identified that "there is strong support for a CoP to support ePortfolio practice", in particular, "the concept of a hybrid forum that blends the benefits of an online community with opportunities for face-to-face meetings" (p 2).

During 2009–2010, the Australian Flexible Learning Framework ePortfolios Business Activity (2010) provided seed funding to a number of vocational education and training (VET) organisations as part of their ePortfolios implementation trials to investigate the use of ePortfolios with learners. These trials examined the way ePortfolios can support learners to successfully gain a qualification through recognition of prior learning (RPL), fast tracking apprenticeships/traineeships, and/or helping learners transition into further education, training or employment. Evidence gathered in the trials provided information about the way teachers/trainers, workplace supervisors/management and VET training organisations could better support learners to: manage their own learning; demonstrate their existing skills and knowledge; and/or achieve their professional, career or educational goals through the successful implementation of an ePortfolio system.

Based on these trials, Miller and ONeill (2011) found, that in order for teachers/trainers to use ePortfolio as part of their students' training and assessment, they needed structured and 'just in time' professional development to understand how best to support learners to present and manage information within an ePortfolio environment. Hence, developing teacher/trainers' digital literacy skills as part of the implementation process was important. Support to help teachers/trainers develop this understanding included providing training/information about a number of issues, including, privacy, ownership and security issues associated with ePortfolio; integration of learner-centred pedagogical approaches; and incorporating self-assessment or reflective activities as part of their learners' ePortfolio experience (Troupiotis, 2010). Teachers/trainers also needed help in developing their understanding of how best to use an ePortfolio for e-assessment and in developing their professional judgement around validating and verifying digital evidence in an ePortfolio environment, for example, in determining the types of digital evidence such as photos, video and audio files which are suitable for collection by learners into their ePortfolios. Miller and ONeill found that helping teachers/trainers connect with other educators experienced in the use of ePortfolios through local and more widely dispersed CoPs could help support some of the teachers/trainers' professional development needs. They also found that this could support their new and continuing ePortfolio learning and development through professional conversations and/or accessing or developing collaborative support resources.

ePortfolio professional learning ecosystems have acted as a means by which universities and individuals new to ePortfolio can gain information about their use. These ecosystems can be categorised into four types:

1. International ePortfolio professional learning ecosystems
2. ePortfolio system-based ePortfolio professional learning ecosystems
3. Australia-wide ePortfolio professional learning ecosystems, and
4. Cross-organisational ePortfolio professional learning ecosystems.

The following presents an overview of ecosystems organised under these categorisational headings. It is presented as an historical survey of how professional learning ecosystems have assisted in embedding ePortfolio into Australian higher education. This overview is not exhaustive, drawing rather on examples that have been, and continue to be, significant in this context.

International ePortfolio Professional Learning Ecosystems

European Institute for eLearning (EIFEL) Leading the way was the European Institute for eLearning (EIFEL, 2015a) created in 2001 as a non-profit professional association with members from around Europe. EIFEL aimed to support the continuing professional development of members through an annual International Conference, still in force, and through national ePortfolio events, and coordinating and promoting ePortfolio developments in Europe and beyond.

In 2003, EIFEL (2015b) launched the campaign "ePortfolio for all" Europeans to help support the goals of the 2010 Lisbon Strategy, which was to make the European Union a highly competitive and dynamic knowledge-based economy which generated more and better jobs and greater social cohesion by the year 2010. The main objective of the 2010 "ePortfolio for all" campaign was for all European citizens to have access to an ePortfolio by 2010 giving them opportunity to take advantage of the full benefits an ePortfolio can bring when moving and working through Europe. While this did not happen, this ground breaking work led to many other ePortfolio projects.

In 2006, EIFEL (Baker, 2006) led a European and international study called "eStrategies for Empowering Individuals" to identify the key factors to successful ePortfolio initiatives and implementation, and to measure the readiness of ePortfolio policies and strategies. Research (Edwards & Baker, 2006, p 8) found that there should be people that an educator using ePortfolios can "go to for support in the implementation of ePortfolios and in designing, constructing, and managing learning and training environments", and that is was a good idea to have a steering committee of colleagues from different backgrounds to gain different perspectives on this matter.

EIFEL enabled a European professional learning community through a series of annual ePortfolio events led by the creator of EIFEL, Serge Ravet, starting in 2003 with the first international conference for ePortfolio in France, through to present

day ePortfolio and Identify Conferences (ePIC) (Europortfolio, nd.a) which focus on ePortfolios, open badges and identity.

European Network of ePortfolio Experts & Practitioners (EPNET) is a European consortia-led project made possible from funding under the Lifelong Learning Project ICT (Key Activity 3) initiative (EACEA, 2013). The main goal of this network is "to establish a European Cooperation Network of experts and practitioners from four sectors in the field of ePortfolios: Further and Higher Education; Vocational Education and Training; Employment; and Lifelong Learning – all the actors of nonformal and informal learning" (European Network of ePortfolio Experts & Practitioners, 2015b).

EPNET's outwardly facing arm is Europortfolio, which is a not-for-profit association "dedicated to exploring how ePortfolios and ePortfolio related technologies and practices can help empower individuals, organisations and wider society. Europortfolio provides a network for those doing ePortfolio and related work across Europe; to build the use of e-portfolios across communities, and to provide opportunities for future partnership working" (European Network of ePortfolio Experts & Practitioners, 2015b).

The Europortfolio Charter "defines how individuals can contribute to the Europortfolio activities and benefit from the outcomes, in particular the production and exploitation of resources to support the implementation and development of ePortfolios" (European Network of ePortfolio Experts & Practitioners, 2015b). Europortfolio members are also major supporters of annual ePortfolio and Identity Conference (ePIC) events. European work on ePortfolios has also been supported by UK-based ePortfolio professional learning ecosystems through the Centre for Recording Achievement (CRA), Joint Information Systems Committee (JISC) and Centre for International ePortfolio Development (CIePD).

Centre for Recording Achievement (CRA) is a cross-sectoral organisation which started in the early 2000s with the remit "to promote awareness and understanding of the processes associated with Professional Development Planning (review, reflection, planning) as an important element in improving learning and progression throughout the world of education, training and employment" (Ward, 2008). CRA continues to offer Professional Development Planning and ePortfolio consultancy, and evaluation of existing ePortfolio practice (CRA, 2015) and also offers face-to-face and online ePortfolio professional development activities, including an annual CRA Residential Seminar; The International Journal for Recording Achievement, Planning and Portfolios (RAPPORT); and working in partnership with Europortfolio and US-based, Authentic, Experiential & Evidence-Based Learning (AAEEBL) (discussed below).

Joint Information Systems Committee (JISC) is non-departmental public body which supports "post-16 and higher education and research by providing leadership in the use of information and communications technology in learning, teaching, research and administration" (JISC, 2015). During 2008–2012, JISC funded a range of ePortfolio projects which "helped reduce barriers to implementation and established e-portfolios as vital tools for learning" (JISC, 2015). These projects produced

a range of research reports and resources to help better develop ePortfolio implementers' and users' understandings of ePortfolios and how they add value to learning and assessment. These outputs include:

- Eportfolios guide (2008, updated 2012) – https://www.jisc.ac.uk/full-guide/e-portfolios
- Crossing the Threshold: Moving e-portfolios into the mainstream (2012) http://www.webarchive.org.uk/wayback/archive/20140615090731/http://www.jisc.ac.uk/media/documents/programmes/elearning/eportfolios/threshold.pdf
- The e-portfolio implementation toolkit (2012) – https://epip.pbworks.com/w/page/28670505/The%20e-portfolio%20implementation%20toolkit

Centre for International ePortfolio Development (CIePD) During 2003–2013, CIePD was asked to work "with infrastructure and technology for user-focussed, policy-driven technical developments". Their research "demonstrated how introducing new technology in specific ways can instigate change" (Centre for International ePortfolio Development, 2015). CIePD worked in partnership with JISC and other European organisations, and completed an extensive amount of ePortfolio project work including:

- Specifying an ePortfolio – http://www.nottingham.ac.uk/ciepd/projects/completed-projects/specifying-an-eportfolio/specifying-an-eportfolio.aspx
- eP4LL (ePortfolio for Lifelong Learning) eFramework – http://www.nottingham.ac.uk/ciepd/projects/completed-projects/ep4ll/ep4ll.aspx

Inter/National Coalition for Electronic Portfolio Research (NCEPR) lead the way as it "convenes research/practitioners to study the impact of ePortfolios on student learning and educational outcomes" (NCEPR, 2015). Membership of NCEPR is through an institute-based application process. Successful applicants join a cohort of ten institutions that work together to undertake research for a 3 year period. Cohorts generally involve non-North American institutes and meet annually.

NCEPR contributes to the international and North American ePortfolio professional learning ecosystem through, releasing emergent findings, publications and presentations, and (until 2008) the Connector newsletter.

Authentic, Experiential & Evidence-Based Learning (AAEEBL) is the sister of North American ePortfolio professional learning community. This is a membership-based professional association with the goal "to promote portfolio learning as a major way to transform higher education" with the view that "Portfolio Learning shifts more initiative to learners to guide their own learning and is, importantly, a model of learning that fits the mobile learning characteristic of this era" (AAEBL, 2015a). AAEEBL sponsors research, such as the ePortfolio Survey, which produced an insight into ePortfolio use, mainly in North America (Brown, Chen, & Gordon, 2012). It also convenes and supports a number of activities including: the National AAEEBL Conference and regional events; the AAEEBL Learner newsletter; webinars and discussions; and the International Journal of ePortfolio (IJeP).

AAEEBL works in partnership with a number of the other ePortfolio professional learning communities including the LaGuardia Community College, a substantial leader in ePortfolio use in North America. LaGuardia Community College's Catalyst for Learning: ePortfolio Resources and Research website and community was the result of a 2010 Fund for the Improvement of Postsecondary Education (FIPSE) grant which involved 24 US institutions over a 3-year period (AAEEBL, 2015b).

Electronic Portfolio Action and Communication (ePAC) works closely with AAEEBL, and has been a leading ePortfolio professional learning community since October 2002. ePAC has provided online virtual professional learning support by promoting ePortfolio events and resources such as: Copyright Free Resources for ePortfolio creation: Evolving List of ePortfolio-related Tools; and Archived ePAC Chats & Related Webinars. ePAC's on-going contribution to the international ePortfolio professional learning ecosystem is their listserv, where ePAC members share ePortfolio information and questions.

ePortfolio System-Based ePortfolio Professional Learning Ecosystems

The two main ePortfolio systems used in Australian universities are Mahara and PebblePad. Both contribute significantly to the international and Australian ePortfolio professional learning ecosystems. Mahara is managed by Catalyst and is an open-source ePortfolio software which originated in New Zealand but has developers and coders globally contributing to the ePortfolio professional learning ecosystem, including: Mahara Hui conferences in New Zealand and Europe; Mahara community forum and resources; Mahara quarterly newsletter; Mahara user groups based in North America, Europe, Australia and New Zealand.

PebblePad originated in the UK and is a company which provides e-assessment and personalised learning space technology to education institutions and professional bodies. PebblePad has provided its users with a professional learning community which shares and showcases best practice using PebblePad, including: a PebblePad community website; webinars and user group meetings; bi-annual PebbleBash conferences. These system-based ePortfolio professional learning communities are a vital component of the international ePortfolio professional learning ecosystem, as they provide leadership and support not only for their individual systems, but in the way ePortfolios are used in Australian and international universities in general.

Australia-Wide ePortfolio Professional Learning Ecosystems

Australia-wide ePortfolio professional learning ecosystems have evolved through the commencement of education-sector specific professional learning ecosystems through the Australian Flexible Learning Framework's ePortfolios Business Activity, the Vocational Education and Training (VET) ePortfolio Community of Practice, and Australian ePortfolio Project, which merged into what is now known as ePortfolios Australia.

Australian Flexible Learning Framework's ePortfolios Business Activity was established in 2008 to support the use of ePortfolios in the VET sector as a means to support learner transitions into, through and beyond formal education and training. It produced the National VET E-portfolios Roadmap (National VET E-learning Strategy, 2012), a national strategic ePortfolio planning tool that defined key areas requiring a national and collaborative approach to ePortfolios across the VET sector. The ePortfolios Business Activities undertook wide research, developed case studies and funded trial projects. These projects defined appropriate actions to adequately address each goal. It also produced National Guidelines for implementing E-portfolios in VET for Managers of Learner Information and the associated Functional Specifications for E-portfolio implementers and developers.

Vocational Education and Training (VET) ePortfolio Community of Practice was established in recognition of the uptake of ePortfolios as teaching, learning and recognition tools, "professional development, adequate business structures and support" (Australian Flexible Learning Framework, 2009, p 7) was also required. To support this, the Framework's ePortfolios Business Activity played "a central role in supporting the establishment and facilitation of communities of practice to provide assistance and dissemination of information and a mentoring role for new users" (Australian Flexible Learning Framework, 2009, p 13). As part of this work, the Framework engaged an ePortfolio Community of Practice (ePCoP) facilitator in 2010 to investigate and implement activities that would bring together experienced and new ePortfolio users to share common and best practices, and its function was to: help people find and access ePortfolio information and expertise; to develop and disseminate case studies and use cases of ePortfolio practice; to showcase learner ePortfolios; to develop and disseminate resources and examples for ePortfolio practice and implementation; and to influence teaching and learning to foster lifelong learning.

Background research and participation in other blended communities of practice were undertaken by both the facilitator and the business manager. Consultations with other experienced community of practice facilitators and ePortfolio practitioners were undertaken, including the members of the ePortfolios Reference Group (ERG, 2011), as the frontline stakeholder group providing advice and support to the ePortfolios business manager.

Where possible, this work was based on best and emerging practice and included cases studies to illustrate common issues and scenarios. Connections and partnerships with other Australian and international ePortfolio professional learning ecosystems were developed to cross-pollinate ideas and facilitate activities.

ePortfolios Australia was established in 2010 when key members from the Australian ePortfolio Project and the Framework's ePortfolio Business Activity came together to leverage the knowledge and resources of both projects to create ePortfolios Australia. ePortfolios Australia is a professional network which aims to support the use of ePortfolios in Australia and beyond through professional development activities and the sharing of resources, ideas and practice (ePortfolios Australia, 2015). ePortfolios Australia is a volunteer organisation run by individuals from Australian higher education, VET training organisations and industry representatives.

ePortfolios Australia has facilitated a number of activities to create an Australia-wide professional learning ecosystem, including: 2010–2011 – ePortfolios Australia conference; 2012 - ongoing – ePortfolio Forum and workshops: webinars; website and blog posts; presentations, social media communications; and eUpdates promoting other ePortfolio professional learning events and activities.

Evidence for the on-going need for a national ePortfolio professional learning community came about in 2012 when the planned national conference could no longer go ahead due to discontinuation of the Framework's ePortfolios Business Activity (ePortfolios Australia, 2012a), which managed the conference, but was replaced by the 2012 ePortfolio Forum when individuals collaborated to host this event at the Australian Catholic University, Sydney (ePortfolios Australia, 2012b). Since 2012, the ePortfolios Australia Organising Committee has acted as a centralised means by which those interested in the use of ePortfolios in universities can make contact and share experiences and they organise an annual Forum. This knowledge has been preserved through the sharing of event abstracts, webinar recordings and presentation slides leading to cross-organisational and cross-disciplinary networks and connections being created.

Cross-Organisational ePortfolio Professional Learning Ecosystems

The ePortfolio professional learning ecosystem has benefited from cross-organisational ePortfolio professional learning communities, allowing those Australian higher education institutions starting the ePortfolio implementation process to seek help and guidance from those who have already implemented and evaluated ePortfolios. These cross-organisational ePortfolio professional learning communities have developed either through institution-to-institution consultations or through grant funding, in particular the Office of Learning and Teaching (OLT)

of the Australian federal government, which "promotes and supports change in higher education institutions for the enhancement of learning and teaching" (OLT, 2013).

Australian ePortfolio Project (AeP) is a good example of a cross-organisational ePortfolio projects funded by the OLT. An initial major contributor to the Australian ePortfolio professional learning ecosystem was the Australian ePortfolio Project (AeP). AeP was a federally funded research project through a consortium of Queensland University of Technology, University of Melbourne, University of New England and University of Wollongong with the goal to "investigate ePortfolio practice in the higher education sector in Australia, in order to provide strategic and practical guidance about the use of ePortfolios in academic institutions" (Australian ePortfolio Project, 2007). The outcomes of AeP include:

- Australian ePortfolio Toolkit – "a series of ePortfolio Concept Guides designed to inform the diverse stakeholders in higher education about issues and opportunities associated with ePortfolio learning" (Australian ePortfolio Project, 2011); and
- AeP Final reports
  - Stage 1 Final Project Report (August 2008) – which examined the use of ePortfolio practice in Australian higher education around that time,
  - Stage 2 Final Report (December 2009) – to focus on building the Australian community of practice.

Other cross-institutional ePortfolio funded projects followed the AeP, including:

- *Business Education ePortfolios project* – another cross-institutional ePortfolio funded project which aimed to "enable academic leadership of Australian Business and Management education programs to design into the curriculum, and best use, ePortfolios and associated technologies in assessing students' learning of highly valued professionally-based capabilities" (Business Education ePortfolio, 2015). The cross-institutional ePortfolio project team consisted of members from Deakin University, Macquarie University, RMIT University and University of Southern Queensland – http://www.buseport.com.au/
- *ePortfolio for creative arts, music and arts students in Australian universities* – an OLT funded, cross-organisational project between Sydney Conservatorium of Music (University of Sydney), University of Western Sydney, Queensland Conservatorium (Griffith University), and Curtin University, with the aim to extend "the use of ePortfolios to undergraduate students in units of study … by creating ePortfolio 'templates' that provide students with a capstone product of their learning." A major output of this project is the website that has been further developed through a subsequent OLT Extension grant (ePortfolioAssist, 2015). (See Blom & Hitchcock, and Rowley & Dunbar-Hall in this anthology).

Conclusion

This chapter has presented an historical overview of the evolution of international, system, national and cross-institutional ePortfolio professional learning ecosystems which have supported, and continue to support, the use of ePortfolios in Australian universities. These ecosystems represent an unseen network of ePortfolio exemplars, uses, advice, problems and solutions that is often unrecognised by ePortfolios in their discrete institutions and professional contexts. The single case study presented highlights the demand for and on-going need for this type of professional learning, and for recognition of the benefits that the experiences of others can provide. The chapter has listed resources, events and collaborative projects from various ePortfolio professional learning ecosystems, both in Australia and internationally. Each case study was presented in isolation, even though each of the groups described has worked and continues to work collaboratively to create and manage various ePortfolio professional learning ecosystems. This enables people to gain leverage from the experiences and resources of others, making the pathways of ePortfolio use more accessible.

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Chapter 2
Striving for Sustainability: ePortfolio Pedagogy in Australian Higher Education

Lynn McAllister and Kim Hauville

Abstract The Queensland University of Technology Student ePortfolio program is a core-funded, fully supported program available to all students since implementation across the institution, in 2004. After graduation, alumni maintain lifetime access to their ePortfolios with access to support resources. Academics are supported to embed the Student ePortfolio program to enhance student learning outcomes and to meet institutional learning and teaching goals. This chapter explores the maturing of said Student ePortfolio program, in particular as a critical reflective pedagogy, through professional narrative based on use cases. The narrative illustrates the diverse nature of ePortfolios for real world learning at Queensland University of Technology. The lived experience of teaching staff and students using ePortfolios to meet expected learning outcomes is detailed through a series of topic areas: lecturers' conceptualisations of ePortfolios; clarity of purpose to encourage student engagement; benefits to students and staff of this creative approach to learning; constraints and consequences of ePortfolio pedagogy; crucial aspects of supporting ePortfolio engagement; identification of factors that contribute to the sustainability of an ePortfolio approach. These issues are discussed based on user experience, broader ePortfolio community experiences and issues, and reference to the literature on ePortfolios. Strategies and solutions identified inform the ongoing development of an ePortfolio approach to learning and teaching, for the enhancement of student learning outcomes and academic learning and teaching goals.

Introduction

The purpose of this chapter is to inform sustainable, regenerative ePortfolio learning approaches in Australian higher education and to contribute to this conversation internationally. Through professional narrative the context of ePortfolio development and maturity at Queensland University of Technology (QUT) is detailed in scenario form with commonly recognised issues, barriers and enablers discussed in terms of

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user-experience and reference to literature. The cases cited detail the embedding of the QUT Student ePortfolio (QSeP) across the Science and Engineering Faculty and the Faculties of Law and of Health. The examples provide insight into challenges and opportunities, and suggest factors critical to sustainability of the program, giving a sense of the purpose for engaging students in ePortfolio creation and curation. The chapter investigates recognised critical success factors for sustained embedding of critical reflective pedagogy through ePortfolio pedagogy at QUT. Through an overview of ePortfolio practice at QUT across several discipline areas, issues raised, barriers encountered and enabling strategies which have been developed to support ePortfolio engagement at QUT are outlined. It is acknowledged that strategies which serve to mitigate difficulties in one area may not be effective in others. Nonetheless, examples and discussion of them will contribute to successful ePortfolio engagement across education sectors and discipline areas to the benefit of academics, teaching staff and students.

Method

Discussion of ePortfolio use has been developed in this chapter as a professional narrative (Fook, 2012) using phenomenological analysis to draw upon and make meaning of the lived experience of stakeholders across 11 years of ePortfolio activity at QUT (Polkinghorne, 1998). The action research cycle of planning, acting and observing, and reflecting (Kemmis & McTaggart, 1988) guides evaluation and development of the QSeP. It is the action research approach that gives insight into the lived experience of those engaging in ePortfolio pedagogy. The body of data collected across stakeholder groups, such as students, administrators, executive and teaching staff, is crucial to the evaluation and development of the program. Reason and Bradbury (2001) note the role of narrative analysis in action research as it uses a mixed data collection method to maximise opportunity to gather user feedback within the QUT environment, and seeks to minimise 'survey stress' for staff and students. Feedback can be drawn from touch points familiar to students, such as the Information Technology (IT) Helpdesk, email and telephone contact, and during lectures, support sessions, consultations and workshops. Feedback typically consists of requests for assistance, complaints, suggestions, ideas, and appreciation. Surveys are used only when specific data is required to inform key tasks, for example, technology enhancement. The mixed method approach to collecting data has led to an effective evaluation cycle which bases decision making on the user experience of all stakeholders in ePortfolio engagement.

The QUT Student ePortfolio Program

The QSeP is an award-winning, university-wide approach to learning and professional development for students and alumni. Planning for QSeP began in 2001 when the then DVC – Technology, Information and Learning Support, brought from an international symposium a desire to provide QUT students with greater evidence of their achievements than could be presented in an academic transcript. There was strong senior leadership for the venture with close engagement between DVCs, Assistant Deans Teaching and Learning, Manager – Careers and Employment and technical developers during the design and development phase. It was, and remains, formally supported by institutional policy detailed in the QUT Manual of Policies and Procedures (MOPP). Use of QSeP is governed by the QUT IT Rules which govern all use of IT by QUT staff, students and alumni.

The program was implemented across the university as a project in the execution phase, in 2004. The ePortfolio online tool provides an electronic space designed around the QUT graduate employability skills. This provides students with the space to create and curate evidence of learning and storage space to upload and store files of their learning. This tool was built within existing QUT systems familiar to students and staff. The space is student-owned and managed and remains fully supported for students after graduation through alumni access. Initial interest in QSeP was aroused through new technology and the idea of ePortfolio as product. It was widely perceived as a collection (or archive) of experiences, achievements and artefacts, developed through critical reflection. Despite early emphasis on use of the 'technology', it was quickly recognised that the process of critical reflection, required to create and curate the ePortfolio, presented students and academics with a challenge at least as great as the technology. From the outset, QSeP has been centrally supported by a team comprising both technical and pedagogic expertise as well as senior leadership. QSeP is available to all students to use independently and to all academic and teaching staff to use in learning and teaching, and assessment activities.

Initial drivers for developing QSeP were founded on the belief that student-owned, student-centred reflective learning spaces could add value for students by supporting them to make connections between personal experiences, formal and informal learning and professional aspirations and goals. It was not conceived at this early point, that the ePortfolio could or would be used to support learning and teaching in the formal sense, such as for assessment or as a mandated or required activity. Since 2004, the understanding of an ePortfolio approach has matured as purposeful embedding within units and courses of study has increased. The QSeP project was transitioned to a core university-wide service in 2011. The ePortfolio at QUT is understood as pedagogy and as a program comprising the process of critical reflection or critical self-enquiry and the online technology which supports development of the ePortfolio as a personal learning space, product or entity. The term 'ePortfolio' conjures many different understandings and it remains a challenge, based on current ePortfolio conversations, to foster shared understanding between

learning and teaching practitioners across the institution, nationally and internationally.

Uptake of QSeP has been consistent since its inception with early adopters sharing practice and inspiring colleagues to adopt the ePortfolio approach. Currently, QSeP is used widely across the institution, both independently and as embedded critical reflective pedagogy in single units, degree courses, higher degree research and extra-curricular programs, where the approach helps students maximise learning opportunities. It underpins learning, teaching and assessment requirements in many health disciplines including social work, nursing, public health, podiatry and biomedical sciences; information management; law and justice; engineering; business and education, supporting undergraduate, postgraduate and higher degree research students. There are approximately 10,000 new ePortfolios created each year and more than 45,000 active alumni ePortfolios.

ePortfolios in Australian Higher Education – A First Look

In 2007–2008, the Australian ePortfolio project, led by QUT and funded by the then Australian Learning and Teaching Council (ALTC), found that 'ePortfolios' were being discussed in all Australian and New Zealand universities. There was a "high level of interest in the use of ePortfolios…to enhance student learning outcomes and help students become confident graduates with a strong sense of professional identity and the capacity to meet recruitment and career challenges" (Hallam et al., 2008, p iii). However, ePortfolio implementation activity was fragmented with only one university-wide ePortfolio approach in Australia, and that was at QUT. In 2006, the New Zealand Tertiary Education Commission developed the Mahara open source ePortfolio, promoting life-long learning and providing students with the tools to demonstrate their skills and abilities to different audiences. Mahara remains freely available across New Zealand educational sectors and has been widely adopted within Australia and internationally (Mahara, 2010). At the time of the Australian ePortfolio Project, Australia was considered to be "in the early stages of ePortfolio practice" compared to practice in the UK, Netherlands and the USA (Hallam et al., 2008, pp iii & 17). Since that time, implementation of ePortfolios for learning has continued to grow across Australian higher education and the notion of ePortfolio learning has continued to expand in the UK, Europe and the USA. There is an extensive body of literature, including dedicated journals, based on the use of ePortfolios for learning in higher education. Research projects, ePortfolio implementations, discipline based ePortfolio projects are well documented in the literature and generally include the barriers, issues, challenges and keys to success of the undertaking. Discussion of these elements has been evident in the ePortfolio literature since the early years of activity in Australian higher education.

ePortfolio Engagement at QUT – Issues, Barriers and Enablers

Science and Engineering Faculty (SEF) The School of Information Systems, a department of the Science and Engineering Faculty and previously within the Faculty of Information Technology, has been engaged with the student ePortfolio for more than 12 years, since the development phase of the QUT ePortfolio. Final-semester students in the Master of Information Technology (Library and Information Studies) course were invited to participate in the pilot testing phase of the QUT Student ePortfolio project in 2001. Students, who chose to participate, used QSeP to complete existing document-based portfolio assessment, which was the major assessment item in this Professional Practice unit. Even at this pilot testing stage of the QSeP technology, it was understood that students would be unlikely to engage with the ePortfolio if their work was not being assessed. This was the reason for 'attaching' this testing activity to a unit where focused critical reflection was an existing practice for the unit and the professional practice portfolio was an assessment requirement. The existing ePortfolio assessment was a graded assessment and remained so for a few semesters after introducing QSeP. It has since changed to a Pass/Fail assessment which must be completed to a specified standard before students can graduate from this course. Critical reflection was already a well-supported element of all assessments in the core units of the degree program, so the use of ePortfolio did not require course redesign and was embedded purposefully into existing learning activities. This was the main reason together with enthusiasm of the course coordinator for inviting this cohort to test the newly developed QSeP technology.

Students reflected on their learning within the course and made connections to their life experience, work placements, prior study to provide evidence of their capacity to perform as an information professional in their chosen field. Artefacts, typically work samples and supervisor feedback often formed the basis for reflection and added extra weight to self-assessed evidence. The portfolio assessment in this unit specified particular types of evidence and artefacts that students were expected to include. It was expected to be of a quality that would convey to a prospective employer, a picture of the 'complete professional'. The course coordinator realised the potential for ePortfolio to effectively engage students to develop reflective habits and to meet the challenge of employment in the online environment. The purpose of engagement was clear to these students who fully expected to use the ePortfolio product to show prospective employers. One of the main issues at this stage was the lack of functionality which precluded sharing the online ePortfolio beyond the QUT firewalls. This was a significant disincentive to student engagement. At this early stage, the ePortfolio was not made available for life so these students did not have the benefit of sustained access to the ePortfolio beyond graduation. By 2008, only 4 years after QSeP implementation, continued lifetime access was realised to be a significant factor for engagement and the ePortfolio service was extended to alumni,

for life. Lifelong access to the ePortfolio is now considered to be a critical success factor for QSeP engagement at QUT. External access was achieved some years later.

The early cohorts were closely supported through practical lab sessions to 'learn the tool'. QSeP has continued to be used to support assessment for this unit to the present day, with online and animated guides providing most support and practical sessions reduced to requested drop in sessions. Most recently, students in this course, now known as the Master of Information Science (Library and Information Practice), continue to use QSeP for assessment of the Professional Practice unit. The Professional Practice unit now runs as a course-long unit. These students typically use a range of software to present their ePortfolios. This encourages exploration of technologies which support critical reflection and allows students to individualise the ePortfolio for presentation. They are required to submit from within their QSeP technology, as this streamlines assessment marking. The ePortfolio requirement has remained embedded despite movement of teaching staff over the years. In this particular instance, it is largely due to the purposeful nature of the tasks and the foundational development of the ePortfolio assessment tasks across the first few years. Students in this cohort come to expect continued recognition of their ePortfolio development by The Australian Library and Information Association, the main industry association for information professionals, which uses an ePortfolio approach to continuing professional development within the association hierarchy of membership.

QSeP has also been used in the Bachelor of Information Technology, large first year core unit, to engage students to more fully understand the different streams and elements of the Information Technology profession. Students typically held a very narrow view of the profession as being all about "games design". Individual academics recognised the capacity of critical reflection and building an ePortfolio to help students understand their chosen profession. Students were required to collect job related information for the type of position they were interested in; to speak with guest lecturers employed in the IT field and gather information about the real nature of the work; to carry out a personal skills audit and discuss strengths and weaknesses with fellow students; plan to develop new skills or improve existing skills. Such activities helped first year students appreciate the real nature of working in the IT field. The program encouraged first year students to think about their professional goals and explore their chosen industry, reflecting on their current skills and on the skills they will need to develop further. There was an improvement in retention in the Bachelor of IT after the implementation of these ePortfolio assessments. This particular embedded use of QSeP was due to the vision and drive of one academic and although successful over multiple iterations, has been discontinuous over time depending on staff turnover. The need to carefully and deliberately support critical reflection in this unit caused workload issues as did the high number of student queries related to critical reflection and the purpose of using the ePortfolio. Butler (2007) notes perception of increased workload as a prevalent barrier to using ePortfolios. The issues of workload and need for reflective writing coaching were mitigated by training the tutors to more closely support students in reflective writing and to ensure all students were introduced to the technology within a compulsory

unit tutorial session. It had been mistakenly assumed that, being 'IT students', they would automatically be comfortable with the technology. The tutors reported that this strategy worked well for this unit and the practice continued for several semesters until the faculty closure and subsequent restructure led to the loss of key experienced teaching staff and the ePortfolio approach to learning in this unit was lost.

Over the years there have been episodes of interest in the possible embedding of ePortfolio to support Bachelor of Engineering students to enhance learning in project and work integrated learning (WiL) units of study. Several consultations with senior teaching staff took place. In 2010, there was a determined effort to recruit final year engineering project students to create their professional ePortfolio; to build a body of evidence addressing professional/industry based engineering standards. There are several similar, but distinct, engineering standards worldwide and, as experience suggests that engineering students tend to look for work outside Australia, there was perceived benefit for students to develop the ePortfolio to aid mobility across the international workforce. However, staff movements and the lack of agreement on a single industry-based set of skills and competencies, hampered the purposeful embedding of ePortfolio pedagogy for engineering students at that time. The ePortfolio team did, however, work closely with an engineering student who developed his ePortfolio to evidence recognised employability skills. He also worked with the team to develop a video, telling fellow students of the insights he had realised as a result of critically reflecting on learning. He greatly valued the increased confidence the process had brought him and felt it improved his prospects of finding employment.

Recently, the Bachelor of Engineering course has been redeveloped and an ePortfolio or critical reflective component has been written into the course outline. Course-wide embedding of ePortfolio achieves best practice principles for student engagement, meeting known expectations from past students who felt it was crucial to 'start early in my course' so they could better manage their learning pathways. ePortfolio pedagogy will underpin the work integrated elements of the course and will be assessed at key points across the course to demonstrate student development of employability and professional engineering skills and competencies. Jenkins (2012) found that when using critical reflection and professional narrative with engineering students it is necessary to structure such reflective elements. This has been found critical in all discipline areas across QUT and supports the use of 'skill sets' to enable deep learning. Drivers for this latest course-wide implementation include currently low rates of graduate recruitment in Australia, the QUT Blueprint and Real World Learning Vision statements (QUT, 2014) which promote work integrated learning (WiL) opportunities for all students, and the enthusiasm and vision of teaching staff. Alignment of ePortfolio pedagogy with these broader institutional initiatives is considered best practice at QUT and important for moving ePortfolio practice beyond sustainability. However, senior leadership awareness of QSeP and a supportive institutional culture which fosters the ground swell of enthusiasm around ePortfolio pedagogy are considered crucial to achieving a regenerative ePortfolio program.

Faculty of Law QSeP has been embedded for some years into three undergraduate law units in the Bachelor of Laws (LLB), Principles of Equity; Trusts and Virtual Law Placement, to encourage and support students to reflect on and document their skills development, plan for future careers, take responsibility for future learning and development, and to synthesise their learning by making links to theory and practice across the course. The goal was to enable students to develop insight by fostering reflective practice and building student confidence and to help them develop as professionals in the workplace. Students were required to reflect on specific skills related tasks such as drafting client legal memoranda or undertaking specific legal research tasks. Students needed to make judgements about their expertise as evidenced by the work sample (artefact) and discuss plans to improve skills; talk about any issues or challenges of the type of work undertaken; discuss expectations of doing the work in a 'real' work placement. These students had the opportunity to submit their reflective writing for feedback to help them develop the critical nature of their reflections; to make connections to formal theories and to work experiences. The ePortfolio team assessed and provided feedback to guide students in reflective writing. The depth of reflection typically improved over time for these students as they were using the feedback to develop more targeted and thoughtful evidence of learning. During this time the unit coordinator developed specific assessment criteria for marking the final ePortfolios. The ePortfolio approach embedded in these units matured across several years and exemplifies best practice in pedagogy development at QUT.

QUT is committed to increasing the number of opportunities for students to engage in WiL opportunities and the Virtual Law Placement was well-received by students. Choy (2009) found that focused critical reflection must be a requirement within curriculum design in order to achieve transformational learning in work placement settings. While lecturers have different motivations for wanting to embed a critical reflective approach to learning and teaching in their units, they have a common desire to add value to existing assessment tasks and WiL opportunities which provide students with a strong base for engaging in critical reflection and ePortfolio, where the purpose of engagement is clear. "Clarity of purpose" is crucial for student engagement (Conole, de Laat, Dillon, & Darby, 2008). The individual academic responsible for developing the ePortfolio in these units is now a senior member of staff and currently involved in the course wide implementation of QSeP, across the LLB. From 2015, ePortfolio pedagogy is embedded from first year and introduced in first semester core units of study. These are large units of more than 900 students and assessment workload issues are expected. This gives a valuable opportunity to explore the use of peer review for fostering critical reflection and managing assessment feedback. Engaging in peer review and collaboration during ePortfolio development enhances the social learning aspect which is central to effective learning opportunities (Barbera, 2009; van Aalst & Chan, 2007; Zubizarreta, 2009). Peer and instructor feedback is crucial to move reflection from description to deeper analysis. It is hoped peer review strategies can be successfully implemented to foster transformational learning and mitigate workload issues.

Similarly within the School of Justice, QSeP has been embedded into the final year Professional Placement unit to support students to develop professional identity and make connections between learning across the course and personal and professional goals. It is hoped that through reflection on the profession and their professional identity, QUT Law and Justice graduates will be resilient and closely connected to the industry which currently experiences high attrition rates from graduates in the early years after graduation. At Curtin University, researchers noted increased career awareness, and increased engagement in 'future-oriented thinking' among students engaged in creating their iFolio through reflecting on their learning (Blom, Rowley, Bennett, Hitchcock, and Dunbar-Hall 2014). Smith, Sobolewska & Smith, (2014) found that undertaking a dedicated portfolio module, within a study program, increased the percentage of students who identified themselves strongly with their chosen profession, from 61 % to 73 %. Interestingly, they found it also had a beneficial effect on student identity, increasing the number of students expressing a strong student identity from 65 % to 83 %. Findings such as these suggest the complex, layered nature of the impact of critical reflection on student learning and development.

Faculty of Health There has been widespread use of QSeP within the Faculty of Health over the years. The Bachelor of Nursing has a very strong clinical practice focus with students undertaking professional practice units and clinical placements across the course. Reflection on practice is crucial to development in health care disciplines as patient safety depends on personal and professional awareness of capacity to practice. Traditionally, nursing students recorded clinical reflections on paper and it is perhaps not surprising that the nursing discipline was an early adopter of QSeP. On graduation, nursing students are required to evidence their capacity to meet the Australian Nursing and Midwifery Competencies. The Bachelor of Nursing academics were quick to realise the potential of changing from a paper based to an online approach. The Bachelor of Nursing was the first course to request a professional competencies 'skill set' be built into QSeP to provide a focus for reflection and structure for presentation. Feedback from students and academics at QUT suggests frameworks help students develop deeper understanding of their learning and experiences. A 'skill set' in QSeP means an industry-based discipline specific set of standards or competencies. Some professions such as teaching and nursing mandate ongoing engagement with these discipline standards through regular re-accreditation or registration. The Australian Nursing and Midwifery Council (ANMC) were in favour of the Nursing Competencies being built into the technology in 2004. User feedback on the use of the 'skill set' suggested they provided structure for students to manage, organise and curate content; provided guidance to viewers of the ePortfolio and most importantly supported critical reflection for students' capacity to evidence the professional requirements of their course. Based on the satisfaction with the 'skill set' for nursing students requests from other disciplines followed. There are now more than 15 discipline specific professional 'skill sets' built into the student ePortfolio. Students have access to relevant 'skill sets' based on their course enrolment information which

ensures students have access only to the professional standards and competencies relevant to them. 'Skill sets' are updated when required to align with industry reviews and changes to existing competencies and practice standards.

In 2007, the then Bachelor of Nursing course coordinator embedded the ePortfolio into the fourth clinical placement unit, which was in the third year of the course. She was aiming to enhance the standard of critical reflection which she deemed unacceptable in students so close to entering the profession as beginning nurses. These students received targeted coaching to help them focus and develop critical reflection and reflective writing. They were given practical hands-on training to learn the technology and were able to develop their ePortfolios during scheduled compulsory course tutorial sessions. It was labour intensive for the ePortfolio support team but worked well for these students. For several semesters, this model supported clinical reflective writing and the course co-ordinator saw an appreciable improvement in the quality of clinical reflections. There was a steady redevelopment of support resources based on student requests for exemplars and specific point of need assistance with the technology. A serious barrier for this cohort was the lack of functionality in the technology, which excluded clinical preceptors [at this time] from accessing the student ePortfolio online tool. The technology could be released only to people who had a formal association with QUT, meaning they have a QUT email account. Honey, Doherty, Marshall and McIlwain (2010), found the lack of access for preceptors to be a critical issue and one of several which led to discontinuance of the nursing ePortfolio in their study. This lack of required functionality, together with staff movement and a preference to support the reflective writing completely 'within-discipline', led to QSeP being omitted from the course. In 2013, funding enabled development of the external release functionality as well as feedback function to enhance the assessment process. Both of these long-awaited developments have been well-received by academics and particularly by students who can now release their online ePortfolios to external audiences such as prospective employers. The capacity of QSeP, to once again support students in the Bachelor of Nursing, is currently under review.

The Master of Nursing Science (Nurse Practitioner) course has been using QSeP to underpin the major assessment item in the course for more than 6 years, with seamless handover from the outgoing to newly-appointed course coordinator, during that time. These students develop their professional practice portfolios to evidence their capacity to practice as stated in the Nurse Practitioner Standards for Practice. The recently created 'feedback' form was developed to meet user needs and has been successfully trialled by the teaching staff in this course. It supports students' needs, as they require ongoing feedback across the course to help them develop deep reflection with strong connections between clinical practice and the formal learning in the course. Teaching staff are now able to leave feedback within individual ePortfolios enabling students to quickly respond to the suggestions for developing more-critical reflection on practice. This functionality has been well-received and further innovations are planned as the use of QSeP in the nurse practitioner course has matured. It has developed purposefully and with the close

collaboration of students and teaching staff over time. It was the first use-case at QUT to request exemplar ePortfolios. Exemplars guide students to the required structure for the ePortfolio, thereby minimising student stress regarding the design of the ePortfolio (which is not the core goal) and also simplifying the assessment marking load by standardising the ePortfolio collections. James, McInnis & Devlin (2002) note the value of exemplars in managing large cohort workloads. Within two semesters of the first exemplar being developed, academics and students from other disciplines were requesting exemplars to help understand and visualise the structure of the ePortfolio for different purposes and also to inform content development. Feedback from staff and students suggests exemplars are one of the most popular and directly educative support resources developed to date.

In 2010, and based on the experience of colleagues in the health sciences the course coordinators of the Bachelor of Social Work and the Master of Social Work embedded QSeP and critical reflective pedagogy to help students develop the skills to best meet the demands of a competitive employment environment. Students were introduced to the ePortfolio early in the course and were expected to collect work samples and develop evidence of their skills development related to the Australian Association of Social Workers (AASW) practice standards across their units of study. At several touch points across the course the ePortfolio supported assessment tasks. It was envisaged that students would build a useful body of evidence to help them meet work placements, job applications, recruitment processes, scholarship applications and other purposes. The embedded ePortfolio was purposeful, closely supported through assessment tasks and students reported that the process of ePortfolio creation gave them confidence in their capacity as professionals. Nonetheless, in 2013 when the course coordinator retired, interest in continuing with the embedded ePortfolio was lost and engagement lapsed. Twelve months later an experienced ePortfolio pedagogue joined the teaching staff and QSeP was embedded into a single elective unit of study for Bachelor and Master of Social Work cohorts – the Professional Practice unit. Jasper and Fulton (2005) make the point that creating an ePortfolio requires students to link theory and practice. This is at the core of ePortfolio pedagogy at QUT as a university for the 'real world'. QUT aims to have 60 % of students undertaking at least one WiL experience during their course of study and the Professional Practice Portfolio is the major assessment for this unit which is created and presented for assessment within QSeP. The current unit coordinator is actively researching the impact of critical reflection and ePortfolio creation on the student learning in this cohort and this promises to provide valuable information for the development of ePortfolio pedagogy. The current iteration evidences best practice, being purposeful and engaging, and has the support of the discipline industry partners, which is unique within QUT ePortfolio practice.

QSeP is purposefully embedded to support minor assessment tasks in a number of areas within the Faculty of Health: exercise science, cardiac science, biomedical laboratory skills, medical radiation science, paramedicine, public health and podiatry. Embedding in these units of study follows best practice at QUT which is to assess student engagement with critical reflection and to ensure students understand the purpose for creating and curating a body of evidence of their learning and

development for the purposes of employment, career progression, research funding and scholarships and awards. This is very valuable for students and academics alike as it combines the discipline specific learning with students' personal attributes and employability skills such as leadership, persistence, self-management, interpersonal and communication skills (Holmes, 2013). Radloff et al. (2009) noted that teaching staff may be disengaged with generic graduate employability skills, preferring to focus on discipline standards and competencies.

It is expected these cohorts will require critical reflective writing support as it is not a within-unit focus. Early trials of the ePortfolio revealed the need to provide students with instruction in reflective writing and to connect the ePortfolio with career-related outcomes (McCowan, Harper & Hauville, 2005). Members of the ePortfolio team were instrumental in conducting training sessions designed to provide students with the technical and reflective skills required to create a portfolio. The *5Rs Framework for reflection* (which is a component of the QSeP) was used to help students begin to develop reflective writing. This framework consists of Reporting, Responding, Relating, Reasoning, and Reconstructing. Frameworks such as this ask students questions and help them develop the critical nature of reflection by structuring their thoughts, enabling them to meaningfully and systematically reflect on significant experiences (Bain, Ballantyne, Mills, & Lester 2002). Training sessions also provide an opportunity to contextualise these reflective practices by demonstrating how these reflections may be applied in job-seeking activities, such as responding to selection criteria. The ePortfolio team develops reflective writing resources which assist students to make connections between their clinical evidence and their 'real world' credibility, which anchors the ePortfolio for the students as a motivating tool to help them find employment.

The Future and Sustainability

The term 'ePortfolio' is variously understood in different discipline areas and different institutions. After many years of focused ePortfolio development in higher education worldwide, there is still a sense that it may not be well understood (AAEEBL, 2015). The QUT brand is a 'University for the Real World' (https://www.qut.edu.au/) which challenges all academics and professional staff to aim to enhance students' capacity to meet career and employment processes and professional goals. QSeP and critical reflective practice have a role to play in this pursuit and the sustainability (and perhaps regenerative capacity of this approach to learning) may be best supported by following best practice principles evidence from experience at QUT, from the body of literature and by ensuring critical success factors continue to guide development and application of the pedagogy. At QUT, ePortfolio is promoted as critical reflective pedagogy, an approach to learning which provides opportunities for students to come away from their university learning with much more than a testamur. The previous section has suggested a range of activities which provide a basis for reflection and the creation of an online ePortfolio

to develop, document and present evidence of learning and professional development. At QUT, striving for sustainability means communicating the ePortfolio concept in context and supporting the approach in an holistic manner. The following section presents elements for sustainability.

Critical success factor (CSF) is a term for a strategy or element required for the success of an enterprise or undertaking (Rockart & Bullen, 1981). We know from experience since QSeP implementation that certain factors are critical to ePortfolio success at QUT – QSeP needs to be purposefully embedded; when used to support unit and course learning outcomes, student effort must be assessed; academics need to know they will be supported with perceptions of increased workload and negative feedback from students minimised; we need to identify and convey 'measures' of positive impact on students; positive and consistent senior leadership is required to support bottom up implementation and sharing of practice. The critical nature of these factors may well differ in other contexts based on institutional culture and practice. At QUT, however, experience suggests that sustainability of the QSeP program will falter if any one of the following factors cannot be met.

Practice Should Be Evidence-Based

The process of developing and maintaining an ePortfolio requires students to think critically about their skills, abilities and professional identities. The annual Australian Association of Graduate Employers Survey (AAGE, 2014) showed that employers mainly use behavioural interviews, panel interviews and reference checks when recruiting and are looking mostly for evidence of communication and teamwork skills and cultural fit with the organisation. Students who have been through the process of ePortfolio development – through critical reflection on their learning and experience – are more likely to understand their capacity and be able to meet the challenges of graduate recruitment. The QSeP team supports academics to make the connection between critical reflective assessment requirements and the world of employment and self-promotion clear for students.

These factors from the literature are recognised as best practice at QUT. They guide the use-cases which have been detailed in this chapter and are aimed for in all implementations of ePortfolio pedagogy. The program evaluation cycle ensures the body of literature and user feedback continually inform best practice. The following summary provides key best practice strategies:

- ePortfolio pedagogy must drive the technology and not the other way around
- ePortfolio should be embedded in unit/course activities as this clarifies purpose and motivates engagement
- ePortfolio should be introduced early in the course preferably Year 1 Semester 1
- ePortfolio tasks should be assessed and effort acknowledged and rewarded
- students should be able to 'see' where ePortfolio assessments fit within a course
- ePortfolio assessment should use a range of types e.g. peer feedback

- flexible support modes are most effective in supporting diverse cohorts
- students require structure and scaffolding to develop reflective writing skills (Brandes & Boskic, 2008; Peacock, Gordon, Murray, Morss, & Dunlop 2010).

Best practice in ePortfolio pedagogy suggests that critical reflection and ePortfolio development and curation be designed into units (preferably programs) of study. Reflection develops over time and is an iterative process in which ePortfolios should develop with the learner across a course or program of study. They should be a core assessment requirement and never seen as an add-on, as critical reflection requires support and structured teaching approaches to help students write reflectively (O'Connor, Obst, Furlong, & Hansen 2015).

Creating an ePortfolio can encourage teachers to think deeply about teaching, to acknowledge theories about their practices, and to engage in dialogues about teaching (Butler, 2007). Provision of a staff instance of ePortfolio aligns with known best practice which indicates that student engagement is more effective where teaching staff engage in ePortfolio creation; value the approach and model critical reflective behaviour (Schaub-de Jong, Schönrock-Adema, Dekker, Verkerk, & Cohen-Schotanus 2011).

Where the ePortfolio is embedded into units and courses of study at QUT, it is assessed. This rewards students for the significant time and effort required to meaningfully engage in critical reflection and with the technology and was done to avoid the difficulty of moderating grades across a diverse range of ePortfolios. In most cases, the ePortfolio assessment at QUT is Pass/Fail. In the three LLB units detailed, the ePortfolios were graded to meet student expectations. Interestingly ePortfolio for assessment is always an interest area at the annual ePortfolio Australia Forum with a workshop dedicated to the subject each year. Over the years the literature has suggested there is a perceived tension in assessing something as personal as an ePortfolio. When academics are supported to develop authentic assessment tasks which focus on critical reflective practice and evidencing learning, and to develop criterion referenced marking rubrics, there is less concern or tension around the grading of ePortfolio assessment tasks. The use of clear guidelines and frameworks to support academics to embed ePortfolio pedagogy is a recognised success factor and not unique to this activity.

At QUT, the student ePortfolio is a way of learning and teaching. It is only through carefully designed pedagogy that ePortfolios become empowering and regenerative. Delandshere and Petrosky (2010) and Thomas and Liu (2012) have shown that while ePortfolios have the potential to support critical reflection, they are not sufficient to sustain student engagement which requires collaboration and feedback to help students develop. This is one of the reasons that the student ePortfolio is now recognised as pedagogy, requiring thoughtful design and purposeful delivery.

The Planned Flexibility Support Model

The Planned Flexibility support model enables the team to respond quickly and to draw upon pedagogic, technical and management expertise to support users, in-context and at point of need. The ePortfolio team is within the eLearning Services department in the Division of Technology, Information and Learning Support and can access skills from technical developers, learning design and management. The team manager can facilitate communication with faculties and senior leadership. All users – academics, students and alumni, can access support resources for ePortfolio engagement.

The support model has developed over time, in line with user needs and underpinned by an action research method, which enables ongoing evidence-based evaluation and development (Kemmis & McTaggart, 1988). It reflects the elements of best practice as found in the ePortfolio body of literature. Academics and user groups can request contextualised, cohort specific resources; students have access to resources best suited to their learning styles; alumni can continue to access support resources which support their continuing professional development. The underpinning action research cycle ensures the support model moves beyond mere sustainability to offer a regenerative strategy which continues to effectively support ePortfolio engagement at QUT as pedagogy in context and 'within' technology.

Design and delivery of information and support resources is a large part of the team workload and crucial to support user engagement. Teaching staff can request ePortfolio introduction sessions within lectures, tutorials or as online modules. Students are supported to learn the technology through a range of online and animated guides as well as practical lab sessions, drop-in sessions and clinic sessions to support assessment requirements. Contextualised resources which support specific cohorts and assessment tasks have proven most effective over time. Technical development for example the 'skill sets' detailed in the use-cases is crucial for engagement and must be timely. Allan and Clelland (2012) note the importance of being able to provide "abundant support…wherever needed" for staff and students. They also noted the need to develop and deliver a range of support resource including examples and exemplars to guide both students and lecturers. It has been the experience at QUT that students and staff need to know that contextualised, task specific support resources can be developed and delivered and can be accessed through a range of modes such as face-to-face and online modules, animated and paper-based guides, email assistance, telephone support and that help can be delivered at the point of need.

Measuring the Impact on Student Outcomes

It is crucial to sustain a service or program such as QSeP to be able to provide evidence of the benefit to users. It is very difficult to quantify the impact of learning approaches on student outcomes and this remains an ongoing challenge for the ePortfolio team. Feedback and comments are collected here and when possible to build a collection of evidence which suggests success or benefit. Oliver (2013) notes there is "no universally accepted way of measuring graduate achievement of attributes and capabilities" (p 458). Similarly, while ePortfolio engagement can be seen to evidence graduate capabilities, employability skills, and discipline and industry specific skills and abilities, it is not possible to measure exactly nor clearly understand the impact of connected, authentic learning experiences, on student learning outcomes. Research activities, formally based or anecdotal, ought to be expected, supported and encouraged as part of ePortfolio practice.

In 2008, Knight, Hakel and Gromko found that undergraduate students who had developed ePortfolios had "significantly higher grade-point averages, credit hours earned and retention rates than a matched set of students without ePortfolios" (p 1). Hakel and Smith (2009) found that students who engaged in ePortfolio building had higher pass rates, higher GPA and higher retention rates. It is not feasible for the support team to research the benefit to students in terms of GPA or retention rates owing to research capacity within professional staff activities.

Eynon, Gambino and Torok (2014), detail an extensive range of success indicators from across 24 higher education institutions and also found a positive correlation between students' ePortfolio creation and curation, and higher grade point average. They particularly noted higher levels of student retention and number of students graduating as 'hard-outcomes', measuring the success of ePortfolio practice. The cases detailed in this recent study indicate that building an ePortfolio makes learning more visible to students. They note the criticality of skilful and intentional pedagogy to achieve successful ePortfolio outcomes. At La Guardia Community College, Eynon (2009) found that student retention rates increased from 61 % to 72 % with continued ePortfolio engagement. Pass rates were higher in ePortfolio intensive courses, 79 % compared to 69 % in courses without ePortfolios and similarly retention rates were also higher, 75 % compared to 70 %. La Guardia has continued to research and report the impact of ePortfolio engagement on student outcomes noting increased retention in ePortfolio cohorts (2011–2012), 80 % compared to 62 % where no ePortfolio undertaken and likewise higher completion rates +2 % and higher pass rates +10 %, in the ePortfolio cohorts (Eynon, Gambino & Torok, 2014). This type of research serves to build understanding of the complex nature of student learning.

Institutional Support and Senior Leadership

Hallam et al. (2008) noted that ePortfolio approaches often succeed where institutions "explicitly encourage a spirit of innovation…and student-centred learning" through balanced "top-down and bottom-up" processes rather than unreconciled emerging technologies (p 53). Support by senior management is crucial to ensuring institutional strategy, policy and governance effectively support ePortfolio technology and pedagogy. This is the context in which the aforementioned processes align to enable a successful ePortfolio program.

Over the years of QSeP activity, academic and professional staff members had often requested a tool 'like the student ePortfolio' to support their academic and professional development. Experimental work in 2007–2009 found the student tool was not an effective technology for staff use. In 2010, based on these requests and on the evidence of positive benefit, from the literature, work began on the Academic and Professional staff ePortfolio. Consultation with the human resource department recognised alignment of such an ePortfolio with academic development activities, staff performance planning and review, and promotion processes. After 2 years of pilot activity and exploration, the QUT Academic and Professional Staff ePortfolio (APSeP), based on Mahara open source ePortfolio software, was made available to all staff. It is a core service based within the eLearning Services department and fully supported by the ePortfolio team. Perhaps not surprisingly, many of the issues familiar across QSeP use, apply also to staff engagement with critical reflection and ePortfolio creation and curation.

This initiative has been well received by participating academics and by Human Resource managers who are supportive of the concept and keen to explore Mahara and to promote it. Feedback from the pilot phase of this staff instance clarified the need for a directly similar support approach as available for QSeP users, flexible, customisable and available at point of need.

From the point of conception of an institutional wide ePortfolio initiative, buy-in by senior management is essential. At project initialisation senior staff play an important role in rallying support. By virtue of their position in the institution, their influence affects positive outcomes for managing high level change, communication, resourcing and funding, and embedding activities where most strategic value will be realised. This ensures ePortfolio is seen as the credible and significant activity that it is.

Senior staff also play a crucial role in establishing the factors which sustain the ePortfolio program/service. Every educational technology, where its use is optional, experiences peaks and troughs of use (Gartner, 2015). Any change in strategy, organisation, or leadership can influence perspective on value and impact, and in resource constrained environments ePortfolio needs to be and should be defensible.

Prior to the formalisation of an initiative such as ePortfolio there are many informal conversations that take place at various levels of the organisation. At the senior management level these conversations play a critical role in connecting the ePortfolio program into the formal conversations around strategies and sub-strategies

of organisational units. Collectively this ensures that the ePortfolio program is given the consideration, prominence, and support it needs to succeed, and that institutional strategy and governance is well aligned. The distillation of this is coherent approaches in curriculum and connected positioning of ePortfolio with respect to current and emerging learning and teaching needs.

Allan and Clelland (2012) found that top down support coupled with bottom-up grass roots initiatives most effectively drives successful, meaningful ePortfolio pedagogy. ePortfolio practice at QUT has achieved the current very high level of maturity based on a model of strong top down support for single unit initiatives which have continued like spot fires to ignite enthusiasm across all discipline areas. Marshall (2011) maintains that institutions must "provide systems and environments that result in wider adoption of successful ideas" rather than relying on early adopters and local champions (p 31). QUT continues to evaluate ePortfolio in the context of new and emerging university-wide strategy, institutional reaction to a changing government agenda for Australian higher education, and national and international factors such as graduate employability. There will always be any number of agendas, pressures, strategies, for institutions to grapple with, and at QUT the constant has been steady, evidence based support for learning initiatives coupled with strong institutional leadership.

Without the strong support of senior managers it is difficult to establish the breadth and depth of practice that brings the impact discussed in this chapter, and as a consequence uptake and support will be piecemeal which can lead to abandonment of the ePortfolio program. Garrison and Vaughan (2013), emphasise the need for strong senior leadership to promote pedagogic innovation and strong uptake for learning and teaching initiatives.

Conclusion

The current chapter has provided insight into ePortfolio pedagogy in Australian higher education through specific use cases and has suggested the types of challenges and opportunities that occur and a support strategy that has the potential to steer ePortfolio learning into the future through continual evaluation of practice, evidence based decision making, flexibility to contextualise across different discipline areas and meet the diverse range of tasks which align with an ePortfolio approach. It suggests the importance of recognising the factors that are critical to success for an institution and the value of promoting a culture that understand and supports pedagogic innovation.

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Chapter 3
Professional Development to Support the Embedding of ePortfolios in Higher Education Programs

Katrina Strampel, Ruth Sibson, and Susan Main

Abstract The documentation of achievement in program outcomes is important in higher education and often occurs in upper year courses through capstone and/or work-integrated learning projects. There is growing recognition that ePortfolios can be used in this process. Embedding ePortfolios across the curriculum offers a framework for student learning, increases student satisfaction, and provides a mechanism to demonstrate standards and professional competencies. However, if ePortfolios have not been embedded across a program, evidence for outcomes and the student experience can be disjointed or unclear, and can exclude important elements of the learning journey. This chapter uses case studies of professional development workshops to assist higher education curriculum leaders, academic developers and teaching staff to identify and develop methods for building a structured program that embeds ePortfolios from first to final year within tertiary and industry contexts. The process includes understanding and mapping program learning outcomes, scaffolding course learning outcomes, and addressing and assessing these outcomes to ensure that holistic program design provides evidence to meet quality standards and competencies. Higher education teaching staff often design and deliver courses individually, without considering implications of assessment design and learning outcomes for a program as a whole. The aim of the professional development workshop was to simulate authentic, collaborative planning activities where participants worked in small groups to plan the integration of ePortfolios across a program. Utilising self-completed questionnaire data gathered through end-of-workshop evaluations, this chapter discusses the pedagogical design, content and considerations addressed by the professional development workshop, as well as implications for its use to support higher education teaching staff.

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Introduction

The changing profile of university entrants and the workplace has led to greater emphasis on graduate employability and interest in how to facilitate this (Knight & Yorke, 2003). For almost a decade, the American Association of Colleges and Universities has been leading a project for tertiary institutions to develop both indicators of student achievement as well as ways to share this evidence with various stakeholders, such as accrediting agencies (Rhodes, 2008). The UK Quality Code for Higher Education, Chapter B6 (Quality Assurance Agency for Higher Education, 2013), identifies the expectation that higher education institutions provide equitable, valid, and reliable assessment tasks that allow students to demonstrate achievement of the intended learning outcomes for the credit or qualification they are seeking. In Europe, Standard 1.2 of the Standards and Guidelines for Quality Assurance in the European Higher Education Area states that "programmes should be designed so that they meet the objectives set for them, including the intended learning outcomes" and, Standard 1.3, that they "are delivered in a way that encourages students to take an active role in creating the learning process, and that the assessment of students reflects this approach" (European Association for Quality Assurance in Higher Education, 2015, pp 8–10). Similarly, in Australia, all universities need to meet the requirements of the Tertiary Education Quality Standards Agency (TEQSA, 2011) standards-based approach and it is essential that assessment tasks provide opportunities for students to demonstrate achievement of the expected learning outcomes. In addition, several professional organisations require graduates to engage in continuing professional development (CPD) by logging evidence of their skills and achievements and demonstrating their competence in order to be registered to practice (e.g. in Australia: Engineers Australia; Physiotherapy Board of Australia; Nursing and Midwifery Board of Australia; Chartered Professional Accountants; Speech Pathology Australia; Australian Psychological Society; Teacher Registration Boards, etc.).

ePortfolios have been identified as a promising tool for demonstrating the learning processes and outcomes of programs across a range of disciplines, such as Nursing Education (Garrett, MacPhee, & Jackson, 2013), Teacher Education (Moran, Vozzo, Reid, Pietsch, & Hatton, 2013; Walsh, Main, & Lock, 2008), Social Work (Richards-Schuster, Ruffolo, Nicoll, Distelrath, & Galura, 2014), Music Education (Bennett, Rowley, Dunbar-Hall, Hitchcock, & Blom, 2014; Blom, Rowley, Bennett, Hitchcock, & Dunbar-Hall, 2014; Taylor, Dunbar-Hall, & Rowley, 2012) and Engineering and Law (Faulkner, Mahfuzul Aziz, Waye, & Smith, 2013). However, the benefits of using ePortfolios to track progress and demonstrate outcomes are not limited to meeting national requirements. For example, Ralston (2015) asserts that ePortfolios can result in transformative and self-motivated learning. When students use ePortfolios to track progress across each year of their program they are more able to reflect on the learning undertaken and, consequently, articulate this to a prospective employer (Liu & Burt, 2015; Rowley, Bennett, Blom, & Dunbar-Hall, 2014). However, for students to get the most out of their ePortfolio,

staff of learning institutions need to ensure that students are aware of the benefits to their learning and the professional recognition that can result from using an ePortfolio tool. In order to facilitate this learning reflection cycle, ePortfolios need to be embedded throughout the students' program of study.

The use of ePortfolios in Australian universities and training institutions is increasing (Hallam, Harper, McAllister, Hauville, & Creagh, 2010; Miller, 2009); however, their implementation still tends to be on an ad hoc basis. Some tertiary institutions, especially in North America, have taken on ePortfolios in an extensive way: providing all students and staff with ePortfolio accounts and making some effort to embed ePortfolio processes into programs (e.g. Kardasz, 2013; von Konsky & Oliver, 2012) but most are still struggling to truly embed ePortfolios from the beginning of the learning journey, through middle-year courses, to final year and graduation (Hallam et al., 2010; Kahn, 2014). While ePortfolios have been part of the higher education scene for well over a decade (e.g. Gibson & Barrett, 2003), in most instances ePortfolio are used for documenting or assessing discrete outputs (e.g. artefacts, reflections, ePortfolios) (Hallam et al., 2010) rather than facilitating the learning journey across a program. A number of issues become evident when examining how institutions go about integrating the use of ePortfolios in their programs. In some situations the key driver (e.g. an academic developer) behind ePortfolio use does not have their own cohort of students and this necessitates generating interest and support among teaching staff (Fisher & Hill, 2015; Kardasz, 2013). In other instances, the key driver or 'champion' could be one of the teaching staff motivated to use ePortfolios because of the benefits to their students (Hallam et al., 2010). These 'champions' have often demonstrated innovative practices, but the isolated nature of these interventions can mean they lack institutional support and are difficult to sustain (Hallam et al., 2010, p 29). The benefits that these approaches provide to a cohort of students is not always available institution-wide, and students themselves can sometimes fail to appreciate the value of ePortfolios when they have experienced 'one-off' uses. While 'champions' are important to the implementation of ePortfolios, it is necessary for this to translate into wider institutional acceptance if students are to realise the full benefits of ePortfolio use.

There are several studies into how the embedding of ePortfolios across institutions can be scaffolded in programs, and these generally outline procedures for selecting key drivers, appropriate software and garnering staff support (Posey et al., 2015; Siu, 2013; Slade, Murfin, & Readman, 2013). Institutional commitment for professional development and collaborative planning is also necessary as these are key components for embedding ePortfolios across a program (Fisher & Hill, 2015; Fong et al., 2014; Slade et al., 2013. See Polly et al., and Slade et al. in this anthology). These processes provide the opportunity to identify the existing knowledge and skills of the participants, which enables the development of appropriate scaffolds to support ePortfolio implementation. There is, however, little in the way of specific guidance as to how ePortfolios can be embedded throughout a program by serving different purposes at different stages of the program.

The aim of this chapter is to examine how professional development workshops can be designed to assist curriculum leaders, academic developers and teaching staff

to identify and develop methods to scaffold and embed ePortfolios within programs in ways which support student learning. The following section begins by explaining how ePortfolios have been implemented at the authors' university; the case studies of the two professional development workshops, which emerged as a consequence of this institution-wide implementation process, are then elaborated. The survey evaluation of these workshops by participants is presented and, finally, implications for the use of this process in other institutions is discussed, including recommendations for how future workshops of this nature could be designed and modified to suit individual contexts.

Professional Development Workshop: Background

ePortfolios have long been used in a variety of ways by teaching staff across the disciplines at the authors' University, in Australia, but, for many years, there had been little institutional support or acknowledgement. In 2010, under the auspices of an institution-wide curriculum review, two academic staff and one learning designer came together to chair a working party and advisory group. The academic staff had been implementing their own form of ePortfolios in their teaching for a number of years, and the learning designer was interested in ePortfolios for both student learning and documenting staff learning journeys through professional development pursuits. After several months of consultation with professional and academic staff, at all levels, the group put forward a recommendation to the University to adopt an ePortfolio system with specific features important for teaching and learning. These features included allowing for collaboration, sharing, formative feedback, forms, and the ability for students to have continued use after graduation. The university recommended that a strategy be put in place for embedding ePortfolios into the curriculum and resources be available to support staff and students. In 2012, a software licence was purchased for 3 years, but limited resources were available to successfully integrate the use of ePortfolios and to fully support staff and students.

The result was that while many staff continued to embed ePortfolio activities into their individual courses, there was not a systematic, cohesive strategy in place for engaging students in ePortfolio thinking, or for assisting staff to document their professional learning journey. Addressing this issue became the concern of the Teaching and Learning Centre, a central support system for staff and students in the university. After working with several individual staff members to implement ePortfolio activities in their courses, and training the students for one-off uses, it was clear that there were ePortfolio champions, but the student learning journey was disjointed and evidence of outcomes through the ePortfolio were unclear. The learning designer involved in the original working party thought it imperative to develop a process whereby ePortfolio activities would be integrated into whole programs and, as a consequence, initiated the design of a professional development workshop along with two academic staff from the disciplines of Business and Education.

An initial 3 h workshop was held at an Australian ePortfolio Forum (in Canberra, Australia, 2013), and a second, shortened, 55 min workshop was run at a state-based Teaching and Learning Forum (held in Perth, Western Australia, 2014). The different focus and time allocation at each Forum brought together a different audience and, thus, the structure of the workshop was modified accordingly. The ePortfolio Forum workshop was advertised as appropriate for 'Experienced Users' and brought together various levels of academic and support staff from the Higher Education, Vocational Education, and Training sectors across Australia. Whereas, the Teaching and Learning Forum workshop brought together educators mainly from universities in Western Australia and was open to anyone attending the conference. It was not advertised as specifically for users of ePortfolios. The workshops were designed to help all participants understand the rationale and methods for building a structured approach to embedding ePortfolios from first to final year, and engage the participants in activities related to mapping program learning outcomes, as well as addressing, scaffolding and assessing course learning outcomes. The purpose of the activities was to produce a series of intentionally designed assessment tasks that were aligned to two program learning outcomes (of communication and reflective thinking skills) scaffolded across a generic Bachelor of Business program, which could be modified for different disciplinary contexts at participants' home institutions.

The impetus for a professional development workshop was based on the understanding that documentation of achievement is an important outcome and it is the quality of the learning process determines that outcome (Yancey, 2011). The workshop was predicated on the presenters' beliefs that building a structured program that is readily understood and is meaningful to the learner is of primary importance, while acknowledging the need to ensure provision of technical support, online help, and software documentation. The following sections, therefore, explain the design and implementation of these workshops and, through the findings of an evaluative survey, examines the participants' perceptions of their usefulness. The design of the initial 3 h workshop is outlined first, with the modifications made to the 55 min workshop noted later. As the workshops were deemed successful they are outlined here in detail so that others can modify them as needed for use in their own contexts.

Professional Development Workshop: Introduction and Learning Design

Participants were prompted to sit in an area allocated to a course level of their interest (e.g. 1st year discipline core, 2nd year discipline core, 2nd year work-integrated learning (WiL), or 3rd year/capstone). At the start of the workshop, the presenters facilitated an icebreaker activity designed to prompt participants to start thinking about how and why students make connections.

The icebreaker activity was designed to encourage participants to understand how connections can be made between seemingly unrelated events and activities and, when connections are made, new opportunities for learning and understanding arise. The activity *What Would the Brady Bunch Do?* was designed by Karen Eifler (Eifler, 2012). While not using ePortfolios, Eifler notes:

> undergirding each of our disciplines is a complex, yet detectable, web of related ideas. If students approach new concepts aware that they're related and actively seek links between them, that makes the content easier to understand and retain. More important, the conceptual framework they acquire looks more like an integrated body of knowledge than an incomprehensible menu of scattered facts (p 2).

Adapted for our use, participants watched the introduction to the Brady Bunch show, were made aware of the connections between people, and how those changed when the two families came together, and the understanding that old links still exist but new links open up exciting possibilities for new connections. Then participants assumed the role of teacher, student or professional, and completed a grid of aspects of their *university life*, *personal life, and career*. Participants were asked to volunteer to share their story and one of the presenters shared a concept map showing some of the links she had made between different aspects of her life that showed the complexity of interactivity. The activity was debriefed by talking about how ePortfolios can help students make similar connections, if encouraged and supported to do so, and the impact understanding these connections can have on their ability to understand and articulate their learning.

The next phase of the presentation was to share some design principles from the literature and personal experience for designing ePortfolios to enhance effectiveness and learner satisfaction, including: design as a team; ensure scaffolding activities are applicable and timely; provide formative feedback; create and provide useful resources; ensure the ePortfolio tool is a value-add; embed ePortfolio activities in the whole curriculum; and, motivate students to engage in lifelong learning. This was an important discussion that might require more focus if a teaching team did not have a lot of experience with ePortfolios.

Finally, we shared the *UWA Curriculum Skills Framework* (University of Western Australia, 2015) which shows scaffolding of skill development across years. Participants were provided with a description of a generic Bachelor of Business program, and the course descriptions for three employability-focussed Business Edge courses (one of each year of the degree), as well as a 2nd year WiL Business Practicum course (Contact authors for Program and Course Descriptions). Using two generic program outcomes (communication skills and reflective thinking skills), an *Outcomes Framework* (see Fig. 3.1) was used to show how outcomes could be mapped and scaffolded across the degree. The participants were tasked with using this framework to complete the workshop activity: designing ePortfolio tasks to assess communication and/or reflective thinking skills. Note that in a workshop with teaching teams, teachers should be aware of program learning outcomes and map these with course learning outcomes to decide where best to situate ePortfolio activities.

Skill	Beginning (1st yr)	Developing (2nd yr)	Advanced (3rd yr) (Program outcomes)
Communication Skills	Communicate clearly in both written and oral formats, using technology.	Communicate and convey discipline knowledge or ideas clearly in both written and oral formats, using different forms of technology.	Communicate and convey discipline knowledge, ideas or generate advice clearly in both written and oral formats, demonstrating innovative use of technology.
Reflective thinking skills	Reflect on personal practices in order to understand and identify opportunities for learning in the context of employment and/or life.	Reflect on and analyse personal practices and performance feedback to identify opportunities for learning in the context of employment and life.	Use reflection and evaluation of personal practices and performance feedback to produce changes to practice in the context of employment and life.

Level of skills development across the course

Fig. 3.1 Outcomes framework (Adapted from the UWA Curriculum Skills Framework (University of Western Australia, 2015))

ePortfolio Activity Task Worksheet, Discussion, and Authentic Examples

This task was designed so that participants could see how ePortfolio assessment items could be both embedded and scaffolded across a program. Participants were prompted to think about the discussion around designing ePortfolio use to help them respond to guiding questions. The task modelled an appropriate learning design activity that participants could use with colleagues at their institution. The focus of the activity was on the pedagogy, ePortfolio thinking and scaffolding, not the technology (the ePortfolio tool). Participants were encouraged to constantly think about the *why*, that is, why is this important for student learning, rather than the *how*, i.e. how do I implement this with technology. Although we were facilitating this workshop at an ePortfolio conference, it was a conscious decision of the presenters to remind participants that when embedding an ePortfolio tool into the curriculum, it is critical for success to design pedagogically sound activities and see the tool as a value-add, rather than the central component.

Collaborating in small groups of four to six members over a time period of approximately 1 h, participants designed an appropriate ePortfolio assessment item that was applicable to the year of study they had chosen to work with (1st year, 2nd year, 2nd year WiL, or 3rd year/capstone). They were provided with an *ePortfolio Activity Task Worksheet* that prompted them to design the assessment item whilst thinking about key concepts covered in the workshop. Figure 3.2, below, provides a rationale for each of the questions in the worksheet.

At the completion of the activity time, each group (in year level order from first to third) presented their proposed ePortfolio assessment item and explained the application and rationale behind the key worksheet questions. The facilitators led a discussion exemplifying how activities and processes could be scaffolded to foster

Worksheet Question	Rationale
Describe the assessment item	It is important for teaching staff to describe, on paper, the activity they want to implement. This helps them keep the activity clear in their mind, ensure the activity is aligned and stays aligned to the learning outcome/s and keeps the activity on track. In a teaching-team workshop, if staff members are working on individual tasks, it is a good idea to give them the opportunity to share their task and seek feedback on clarity from their colleagues. This description can be used as the basis for the task description provided to students.
Describe how the activity will be assessed* and *describe your method of feedback	Too often, assessment of tasks takes the wrong focus. It is imperative to acknowledge, before tasks are assigned, what will be assessed, how, and why. Having a clear understanding of the task description and marking criteria will help ensure students do what you want them to do, teachers will mark how you want them to mark, and tasks can be documented as evidence of achieving outcomes. It is also vital, especially with scaffolded activities, to provide formative feedback to students. Participants were asked to consider how, and when, they would provide feedback. This is something to consider early in the design process because feedback can be time-consuming and must meet students' needs while not being overwhelming for teachers. Activities may need to be 'tweaked' to lessen the load on teachers, e.g. peer review and self-assessment may need to be considered.
Describe what activities will scaffold the assessment	It is important to think about the non-assessable activities that will enable students to successfully complete assessment items when designing any unit. When using new technologies, especially, it is important to think beyond content (e.g., attending lectures, etc.) to the actual use of the technology and any new skills required of students.
Can you foresee any challenges with this activity?* and *Describe the resources you will need to provide to students to successfully bring about their learning	This question was deliberately left open so that they could consider all types of challenges. This is important for teaching teams to consider as challenges need to be addressed before they cause major issues. Thinking about these types of problems before they arise gives the teaching teams time to consult with their Learning and Teaching Departments, IT Departments, etcetera to try to mitigate any foreseen challenges. It is also important to acknowledge that not all challenges will be due to the technology. For example, for many students, reflective practice is a new and daunting thing. Participants were also asked to consider what resources they would need to support their students.
What are the affordances of the ePortfolio system for this activity?	Providing a rationale for the use of an ePortfolio tool helps ensure the technology is being used in a way that adds value to the pedagogical process. At this point, teaching teams might realise that an ePortfolio system does not actually add value to the activity, in which case, they need to be prompted to either rethink the use of technology, or rethink the outcomes of the activity.
When thinking about scaffolding for learning, there are some assumptions you need to address…Please add other assumptions as you design this assessment activity	At the end of the worksheet, participants were asked to think about, and articulate, their assumptions about their students. This was important in the workshops because participants did not know their (fictional) students and so were clearly designing the activity with preconceived notions about their students, which had an impact on the design of the activity and the support they deemed necessary for students. This is an important consideration for teaching teams, too. They need to be supported to think about who their students are, what other pressures they might face, what experience they will have with the ePortfolio tool. They also need to think about other assumptions they may have, e.g. the institution will support this process; the tool will continue to be supported by the IT department; employers will want to see an ePortfolio, etc. as these will all impact the design and the scaffolding of the activity.

Fig. 3.2 ePortfolio activity task worksheet

growth from beginning to advanced skill development and, ultimately, provide evidence of achievement of learning outcomes. In the 3 h workshop, participants were also shown authentic examples of how ePortfolios can be used to scaffold learning and improve learning outcomes. These were examples taken from units at various levels and across disciplines, including a WiL example. The purpose was to

show participants how types of activities they had designed would actually look in an ePortfolio platform. The examples also modelled good practice for ePortfolio design, including scaffolding, reflective practice, etc.

The 55 min workshop differed from the 3 h workshop as a matter of necessity to get the activities completed in the allotted time. To this end, there were two major omissions: the ice-breaker activity and the ePortfolio demonstration showing authentic examples. Furthermore, in the interest of time, the groups focussed on only one learning outcome: reflective thinking. The introduction and discussion were also significantly shorter with much of the focus on the group activity. The facilitators also 'listened-in' on each group as they worked through the activity worksheet and, in the final debrief, were able to quickly and easily draw the connections between the activities to show how a scaffolded approach could be taken.

Evaluation: Workshop Survey Methods

At the completion of both workshops, all attendees were asked to respond to a self-completed, anonymous survey. The research received approval from, and followed the ethical guidelines of the university's Human Research Ethics Committee. An information letter was provided to all participants to ensure they had full knowledge of their rights and the purpose of the research; and participation was entirely voluntary. First, there were four closed-ended questions which asked attendees to rate their agreement on a 4-point scale (Strongly Disagree, Disagree, Agree, and Strongly Agree) in regards the appropriateness of the purpose, structure and activities, and resources used in the workshop, as well as the knowledge and preparation of the facilitators. Second, there were six open-ended questions which focused on the most/least valuable parts of the workshop; whether the workshop met the participants' needs and expectations; how they might apply the knowledge and skills learnt from the workshop; as well as suggested improvements; and whether there were aspects of the workshop they might like to know more about. As there were only a small number of participants, the data analysis was completed manually. All statements made in relation to the six open-ended responses were coded using a constant comparison method, which is a method of qualitative analysis where any newly collected data is compared with previous data.

Findings from the Workshop Surveys

At the 3 h workshop presented at the ePortfolio Forum there were a total of 20 participants, with 16 of these completing the survey (for a response rate of 80 %). At the 55 min workshop, presented at the Teaching and Learning Forum, there were a total of 19 participants, with 8 survey respondents (for a response rate of 42 %). The audience differed between the two sessions. The ePortfolio Forum brought together

various levels of academic and support staff from higher education across Australia, including Universities and the VET sector (Vocational Education and Training), who were either using ePortfolios or interested in using ePortfolios. At the Forum, the workshop was advertised as appropriate for 'Experienced Users of ePortfolios (intermediate and advanced)' and therefore on one hand most participants, even by very nature of attending the forum, had some experience with ePortfolios and some understanding of how/why they could be used in these educational settings. The Teaching and Learning Forum, on the other hand, brought together educators mainly from universities around Western Australia to discuss current ideas and issues in Higher Education. The workshop was open to anyone attending the conference and not advertised to 'Users of ePortfolios'. As such, only some people in the audience had experience using ePortfolios, and/or an understanding of the concept behind ePortfolio thinking.

In response to the question "What part of the workshop did you find most valuable?" the majority of participants indicated that it was the group ePortfolio assessment design activity and its accompanying worksheet, but more importantly, the discussion with colleagues, they found most valuable. Some comments include:

> The group activity – discussing, analysing and reviewing peoples' ideas around assessment – ideas developed through this process.
>
> Discussion with others. The sheet to complete the task was very useful in clarifying the steps.

Others highlighted the actual process where each group came back to present and share their assessment design activity from their designated year level for feedback, review and discussion:

> Small group discussion interspersed with large group [was] very clever.

In addition, some noted that it was the whole process design and approach of the workshop utilising both the small and larger group discussion as most valuable. As one attendee commented:

> The whole thing – can't be separated out as it was a scaffolded exercise ☺

Of particular interest to the designers of the workshop were the participants' responses to the question "How will you apply your new knowledge and skills?" Some indicated that they would use a similar approach and utilise the ideas and resources from the workshop to simply implement in their own course, but more importantly many stated they would share their skills and knowledge with others, either through a discussion, presentation, report or even to run their own workshop. As participants stated:

> I think I'll steal the task sheet to share with others.
>
> I will report to my project team – may run a workshop on scaffolding.
>
> [I will give an] oral presentation or report or probably run this kind of workshop.

In considering whether the workshop met the participants' needs and expectations, the responses were largely positive. Participants found it interesting and valuable, it provided opportunities to share experiences and ideas, have discussions

about scaffolding and the different ePortfolio software platforms, and to be "in a room of like-minded people". The only negative feedback was that "Time was tight [and] it would have been good to see it applied more in a technology". There was similar feedback to the question which asked "What part of the workshop did you find least valuable?" where two participants commented on not having enough time to complete the activity and that it was "a bit rushed". Similarly, there were improvements recommended for the workshop with the focus from participants on time, with more than half of the responses indicating that they would like to see "more time to be allocated". In response to the least valuable aspects, others mentioned that the introduction and background section wasn't clear, or too long, for them, though they did note that it "depends on individual level of experience/need". Additional suggestions were to do with having more software examples. A number of participants, in response to this question, also indicated that they had no thoughts on what was least valuable as "it was all good"; "it was very informative"; and "all pretty valuable". With one going as far to note that the least valuable was "Morning tea! [As I'm] having too much fun".

The question of whether to include technology and examples was the one area that seemed to very much depend upon participant needs. Whereas one participant asked for more application in the technology in regards their needs and expectations, another noted in response to this question that they felt it was not needed – their idea was that "the final computer-based activity … could be a follow-up workshop focused on the relevant technology". And, from a smaller number of overall responses to the final question of "Which aspects of this workshop would you like to know more about?", some participants referred to wanting to know more about the technical aspects and examples in specific ePortfolio software packages, so this aspect was clearly of importance to them.

Importantly, 16 respondents strongly agreed or agreed that "the learning outcomes and purpose were clearly outlined"; "appropriate and sufficient resources were used to engage with the participants"; and "the facilitators were knowledgeable and well prepared". Only one participant disagreed with the statement "the structure and activities were appropriate to achieve the learning outcomes".

Having presented reactions to the initial 3-h workshop, discussion now moves to discussion of the subsequent 55 min one. In response to the question that asked, "What part of the workshop did you find most valuable?" participants noted that it was the interactive and practical nature of the workshop activities, and the group discussion and sharing of ideas across the groups that was most useful. In terms of future application of knowledge, participants indicated that it got them to start "thinking about ePortfolios" or for others it gave them "the opportunity to do this across an entire program!" Once again, although some participants noted that there were no areas required for improvement as "it was well run", many others noted that they would prefer more time; and in this 1 h workshop aimed at a wider audience, it was not surprising that the key areas in which participants felt that the workshop did not meet their needs and expectations was in requiring more information and tangible examples of how ePortfolios work and what they might look like.

> I'm not familiar with ePortfolios and would appreciate an explanation of what it is/does
> I would have liked to see clear and specific examples of the ePortfolio.

Again, all eight respondents strongly agreed or agreed that "the structure and activities were appropriate to achieve the learning outcomes"; "appropriate and sufficient resources were used to engage with the participants"; and "the facilitators were knowledgeable and well prepared". Only one participant disagreed with the statement "the learning outcomes and purpose were clearly outlined."

Conclusion

There are a number of implications and recommendations from the findings outlined in this chapter that should be considered in the future use and development of such workshops. The first is that although the workshop was run in two different time-based formats, to two different audience types, the results show that there are key elements which are applicable to a wide range of participants with differing levels of expertise and academic or professional focus, and which can be delivered according to the time availability of the group.

Clearly, however, for this workshop to have the most success across the range of users it could engage, it is suggested that delivery would be best to occur in two parts. The first part (Workshop A) should be focused on the basic information on ePortfolios such as what they are, and how they can be utilised. This focus could then be enhanced by providing some specific and tangible examples of their use in practice across different discipline areas, and a focus on the technology highlighting the key features of the software platform or platforms appropriate to the users. Workshop A would be promoted as being for beginners to ePortfolios and as a recommended pre-requisite to Workshop B, but only required if the participant does not have prior learning experiences of ePortfolio use. The second part, presented as Workshop B, would focus more exclusively on the learning design process and scaffolding using the associated ePortfolio activity tasks and discussion amongst colleagues. The length of time required for each workshop would depend upon participant needs but, based on current feedback as a suggestion, Workshop A could be for 1 h and Workshop B could be for 2–4 h depending upon the desired outcomes (e.g. a general workshop for a range of staff versus a workshop for a specific program).

This approach to embedding ePortfolios across programs is based on research (Fisher & Hill, 2015; Fong et al., 2014; Kardasz, 2013) and the experience of the facilitators; however, incorporating a process for providing feedback on the efficacy of this approach into the workshops would be beneficial. Subsequent workshops could provide participants with measures of outcomes that they can share within and outside of their organisation as a means of evaluating this approach. These measures could take the form of key indicator checklists or rubrics to gauge the

extent to which ePortfolios are embedded within their programs as a consequence of using the approach outlined in the workshop.

Fundamentally, the workshop design and delivery was successful in that it met the intended outcomes. The purpose was to give participants the knowledge, tools, and processes to run a similar workshop with staff in their institution to successfully support them to embed ePortfolios across a program; scaffold and document the student learning journey; and provide evidence of achievement of outcomes. Despite the implications and potential modifications identified above, the results show that participants were satisfied with the process and the outcomes of the workshop and, as many stated, thought it would be a useful session to run with staff at their own institutions. Taking a similar approach, with minor tweaks to contextualise to participants' needs, these workshops could be run both nationally and internationally with a group of academic staff within a program to support them to successfully embed ePortfolio activities.

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Chapter 4
ePortfolios, Assessment and Professional Skills in the Medical Sciences

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Abstract Medical Science students are generally unaware of their developing professional skills related to graduate capabilities during their initial training and at a program level it is a challenge for administrators to evidence development of such capabilities. In the Bachelor of Medical Science program at the University of New South Wales, staff have instigated alignment of assessment with graduate capabilities, combined with program-wide tracking of student achievement in teamwork tasks. Teamwork was chosen as a focus as anecdotal evidence suggested that this graduate capability is hard to master. Tracking was achieved by mapping and aligning assessment tasks that built authentic teamwork skills, and by implementing standards-based criteria addressing development of teamwork skills. This curriculum strategy is program-wide and cross-disciplinary, integrating content knowledge and technical skills that articulate with professional skills across all medical sciences. Implementation was via Workshop UNSW (a guided learning space) in Moodle with Wordpress used as a digital site to create ePortfolios that facilitated and captured student reflective practice related to developing deeper understanding of key teamwork elements such as contribution, collaborative behaviour and role play. ePortfolios allow students to curate evidence that facilitates recognition of teamwork skills and use of Workshop UNSW allowed monitoring of student narratives in skills development, and enabled student self and peer evaluation. Student peer evaluation is an important aspect of the intended process for learners with complimentary implementation of ePortfolio pedagogy to engage students in professional skills development in teamwork. This is a first stage approach to building professional skills for Medical Science students that will have life-long learning effects and can be easily adapted to other skills and other programs.

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Introduction

Demonstration of professional skills mastery by undergraduate students is foundational to attaining university graduate attributes. Within Australia and globally, university frameworks for graduate attributes typically focus on knowledge and skills that support graduate employability and global citizenship (Bosanquet, Winchester-Seeto, & Rowe, 2010). Internationally, there is growing interest and demand to measure graduate generic skills such as communication and teamwork (Oliver, 2013). A commissioned report for the United States Department of Education urged higher education institutions to measure student learning during college as well as general education outcomes in undergraduates (Spellings, 2006). In Europe, emphasis is placed on reporting learning outcomes via the Diploma Supplement, which is an official document associated with a higher education diploma that facilitates transparency and professional recognition of qualifications (European Commission Education and Training, 2015). In Australia, a number of universities have implemented ePortfolios as a tool for students to collect and evidence their achievement of university and discipline-specific graduate attributes (Hallam et al., 2008). Similarly, a survey in 2007 found that 77 % of higher education institutions in the United Kingdom used electronic tools to document progress and facilitate professional development planning (Strivens, 2007).

Although the majority of Australian universities have stated teamwork as a graduate attribute for more than 20 years, there is still currently no established method to evaluate or formally recognise this skill in graduates (Resort, 2011). Therefore, the aim at University of New South Wales (UNSW) Medical Sciences was to develop and pilot a system that would build, track and assess undergraduate student teamwork capabilities in the biomedical sciences. The approach involved a program-wide alignment of assessment tasks that build teamwork skills that would be easily quantified. Specifically, courses in the Bachelor of Medical Science (BMedSc) program at UNSW Australia with assessment tasks that focussed on teamwork skills were identified, mapped and aligned. In this system, metrics relating to students' teamwork skills and performance were standardised across courses and captured incrementally as students progressed through the program.

In the School of Medical Sciences (SoMS) at UNSW, the initial trial of ePortfolio use as an educational tool to promote student learning through reflective practice in a third year undergraduate pathology course, proved to be an effective way to support and improve student-learning outcomes that align with UNSW graduate attributes (Polly et al., 2013). Since this initial trial, ePortfolio pedagogy has been implemented in Years 1–4 across other science courses and across various disciplines within SoMS at UNSW. Program-wide implementation and longitudinal use of ePortfolio has previously been suggested to facilitate learning, attainment of graduate attributes, employability skills, professional competencies and life-long learning (Clarke, Housego, & Parker, 2009; Hallam et al., 2008; Polly et al., 2013).

An additional key element to this program-wide approach was the development and maintenance of an ePortfolio community of practice for the medical sciences. It

was previously reported that ePortfolio use enhanced science student technical and transferrable skills awareness (Polly et al., 2013), and therefore it was envisioned that ePortfolio use would also facilitate student critical reflection on teamwork skills development. In particular, students were asked to reflect on their teamwork skills development in their ePortfolio using WordPress or any other online web creation tool. It was believed that scaffolding via assessments is a key, first stage approach to building professional skills for science students that have life-long benefits and can be easily adopted to support other skills development and applied in other programs (Polly, Cox, Coleman, Yang, & Thai, 2015; Polly et al., 2013).

In this chapter, we describe a recent initiative at UNSW to align assessments in the BMedSc program with graduate capabilities and explore standards-based criteria and folio thinking to assess teamwork capabilities, the approach to align assessment tasks to facilitate teamwork skills development, and document the student and staff experience. The chapter presents ten mini-case studies, each one focusing on ePortfolio use in a discrete subject of the BMedSci degree program at UNSW (see Table 4.1 for an overview of the ten subjects discussed). This allows highlighting of differences across subject areas, and demonstration of the collaborative, and collegial, approach to introduction and use of ePortfolios in this context.

Methodology – Implementing Standards-Based Criteria and Folio Thinking

The approach explicitly assesses and records graduate capabilities through team-based assessment tasks. To achieve program-wide consistency, we identified and mapped courses within the BMedSci program with assessment tasks that elicit teamwork behaviour and provide opportunities for collaboration (Hughes & Jones, 2011). Student teamwork skills were assessed with the Association of American Colleges and Universities (AACU) teamwork rubric (available at https://www.aacu.org/value/rubrics/teamwork), with minor modifications. The AACU's teamwork rubric provides a standards-based evaluation of teamwork elements including contribution to team meetings; facilitating the contributions of team members; individual contributions outside of team meetings; fostering constructive team climate; and response to conflict. The SoMS modified rubric expanded on the response to conflict and included factors relating to adaptability and negotiation.

In conjunction with the teamwork skills rubric, we also implemented ePortfolio pedagogy. ePortfolio is a digital space that allows students to collect, reflect, curate and present evidence of their co-curricular, professional skills attainment in the teamwork graduate capability (Housego & Parker, 2009; Polly et al., 2013, Polly et al., 2015). It is worth noting that folio thinking and ePortfolio pedagogy are interchangeable terms, and refers to the use of (online) portfolios for the development of reflective practice that enhances learning and understanding (Jafari & Kaufman, 2006). In the Australian context, ePortfolio pedagogy is characterised by portfolios

Table 4.1 Undergraduate year 1–4 courses that use teamwork assessment in the BMedSc Program, UNSW

Years and semesters	Course name	Graduate attributes assessed	Discipline
Year 1 Semester 1	SCIF1111 Perspectives in Medical Science	Individual and teamwork, oral and written communication	Cross-context
Year 2 Semester 1	ANAT2511 Fundamentals of Anatomy	Teamwork, written and oral communication	Anatomy
	ANAT2451 Functional Anatomy for Health and Exercise Science		
Year 2 Semester 2	PATH2201/PATH2202 Processes in Disease	Teamwork, online quizzes	Pathology
Year 2 Semester 2	NEUR2201 Neuroscience Fundamentals	Teamwork, written communication	Cross-context Neuroscience/ Physiology
Year 3 Semester 1	ANAT3141 Functional Anatomy of the Limbs	Teamwork, written communication	Anatomy
Year 3 Semester 1	PATH3205 Molecular Basis of Inflammation and Infection	Teamwork, oral communication	Pathology
Year 3 Semester 1	NEUR3121 Molecular and Cellular Neuroscience	Teamwork, written communication	Physiology
Year 3 Semester 2	PHAR3202 Neuropharmacology	Teamwork, oral communication	Pharmacology
Year 3 Semester 2	PATH3208 Cancer Sciences	Teamwork, written and oral communication	Pathology
Year 3 Semester 2	ANAT3212 Microscopy in Research	Teamwork, written and oral communication	Cross-context
Year 4 Semesters 1 and 2	SOMS4001 School of Medical Sciences Honours	Individual written and oral communication	Cross-context

for learning, assessment and professional development that aligns with graduate attributes (Barrett, 2006, 2007; Hallam et al., 2008). Specifically, we implemented ePortfolio using WordPress (www.wordpress.com) to promote students to document and critically reflect on their experience in the team-based assessments and teamwork skills development.

In developing a system to evaluate teamwork skills, a process of aligned criteria-based standards was designed to be transferrable across courses and disciplines, and recognises the academic stage of the student throughout their degree. Therefore, we implemented stage/year specific criteria for students to reflect upon in their ePortfolios. In stage/year one, students were asked to identify barriers to successful teamwork and strategies to overcome these obstacles. In stages/years

two and three, students were asked to consider team member identities in each assessment task across courses, reflecting on their own role(s), level of contribution and adaptability.

Program-Wide Alignment of Assessment and ePortfolio to Support Skills Building

Academics within the SoMS teach science students from diverse backgrounds that elect to take degree programs in Science, Advanced Science, Medical Science and Health and Exercise Science. While the BMedSc program is structured for medical science students, there are students from other programs in the core subjects. The BMedSc requires all students to partake in the compulsory subject *Perspectives in Medical Science (SCIF1111)* in Year one, a generalist cross-context course introducing students to the discipline of medical science. Students are required to take all four compulsory second year core subjects which are introductory Anatomy, Pathology, Pharmacology and Physiology, which are discipline specific courses within the SoMS. In Year 3, students can select their third year courses based on their preferred discipline-specific specialisation. In Year 4, students have the opportunity to engage in a research-intensive Honours course (see Table 4.1).

Embedding of ePortfolio pedagogy from Year 1 allows students to develop folio thinking and information technology skills at the start of their degree. As the goal was to engage students in reflective practice on teamwork skills development from their first year, the approach addressed development of this co-curricular, professional skill over time, in a program-wide manner (see Fig. 4.1). Importantly, development of reflective practice in our science students has had the additional benefit of developing confidence, critical thinking and career preparedness (Polly et al., 2013, Polly et al., 2015; Yang, Coleman, Das, & Hawkins, 2015). Teamwork skills were developed in Years 1–4 within the Bachelor of Medical Science degree program by aligning assessments and ePortfolio use in a cross-context and cross-discipline process that was program-wide. This representation of our process builds on earlier approaches that were used to develop communication skills (Polly et al., 2013, Polly et al., 2015).

Students' teamwork skills were developed using various assessment strategies to engage the learner. These strategies have blended traditional discipline-specific modes of learning with information technology to assist student understanding of content, critical thinking and evaluation. Most importantly, engagement with folio pedagogy facilitated development of student reflective practice, which was supported by the establishment of an ePortfolio community of practice for the medical sciences. Our journey in implementing ePortfolios to help build teamwork skills within the various courses that we coordinate is discussed below.

Case Study 1: Perspectives in Medical Science (SCIFF1111) is a compulsory, cross-discipline first year course offered in semester one for students in the BMedSc

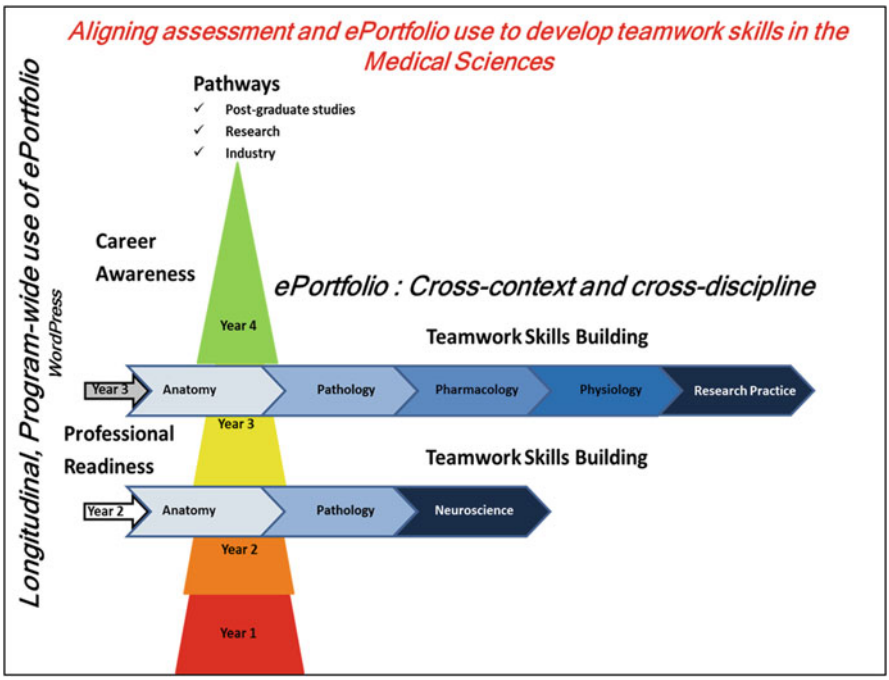

Fig. 4.1 Longitudinal program-wide use of ePortfolio

Program, which aims to help students become aware of UNSW's key graduate attributes. It requires students to apply these skills in everyday context, which is followed by reflections on their performance and the role that these attributes play in their professional career. The subject is offered, and generally taken, in the first semester of the students' academic career. Therefore, most students are recent school leavers and this is potentially the first time they are encouraged to think about skills other than academic, or technical knowledge that are important to their chosen profession.

To demonstrate the development of these key graduate attributes, students are asked to create an ePortfolio and reflect on the concepts that they are introduced to during the lessons. In the tutorials, a number of teaching strategies are employed to facilitate and expose students to various graduate attributes. Classes rarely utilise any technical aspects of science, but aim to be memorable and fun. For example, to introduce the concept and practice of written observations, students are required to describe a cocoa bean with sufficient detail to distinguish it from others in a group, while an introduction to teamwork and group roles are done using the completion of a simple jigsaw puzzle. These quirky examples challenge stereotypical viewpoints and encourage an exaggerated perception to provide clearer understanding of the required scientific skill. It is also understood that these skills are practised and developed in appropriate disciplines, as students progress through their degree.

As with many cohorts of students, there was a variety of personalities and abilities – some students embraced this freedom of thinking and writing about their experience, others are apprehensive and unsure about what was required of them. Our data shows that students' practice in connecting concepts and learning was limited by the structures provided in high school, with many unable to use higher order thinking independently. To counter this, questions were provided to scaffold reflections. Unfortunately, this resulted in many students simply answering the questions and not reflecting on their experience from class to enhance their learning. As a result, there was little connection between the activities or issues with career development unless specifically asked. This reaction by students allowed redesign of the task.

Case Study 2: Processes in Disease (PATH2201 and PATH2202) are core, second year courses offered in semester two which provide an introduction to the discipline of Pathology for approximately 300 students each year enrolled in Medical Science, Science, Advanced Science and Health and Exercise Science. In addition to providing students with a broad understanding of the pathological basis of disease, these courses aim to promote students' development of professional skills including reflective practice, effective communication and teamwork. ePortfolios have been used in PATH2201/PATH2202 since 2012 and play an important role to encourage students to document and reflect on the development of technical and transferrable skills throughout the semester and to develop professional skills such as teamwork, reflection and self-directed learning as skills that are useful to students not only across their degree program but also in their future careers. However, development of these co-curricular professional skills is difficult to monitor and assess. Through the combination of ePortfolio pedagogy and skills building assessment activities, we provide students with a valuable mechanism to facilitate and monitor their development in key professional skills such as teamwork, which will in turn enhance the employability of our graduates. In this course, students are required to use ePortfolio to document their learning based on the Pathology content taught and this allows students to track and reflect on their learning, as well as evaluate choices shaping their research goals. By embedding assessment tasks to build authentic discipline-specific and transferrable skills in this course, students can actively engage with learning content as well as begin to develop their teamwork skills. Moreover, use of ePortfolio in PATH2201/PATH2202 to develop skills awareness and reflective practice is a springboard into third year courses that target discipline-specific skills and career preparedness. Student engagement with the ePortfolio is monitored and assessed throughout the semester by tutors and forms a component of the overall course outcome.

The purpose of the ePortfolio is outlined to students during lectures at the beginning of the semester. Students are required to create and maintain an ePortfolio where they can document their experiences, curate information and reflect on their learning. In 2015, we suggested WordPress as a platform for creating online portfolios, however, students are free to use any other online web design tool they choose. This encourages self-directed learning at an early stage of their academic career.

Since SCIF1111 is only available to Medical Science students as part of their degree requirement, many students in PATH2201/PATH2202 have not yet been exposed to ePortfolio use. To encourage engagement and reflection, prompt questions are provided at regular intervals throughout the semester via Moodle. For example, "how will this course help you in your future career or studies?" Tutors in PATH2201/PATH2202 are an integral part of the desired community of practice and students are required to provide tutors with a web link to their ePortfolio to track student engagement and assess and provide feedback on the quality of reflections throughout the semester. The minimum expectation is for students to reflect on the prompt questions, however, many students also use the ePortfolio to summarise and reflect on lectures, tutorials and practical classes. Engagement with ePortfolios in PATH2201/PATH2202 has been facilitated by explicitly linking a quiz assessment task that promotes teamwork and collaboration. This was a mechanism for students to assess and monitor their own development as a team member and build their teamwork graduate capability within this course.

Throughout the semester, students participate in team-based, online tutorial quizzes. During these quizzes, students individually attempt a multiple choice quiz based on content presented in the course lectures. Afterwards, students re-attempt the quiz as a team of four or five members. During the team attempt, students are able to discuss and negotiate their responses before submitting a single team response. Feedback is provided after the quiz and the overall score for each student is a combination of the result from individual and team attempt. Students are encouraged to use their ePortfolios to reflect on their contribution to the team-based activity.

One of the most significant challenges with use of ePortfolio in PATH2201/PATH2202 has been an initial resistance from some students to engage with folio thinking. Some students are only interested in the lecture content and do not see any value in developing professional skills. However, we observed a shift in student attitudes throughout the semester, towards a better understanding of ePortfolio use and its value. Another challenge is the variety of different ePortfolio platforms available. Privacy settings on some ePortfolio software can make it difficult to share entries with tutors for assessment purposes. Also, software may become discontinued or obsolete from one year to the next. Finally, it is unlikely that all students will like one particular ePortfolio platform. Therefore, we addressed some of these issues by recommending one platform (WordPress.com) but permit students to use other software if they prefer. Students commented:

> After now seeing the benefits of reflection, I'm sure it is something that I will try to employ more often, not just in pathology but in other courses as well.
>
> …a last skill which I didn't expect to gain was the ability to work effectively in a team. This was seen through the group tutorials and specifically the group quizzes, where it was impossible to record a good result without the use of discussion and consultation as a group.

Our findings showed that student participation is improved by assigning a proportion of the course mark to the ePortfolio (e.g. 5 %). In addition, we have found that prompt questions encouraged students to engage early on. We observed that by

the end of the semester the majority of students agree that ePortfolios are beneficial and willingly engage in reflective practice. Furthermore, ePortfolios also provide academics with an additional source of student feedback that can be used for ongoing development of courses and assessment tasks. Despite the initial reluctance, overall student feedback suggests that the use of ePortfolios in PATH2201/2202 is beneficial.

Case Study 3: Neuroscience Fundamentals (NEUR2201) is a second year course offered to a diverse science student cohort similar to PATH2201/PATH2202. The key benefit of ePortfolio work is that it can provide a platform that facilitates collaboration in learning as it is easier to share an electronic document than a physical one, it is more easily amended and revised, and many systems support version control and simultaneous editing or phased-editing. Collaboration is embodied in the major assessment task in this course, which engages the learner in digital content creation and evaluation. The course is built on the idea of inter-disciplinary collaboration, with each fortnight-long module taught by experts from two different disciplines who collaborate on content delivery and team-teach in the tutorials. We aimed to foster this idea of constructive collaboration among the student body, as they are drawn from several distinct cohorts including psychology, medical science, and engineering. For all of these students, this course represents their first contact with a course badged as "neuroscience". We created a task that allowed maximum student self-direction, so that students could find material that engaged their interests and aligned with their educational backgrounds.

The *Neuroscience Media Item Group Project* is an exploration and analysis of an intriguing item found in the popular media related to neuroscience by teams consisting of four students. The format of the project relies on building a wiki page. Currently, the Open University Wiki module within Moodle is used, although we have previously used wikispaces (www.wikispaces.com) and custom websites built by the students at yola (www.yola.com) and atspace (www.atspace.com). Using an electronic format allows students to select from the broadest range of media items including video, cartoons, songs and articles. The process involves iterative engagement of staff and students throughout the project. We explicitly foster collaboration in teams of four students in a number of ways. These include:

1. We ask that students within a team of four work in pairs to address each section of the project, rather than dividing the project into four and then compiling it at the end. Students are required to use the work plan to document how well they work together. Past experience and discussions with colleagues suggest that content creation is difficult when there are too many students. However, students in teams of two can effectively negotiate ideas and thus work together efficiently.
2. The grade for the project includes an individual grade for teamwork from the tutor. This is based on a number of objective measurements, including editing the document at least four times over a period of more than 1 week, documenting the reasoning behind their editing of the document, completing a self- and a peer-assessment rubric.

3. The other individual grade for the project is based on individual students peer-reviewing another team's project. In this task, students offer constructive feedback within a teacher-provided scaffold. The teams then have one week to act on these feedback to improve their project, and are also required to document their response to the feedback including explaining any decision to ignore parts of the feedback.

The media project enables students to address four of the five learning outcomes for the course. First by completing the task, the students demonstrate detailed knowledge in an area of neuroscience. Second, by finding and summarising the neuro-scientific background to the item the students demonstrate experience and expertise in locating and appraising information related to neuroscience and succinctly present information related to these enquiries. Third, by analysing the media item and writing their findings, students demonstrate experience in applying basic biological and psychological principles to resolve questions related to brain and behaviour. Finally, by engaging in collaborative knowledge building to make the wiki page and by providing constructive scientific feedback in their peer review, students demonstrate experience and expertise in critical enquiry by contributing to scientific discussions.

This assessment task engages students in self-directed learning and content evaluation within a collaborative group setting. Students develop graduate attributes in teamwork as well critical evaluation and thinking skills. This digital blogging space has facilitated the student learning journey, allowing their critical thinking process to be developed as well as discipline-related content to be viewed and shared.

Case Study 4: Fundamentals of Anatomy (ANAT2511) and Functional Anatomy for Health and Exercise Science (ANAT2451) are second year courses also offered to a diverse group of science undergraduates similar to PATH2201/PATH2202 and NEUR2201. Functional Anatomy of the Limbs (ANAT3141) is a third year course that is part of the specialisation in the discipline of Anatomy. The courses are offered in semester one and have team-based learning activities linked to ePortfolio use. In these courses, students worked in teams of four to five based on their prior academic performance in UNSW courses. Laboratory sessions required that the teams work together each week to complete learning activities. In addition, the teams were required to produce a video learning resource on assigned topics for the cohort. ePortfolios were used to scaffold students in reflecting on both their assigned team-based learning activities and their teamwork skills development.

At the commencement of these courses, students attended a tutorial that outlined the benefits of teamwork and reflection for learning, skills development, and future employability. In this initial session, students were also introduced to the Edward De Bono's Six Thinking Hats as a framework for reflecting on teamwork (De Bono, 1989). This framework was used to scaffold students' reflection and was selected as it has been shown to facilitate critical thinking, collaboration and communication (De Bono, 1992). Students were required to work in their teams and use this framework to reflect on their past experiences and perceptions of learning through team-

work activities. Each 'hat' focuses on one aspect of learning (white hat facts, green hat creativity, yellow hat benefits, black hat cautions, red hat feelings, and blue hat process) (De Bono, 1989), which were utilised by students independently and then as a team. At the end, each student is required to write a short self-reflection on teamwork and the experience of using the thinking hats. These self-reflections were then peer-reviewed by another member of the team who also provided feedback on their reflection.

Following the introductory lesson, students were asked to complete a self-reflection every 3 weeks throughout the course. Students were encouraged to continue using De Bono's Six Thinking Hats in their self-reflection on their learning and on their teamwork experience. Student reflections were assessed using predetermined rubrics at the end of the course. We observed active student engagement in team-based learning. This was supported by their reflections, which indicated development in teamwork skills and a shift in view on the benefits of teamwork. Some excerpts from their reflections are below as examples of the impact on learning, demonstrating the positive aspect of reflection on learning and developing teamwork skills.

> When reviewing my team's progress over the semester, I can confidently say that we have successfully produced a strong assignment which is likely to achieve reasonable results. We engaged with the subject and learnt so much. As a team we undoubtedly covered all aspects of De Bono's Six Thinking Hats. Overall, despite having a few initial concerns and worries at the beginning of semester, I believe each member proved themselves very important and strong contributors to the overall team. In parallel, we all demonstrated strong commitment toward the team and ultimately respected each opinion and idea that we discussed as a group. I enjoyed this assignment as I was able to work within a team environment (which is reflective of the workplace) and also because it gave me an opportunity to interact and get to know other peers in my course.

This reflection is evidence of the value of the teamwork activity. The impact on learning is detailed here:

> We made many decisions that weren't "by the book" (as in we hadn't planned for them to happen) and this came out of discussing our thoughts on content/script/filming etc. Despite each of our team members researching and writing up a script for each of the 5 upper limb sports injuries, we still collaborated in terms of acting out the injury and tried to include moments of comic relief, most of which was unplanned. This has put us in the place of the lecturer – we have to think about how to present our cases. I am surprised at how much I have learnt by reflecting on our team assignment and class work. I know this topic so well.

Students also commented that this approach not only helped them engage with the content and problem solving, but developed teamwork skills and reflective practice.

Case Study 5: Molecular Basis of Inflammation and Infection (PATH3205) is a third year, semester one course offered to students who intend to build a specialisation in Pathology. This course has two key authentic assessment tasks that have been embedded to build research communication skills. A research team presentation, which facilitates development of skills in collaboration and teamwork in medical research and a research laboratory report, which facilitates development of

scientific research and communication skills (Polly & Jones, 2013; Polly et al., 2013). The research team assessment task requires that PATH3205 students are organised into teams of four to five and are given a topic in Pathology to research. Students are asked to prepare and deliver a 15-min presentation (including time allocated for audience questions). Team membership is assigned based on prior academic performance to provide equity and diversity amongst groups. The team-based activity relied on all members being prepared as the speaker is selected by a random draw to deliver the presentation on the day, while the other team members contribute during question time, which immediately follows. The presentation and team's ability to answer audience questions is evaluated by peers (students) and academics using a criteria-based rubric that focuses on content. Students are required to reflect on individual team members' contribution and engagement with the entire task. Reflection on the role and contribution from self and team members was documented in student ePortfolios. An example of student comment is:

> The group project I found to be a good exercise in developing skills that have been idle in my education and I can incorporate into future endeavours. Such skills include co-operation in teamwork environments, ability to contribute in conjunction with other team members, an ability to engage in a topic creatively, and an ability to effectively communicate with others towards a common goal.

Another student commented:

> As part of the learning process provided in these labs, I have also built upon my problem solving and teamwork skills by engaging in collaborative and individual research tasks.

It can be seen here that students respond positively to the activity and see the impact on their future development as professionals.

Case Study 6: Molecular and Cellular Neuroscience (NEUR3121) is a third year course that can contribute towards a specialisation in neuroscience, physiology or pharmacology. The focus of this course is to provide a deeper understanding of key molecular building blocks and biophysics that contribute to neuronal signalling, which then allow students to build an understanding of more complex neuronal systems. As a part of this process, a group assessment project uses a combination of self-directed and guided learning tasks to encourage further development of teamwork skills, while producing a review-style report on 'Ion Channels and Disease'. The student groups begin the task simply with a gene name for an ion channel. From this students carry out literature and database searches to investigate the function of the channel, scaffolded with two formative tasks. The final report describes the normal function of the ion channel and links this to how a particular mutation in the channel causes the altered behaviour or function in the disease state.

Students are allocated to groups based upon their grade from previous courses, so that each group had a mix of academic abilities. This was an attempt to equalise the collaborative potential across all groups, with the expectation that those groups that worked best as a team would also perform better in the assessment task. Students performed a self-assessment of their teamwork skills using the modified AACU rubric at the start of the task and reflected on the teamwork process and their own

teamwork contributions after specific milestones in the project as part of an ePortfolio. Upon completion of the final report, a self-assessment of teamwork skills was included as part of the final reflection. In this course, the blog tool in Moodle was used by students to record their reflections.

To support the development of teamwork skills, all groups were required to create a team agreement setting expectations for how the group will work together. This was supported by workshops on teamwork skills to assist in understanding the different skills that people bring to the team and the different roles that people can perform within a team project. The teams also discussed different characteristics and criteria that are assessed in the modified AACU rubric. Some comments from students were:

> While it may seem obvious from this assignment I learnt how to effectively work as a team through planning, compromise and constant and clear communication between all members of the group.
>
> Overall, I felt that this semester has taught me a lot in terms of working within a team, particularly this group report. I learnt what was most efficient (planning out when to do what in detail) and what was not (assigning roles and assuming that person knows everything related to that role).
>
> Overall, the project was a useful way to not only develop our research skills and knowledge of ion channel functioning, but also to practice working as a team which is an essential component of most real world occupations. I have learnt the importance of communication, planning, cooperation, and a positive approach in team settings. I have also improved my ability to distribute tasks and to facilitate the contributions of others.

Feedback from the students in their final reflection indicated that they had generally positive experiences from working in teams, and the teamwork skills rubric allowed them to identify their own strengths and where they need further development.

Case Study 7: Neuropharmacology (PHAR3202) is a third year course, in the discipline of pharmacology offered in semester two, where students develop an understanding of use and action of various drugs in the treatment of human brain diseases. The need for further research to identify new drug targets for more effective therapies is a main focus of PHAR3202. In this course, ePortfolios were implemented for weekly reflection and promoting development of teamwork skills related to an assessment task. This task is conducted over the first 9 weeks of the 12-week course, involving a debate presentation on a controversial research topic in neuropharmacology. Students are assigned to teams, where they research topics and are required to evaluate the available experimental and clinical data in order to construct their arguments for the presentation. All students were required to help prepare for the debate. In week 8, the debates were presented, and students rebut the opposition, and then answer questions from the audience. A week later, students must submit an individual synopsis of their topic and an evaluation of their overall teamwork experience using both self- and peer- evaluations.

We implement ePortfolio pedagogy in PHAR3202 to engage students in weekly reflections on the overall learning process and teamwork contributions. As a guide, students were asked to comment on their own and overall team progress, problems

related to the team or task, and potential solutions if issues were identified. This reflective component of the teamwork task has proven very useful. Using ePortfolios, students actively participated and reflected on their team's progress, rather than complain about issues related to other team members' performance, as had been the case in previous iterations of the course without ePortfolio use. The final teamwork evaluations also matched well with the student's reflections.

Feedback from students via official course evaluation surveys highlighted that a considerable number of students favoured the teamwork component of the assignment task and the reflective process. For example:

> The logs were a nice way to collate my feeling about the assignment and the progress we were making as a group. Also, I think a good way for Dr Jones to see what was going on.
>
> Feel like I've learnt something from this subject: communication and research skills.

We recently transitioned from using Mahara to the WordPress platform for ePortfolio submissions in the course (July, 2015). Although there were some initial teething issues relating to the new technology and ensuring ease of access of course staff to the student contributions, these were quickly sorted out. Using WordPress has proven to be even more user friendly in relation to accessing and providing feedback to the weekly reflections. This ease of use is mostly due to availability of the WordPress app on a smartphone and tablet.

> So easy to use in fact, that I recently attended a conference, and decided to use the platform to reflect on my own learning at the conference and share this with my students. A number of them were following my daily blogs, and were actually mentioning them in their own teamwork reflections. As yet, there has been no formal feedback regarding the use of this new platform for reflecting on teamwork in the course, but so far the students appear to be embracing the technology and I have even been able to engage other pharmacology teachers into considering adopting ePortfolio pedagogy via WordPress in their own teaching practice.

This reflection on the course by the PHAR3202 Convener gives evidence of how effective implementation of ePortfolio can be on teaching staff.

Case Study 8: Cancer Sciences (PATH3208) is a third year course offered in semester two. Career and reflective ePortfolios were introduced in this course to develop graduate employability skills and improve reflective practice. Students were instructed on how to write their own learning stories, reflecting on previous learning and job application documents (cover letter and résumé) for a current advertisement on the job market. In addition, students were encouraged to write fortnightly reflections, which were assessed using pre-determined rubrics at the end of the course. Students were actively engaged in the learning process by recording their progress and reflections, commenting that they thought it was challenging but fun. Engaging with these career-focussed tasks led students to gradually change their views on their career, and become more confident in their career-associated self-efficacy (Yang et al., 2015):

> Though I will not specifically be doing research in Cancer, I felt the skills obtained through research design, literature reviews, presentations and working in group environments will assist me throughout a research career and work environment. I also have a deeper apprecia-

> tion of medical techniques and how they assist in research and clinical work to better understand and diagnose diseases. I have felt the courses I have chosen this semester has given me a new perspective of my goals particularly evident in myself now undertaking an Honours year.

This quote from a student shows the effectiveness of explicit career-focussed tasks for final year students.

Case Study 9: Microscopy in Research (ANAT3212) is an advanced third year, research-intensive course offered to undergraduates interested in pursuing a pathway in medical research. Students are from diverse science backgrounds that include Medical Science (50 %), Advanced Science students (30 %) or Science (20 %). In 2013, ePortfolios were introduced to support student reflections on their learning, research training and to foster graduate aspiration focusing on self-directed practice and independent life-long learning. In 2014, the ePortfolio component of ANAT3212 became an assessable task. Implementation of ePortfolio across several third year BMedSc courses, in collaboration with other colleagues within the Faculty of Medicine has prepared students in ANAT3212 in reflecting on development of their professional skills in both written and oral research communication and in technical understanding. Reflections using ePortfolio has provided important evidence that students are able to develop critical thinking and analytical skills in ANAT3212:

> I was able to build a number of laboratory skills, able to think like a researcher, and able to collaborate and work within a team environment.

Based on evidence that ePortfolios were useful in facilitating development of professional skills in ANAT3212, a 500 word reflective essay was introduced within the SoMS Honours program.

Case Study 10: School of Medical Science Honours Program (SOMS4001) is a fourth year, practical course that runs for one year and provides students with hands-on laboratory experience in established research teams at UNSW. In 2015, a requirement of the Honours course is that students submit a reflective essay at the completion of the course. The reflective essay can be considered a pilot study for the use of ongoing reflective practice in the Honours program and to evaluate and prepare for the introduction of a future ePortfolio component to the course. Currently the reflective essay is assessed using a rubric with five specific categories to evaluate awareness of skills learned, career awareness, personal values, self-reflection, and strengths and weaknesses of reflective practice. Evaluation of the reflective essays against these criteria will shed light on how this assessment stimulated professional and personal development, including reflective practice. Information on the efficiency of the introduction of ePortfolios in the Honours year will be important when evaluating the introduction in other programs at UNSW. ePortfolio in the Honours program aims to build on our earlier ePortfolio implementations in years one to three and prepare students for the workplace (Polly & Jones, 2013; Polly et al., 2013, Polly et al., 2015; Yang et al., 2015). Results from this trial inform the challenges that the full implementation in the Honours program will face.

Conclusion

One of the most fascinating observations we have made in this collection of case studies is the maturation of students from being apprehensive and simply answering prompt questions in first year, to being more willing to engage in reflective practice in second year and ultimately becoming active and capable reflective practitioners in their third and fourth years. We believe this transition is due, in part, by the program-wide use of ePortfolio and that the link between professional skills awareness, graduate attributes and employability becomes more significant to students who are about to graduate. Indeed, others have also considered the program-wide use of ePortfolio as being most useful to students, and already has an institution-wide ePortfolio system or working towards one (Hallam et al., 2008; Lambert & Corrin, 2007; Lumsden, 2007; McCowan, Harper, & Hauville, 2005; Posey et al., 2015). This has implications for ongoing use in the medical sciences and future implementation across different health sciences.

We also observed better student engagement with ePortfolio in courses where students were formally educated on the roles of reflection, provided with a framework (e.g., De Bono's Six Thinking Hats or student group contract) or for students in the later part of their degree, linked with aspects of employability. Unsurprisingly, we saw more willingness for students to provide deep reflections when marks were awarded for the quality of reflection or when ePortfolio was explicitly linked to an assessment tasks.

Recently we showed that ePortfolio was beneficial to improve students' awareness of both discipline-specific and professional skills, which aligned with achieving graduate attributes (Polly et al., 2013, Polly et al., 2015). In this chapter, we demonstrate that the combination of authentic assessment tasks that build teamwork qualities and a teamwork assessment rubric, ePortfolio can be extended to facilitate students' awareness of their teamwork skills and capability. This approach to coupling authentic assessment with skills building has implications for other graduate attributes such as research inquiry and critical thinking.

Implementation of ePortfolio pedagogy across courses, disciplines and program focussed on building teamwork skills has successfully resulted in perceived improved student confidence, awareness of skills awareness development, and reflective practice. Qualitative feedback from third year students in PATH3205 highlighted the notion that skills development was not only observed in discipline-specific content but also in transferrable skills such as teamwork and critical thinking. Future directions for this approach would include application in other health disciplines such as exercise physiology, where teamwork and communication skills are essential for professional practice. Together, academic skills in content knowledge and professional skills in teamwork have been successfully developed in a program-wide manner in the medical sciences at UNSW.

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Chapter 5
ePortfolios and the Development of Student Career Identity Within a Community of Practice: Academics as Facilitators and Guides

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Abstract Based on the position that ePortfolios are a mode of innovative practice that benefits pedagogical thinking and action, this chapter investigates educators' roles as facilitators in the process of ePortfolio development. It is based on the authors' experience with final-year writing students, whose simultaneous ePortfolio development, industry placement, career-focussed workshops and online blogs provided unique opportunities for students and staff to explore students' imminent transition into the workforce. This project saw students negotiate their identities within what became a blended learning community of practice. As members of this community the authors found themselves as facilitators and guides rather than teachers. Reflections, blog posts and ePortfolios formed a dataset from which this setting could be analysed from pedagogical and scholarly perspectives. Within the chapter, findings from the project are presented, and its characteristics that led to a mediated environment in which students developed self and career identities through their ePortfolio thinking are investigated. Key findings were twofold. First, the ability to "experience" multiple workplaces through their online interactions with peers led students to develop a broader preview of their future selves and to develop their ePortfolios in line with these possibilities. Second, the group process and modelling of community of practice behaviours fostered complex reflective thinking skills in individual students.

Introduction

In this chapter we investigate educators' roles as facilitators and guides in the process of ePortfolio development. Specifically, we write from our experience with final-year writing students whose ePortfolio development was simultaneous to their industry placement. The introduced career-focussed workshops and online blog

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provided unique opportunities for students to explore with staff their imminent transition into a work ready graduate. We begin with the context of the study, including a short overview of the professional writing program and the possible outcomes for graduates. We then present the theoretical framework, which utilised Wenger, McDermott and Snyder's (2002) seven principles for cultivating a community of practice to engage students in future-oriented learning. The results and discussion are structured to address the two key findings. These relate to the effectiveness of concurrent ePortfolio development, blended community of practice and internship in generating a broader preview of possible future selves, and the development of individual complex reflective thinking skills within a group environment where community of practice behaviours were modelled by educator.

Students taking the capstone Professional Placement unit were either completing a major in Professional Writing and Publishing (PWP), a double major or double degree including PWP, or completing PWP postgraduate course work. Students take the Professional Placement unit in their final year of study and have by then completed a number of PWP units to prepare them for the experience, including the pre-requisite Writing and Research for Professional Contexts unit. Students' lack of awareness and experience with ePortfolios is consistent with the results of a survey undertaken with our third year PWP students 2 years earlier (Bennett & Robertson, 2015). Few of those students had developed an ePortfolio and few were aware of the technologies available to them to do so. We also found that the students did not consider themselves to be highly technologically literate. In that survey, only 26 % had previously written text for both a website and a blog (outside the classroom). Just under half had written website text and a similar proportion had written a blog, while 36 % had no prior experience in writing online texts. The survey did not ask whether students had created an ePortfolio, but our in-class discussions revealed that none of the students at that time had an electronic portfolio.

The survey led us to consider students' technological and career literacy, and we began to work with the "layered literacies" originally developed by Cook (2002) as a framework for technical writing pedagogy. Based on the notion that writers need a "repertoire of complex and interrelated skills to be successful" (Cook, 2002, p 7), Cook's six literacies comprise basic literacy, rhetorical literacy, social literacy, technological literacy, ethical literacy and critical literacy. By conceptualising how all six literacies might be developed across a program in a layered and interactive way, the framework enables educators to provide students with the "increasingly complex range of knowledge and skills" (Cook, 2002, p 24) required for successful communication and writing roles in the contemporary workplace. In our earlier work using ePortfolios (Bennett & Robertson, 2015) we conceptualised career literacy as a seventh literacy to add to those developed by Cook. Based on this work, we assert that career literacy is not limited to understanding the employment market and how to present one's self. Rather, career literacy concerns professional identity and the development of ongoing communities of practice.

The PWP program's methodology of professional writing avoids a template-based formulaic approach to teaching workplace writing but rather aims to foster the development of a set of complex skills around writing, research, editing and

publishing. This approach is in accord with Surma's (2005, pp 17–18) theorisation of professional writing as a "creative, critical and dialogic process, central to which is the imaginative negotiation of rhetorical and ethical issues and choices relating to language and to its forging of specific relations between writing and readers". The program continually reinforces the importance of context, purpose, audience and sponsor/writer, in order to help students imagine their work in real life environments. This is a focus reinforced by the final year Professional Placement unit and ePortfolio development.

There is little research on the destinations of professional writing graduates in Australia (Baverstock, 2007; Robertson, 2011); but, anecdotally, we know that they work across a number of associated professions and industries including public relations, advertising, communications, government, information technology, publishing, administration and journalism. Australian government data suggest that employment levels in these sectors are static or dropping (Department of Employment, 2014), and yet the number of students and graduates in Australia has more than doubled since 1995 (Australian Government, 2013).

At the same time, the publishing industry is under stress and the role of writers and editors is changing rapidly as technology influences modes of communication and commercial publishing models. Writing practitioners are required to become active in the marketing and communication of their own work in a way that wasn't expected of them even 5 years ago. In this context, a growing proportion of writing graduates manage multiple concurrent roles within portfolio careers, work across traditional and digital environments (Daskalaki, 2010), and create work opportunities through reputation building and networking (Arthur & Rousseau, 1996; Bridgstock, 2009). This context increases the importance of ePortfolios and career literacy for writing graduates.

Theoretical Framework

In response to this employment situation, the writing program has a strong focus on collaboration and partnership building as the mechanism to connect students to the world upon graduation. Educators recognise the need to teach more than the craft of writing: we also develop students' networking skills and the career and employment literacy necessary to keep pace with employers' expectations and the demands placed upon contemporary writers. Recognising the need for students to explore their professional identity during their degrees, in this study we wanted to model and extend our community of practice approach to career literacy (Wenger, 1998; Wenger, McDermott, & Snyder, 2002) by supporting students' engagement in their own such communities.

Despite increasing pressure for higher education institutions to prepare students for the real world of work (Reid et al., 2008), there is little understanding about how students develop their professional identities and little knowledge as to how educators can facilitate this process within the context of degree programs. There is,

however, broad acceptance that future-oriented approaches and collaborative learning are fundamental elements of identity development. The first of these, future-oriented learning, involves students in the development and ownership of their identity development through a process of self-authorship (Baxter Magolda, 2004) through which individuals come to identify with their (intended) profession (Trede et al., 2011). The ePortfolio, therefore, became a key vehicle for this in our study.

We adopted Wenger et al. (2002, p 4) definition of a community of practice (CoP) as a group of people who share their concern and passion for a topic and who interact regularly to "deepen their knowledge and expertise". We took our cue from Wenger (1998), who identifies the three dimensions of a community of practice as joint enterprise through negotiated meaning, mutual engagement and a shared repertoire. This contributes to a process of learning that includes participation, membership and identity formation. A CoP, then, is about shared identity and goals and the development of collective learning. While we accept that a student-learning group that contains mandated tasks could never be a true voluntary community of practice, in this project we anticipated that the community of practice concept would frame our role as academics seeking to facilitate the development of identity. To gauge this development we considered Wenger et al's. seven principles for cultivating communities of practice:

1. Design for evolution
2. Open a dialogue between inside and outside perspectives
3. Invite different levels of participation
4. Develop both public and private community spaces
5. Focus on value
6. Combine familiarity and excitement; and
7. Create a rhythm for the community (p 2).

The research also drew on our learning from earlier work with ePortfolios, which suggested the merits of embedding the ePortfolio as a requirement within a course (unit) that was highly focused on industry (Bennett & Robertson, 2015). In this chapter we address two research questions:

1. To what extent might engagement in a CoP involving multiple activities, in particular an ePortfolio, promote students' understanding of self and career?
2. To what extent can educators influence complex thinking about career identity by modelling CoP behaviours?

Method

The community of practice referred to in this study consisted of all students enrolled in the Professional Placement capstone unit. As well as face-to-face meetings, the group worked together through the University's online learning management system, Blackboard. The sample of 14 students (two male and 12 female) was drawn

from the capstone unit. Three graduate students were enrolled in a Masters or Graduate Diploma of Professional Communication; four Bachelor's degree students had a PWP major; and seven were studying double majors including PWP. Eight students were in their final semester of study, with the others due to complete within 12 months. The graduate sample (n = 5) was drawn from this cohort and included four females and one male. Participants and educators are identified here with pseudonyms appropriate to their gender and cultural background.

Participants were invited to participate as part of their enrolment and they knew that they could withdraw at any time without prejudice. Students attended two career-related workshops and an instructional ePortfolio session as well as being offered regular technical support. Students participated each week in an online blog that connected them with peers and lecturers. Each student had to contribute at least six blogs posts of 200–250 words as well as at least six responses to other students' posts; however, many of the students participated more than this. Students were required to submit two career development tools and their ePortfolio "home page" as part of their assessment tasks. They did not need to submit any materials for analysis by the research team. Eight graduates for whom contact details were available were contacted by email and five responded. All participants were assured of their anonymity.

Student data collection involved the online blog and two focus group discussions. Focus group interviews and blog entries were transcribed for analysis. Using Wenger's (1998) community of practice dimensions, initial analysis involved deductive coding by both researchers, after which coding was compared and refinements applied. The data was then analysed to shed light on our roles as educators and to consider how we might, in the future, develop our work with final year students using a CoP framework utilising Wenger et al. (2002) seven community of practice principles. Two years later, graduates were contacted by email and asked six questions. Analysis was again deductive, but the researchers were open to themes that may fall outside the themes determined from the initial study.

Developing Self and Career Through a Community of Practice

Student experiences within a combination of class-based activities, online blog and internship enabled students to select and collate a range of evidence for future employers or clients. We found that the ePortfolio enabled students to articulate their learning and reflect on both challenges and achievements. We also noted the authenticity of the learning process (Piihl, Rasmussen & Rowley, 2015). The alignment of multiple activities prompted students to explore views of self and career, and Cook's (2002) layered literacies emerged as a useful pedagogical framework and conceptual tool for us to understand learner development in the context of final-year studies. Recognising the central role of ePortfolio development on students' identity development, we concluded that the combination of ePortfolio and internship had great promise.

Here we are concerned with the promotion of students' understanding of self and career through the CoP and concurrent activities, especially ePortfolio development, and the extent to which our behaviours might influence students' individual complex thinking. In the next section we initially explore how the CoP influenced students to develop a broader view of possible future selves and develop their ePortfolios and the extent to which more complex reflective thinking about career identity was demonstrated by students. We became interested in the extent to which the ePortfolio, professional placement, blog and workshops might combine to give students an "experience" of multiple workplaces. If so, we wondered whether they might learn from these experiences and apply their thinking to their portfolios and their thinking about career. This was explored through Wenger's (1998) earlier three community of practice dimensions (below).

We accept that a true community of practice is voluntary, with participants choosing to be involved rather than being required to be. In this case, the students all chose to take the Professional Placement Unit (there was an alternative class-based unit for those who didn't wish to do an internship), but once they were enrolled in the unit they were required to participate in the ePortfolio, blog, and placement if they wished to successfully complete the unit. Attendance at the workshops was optional but encouraged. In spite of their varying degrees of activity on the blog, all the students were part of the community of practice and contributed to individual or group learning.

In Wenger's (1998) three community of practice dimensions, meaning is negotiated among group members and roles are developed through engagement and participation. The three dimensions within each community – joint enterprise, mutual engagement and shared repertoire – contribute to a process of learning which involves identity formation. In our study, students were prompted to think about their professional identity and to imagine future possible selves (Markus & Nurius, 1986) through the process of developing an ePortfolio and the various tools we provided to support this. As the semester progressed, we found that the students also used the online blog to collaboratively ponder future selves, career options and identity. It was in the blogging activity, rather than the face-to-face workshops, that the community of practice dimensions started to be demonstrated.

For example, while each student was undertaking a different internship, the blog site discussions revealed that students were finding similarities between their situations and establishing these as a joint enterprise. Their blog discussions demonstrated a negotiation of responses and meaning around their different experiences.

Clare: The experience so far has demonstrated in a real-life setting just how little a professional writer actually writes. Many other things have to happen before the writing begins, and doing other (unrelated) tasks is essential as part of employment in an organisation. [Blog]

Yusri: I can definitely relate. While I was doing all the writing I thought I needed to do, I was instructed that most of it was irrelevant and that I needed to think about things such as the best ways to reach the target audience without them tossing the brochure in the trash. …. I have been struggling a bit

on my first two days, but seeing how well you have been adjusting makes me feel inspired to continue so that I may be able to get into the swing of things too. [Blog]

Nicki: My project is pretty much entirely research based. Apart from a few recommendation reports, the main writing section doesn't really start until the end of the project. But I love the research journey, even though it is a long and sometimes tiring process, I find the final result very satisfying. [Blog]

Suzi: I guess how much a professional writer writes depends on how the place operates: where I am, at [organisation name deleted] there seems to always be something for me to write or edit. …. However, I can see some benefit to the extra tasks you have been doing, in that every event you attend you have the opportunity to meet new people and expand your professional network, and being able to attend an event you will write about certainly makes the writing process easier. [Blog]

Discussions such as this helped the students recognise that situations about which they were uncomfortable (for example, not doing much actual writing) also offered opportunities. Students saw that responding in an alternative way may be helpful to them in terms of learning about the workplace and the role of professional writers.

Students also used the blog in a more instrumental way, to share skills and techniques developed during their placements.

Clare: A core element of the blog is posts promoting the [deleted organisation] events. Prior to my start date, my supervisor had a list of questions emailed to the managers of bands playing. … I turn them into a feature article to be posted a week prior to the event. In writing these, I have developed a few processes that I thought I would share. First, I read the answers and remove all the filler-sounding material. Second, I try to omit any repeated information. The third is finding the 'gold' and making that the hook into the piece. I consider 'gold' to be a statement that encompasses an essence of the band, something heartfelt or catchy. [Blog]

Sylvie: I hope you had some fun using those interviews, it does sound interesting! … When I sent my questions to the writer in residence, I felt a bit bad because I had not read her book yet. … in her responses, I also looked for key sentences that would be telling of the author's style and tried to reuse the phrases I thought were representative. [Blog]

Through these exchanges, students identified alternate purposes and roles for writers in the workplace: they negotiated meaning in practice. Students negotiated, for example, whether a staff writer's role is to promote the organisation (an organisational goal) or to reflect the work of visiting artists or clients (a more individual role), and how a writer might mediate between these different roles. Surma's (2005) analysis of professional writing as a process in which the negotiation of rhetorical and ethical issues occurs within a specific organisational context, had been discussed in class-based units. However, it only became real to students when they had

to undertake this negotiation in a workplace and could discuss it with peers in a safe environment.

Towards the end of the semester, students negotiated meaning by shifting the focus of the blog towards a process of mutual reification, summarising what they had learned from their placements and how it might align with future possible jobs.

Lee: I am starting to see a pattern emerge out of the blog posts. As time goes on I can feel the blogs become more confident and I am seeing that everyone is starting to get great feedback from their supervisors. Seems that the process is working and we are all getting some really valuable experience. [Blog]

Suzi: Honestly it felt wonderful just to have all my efforts and hard work appreciated, as I have had a really pessimistic view of the workforce due to a lot of bad luck in my previous jobs in the retail sector. While I was really nervous about doing the placement, due to my work history … I now have the confidence I will be employable in the future, and am confident in my decision to choose professional writing as a career pathway. [Blog]

Riya: … don't forget to add your interpersonal skills and attention to detail in your resume and capacity statement. Add a page on [website] and search on [specific website names deleted]. [Blog]

Wendy: [Your capacity statement] actually gave me some ideas for mine. I really like how you've incorporated uniquely personal skills and highlighted how they would help the workplace. I'm going to echo [name deleted] and say that it might need a little more about your writing skills … Perhaps you could also mention what industries/sectors you're interested in and why. [Blog]

Qiang: It doesn't feel like it, but we've learnt a lot. You're probably doing a fantastic job and don't even realise it. And don't worry, with two degrees under your belt, you should have no trouble finding a job. :) [Blog]

The focus group discussions confirmed that some students gained new recognition of the value of what they had learned during their years of study, and in particular in their final semester. For two students, this recognition came from external validation of their skills and knowledge.

Jen: I was at the airport the other day and an Asian man walked up and said, "Do you speak English?" … and I could explain to him how it was working in English. It was almost Facebook status updateable, sort of quality awesome! [Focus group 2]

Tim: Yeah my friend's started using me [as a writer] as well now. She's a store manager and they asked her to write this article or something for their magazine, so she told me what she wanted me to say and then she got me to put it into better words for her. [Focus group 2]

The goal of forming the community of practice thus moved from the initial goal (established by the educators) of supporting students while on their placements, to

being an avenue for information sharing about the skills and knowledge the students had gained and how to use this to gain employment in the future. As educators and drawing on Wenger's (1998, p 215) three community of practice dimensions we recognised that the blog had opened "trajectories of participation that place engagement in its practice in the context of a valued future". This student-driven shift in purpose evidences the joint enterprise dimension of this CoP. It also indicates students' emergent knowledgeability, which led to shifting roles within the community.

Whereas we had initially taken a role at the centre of the community of practice, over the 14 weeks of the semester we gradually moved towards a more peripheral role to make way for students. Whilst all students participated in the blog and were members of the community of practice, their level of activity and enthusiasm varied. By mid-way through semester, five students were clearly the most active bloggers and contributed to the shape and nature of the discussions more than the others. Another three students were less frequent bloggers but regularly contributed to support the discussions. The other six students contributed as mandated by the unit assessment requirements and made brief comments, but they were much less likely to steer the discussion, ask questions of others or contribute comments beyond their own specific workplace experience. From this pattern, we were able to discern different levels of ownership and interest in the community of practice and also the development of a shared repertoire of language within that community.

The shared repertoire was initially as one might expect of a group of students completing the same unit – references to the learning and assessment tasks and the language of university study. However, some students introduced themes into their blogs and other students picked them up and started using them as a way to interact with their peers. After Lee noted, "You can tell a lot about a person by the kind of umbrella they carry," Suzi replied, "one of the ladies at my placement has a black umbrella with small white polka dots and lace trim," and the idea of umbrellas as masks that cover but also betray your persona became a theme in the blog. Another playful shared reference was workplace snacks and how they reflected the nature of the workplace, with Qiang noting: "The snacks at your placement consist of scones, patisseries, fruit and tea/coffee. The snacks they have at my placement consist of cupcakes, lollies and champagne. It's probably the age difference. People at my work placement are a lot younger".

Other forms of shared language or symbols that the community developed included different organisational Style Guides (or the lack thereof), the complexity of understanding workplace mores (represented by government bureaucracy), and their struggles with technology (represented by a moment one student experienced when her workplace website was hacked and a rapping devil took over the site). While this shared repertoire mainly worked to connect the group, it did result in some reflective discussion around working life and professional identity. In relation to snacks in the workplace, for example, Clare noted, "It is fascinating that the social environment can really make-or-break a work environment, yet, the social is generally constructed by employees, not the employer." A discussion about favou-

rite moments in their placement led to Tim (whose workplace was a zoo) talking about an interaction with an animal that had a profound effect on him:

Tim: It will take me some time to work out why this meant so much to me. Perhaps it means I should be working with animals rather than studying writing. I don't know. All I know is that I will never forget what happened. [Blog]

Sylvie: That's great Tim!! Really happy to hear that you had an experience like that. Inspiration for your next piece of CNF [creative nonfiction] right there! You can do both writing and work with animals. [Blog]

Yusri: The great thing about writing is that it does not have to be a standalone profession. It can be combined with whatever your passion may be. [Blog]

Lee: You can definitely combine your writing skills with your love of animals. Writing is a skill that will stay with you forever and is always highly regarded in any profession. Communication skills are an excellent tool to have and I think you should try to find a way to combine it with what clearly is your passion. [Blog]

In this instance, the other students were clearly picking up Tim's confusion about his career goals and encouraging him to use his writing skills to pursue his passion for animals. In this and many other examples in the blog, the students primarily offered support and encouragement to one another; very rarely did they critique or challenge each other. This may be partly a result of the educators modelling support in our contributions to the blog.

Whereas we had expected students to discuss the development of their ePortfolio on the blog, in fact, that was rarely the focus of discussion. Discussions about content occurred only five times and technical issues arose six times. However, because the students were aware they were required to complete the ePortfolio, the idea of using their placements to generate good examples of their work for the ePortfolio was a convergent feature of the blog, with students often reminding each other to secure copies of work for their ePortfolio. In this way, the mandated task of creating an ePortfolio added a particular focus to all the group discussions.

Students also used the blog to learn vicariously about other workplaces. One student did her internship in an Indigenous health organisation and regularly posted information about Indigenous issues on the blog, such as:

Chloe: I spoke with a health worker who leads a cancer support group and she told me that some Aboriginal and Torres Strait Islanders (ATSIs) believe that after you have been operated on, you lose your spirit – and so she spends a lot of time chasing up people who, post-surgery, get lost in the system and fall into homelessness and alcohol dependency because they believe they are soul-less from that point on. [Blog]

Chloe: The human development index (HDI) indicates the health of a people group in terms of 1) health, 2) education and 3) living standards. It is calculated by analysing life expectancy, mean years of schooling and gross

> international income per person. On the HDI chart, #1 is Norway, Sweden and Non-Indigenous Australia (meaning these groups have a high quality of life and health). The US is on #13, New Zealand is on #20, Cuba #40 and Mexico at around #50. Indigenous Australians have a HDI of 140 – showing just how far the gap extends. … There is also a 17-year life expectancy gap between Indigenous and Non-Indigenous Australians. [Blog]

The other students responded to such posts and the conversation developed to explore the differences between working in non-profit and government agencies and between working with different cohorts of the community. Some of these discussions influenced students to adjust their ideas about possible future selves and career choices, as for example:

> Wendy: Since reading your blog I've actually been looking into positions at not-for-profit organisations as well as the public/private sector. I can imagine that it must be very rewarding work! [Blog]

Two students took placements in science communication organisations and their experience differed greatly. Riya found the challenge of communicating complex scientific ideas to the layperson very challenging. Emma, however, found the environment and work highly stimulating and expressed her interest in switching to a career in science:

> Emma: I am learning so much though writing the blogs is the easy part – finding the information is the hard part. …. But I will say (sorry Liz) that I cannot wait to finish this degree at the end of the year and then move on to something else. Commerce or science, commerce or science? I'm 40/60 at the moment. [Blog]

Emma, like Tim, found her positive internship experience made her question her previous career choices. Riya and Yusri, however, had more challenging placement experiences and experienced a loss of confidence as a result, in spite of the other students' supportive and encouraging comments.

Returning to the students (now graduates) 18 months after the end of the unit, we asked them how they now felt that the interactions with students, work placement colleagues and educators had helped them negotiate their individual goals as they had approached the end of their degree programs. Remarking on the ePortfolio, four graduates said they had found it useful whilst the other graduate, a mature student, reflected that she was already engaged in a portfolio approach.

> Yusri: It was quite useful in the sense that I learnt how to put together a proper portfolio that looked good as opposed to the simple two-page resume I used to give out. It really gave me insight into what employers would be looking for when reading a portfolio/resume as well. [Grad survey]
>
> Clare: Identified my weaknesses which allowed a more focused professional development. [Grad survey]

When asked about the combination of activities in which they were involved, two of the graduates remarked on the realisation that they were transforming knowledge into practice and could apply this across multiple contexts. One graduate noted that her confidence had risen greatly because of the interactions with peers. Another graduate contrasted the positive interactions within the community of practice with those he had encountered at his internship workplace.

Clare: Opened my eyes to different ways of interpreting my skills, as transferrable across roles and organisations. [Grad survey]

Jessica: At the end of my degree, I was beginning to get a bit disheartened at the fact that an arts degree would not open as many career pathways as I was hoping for. Liz in particular really helped get me into a great placement where I saw the first tangible stepping stone into a writing career. [Grad survey]

Yusri: Interactions with Sophie, Liz and the students was wonderful and created a very positive environment for learning. Interaction with the colleagues on placement, however, was difficult and challenging. [Grad survey]

None of the graduates believed they were now part of a CoP, even though four were either working or studying, or both (while one was at home with a child). One graduate noted that she had "valued connections" she can ask for advice at any time. Two graduates expressed interest in becoming part of a CoP, one noting that it was something she might now consider and become active in seeking.

Educators and Community of Practice Behaviours

In reviewing the extent to which educators can model community of practice behaviours, we returned to Wenger et al. (2002) seven principles. This was not a set of principles we had used in the initial development of the unit, but rather one we subsequently used to shed light on our roles as educators and to consider how we might, in the future, develop our portfolio work using a CoP framework. Table 5.1 summarises the ways in which we consider our approach may have met aspects of the seven principles.

While our approach certainly did not meet all the seven principles, it met some aspects of the principles and could be adapted in future years to encompass more of them. This would work particularly well if we introduced the ePortfolio earlier in the degree and then used the full final year (rather than the just the final semester) to work with students in a community of practice to develop their ePortfolio content (particularly through the pre-requisite unit, Writing and Research for Professional Contexts), support them through a Professional Writing work placement, and use the blog and career workshops to develop their professional identity and career literacy.

A number of institutional and logistical barriers would need to be navigated to develop a full year community of practice, but this represents a promising direction

Table 5.1 Our study and the seven principles for cultivating communities of practice (Wenger et al. 2002)

	Principle	ePortfolio project
1	Design for evolution	The combination of activities gave students multiple places in which new ways of knowing could be discussed, shared and realised. The blog allowed students to change the focus as required; the ePortfolios could be adapted to individual student needs. There was no opportunity for an ongoing community after the end of semester, which meant students needed to become indpendent
2	Open dialogue between inside and outside perspectives	Dialogue occurred between workplace supervisors (outside) and students and supervisors (inside); however, this was only shared with the larger group if the student chose to do so. Students also sought or encountered external perspectives in line with their increased exposure
3	Invite different levels of participation	All students were required to participate at a certain level, but beyond that there was a core group of very active or active participants and a group of less active participants. Educators began as core participants but moved to the periphery during the semester
4	Develop both public and private community spaces	Public spaces included workplaces, the blog and the university workshops; private spaces were the ePortfolios and any private communication between students and educators. The blog's community was limited to students and educators
5	Focus on value	The ePortfolio focused students on the value of their current and past learning by being a mandated repository for work samples; the blog encouraged recognition of value by students, their peers and educators
6	Combine familiarity & excitement	Placements provided the excitement; the familiar was provided through university systems, the blogging platform, and educator support
7	Create a rhythm for the community	Rhythm was created by an established timeline for placements, assessments and ePortfolio; there was required weekly blogging by students and educators provided regular feedback for students and regular blog comments

for the future. By framing the project within a community of practice approach, we have been begun to reconsider some of these structural aspects, such as establishing a longer timeframe for the CoP to work, linking the two discrete units into a full year unit, and creating a more overt focus on the CoP as a model they could take into their future working life.

One of the key approaches we took from the start was to model certain behaviours for students. The first was to provide support and encouragement, as we have learned from previous years that students going on their first professional internship are often anxious and may even attempt to withdraw after the first few days if they don't get appropriate support. Following are some examples of our early responses to students' concerns:

Liz: Thanks for being the first to blog! I think confidence (or lack of) is the biggest issue for most students at the start of the placement. What a great

project – you'll soon know heaps about Apps! Any tips from other students about getting to grips when you start out? [Blog]

Liz: You are really being stretched in this placement. I think that's good! Sometimes it can be good to reframe things: so, instead of seeing people's comments as 'criticism', maybe you could see the process more like one of draft – consultation – redraft – further consultation – and so on? [Blog]

Sophie: It's always hard [to turn complex ideas into Plain English for a lay audience]! A colleague of ours says to use language suitable for a 17-yr old … Perhaps the user-friendly language suggestions could come from the people doing the research, who will have had to develop a narrative that friends and family can understand. It's a good idea to ask your supervisor. [Blog]

Sophie: [in response to a student anxious about his ePortfolio] I think it's back to the concept of sharing your ePortfolios with your colleagues here, even if it's only one page, and say to somebody, "would you look at my home page or my showcase page?" And get some ideas from each other and look at those examples that are on the website already. [Focus group 1]

While the students reported they felt encouraged and supported by the group, this was not always sufficient. Two students ended the semester with a sense of disappointment about their placements, one because she found the tasks too challenging and the other because he felt the workplace environment was unsupportive. For Yusri, this feeling of disappointment was retained well after graduation, as he notes in his response to our follow up survey:

Yusri: I personally felt that I was able to rise to the challenge [of the placement] and actually produced a product that they used on their website. However, the end result was soul-crushingly disappointing. Even though I created the content for a document which was published, my internship supervisor refused to let me use him as a professional reference. If that's not a slap in the face, I don't know what is. It was very disheartening … Unfortunately for me, this (and many rejection letters) killed my ambition of becoming a writer in Australia. Perhaps it was just me as many of my peers managed to secure jobs in media etc. It could also be that I am an international student and it's just much more difficult to start a career here. [Grad survey]

This response has raised additional questions for us as educators about how we might recognise and respond better to the needs of international students or other students who find the workplace context so challenging. The support and encouragement provided by the blog was clearly valued by Yusri but we wonder now if we need to create more overt spaces in the blog discussion for expressions of negativity or a sense of failure.

We hoped the group conversations might become more complex and that they would challenge each other's thinking, and to some extent this occurred. We modelled using comments to ask questions that would encourage other students to share

their thoughts. Our input was targeted to help students generalise their learning, and to prompt them to place evidence of their learning onto their ePortfolio, as well as to develop more complex self-reflection.

Liz: Hey, good editing tips, Chloe. Maybe we should keep a note somewhere of tips for editing and tips for successful placements. Anyone got an idea about how we could easily do that on Blackboard? I'm sure next year's students would find it useful. [Blog]

Liz: Sounds like your placement has been valuable to you and to [your employer]. You touch on something that I have also found to be true – it seems no matter how often you read and edit something you have written, there always seems to be more that you can improve next time you read it! [Blog]

Sophie: It sounds as though you are getting some ideas about the type of environment in which you would like to work. The passion and determination in a workplace like this can be really engaging. [Name] works for [workplace] and she has become really passionate about Indigenous health. After a while she managed to start new campaigns and to organise events, which she loves. I hope you can write some things which become public, so you can keep them for your portfolio. [Blog]

Sophie: Did you ask whether you can post a copy of the guide on your portfolio as an example of your work? If you can, see whether you can get a comment from your supervisor once it is done. That will be really powerful evidence for a potential employer. [Blog]

By asking questions and encouraging students to think about both the processes and the products of their work experience in relation to the ePortfolio and future careers, we found that some of the students demonstrated complex self-reflective thinking. In general, we found that those students who took an active role in using and shaping the blog discussion also developed their ePortfolios to a high degree (beyond the mandated elements of the unit assessments) and reflected this complex thinking. These students included some who found their placement less enjoyable than they had hoped as well as those who had a very positive experience, and included students with a range of course weighted averages. That is, active involvement in the community of practice and ePortfolio, and evidencing self-reflection, were not solely the domain of the highest achieving students.

Suzi, whose writing skills were not at a high level for a graduating student, used her internship to reflect deeply on her own interests and skills and to target areas in need of development. Her pro-active use of the internship and her thinking around the ePortfolio were more sophisticated than she had demonstrated in any previous study, leading us to conclude that the combination of internship, portfolio creation and CoP had helped her gain new skills. The student herself reported on her growth during the semester:

Suzi: Looking back, I believe this has been the most beneficial unit of the professional writing major … This semester, I have found myself better managing my time, completing drafts of my assignments before the deadline, and

> going over them several times before submission … the quality of my work has definitely improved, which has been noticed by some of my lecturers. I am proud of the personal growth I have gained this semester … I am more focused on the future, have more confidence, and am excited about my future as a professional writer. [Blog]

Other students also identified their own growth during this unit:

> Lee: So I feel like this year I've made some more definitive choices, smarter choices, and I've got a really strong idea of what I want to do … Right now, it's a direction. Because you never know what opportunities are going to present themselves within your professional life. [Focus group 2]

This flexibility and sense of possible future selves and careers was discussed in the focus groups and blog, where students provided contrary options to each other, for example, when Wendy was wondering whether to take up the option of doing further paid work at her placement organisation or whether to try to get work in a different organisation to extend her skills. The students demonstrated an ability to move beyond the notion of specific workplace skills (which is how they tend to view skills in their earlier years of study) to recognise the importance of transferable skills and how their own experience could be used. For example, in one of the focus groups, Sylvie mentioned that, as a hobby, she designed tattoos for her friends, developing their ideas into a final image. Clare and Jen pointed out that this could be represented as a skill to potential employers:

> Clare: That would show that you can work through a process, which you do with writing, you're just applying that process of editing and re-writing, as editing and re-drawing, and going through a process. [Focus group 2]
> Jen: And also working with a client. [Focus group 2]

In reflecting on the process of using the ePortfolio within this unit, Clare later noted:

> Clare: Well … I think that it makes you more aware of the work that you're doing at University and how it's actually going to have a real outcome … everything has a purpose, you're just not aware of it until you start writing down the things that you can do, or you can't do, or you want to do. [Focus group 2]

As noted above, not all students fully embraced the tasks and discussions in this unit. Some students found contributing to the blog a burden and saw the ePortfolio purely in the light of an assessment task rather than a useful resource or process. We noticed less self-reflection among these students and also a lesser sense of a clear direction for their careers. As educators, we are hoping in the future to find ways to engage such students more fully through the community of practice approach.

Conclusion

Our two key findings are that the ability to "experience" multiple workplaces through online interactions with peers leads students to quickly develop a broader preview of possible future selves and to develop their ePortfolios in line with these possibilities, and that the group process and educators' modelling of community of practice behaviours fosters complex reflective thinking skills in individual students and enhanced career literacy and ePortfolio development. In reporting these findings we make four points that might be thought of as indicative guidelines for others. First, strengthen ePortfolio development by positioning this work concurrently with activities such as a work placement and blog, but ensure that students have already created their ePortfolio template and have overcome any technical difficulties prior to their concurrent engagements. Second, model positive CoP behaviours in both online and face-to-face student interactions, and seek to move to peripheral engagement once students take ownership. Third, schedule interventions in second year or, at the latest, in the first semester of students' final year. This will give the ePortfolio and CoP sufficient time to mature, and may prompt graduates to reform their communities after graduation. Finally, student engagement will vary. Include each proposed activity in the unit outline and more broadly across the program to illustrate to students that their personal and professional development is a valued component of their studies. Explicit teaching and valuing of these dimensions heightens student engagement.

Our study is not without limitations. We note, for example, that to facilitate in-depth case studies we worked with a small sample of students. We do not, therefore, seek to generalise the findings or to make distinctions according to age, work, life and educational experience or cultural background. Each of these aspects merits further research. We note that most of our students were in their late teens or early twenties; three spoke English as their second language. We also note the small graduate response (five of the eight graduates for whom we had contact details).

Future research might evaluate a community of practice that runs for longer than a semester, possibly in combination with peer-supported evidence building of graduate capacities or standards using an ePortfolio. Research might also seek to highlight strategies for engaging the un-engaged, because this cohort often includes the students for whom complex thinking is most needed. Similarly, research that enhances understanding of the needs of specific cohorts, particularly equity groups and international students, would be welcomed. Finally, we would value studies that work with graduates to ascertain how, when and why their portfolios are used during the first years of work.

Returning to the theme of this book, we note the importance of understanding the benefits of student exposure to whole learning through engagement in their own personal learning spaces. As educators who are integrating portfolio work into our pedagogical practice, we also highlight the need to understand the benefits of teacher exposure and the impact of teacher behaviours on student engagement. These aspects deserve equal attention if digital Portfolios are to be effectively embedded into pedagogical practice in higher education.

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Chapter 6
ePortfolios in a Music Faculty: Student Differentiations in Expectations, Applications and Uses

Jennifer Rowley and Peter Dunbar-Hall

Abstract This chapter compares findings from two discrete ePortfolio projects within a university music faculty to locate different ways students undertaking various types of music degree programs perceive ePortfolios as relevant, or not relevant, to their studies, and through this to investigate how ePortfolios can be used in the music profession. The initial project was conducted with Music Education students, and their reactions to and uses of ePortfolios provided a substantial amount of data on uses of this multi-media technology in the pre-service training of music teachers. Data from a subsequent project, which focused on Composition, Musicology, Music/Medicine and Performance students demonstrates a range of opinions on ePortfolios; not only do these opinions differ among these students, they differ from those of the Music Education students in the first project. Issues that arose across all student types include the relationship between staff modeling of digital technology in teaching and student acceptance of this technology; expectations of degree programs in relation to learning and using music technology and educational technology; perceptions of students' uses of ePortfolios after graduation; and students' perceptions of the standing of their chosen degree program regarding electronic technology.

Introduction

In a faculty-based project over the years 2009–2011, staff in the Music Education Unit of Sydney Conservatorium of Music (SCM) at the University of Sydney introduced and evaluated student ePortfolios in subjects within the 4-year undergraduate degree program in Music Education. Research during this project revealed diverse applications, uses, advantages and disadvantages of ePortfolios among students training to become music educators, and among staff working with them. In this

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project, Music Education ePortfolios were constructed from individual assignments in a range of subjects utilizing the multi-media potential of ePortfolios, and were viewed holistically as summative objects. They were primarily intended for use in job applications, and therefore were designed to address the requirements of professional teacher accreditation set by government bodies (Dunbar-Hall, Rowley, Webb & Bell, 2010; Dunbar-Hall, Rowley, Bell, & Taylor, 2012).

In addition to this professional accreditation context, these ePortfolios were recognized as belonging to a second context of analysis – as a way of raising debate over various issues in the pre-service preparation of music educators. These issues were discussed in a series of research publications focusing on: ePortfolios in relation to pedagogy through consideration of how they benefit both teaching and learning (Rowley & Dunbar-Hall, 2009; Rowley & Dunbar-Hall, 2010); ePortfolios as a site of problem solving in the integration of IT-assisted learning and teaching in a music education degree program, and as a picture of students' multiple music identities as composers/arrangers of music, deliverers of community music activities, ensemble directors, international learners, performers, researchers, teachers, and technology practitioners (Dunbar-Hall et al., 2010); how ePortfolios demonstrate student learning (Rowley, 2011); the profile of ePortfolios in curriculum design, particularly in relation to their integration across a complete degree program through increasing levels of complexity, longitudinality, choice of content, and development and application of technological skills (Rowley & Dunbar-Hall, 2011a); student attitudes to ePortfolios, especially in comparison to the possibilities of social networking sites such as Facebook and Linkedin for profiling and promoting individuals' personal abilities and experiences (Rowley & Dunbar-Hall, 2011b); ePortfolios as a location for theorising about the nature of music education (Dunbar-Hall et al., 2012); and ePortfolios as a means for demonstrating students' technological backgrounds, capabilities, preferences and concerns (Taylor, Dunbar-Hall, & Rowley, 2012).

A third context in which these music education ePortfolios were read was that of the University of Sydney's policies on and practices in IT-assisted learning and teaching. At the University of Sydney a university-wide eLearning policy is part of the institution's strategic plan. However, each faculty is expected to develop its own Teaching and Learning Plan that must align with the University one, and must include reference to eLearning. The eLearning aspect, therefore, of Sydney Conservatorium of Music as expressed in institutional documentation is "to offer learning opportunities by web-based and other electronic means of course delivery" (Sydney Conservatorium of Music, 2010a, p 18) and "to use technology appropriately … to support multi-modal learning … (and) ensure that eLearning is supported" (Sydney Conservatorium of Music, 2010b, pp 24–25). Further to this, the faculty specific policy on learning and teaching states that to improve the quality of student learning, there will be strategies to "ensure students are learning about technology enhanced performance and learning practices" and to "trial the development of e-portfolios" (Sydney Conservatorium of Music, 2010a, p 2). Introduction and use of ePortfolios for Music Education students, therefore, was a viable implementation of university and faculty policies on IT-assisted learning.

This initial project was used as the impetus for a wider one in 2012–2013, in which ePortfolio use was analysed in two other, comparative contexts. First, internally across other parts of SCM, and second, externally in university study in the creative and performing arts at other Australian universities. This second, multi-institutional context and its implications for learning and teaching in the creative and performing arts has been discussed in various fora (Blom, Rowley, Bennett, Hitchcock, & Dunbar-Hall, 2013; Dunbar-Hall, Rowley, Bennett, Blom, & Hitchcock, 2013; Rowley & Bennett, 2013). In this chapter we focus on the first component of this second ePortfolio project: dissemination of ePortfolios from the Music Education Unit within SCM to the other Units of this faculty.

Discussion of this move of ePortfolio use from one Unit to others within one faculty is an important way to investigate ePortfolios in a university music learning and teaching context, as the various Units of this faculty cover a range of music study and music industry related professional directions in Composition, Music Education, Musicology, and Performance. These Units differ in many ways, including content of degree programs, delivery of teaching, forms of assessment, aesthetics of pedagogy, types of learning, student and staff workloads, and ways in which IT-assisted learning and teaching address university expectations, are conceptualized, put into practice, evaluated, and utilised. On a more detailed level, there are also differences in these fields within the Units themselves, for example, in Performance, which includes teaching/administrative areas in Brass, Early Music, Jazz, Keyboard, Percussion, Strings, Vocal Studies, and Woodwind, each with its own focus on and expectations of IT-related learning and teaching. To assess student uses of and attitudes to ePortfolios across these Units, therefore, reflects multi-faceted ways in which ePortfolios can be used in the music industry. It also highlights different needs by students in their uses of generic platforms used for ePortfolios, and how music, as an area of university study and a field of future employment, has different expectations of ePortfolios from those found among students in other university discipline areas. Research on these issues reflects similar areas of analysis in literature on ePortfolios in higher education, both in Australia (Hallam & Creagh, 2010) and internationally (eg Challis, 2005; Gikandi, Morrow, & Davis, 2011; Jafari & Kaufman, 2006; O'Keefe & Donnelly, 2013; Peacock, Gordon, Murray, Morss, & Dunlop, 2010; Willis & Rice, 2013). While research regularly investigates ePortfolio uses in specific faculties/departments of universities (Inter/National Coalition for Electronic Portfolio Research, 2015), study of them solely within a music faculty is unknown, as reference to literature on ePortfolios in the creative and performing arts demonstrates (Dunbar-Hall, Rowley, Brooks, Cotton, & Lill, 2015).

To explain this project, the following is organized to cover our methodology; reporting and analysis of our findings from students in Composition, Musicology, Music/Medicine and Performance; comparison between these students and those in Music Education; and implications for ePortfolios in university music study.

Methodology

Our methodology is qualitative in nature, relying on interactions between staff researchers and the various groups of students involved in ePortfolio use – students in specialist, 4-year degree programs in Composition, Musicology, and Performance, those in a generalist, 3-year degree program in Music Studies, and students undertaking a 7-year double degree program in Music and Medicine. The data produced from these interactions are compared with each other, and are also compared with those from Music Education students in the initial 2009–2011 ePortfolio project.

Three data collecting processes were used in the faculty-wide 2012–2013 project: questionnaires, focus group interviews, and individual interviews. Questionnaires used open-ended questions, allowing students to describe and comment on their experiences (or non-experience) with ePortfolios. They were used to recruit student volunteers for focus group interviews. Focus group interviews were selected as a means of investigating relevant issues more deeply than the questionnaires allowed. They were considered a viable means of gathering opinions as they provide a way for students to respond to each other's ideas, to develop lines of argument, and to uncover and discuss issues that might not have previously occurred to individual participants. This is an advantage of group interviews noted by writers on educational research methodology, such as Cohen and Manion (1996, p 287), who explain that group interviews allow "the potential for discussions to develop, thus yielding a wide range of responses … alternatively, the group interview can bring together people with varied opinions, or as representatives of different collectivities." The focus groups were constructed within Unit-based discipline areas as this allowed questions on specific sectors of the faculty to be posed, and ensured that issues discussed were relevant to different groups of students. Individual interviews were held with volunteers who felt that their interactions with ePortfolios had produced a level of recognition of the potential of the medium to support their studies. These students were recruited via institutional email address lists. Interviews were also conducted with students recommended by teaching staff as having worked effectively with ePortfolios.

In both types of interviews, questions were open-ended. They provided frames of reference with limited boundaries on the content of answers (Cohen & Manion, 1996, p. 277); as with questions in the focus group interviews, questions in individual interviews allowed discussion to develop as ideas relevant to each student emerged. Some students had completed subjects that required them to engage in ePortfolio use, some had received one-to-one training in ePortfolios from a dedicated member of the research team. Both situations guaranteed that students taking part in data collection were basing their information about and opinions on ePortfolios on their personal experiences. Questions used both in focus group and individual interviews covered: students' understandings of ePortfolios; ideal components of ePortfolios; uses of ePortfolios, both during time as a student and subsequently in professional settings; changes of opinion on ePortfolios over a period of use; advantages and disadvantages of ePortfolios; the effectiveness of ePortfolios to influence and/or support learning; comparisons between ePortfolios and forms of

Table 6.1 Types and numbers of students in both projects

Student type	2009–2011		2012–2013		
	Audit	Focus group	Questionnaire	Focus group	Individual interview
Music education	81	9			
Composition			21		
Musicology			8	4	
Music/medicine					2
Performance					5

social networking media; technological requirements for working in ePortfolios; and overall attitudes to ePortfolios in university study. These questions, being theme or issue related (eg understandings, components, uses), allowed for facility of coding and analysis. As the same themes were used in all situations in both the 2009–2011 and 2012–2013 projects, responses can be compared across projects to show how students in the range of types of study in this music faculty differentiate between expectations, attitudes to and uses of ePortfolios.

The original 2009–2011 project in Music Education used two data collecting methods: focus group interviews, and an audit of student ePortfolios. As with focus group interviews in the 2012–2013 project, participation in focus groups was voluntary. Similar questioning processes and types of questions to those of the 2012–2013 project were used. The audit of student ePortfolios, undertaken with students' agreements, produced data on what materials students were using to compile their ePortfolios, the types of digital media they were using and the extent of these uses, the effectiveness of ePortfolio design, and to what extent students were utlising the possibilities offered by the ePortfolio template in use. This audit data does not provide student opinions or attitudes; however, it does indicate the levels to which students were engaging with the potential of ePortfolios, and was an important step for staff who were evaluating the introduction of ePortfolios at that time, therefore it is included in the synoptic view of student numbers and types involved in the overall, 5-year period of both projects. This synopsis of student involvement is shown in Table 6.1. As this table shows, our discussion is based on contact with 130 students over a 5-year period. The numbers of students reflect the qualitative and voluntary nature of participation in the project, and are not intended to be read as the result of a scientifically constructed sampling process.

Students' Understandings of the Purposes of ePortfolios in the 2012–2013 Project

All Composition students who completed a questionnaire noted that an ePortfolio could be useful professionally, especially in job applications. Typical of comments in this area was that an ePortfolio could be used "to upload your work so that you

can send it to people eg. as a reference." In contrast to this level of agreement on ePortfolios from Composition students, only three Musicology students indicated an employment context for ePortfolios, one writing that it was "a tool you can take to an interview, show a potential employer. It is like a neat little package containing all the vital info about yourself." The comment of one Musicology student mirrored that of the Composition students quoted above: "to confidentially house and share assessments … with potential employers."

Despite this understanding of use in professional contexts, both Composition and Musicology students indicated in questionnaires that an ePortfolio, if used, was to be seen as support for a paper-based resume, one student indicating how this would occur: "attaching a link to it on your CV will allow potential employers to view your work and understand more about you." The perception that an ePortfolio was simply a digital version of what would previously been done through a paper-based one was evident in comments such as: "(it is a) digital rendition of a content based folio," "(its purpose is) to act like a digital CV," and "(it is a way of) submitting portfolios electronically." There was agreement that an ePortfolio was a suitable way to formulate a CV, and that its digital nature made it easy to disseminate. The implication, however, is that rather than containing a CV as a discrete component of an ePortfolio, an ePortfolio is one.

While both sets of students thought that an ePortfolio could equate to a digital CV, Composition students provided more ideas on uses of them. This may reflect the fact that Composition students were seen as more technologically 'savvy' than Musicology students, as they were expected to work regularly in electronic music environments, were engaged in subjects that mandated study of music technology, were often already working professionally in computer-based music contexts, and were experienced in seeking and gaining employment in part-time jobs, thus had more understanding of how to apply for and gain employment.

Composition students also were more aware than Musicology students of self-promotion through use of an ePortfolio, with 16 of the 21 students mentioning this on the questionnaire. Again, this may reflect their experiences as freelance creative musicians. One student wrote how an Portfolio could be used: "getting their works out there. The Arts industry is about promoting yourself – as it is a different industry to something like economics where you might find employment in a company." Another student wrote about ePortfolio as a way to "collectively promote one's projects or work." The term 'showcase' was used by a number of Composition students in this area, implying how they perceived an ePortfolio:

- "you can send it out … to showcase what you can do"
- "showcase work to a wider audience"
- "showcasing myself."

In contrast, only one Musicology student noted self-promotion as a use for an ePortfolio with the comment: "for employment and self-promotion."

Despite the positive responses of Composition students about the potential of ePortfolios, there was still a strong feeling that ePortfolios were similar to a traditional resume. Items that they listed as components of ePortfolios show this, for

example, "info about one's self, samples of your work, contact details, etc., pictures so people know what you look like, info about what you do." Also, while the multimedia, digital potential of ePortfolios for uploading of sound and visual files was recognized by some students, responses concentrated on the nature of ePortfolios in terms of traditional resumes. This was not noted by the Musicology students, perhaps relating to the fact that, as mentioned above, Composition students had already been applying for professional work and were more aware of how this functions "in the real world."

Performance students' comments from individual interviews tended to mirror those from questionnaires, with clear job application and or CV uses of ePortfolios mentioned as the primary response to questions about how an ePortfolio could be used. Students stated that an ePortfolio was "basically an online CV/resume" which one student had complied in the following way: "I just carried a lot of stuff across from my existing CV – paid work I've done and non-paid volunteer … stuff as well." Job application was specifically mentioned a number of times:

- "apply for jobs (and) post graduate education"
- "it's like a job application."

These students, however, did have other views of uses for ePortfolios. One noted that an ePortfolio had a longterm applicability during study when he stated that "you could update particular courses you've completed … as you go along," while another was interested in the potential of an ePortfolio to present the various documents music students tend to collect from their performance/music examination experiences: "I think it's very cool because you can put your certificates – it (is) very organised." This student was also keen on the use of an ePortfolio in applications to study outside the university, and possibly overseas, noting that she could use one in "applying for internships, exchange."

Another student, noticing that the components within the ePortfolio platform in use were similar to the types of questions that would be asked in a job interview, saw the design and implications of ePortfolio contents as a way to think about how to successfully negotiate such an interview: "(the questions in the ePortfolio) are, you know, good questions … which you might be asked in a typical interview, so it's good to cut out the middle man aspect of it."

Personal Uses of ePortfolios

In contrast to responses from both the Composition and Musicology students on possible professional uses of ePortfolios, in questionnaires few students could suggest personal uses of them. This could indicate that ePortfolios had only been considered by students as a way to demonstrate abilities as a means of finding employment, rather than as a site of personal development and/or reflection. The most often mentioned personal use of ePortfolios was to allow online storage of materials. Two Composition students mentioned this aspect of ePortfolios and use

of them as a form of self-evaluation, while none of the Musicology students did. One Composition student noted that an ePortfolio could be "a reference point to compare (new work) against older work," indicating a sense of the longitudinality offered by an ePortfolio, and potential as a site of self-evaluation.

The most common use in this area was for an ePortfolio to be a place for storage of documents, with five Musicology and twenty one Composition students noting this, although other ways for doing this were already being used: "as an online repository for my own use, but I already have ways to do it." One student went further than this, including reference to not only storing, but organizing work: "as a common place to store and organize my work."

In individual interviews, students were able to raise a number of uses other than job application for their ePortfolios. One student thought that "it can be kept as a sort of journal … to record (work) and share it with the teacher." Numerous students commented on the ability of an ePortfolio to show aspects of a student's life outside their studies: "it's a good opportunity to include more personal information about yourself … of the sort of person you are outside a work environment," and "something that's completely removed from what you do from day to day … the chance to put down more personal, not work related, not education related stuff" which another student agreed with: "I'd want to express other aspects of myself … I have other interests and hobbies."

For some, the potential of an ePortfolio to act as an incentive to personal organization of materials was important: "I had to think about how to organize an ePortfolio, so you have to be organized," with which another student agreed: "it shows that you have a clear, systematic organizational mind." Other advantages of ePortfolios included that "the ePortfolio not only shows all of the qualities you have, it also shows a willingness to learn and keep up with technology," and "you can make it suit yourself." An international Performance student, fluent in three languages, could see that an ePortfolio could be used to demonstrate not only her multilingual capabilities, but her attitudes to people from varying backgrounds: "I can show people who just came from overseas (if) they have a language problem maybe and their family is living overseas, I can show them that I understand different people and I speak three languages."

Once these ideas had been canvassed, students were asked to reflect on how, and if, working on an ePortfolio had been beneficial to their learning. This question seemed to create a dilemma for some students who had only thought of an ePortfolio as part of a required assessment task and specifically as a type of job application: "the assessment guideline said you need to complete an ePortfolio," and that "the tendency is to think that all the learning is done in lectures … learning through an ePortfolio – I'm not really sure." Similarly, another students wrote in response to this question in the questionnaire: "not sure about learning." This implies that these students were inclined to think of ePortfolios as a final object or outcome of their studies, not as part of a process of learning.

However, some students saw that working on an ePortfolio lead them to reflect on their studies: "(it) forces you to rethink about … what was relevant, what was useful in what I learnt.… (it) can force you to reflect on a particular exercise or

assessment where you learnt a particular skill, you can go through and 'Yep, I learnt that.'" The term 'reflect' was also used by another student, who stated that she used her ePortfolio to help her reflect on her studies: "(I used it) to reflect on how I'm performing currently in my subjects – I listed my grades and gave a short description of what the subject is about and at the end I summarised it and how I think I'm performing and what I need to do to improve in the next semester." Other comments included that an ePortfolio could be used to track an individual student's learning goals ("you could have a goal to get a particular mark … with a performance, and then be able to show that you did"). Sharing of work samples (especially original compositions) with other students was mentioned a number of times by students as a way they would think of using an ePortfolio. Another theme which reappeared a number of times was use of an ePortfolio to "keep track of all your compositions," that "it can be used as a reference and inspiration for further works," and "it can be an effective way of checking your progress." Organisaton of work completed, as shown in the comment that an "ePortfolio is useful in the sense that I can organize my creative works online," appeared numerous times in response to how an ePortfolio could benefit a student's learning, even if terms specific to learning were not used in students' respones.

Technology

In all data collecting situations, students were specifically asked to comment on technological issues arising from the requirement to create an ePortfolio. In interviews there was regular contextualization of ePortfolios alongside other forms of both IT-assisted learning, such as the university's Learning Management System; publicly available internet applications, including Facebook, Linkedin, Twitter and YouTube; and generic forms of digital communication, such as blogs, emails and websites. Some students saw ePortfolio creation as similar to making and maintaining a Facebook page, and others mentioned having to make, use and disseminate Powerpoint presentations for seminars and that as this required uploading of text documents, visual images, sound and film files, this was similar in ways to making their ePortfolios. Students who had taken advantage of the ability of ePortfolios to house MP3 or digital video files often commented that these files were already on their computers and only needed to be uploaded onto the ePortfolio platform, and that such files were regular ways of presenting themselves. This ability to refer to ePortfolios as an accepted digital artefact with an educational viability implies that students saw ePortfolios as part of a wider, and increasingly developing, educational technoscape. There was little negative comment on the introduction of ePortfolios in general into the culture of music study; and some students linked this to their membership of a generation of students for whom such forms of technology are regular parts of their lives, as one student explained this: "(we are part of the) younger generations, we've just sort of grown up surrounded by technology so it comes easier (to us)." Advantages were ascribed to the expectation to become

proficient in creating and using an ePortfolio, for example, one student commented on learning how to work on her ePortfolio as "a useful means of learning to get used to making recordings … putting them up on a website or ePortfolio, designing the way (you) want it to look." The same opinion appeared in the comment of another student: "it improves my ability in using technological applications."

However, students did raise negative issues about the technological aspects of ePortfolio creation. A common comment was that constructing one, especially if this were to take maximum advantage of the multi-media potential of them, requires detailed technological skill, and that many students did not feel confident in this. Students' comments on their own insecurity handling the technological requirements of making and using an ePortfolio became regular throughout questionnaires and interviews, with statements such as: "I'm not good at technology," "(a problem is my) technological ineptitude," and "I am not the most technological person out there." There was a suggestion that training in ePortfolio construction and management was required; as one student stated, these problems could be alleviated if "you show people how to use it properly."

While aware that applications for jobs, higher degree study, scholarships and fellowships could require, and in some cases stipulate, submission of electronic files and/or ePortfolios, there was mistrust about the efficacy of this form of application, as one student noted: "the biggest issue I can see with it is technical difficulties … it's always very frustrating" not only for a student making an ePortfolio, but for any prospective user to whom one is sent: "if you have an ePortfolio and someone wants to look at it and they want to hire you and they can't see it, they might just change their mind, and that would be very disappointing."

Problems

In questionnaires and both types of interviews, students identified various problems with ePortfolios apart from the technological ones discussed. Numerous students were not happy with the commercial ePortfolio platform that this university had mandated for use, particularly its appearance, its lack of navigation ease, and its inability to allow suitable playback and pause options for filmed/sound materials. Its ability to respond to navigation commands was described by one student as "clunky." Other problems included that setting up and maintaining an ePortfolio requires time, and that once set up, students might "forget" or "put off" updating it to keep an ePortfolio current. The time requirement for making and maintaining an ePortfolio was mentioned by many students in all situations of data collection, especially when this required students to forego the time they felt necessary for practising on their instrument/voice or engaging in the activities essential to their specialised area of music study. Privacy, confidentiality and copyright issues in relation to the ePortfolio site were raised by some students as perceived concerns, and they were not sure of the security of sending their work to people outside the university system (for example, in a job application). This was indicated in comments

from Composition students (who seemed to have a more developed sense of intellectual property as a topic than other students) such as: "I would prefer to code such a web source myself for full control," and "computer hackers will steal your work," although how this differed from the same issue in relation to sending paper-based copies of work samples (which could be photocopied) was not mentioned. Referring back to criticisms of the appearance of the ePortfolio platform that students were required to use, there was concern from some students that their final ePortfolio product would not look "professional enough" to make the time spent on setting one up worthwhile. This seemed to be linked to lack of clarity on what to include in an ePortfolio, not its component parts (eg. list of qualifications, work resume, etc.), but rather to what specific examples of university based work samples (such as written assignments, creative works) would be good to include. This might indicate a similar lack of clarity in purposes of ePortfolios that some students had expressed. In a similar way, there was criticism of how the mandated ePortfolio template partitioned information in a way that ran contradictory to how a student would do this: "you have to follow the instructions … sometimes they have very strict (requirements) – you have to put Mission and Past Experiences, but sometimes I want to put something else, and I have to put (it) in Other. That's the bad thing, but the good thing is it's very organised."

Differentiations Between Music Specialisations: Comparing the Two ePortfolio Projects

As indicated above, our purpose in this chapter is to compare the findings from a 2 year project in 2012–2013 involving students from a range of degree programs and specialisations (not including Music Education) with findings from an earlier project in 2009–2011 which only involved Music Education students. Through this comparison we can highlight differentiations made by students about their ePortfolios and draw implications for ways that ePortfolos can best be used across the range of types of university training of musicians.

Music Education students, rather than focus solely on the CV/job application aspects of an ePortfolio, saw an ePortfolio as a place to demonstrate teaching ability, and as a site of evidence-based materials, such as short documentaries they had been required to produce, videos of themselves performing and/or teaching, and recordings of their original compositions. This was made clear in statements such as: "it's pretty much a documentation of us in our music career… where we provide evidence of us teaching." Further, an ePortfolio could be the location of personal statement of a music education philosophy: "I think it can say your beliefs of teaching and learning," and "the philosophy of why you want to become a teacher … that's the main thing." In contrast to this, no students in non-Music Education contexts mentioned personal philosophy of a music related career in their choice of music specialization and how an ePortfolio could respond to this. Music Education stu-

dents also had a greater sense of the possibilities for self-representation provided by an ePortfolio than did other students, with comments indicative of understanding of the multiple identities required of musicians such as "I think the scope is just so big with an ePortfolio because you could really put in whatever you like … there's so much that you can video because being a musician means we're a performer, we're a learner, we're a teacher, we're all those different things." Another Music Education student commented favourably on ePortfolios, as they could be used to demonstrate "lots of different little bits that show your diversity."

Another aspect of ePortfolos that appealed to Music Education students was their ability to indicate future professional and musical directions: "it's not just about where you've come from, but where you want to be going." In contrast to this, Composition, Musicology and Performance students, while agreeing that ePortfolios can show the outcomes of their study programs, did not mention use of them in this predictive/future planning way. For Music Education students, the strongest sense of understanding of how ePortfolios related to their studies, was in the ability of this form of IT-based learning to lead them to reflect on their university studies, to think about themselves as potential music educators. This was made evident in comments such as: "it makes you think about all these things" and "it makes you become a better teacher … I was recording my students the other day, I was actually watching 'oh, is that how I teach?' … I've got to change a few things … seeing it from another perspective, it made me think."

In relation to the technological requirements of making and using an ePortfolio, Music Education students also made explicit the fact that their acceptance of the idea of working on and through ePortfolios was an accepted part of the skills and thinking required of teachers. One student summed this up with the comment: "people are going to be expecting us to have this technology." This comment hints at a major difference between students in Music Education and those in other, non-Music Education specialisations in this faculty. These differences relate to an institutional culture through which implications are made about the acceptability and viability of IT-based learning and teaching. Students in Music Education are taught in an IT rich environment. They are required to undertake a mandated subject in Music Technology in Music Education and from this to incorporate music technologies into their own learning, they must present seminars to their peers and staff using IT-assisted pedagogy, are required to submit MP3 and digital video files of their own making as assignments for assessment, need to be able to use forms of IT-assisted technology in their Practice Teaching placements in schools, and are exposed to IT-assisted delivery of teaching by staff on a daily basis. Through this continual exposure to and experience of working with IT-based learning, they have been enculturated into working with, theorizing about and critiquing educational and music technology. As was noted above, only students in Composition had reactions to ePortfolios that were similar, and these students also were required to study in a similarly IT-rich context.

That this differed between the various Units of this faculty was made clear by comments of the Musicology students, who in general could not see the relevance of ePortfolio work to their studies or potential employment situations. This became

obvious as the Musicology focus group interview took place. One student, who had made a short, filmed research documentary on a musical instrument, indicated that she did not think this was a valid outcome of study that would be useful in an ePortfolio: "it wasn't feasible for me … as a musicologist it was secondary to my essays and written work." There was general agreement among students in this area of music study that an ePortfolio was somehow an unnatural location for their studies to be presented. This is summed up in the comment of one student: "the people who are looking at the seventh symphony of this unknown composer from an obscure country … it (an ePortfolio) just seems a bit flashy for musicologists … it's not beige pants enough (laughter from the whole group)." ('Beige pants' meaning that musicology was seen as lacking originality and interest). Another student complemented this with: "musicology is still very 'oldy worldy' … (and) academics are still struggling with Powerpoint." These students indicated that at conferences they had attended, there was little occurrence of IT-assisted presentation. When asked if becoming technologically astute was an expectation of their degree program (such as was expected of Music Education students and Composition students) they agreed that it was not: "Not at all, "according to one. Similarly, they did not see being technologically astute was important to their degree or future professional directions: "it's not important to be technologically savvy … I can find articles, I can attach a sound file in Powerpoint – what more do you need?" To one student, "our choice of degree is to focus on kind of a bit of an antiquated field, and I just don't think that compulsory (ePortfolio) would aid us." The bottom line was that unlike students in Composition, Music Education and Performance, these students did not experience IT-based teaching or learning on a regular basis: "we don't have any focus in class on technology."

Having two students from the combined Music/Medicine degree complete individual interviews, provided a way to investigate the different ways students approached the issues discussed above in relation to either a music or a medicine use of an ePortfolio. For example, the contents and look of an ePortfolio would differ for one of these students depending on which discipline area she was addressing. In relation to content, she stated: "For music, I would talk about my experience, who I am studying with … competitions and exams (and) I would focus on teaching students … (for medicine) I would say why I want to be a doctor … what influenced me … what I (would) like to specialize in … that would be more academic, so I would focus more on my school activities." In general, this student indicated differences: "For medicine I would be making it very professional, very serious and formal. For music … if I'm trying to reach some children (if) I'm applying for a casual teaching job, I might make it very casual, very musical … "

The second Music/Medicine student drew the same conclusions about either a music or a medicine focused ePortfolio. In a medicine ePortfolio she would include materials "to show you are dedicated to helping out the community, as well as studying for yourself but also having society's interest in your life." She would also include "research papers … if you were to apply for a grant in research …you would be able to show that you have this desire to learn more and show the research to … broaden your scientific knowledge … it would also show that you're organised in

keeping your research data … it shows that you have a clear, systematic organizational mind … that would be essential in any sort of scientific field … like clinical medicine." For a music-related ePortfolio, this student would include "music-based (materials) … video files of performances or MP3 files of compositions … " and she had in fact included "a video of one of my … performances." She also considered ePortfolio work as something she could continue with as she progressed through the remaining years of her double degree program:

> I am in this age where technology is rapidly developing – I think the ePortfolio … shows a willingness to learn and keep up with technology, something that in the scientific and medical field is particularly important because it's a lifelong journey of learning.

Conclusion: Implications for ePortfolios in the University Study of Music

Despite difference discussed below, among the non-Music Education students in this faculty, there was agreement on some issues relating to ePortfolios. That ePortfolios were only one application of digital technology in both daily life and students' university learning indicated acceptance of the medium; no student surveyed or interviewed expressed the opinion that ePortfolios had no place in the university study of music, although there was a definite spectrum of opinions on their usefulness. Differences in their attitudes to them were more inclined to relate to the uses of ePortfolios and their relevance to students' chosen types of music study. Many still had an opinion of ePortfolios as replacement for a paper-based CV, with the same types of components simply converted to an electronic format. The time needed for making and maintaining an ePortfolio was noted by students from across different sectors of the faculty as a concern, especially when this would rob students of practice time on their instrument/voice. The usual double-layered attitude to technology – that, problematically, working on an ePortfolio required developed levels of technological skills that students might not have, but, advantageously, through constructing an ePortfolio students would need to develop these skills, appeared numerous times. There was a feeling from some students that using a commercially available product was at odds with the specific music related expectations they needed from an ePortfolio, and that they had to fit their music study interests into pre-conceived categories to fulfill requirements of the ePortfolio platform in use by this university.

By comparing the comments on ePortfolios of students from Composition, Music Education, Musicology, Music/Medicine and Performance, differences in how students perceive an ePortfolio as a component of their studies and of potential employment directions became discernible. Students in more clearly defined professionally directed degree programs in Music Education and Music/Medicine, had a stronger sense of the professional implications of ePortfolio construction, components, uses and significance. This was also seen among Composition students, although their career opportunities after graduation were less obvious. Performance

students, able to see the ability of ePortfolios to demonstrate their abilities on their instrument/voice, could see uses of the medium both during and after graduation. Students in Musicology had trouble seeing the relevance of ePortfolio work to their study programs, or their future employment prospects. More significantly, these Musicology students did not see ePortfolios as relevant to Musicology as an academic discipline. This attitude was based on their assumption that Musicology could be represented almost entirely through written documents, therefore the multi-media potential of an ePortfolio to showcase what a student had learnt and had learnt to do was not something they saw as viable. Across all students there was a sense that clear expression of potential uses and value of ePortfolios, both during time as students and subsequent to graduation in professional settings, would help them understand more the university's agenda in moving this form of technology into their degree programs.

Differentiations about ePortfolios between various types of students in this faculty were sometimes related to ways in which students were being enculturated into an IT-based academic context. Students in Composition, Music Education and Music/Medicine degree programs, in which various forms of digital technology were in constant use by staff, where students were required to work continually in digital technology and present their work through a range of digital media, and where the relevance of digital technology to teaching, learning, self-representation, self-reflection, organizing of work and archiving of studies was strongly implicit if not in many cases explicit, were more open to thinking of ePortfolios positively as an adjunct to their music studies. The need to make this relevance clear to the different sectors of a music faculty, both students and staff, and drawing out the specific applicabilities of ePortfolios to different types of music study would seem to be a logical outcome of these two projects and comparisons between them.

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Chapter 7
The Roles and Features of ePortfolios in Two Australian Initial Teacher Education Degree Programs

Wendy Brooks

Abstract This case study investigates the use of ePortfolios by pre-service teachers in two university settings in Sydney, Australia. The ePortfolio products discussed were created and developed as a means of chronicling the pre-service teachers' professional development, and to encourage reflective practice. Students enrolled in a Music Education degree utilised PebblePad, an online, commercially-available platform that was provided by the university, and students were required to contribute regularly to their ePortfolio as part of several units of study across the course of the degree by creating, editing and uploading digital artefacts of music teaching skills and knowledge from assignments in each unit of study. The second group was enrolled in a general primary teaching degree, and included several mature age students whose attitudes and experiences with ePortfolio creation are presented in this chapter. This group of students was required to construct ePortfolios using the slide show presentation program, PowerPoint, since it is not dependent on internet access for either creation or reception. For both groups of students, one function of ePortfolios was to reflect on their learning experiences of becoming a teacher and to house artefacts and documents serving as evidence of meeting graduate teacher standards of the Australian Institute for Teaching and School Leadership. The students were engaged in reflective practice in creating their ePortfolio products.

Introduction

The use of portfolios has a rich history in teacher education (Strudler & Wetzel, 2005). Portfolios have traditionally served to promote student learning and development; encourage student self-assessment and reflection; provide evidence for assessment and accountability; and document growth of pre-service teachers (Anderson & DeMeulle, 1998). Electronic portfolios, or ePortfolios, were introduced into Initial Teacher Education (ITE) during the 1980s, "born out of

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faculty-assigned, print-based student portfolios" (Lorenzo & Ittelson, 2005, p 3), and gained prominence during the 1990s. According to Granberg, (2010), ePortfolio use within ITE has increased due to requirements to improve quality, attain established standards and to resolve accreditation issues. Indeed, within the two institutions investigated within this study, such factors appear to have influenced both implementation and development.

Within ITE, ePortfolios serve several functions, which may include demonstrating learning; career enhancement; professional development; and as part of academic reviews (Bunker, 2005). ePortfolios may contain artefacts such as work samples; lesson plans; stimulus materials; videos, pictures and photographs; assignments and assessment tasks; and in-service materials which have been produced by the pre-service teachers (Bruneau & Bie, 2010). These artefacts are selected, shared and reflected on by students enrolled in ITE degrees. Such ePortfolio collections may also serve as assessment tools, holding evidence of achievement that is particularly related to standards-based processes. These may be internal assessment criteria, graduate attributes or external standards (Lewis & Gerbic, 2012).

In Australian ITE programs, ePortfolios have become widely used to hold evidence related to the Australian National Professional Standards for Teachers (Australian Institute for Teaching and School Leadership [AITSL], 2011), that replaced numerous state-based standards and competencies operating across the Australian national landscape. These standards have been described by AITSL as "the centrepiece of national reforms being implemented under the National Partnership on Improving Teacher Quality" that aim to "promote excellence in teaching" (AITSL, 2011). The implications they hold for teacher accreditation and re-accreditation also necessarily influence ITE curriculum in Australia and is true in many countries around the world.

The Australian National Professional Standards for Teachers were designed to provide a nationally consistent set of descriptors and benchmarks that might help assess teaching performance, identify areas for improvement, and recognise teaching excellence, as well as providing a public statement of what parents and community might expect of teachers. The standards make explicit the knowledge and skills necessary for effective teaching across three domains: Professional Knowledge, Professional Practice and Professional Engagement. The standards offer a continuum of capabilities and expectations across four career stages of a teaching career, the earliest of which pertains to pre-service teachers. It is mandatory that teachers at this stage, the *Graduate* stage, meet the requirements of the standards in order to gain entry to the profession via provisional registration, which is granted upon completion of an accredited ITE degree.

Demonstrating evidence against professional teaching standards is a commonplace requirement of ITE in higher education institutions around the world (Day, 2004; Day, Sammons, Stobart, Kington, & Gu, 2007; Moran, Vozzo, Reid, Pietsch, & Hatton, 2013). ePortfolios are an ideal receptacle for holding evidence of achievement of such standards because they can support the synthesis of theory and practice (Strudler & Wetzel, 2005), demonstrate professional development across time (Barrett, 2005) and offer the opportunity to reflect on learning processes (Dunbar-

Hall, Rowley, Webb & Bell, 2010; Lin, 2008; Stefani, Mason, & Pegler 2007). An Australian study carried out between 2010 and 2012 found that pre-service teachers using ePortfolios to house evidence related to the AITSL standards learnt to articulate links to the standards using appropriate meta-language, and consequently acquired a sense of confidence and achievement at the start of their teaching careers (Moran et al., 2013).

As students utilise ePortfolios within this process, the ePortfolios serve as "a window into … emergent identity" (Antonek, McCormick & Donato, 1997, p 16), and act as an instrument for the construction of the professional self. Therefore, an ePortfolio may also represent attitudes and beliefs of the author (Zhou, Chye, Koh, & Liu, 2013). The reflective stance of ePortfolios as part of documentation of an intellectual journey also aids in the development of professional identity (Zecker, 2012). McAlpine (2005) proposed that ePortfolios allow students' self-constructed identities to be conveyed through the "weaving [of] an individual's learning and feedback to provide a reflection of who they are and what they have learned" (p 384). Identity emerges through the gathering, reflection and assessment of one's own work, and, together with self-image, is closely linked to the competencies portrayed in ePortfolios (Janssen, Berlanga & Sloep, 2012; Skilba, 2005).

The effectiveness of an ePortfolio as a "structured documentary history of a set of coached or mentored acts of teaching, substantiated by samples of student portfolios," can be "fully realized only through reflective writing, deliberation, and conversation" (Shulman, 1998, p 37). Mansvelder-Longayroux et al. (2007) also claimed that constructing an ePortfolio requires reflection, which is focused on "the process of interpreting experiences during the production of the portfolio" (p 49), and that reflection in the ePortfolio "should be conceived as a mental process that takes place while a portfolio is being made" (p 49).

Effective reflection evidenced in student ePortfolios is that which synthesises theoretical knowledge with university coursework and personal experience, particularly classroom experience. Supporting the synthesis of theory and practice is particularly important in ITE, where program requirements include both theoretical classes within the university setting and professional experience components that are conducted in school settings. Tsui (2009) posits that the process of developing expert professional teacher knowledge requires the capability to deliberate and reflect in order to "practicalise theoretical knowledge" and "theorise practical knowledge" (p 20). This involves making personal interpretations of formal learning for enaction within work contexts, as well as making explicit the tacit knowledge gained through these experiences. Smith and Hodson (2010) argue that in order to develop "professional craft knowledge", student teachers need, "whilst in practice themselves, to engage in a process of searching, critical reflection or 'practical theorizing' in order to frame questions, trial solutions and examine outcomes against more generalized criteria about practice" (p 263).

Pre-service teachers writing about their own classroom experience is considered to be the most productive starting place for reflection because connections can be made between course concepts and practical experience (Yesilbursa, 2011; Yost, Senter, & Forlenza-Bailey, 2000), and critical reflection is acknowledged as a deep

level of learning that allows students to apply learning to practice (Jenson, 2011). Reflective practice needs to be taught explicitly because in most cases, simply telling pre-service teachers to reflect on their experiences is not sufficient (Russell, 2005; Shoffner, 2009). Attempts to include reflection in assessment tasks with little or no pedagogical scaffolding generally results in superficial reflections that have virtually no impact on learning or future practice (McIntosh, 2010).

Methodology

The study investigated the use of ePortfolios within two university ITE programs in Sydney. A multiple case study research design facilitated investigation of the following questions:

- What role do ePortfolios serve within ITE degree, and what characterises their use?
- How is reflective practice facilitated through ePortfolio construction?
- How do ePortfolios contribute to the development of the professional self?

Using a multiple case study methodology allowed description of ePortfolio use within the contexts of ITE programs, as well as an exploration of the differences and similarities within and between the cases (Yin, 2003). Data were collected through content analysis of the ePortfolios, and semi-structured interviews with students enrolled in the degrees.

Through my concurrent roles as a sessional lecturer and tutor within two ITE degree programs, and simultaneous work within the federally funded research project "ePortfolios for Creative Arts, Music and Arts Students in Australian Universities", I was involved in teaching, assessing and analysing ePortfolio use among pre-service teachers. While both degrees utilised ePortfolios as receptacles for evidence against the AITSL standards and to promote reflective practice, I observed several disparities that prompted further investigation.

Case Study One The first ITE program was a 4-year undergraduate degree in Music Education. Approximately 25 students were enrolled within each year group of this degree. These students, who completed professional experience placements in their second, third and fourth years, were provided with an online, commercially available ePortfolio platform (PebblePad) by the university, and its use was introduced in their second year of study. They held this ePortfolio until the conclusion of their studies, and following their graduation at no cost. Across the course of this degree, students utilised their ePortfolios within units of study bearing Education and Music Education content.

The implementation of ePortfolios within this degree served multiple aims, reflecting a range of expectations of both staff and students. For staff, ePortfolios could potentially be utilised to link course content with professional teacher accreditation rubrics, thus assisting in official registration of the degree program;

become a medium through which a range of assessment tasks could be presented; be adapted as a form of curriculum mapping and evaluation; and ensure the integration of information technology. From the students' perspectives, implementation provided an ePortfolio template through which demonstration of generic skills of university study could be made, as well as enabling response to official teacher accreditation requirements. It also gave students a site through which they could showcase their identities as both musicians and teachers while demonstrating the ability to use information technologies as an embedded part of their studies and subsequent teaching (Rowley & Dunbar-Hall, 2012; Taylor, Dunbar-Hall & Rowley, 2012). Throughout the extended process of ePortfolio implementation across the degree, some existing tasks were transformed to suit the ePortfolio format, while others were created to be consistent with aims relating to implementation of the ePortfolio system (Rowley & Dunbar-Hall, 2012). While some of these tasks included exercises such as activities related to weekly classes, others constituted assessment tasks, wherein both the content and the process of creating the ePortfolio contributed to marking criteria. This is in keeping with Barrett's (2010, p 6) description of ePortfolios as "a combination of process (a series of activities) and product (the end result of the ePortfolio process)".

Due to their inclusion in a research project investigating ePortfolio use in Australian universities, aspects of ePortfolio use by this group have been described and discussed in several previous articles: for example, Rowley and Dunbar-Hall (2009), Dunbar-Hall et al. (2010), Rowley and Dunbar-Hall (2010), and Rowley (2011). This chapter differs through the analysis of progressive tasks, and its emphasis on reflection within development of the professional self.

Case Study Two The second ITE program was a postgraduate degree in general primary school teaching. Although offered options for accelerated or extended study, most students completed this degree in approximately 18 months. They completed two professional experience placements as part of degree requirements. Between 200 and 300 students enrol in this degree each semester, and these students represent diverse ages, socioeconomic status, cultural, religious and academic backgrounds. A wide range of undergraduate degrees serve as prerequisite for entry to the degree, and many students enrol as a means to career transitions after a number of years in the workforce, furthering the diversity of background experience. Consequently, students' prior experiences with technology in general, and ePortfolios in particular, varies greatly. As within the aforementioned undergraduate ITE degree, student-created ePortfolios were utilised in this degree to connect course content and professional experience with professional teacher accreditation rubrics; as both process and product of assessment tasks; and to ensure the integration of information technology within various units of study.

A group of ten mature age students with whom I worked closely in two units of study within the Master of Teaching degree have been selected purposively to inform this chapter's discussion, through their potential to offer alternative perceptions of ePortfolio experience. I met with these students again in the final weeks of their degree, as they were preparing final assignments and applications for employ-

ment. These students, who were aged between 35 and 50, were parents of school-aged children, and had worked in a variety of industries prior to deciding on careers in primary school teaching.

Music Education Students

Within and across the undergraduate Music Education degree, ePortfolio use was implemented and overseen by one staff member. This ensured that the ePortfolio implementation was "longitudinal and incremental", where "early tasks [were] the basis of an ePortfolio, and increasingly complex tasks [became] expected as students move[d] through the degree program" (Rowley & Dunbar-Hall, 2012, p 26). This structured approach enabled ePortfolio tasks to be scaffolded[1] alongside students' growing theoretical understandings, and also facilitated student reflection on both ePortfolio creation and the artefacts contained therein.

For example, during an "Introduction to Teaching" unit of study undertaken in the second year of the degree, prior to practicum experience in schools, part of a summative assessment ePortfolio task required students to create an electronic poster or presentation that propounds a metaphor or simile for teaching. As an early reflective task, the creation of a metaphor is effective when considered in light of a definition provided by Massengill Shaw and Mahlios (2008), who explain metaphor as "analogic devices that lie beneath the service [sic] of a person's awareness and serve as a cognitive device as a means for framing and defining experience in order to achieve meaning about one's life" (p 35).

Metaphors constructed to describe our teaching lives "arise" from the "teachers we have known, from our knowledge of pedagogy, and from our relationships to literature, language, and writing. Because they reveal our educational values, beliefs, and principles, they contain information essential to our growth as professionals" (Gillis & Johnson, 2002, p 37). This task required students to reflect on their past experiences as learners and teachers, and their theoretical learning about teaching, as well as to analyse and synthesise these aspects of their developing teacher identities. Therefore, it marks a formal requirement to articulate early stages of the development of the professional self (see also Munday this anthology). An example of such an assignment submission is shown in Fig. 7.1.[2]

As can be seen in the example, the second year student has considered a number of aspects related to introductory teaching philosophy and practice, and likened them to products and processes of applying make-up. She noted that applying makeup was an important part of her daily routine, and one that she spent "a lot of time thinking about, and working out how I can do it better and be more efficient at" (Second year student A). While the poster provided explanations of her metaphor,

[1] The metaphor of scaffolding is commonly used in education to allude to the support structures put in place by the educator to guide students' learning.

[2] All excerpts from student ePortfolios are used with permission of individual student authors.

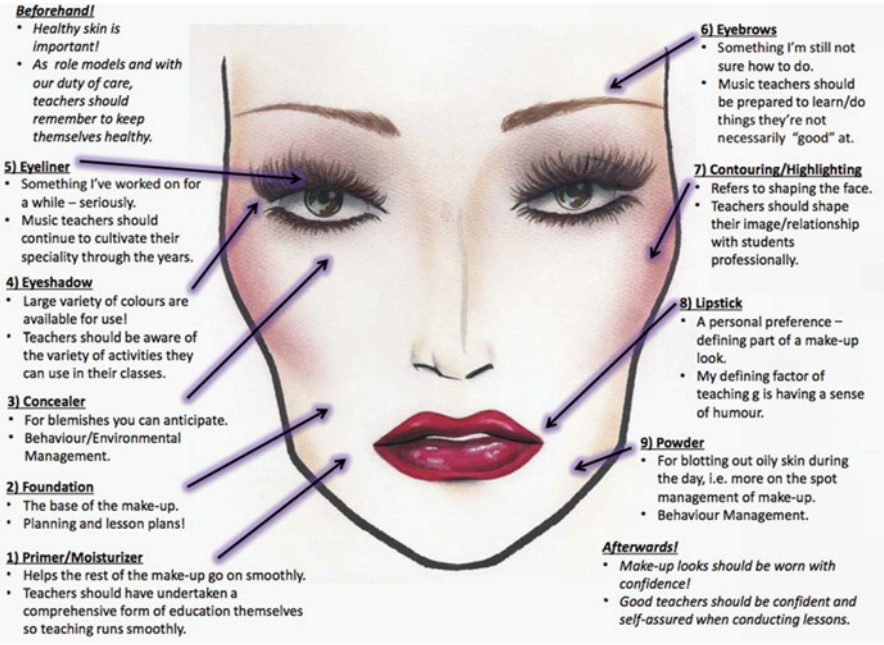


Fig. 7.1 "Teaching is like applying makeup" (Second year student A)

within her ePortfolio, the student also included reflective comments on her poster. For example, she compared her make-up "primer" with the philosophical and theoretical foundations upon which teaching practice is built:

> Teachers should be aware of learning styles, and therefore how teaching should work – i.e. being aware of Piaget's cognitive development theories, Bruner's learning constructivism, or Vygotsky's Zone of Proximal Development.
>
> Also being aware of the Quality Teaching Framework and its three qualities of Intellectual Quality, Quality Learning Environments and Significance + the Australian Professional Standards for Teachers. (Second year student A)

The poster and reflective statements demonstrated the students' attempts to interpret and make sense of her own values and experiences as part of the ongoing, dynamic process of developing a professional identity or self (Flores & Day, 2006). The synthesis of these values and experiences, and their reification through the creation of a metaphor might be understood as "a psychological modelling experience leading to new forms of conceptual insight" (Zhao, Coombs, & Zhou, 2010, p 381). As well as contributing to her developing understandings, the task also evidences the close connections between reflective practice and the use of higher order thinking skills such as application, analysis and synthesis.

Together with a curriculum vitae constructed with the ePortfolio platform's inbuilt tools, this task of creating a metaphor acts as a foundation for the documentation of the construction of a student's professional self through a number of successive assignments across the degree, and which potentially continue after

graduation. The task precedes assignments such as reflections on practicum experiences in schools, and the more formal requirements of a written teaching philosophy statement. Although it might be assumed that content and assessment naturally become increasingly complex across the course of any higher education degree, housing tasks within an ePortfolio enables a chronological and systematic organisation of documentation within a central location. As the students progress through the degree, they can easily and conveniently access previously submitted artefacts, aiding in the clear documentation of the development of the professional self.

During a Student ePortfolio Showcase and Staff Professional Learning Day held in Sydney in 2014, a fourth year student enrolled in this degree commented "A lot of these documents I actually have on my computer anyway, but keeping them in PebblePad makes them easy to find, and reminds me what I've done" (Fourth year student A). However, while this serves the *owner* of the ePortfolio well, another student likened his ePortfolio and the documentation held therein to "a closed box" (Fourth year student B), and voiced an *audience* concern that the contents were not able to be found through conducting an internet search, so therefore lacked effectiveness as a means of promoting one's achievements such as musical compositions. Conversely, a second year student baulked at the notion of creating a curriculum vitae within PebblePad because she "wasn't comfortable using something that's accessible by other people. Even though they said that it's a secure website … I wouldn't put down personal information" (Second year student B).

These divergent viewpoints highlight the discrepancies of student expectations with regard to personal ePortfolios and their uses, and consequently the difficulty of using a single, mandated ePortfolio platform to suit the needs of all students. It may indicate a lack of understanding about ePortfolios, their features and capabilities by the students, or may be due in part to the fact that music education students bring to their study several distinct aspects of persona that may include musician, composer, preservice teacher, studio teacher, intern, community musician, church musician, or scholar. Each of these personas may continue to develop across the course of the degree, and even compete for prominence within an overall identity. It would seem that the capacity of ePortfolios to track aspects of the development of these selves might aid in reconciling various aspects of one's overall musical identity through reflective processes, thereby aiding in the subsequent formulation of professional identities (Zecker, 2012). However, this would perhaps require the use of student ePortfolios across all areas of their study, rather than solely in Education and Music Education units of study.

A specific feature of ePortfolio platforms such as PebblePad is the ability to create, represent and present multiple ePortfolio identities independently. Each separate component of the ePortfolio is privately owned and able to be shared with selected audiences (Ravet, 2005). This enables the students to focus on particular skill sets necessary for the particular roles they play, and to represent themselves as "exactly who you want to be when you're applying for a job" (Fourth year student C).

As digital interactions become ubiquitous, these representations of one's identities plays a significant role as a gateway into interactions with external bodies and

audiences (Delaitre, 2007) such as AITSL or prospective employers, and so constitute an important function of ePortfolios within ITE. As identities become increasingly represented, negotiated and reflected using digital tools such as ePortfolio platforms, they become the artefact of what Roberts (2006) refers to as "personal identity technologies".

Students' explorations and representations of their developing identities necessitate reflection on their own personal growth and development. Barrett (2010, p 6) suggests that the "real value of an ePortfolio" lies within such reflection. A fourth year student, presenting his ePortfolio at the aforementioned showcase stated:

> It's a timeline of activity … because we start something in second year, we see this constant adding of material over the years and when you go back and look at your original philosophy of teaching and music education … you think, "well, did I really think that back then?" and this is such a good thing for your development. (Fourth year student A)

The statement highlights the significance of ePortfolios in facilitating reflection on professional growth and development.

An ePortfolio and a student's identity growth and development are integrally linked through processes of selecting, gathering, reflecting and critiquing one's own work (Bennett, Rowley, Dunbar-Hall, Hitchcock, & Blom, 2014). These are the processes required of music education students in their ePortfolio tasks associated with evidencing the AITSL teaching standards. The standards are introduced to students in their first education unit of study, and are highlighted within subsequent units, particularly those associated with professional experience in classrooms. From their first practicum experiences, the students are required to submit tasks focusing on addressing and meeting the standards, culminating at the end of their third and final practicum session in fourth year with a collection of evidence against the seven graduate teacher standards and associated reflections.

Students are offered several opportunities to learn and develop their skills in reflective practice, and students' ePortfolios provide both content and means for the development of meaningful reflection. While each individual task submitted within the ePortfolio requires student reflection, the reflective process is further facilitated through students accessing and reconsidering prior tasks held within the ePortfolio. The lecturer or teacher's careful scaffolding of tasks, together with written feedback that is given and held within the ePortfolio, also aid in the development of reflective skills. This process might be demonstrated by the following diagram (Fig. 7.2).

An example of the result of this cycle of reflection can be seen in the following excerpt from a third year student's ePortfolio, wherein the student ultimately synthesises reflections made on a theoretical article with reflections on ideas presented in a university class and with reflections on classroom experiences.

> The most thought-provoking part of this article … state[d] that students "need not passively absorb pop culture" as they do at home. Much of pop music's perceived lack of validity does not stem solely from the form itself but from the way it is received. This made me realise that is entirely up to us as music educators to pick repertoire that students both enjoy, and provides room for analysis and further study. This correlates to our study in Key Ideas of Music Education, where we have been taught that the key to a quality education is using a wide variety of repertoire, and using high-quality musical examples (Third year student A).

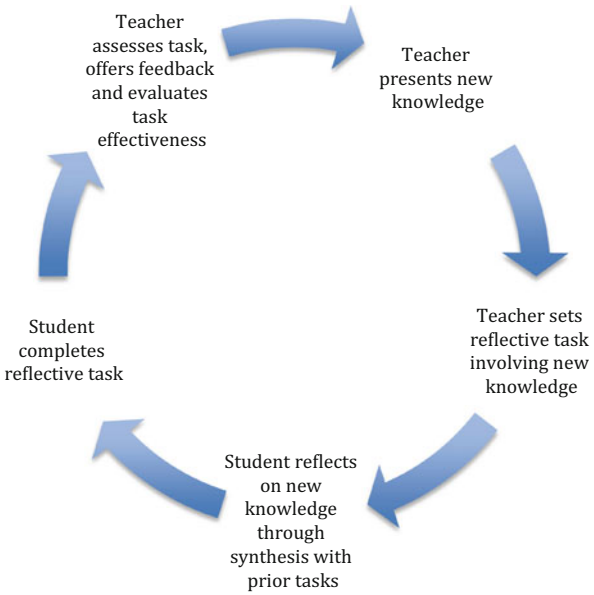


Fig. 7.2 Cycle of reflection

Although most of the students enrolled in this Music Education degree belong to the so-called "Net generation" (Oblinger & Oblinger, 2005; Prensky, 2011; Tapscott, 2009) and have grown up surrounded by technology, not all of these students consider themselves to be technology experts and often they depend on other learners (or instructors) to help or guide them in their technology use (Brooks & Rowley, 2013). Issues related to using technology as both process and product were exacerbated by restricting ePortfolio activities to the university-supplied platform, with which many students have expressed discontent.

> I don't like the way it's designed and the way it works. The technology of it is not intuitive for me … I find it quite tricky. It looks very old and very clunky … It was very time-consuming (Third year student B).

These issues, together with the time-consuming nature of task creation in ePortfolios, were oft-mentioned themes across investigations conducted with this group of students (Brooks & Rowley, 2013). Although the students were offered assistance in the creation of their ePortfolios, few chose to accept this assistance, and remained quite negative in their attitudes toward using the technology. This appeared to restrict the potential of the ePortfolios, with several students limiting use to compulsory assignment completion and submission.

While ePortfolios are utilised as a tool for teaching and developing reflective practice and professional identity within this Initial Teacher Education degree, they also serve as a point of reflection for teaching staff. Their use within the degree continues to be evaluated by faculty members, in close consultation with the student cohort.

General Primary Education Students

Within the ITE program constituting the second case study, a postgraduate degree in primary teaching, students did not create and develop a single ePortfolio, but rather were required to create and submit separate ePortfolios created within static programs such as PowerPoint as assessment tasks for independent units of study. This slideshow presentation program was selected because it was readily available, cost free, and not dependent on the Internet for delivery or presentation, a factor that was significant at various points of time within the development of the degree program. Another factor that appeared to influence the decision to use PowerPoint was the lecturers' confidence and familiarity with the program.

Although ePortfolios created within PowerPoint were required across a number of units of study in this degree, the ePortfolios were created separately on each occasion, and connections between them were not made explicit. In this ITE degree, each student-created ePortfolio was a finalised short-term product for assessment, lacking the ongoing potential for further development, or the invitation for reflection through housing of progressively accumulated artefacts. Indeed, while teaching a unit of study that was scheduled towards the end of the degree, I mentioned to a group of students that an ePortfolio task within the unit was very similar to one they had completed earlier in their degrees, and that they may find it helpful to refer to these earlier ePortfolio tasks. My comments were met with surprise. "But that was a different subject!" exclaimed one student. The ensuing conversation revealed that these students failed to see clear connections between their learning in each unit, despite all units bearing strong links to primary education.

Perhaps a single ePortfolio, with artefacts and reflections gathered from across several units of study, would have enabled the students to recognise the connections across and within their learning, as well as to aid in the development and emergence of their professional identities. While their assessment ePortfolios enabled the students to demonstrate their learning using technologies rather than traditional written assignments, the creation of separate ePortfolios failed to acknowledge the inherent potential of a single ePortfolio "to support reflection that can help students understand their own learning and to provide a richer picture of student work that documents growth over time" (Barrett, 2005, p 2).

For most of the mature-aged students within the sample selected from this ITE degree, even those who had worked extensively with information technologies, the notion of an ePortfolio was novel. For example, one student stated "I'm very fluent with PowerPoint, but had never seen an ePortfolio, so I didn't understand the concept. In my job, it was all about presenting information, not about making it look flashy or pretty" (Student A). The comment demonstrated that the student's conception of ePortfolios was limited to that presented within the degree's assignment requirements as it was assimilated with PowerPoint, and highlighted the ways in which prior experience contributes to the development of the professional self. The comment also alludes to the differing characteristics of ePortfolios created for varying purposes.

While most of this group had not been exposed to the notion of ePortfolios prior to enrolment in the ITE degree, two students who had completed undergraduate degrees in Design had utilised online ePortfolios across the course of their studies. These students had found ePortfolios to be lacking as a means of presenting samples of their work, and expressed a preference for traditional portfolios for their capacity to hold "real" rather than digitised artefacts.

> If it has our real projects in it, then it is good to be able to show and discuss them with an audience in a live situation, especially like in an interview. Sending someone a link to a photograph doesn't give the overall effect. You know, you can see a photo of the Mona Lisa in a magazine, but it's pretty different to seeing the real thing in a gallery (Student B).

A prime purpose of ePortfolios within this degree is to serve as a receptacle for evidence against the AITSL National Teaching Standards. Students are required to collect evidence in the forms of documents, photographs and video and to assemble these on PowerPoint slides as a graded assessment task. These slides tend to resemble a montage of snippets of appropriate artefacts, rather than presenting documents in their entireties. An example of such a slide, with evidence related to the focus area "Demonstrate knowledge and understanding of research into how students learn and the implications for teaching" of Standard 1, "Know your students and how they learn", is shown below, in Fig. 7.3. The student had selected keywords, snippets of teaching evaluations, images of literature that he had consulted, and a novel photograph with conversation "bubbles" to arrange as evidence on the slide.

In terms of the assignment submission, an important aspect is a written reflection that accompanies the evidence, explaining the significance of the evidence for professional development and for student learning in schools. This reflection is completed in the "notes" section of PowerPoint, rendering it invisible to an audience during a slideshow presentation of evidence. In a printed format, as is presented for marking of the assignment, the reflection may be viewed simultaneously with the evidence, creating a meaningful connection between the two components, as is seen in Fig. 7.4. However, submission of a printed copy seems to be at odds with the aims and concept of an ePortfolio.

The reflection accompanying the slide shown in Fig. 7.4 is a brief analysis and synthesis of the student's theoretical and practical experience and knowledge, which effectively complements the artefacts on the slide, as well as the reflections written for the other standards. These notes would surely be valuable as a future source for reflection, or for sharing with a wider audience. They draw on the student's previous employment and experience in chiropractic and counselling areas, as did several of his reflections. For example, the reflection on Standard One drew clear connections between the student's prior knowledge and experiences as a chiropractor and his current experiences in the classroom, and documents the developmental pathway of the professional self through synthesis of these aspects of his life.

> In my classroom, I harness the power of the Reticular Activating System and limbic system by providing **safety**, **connection** and novelty/**curiosity** with animated topic relevant storytelling, puppets or dressing up in character. Communicating well-framed intentions (Woolfolk, 2013, p. 439) and success criteria engages the drive of the dopaminergic system by providing meaningful challenge and opportunities for **success** and **agency** (Student C).

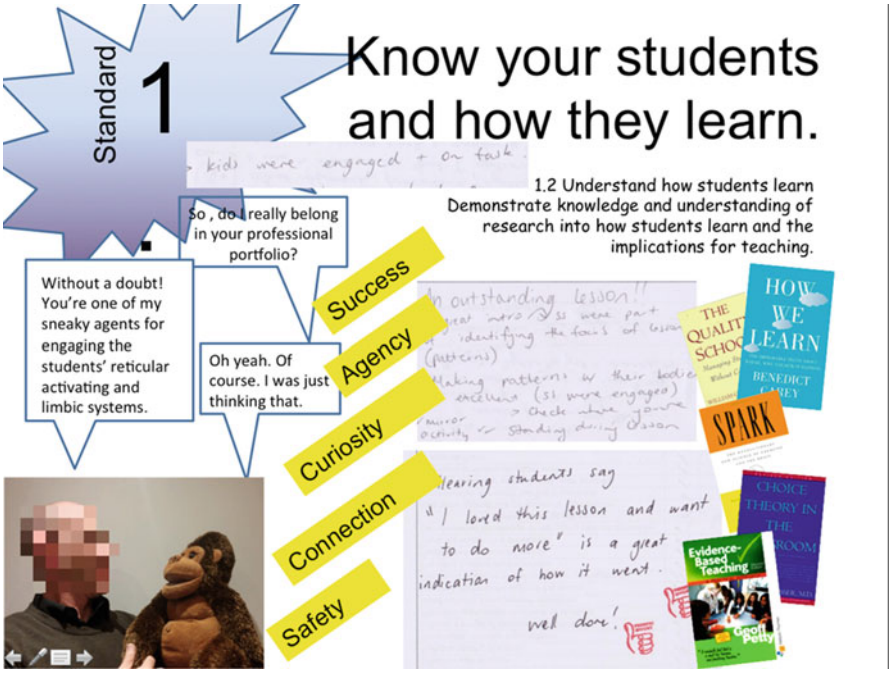


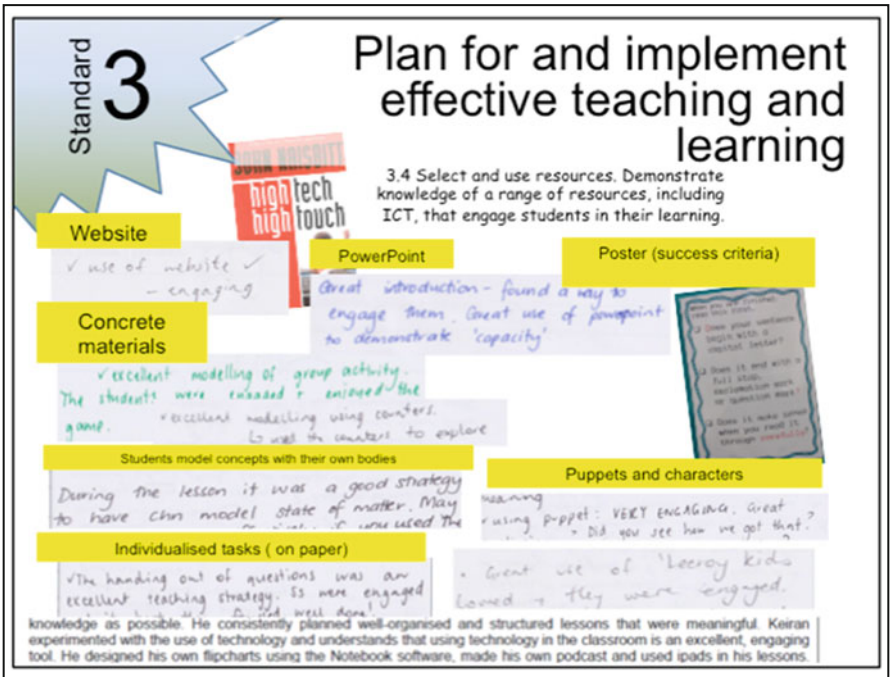
Fig. 7.3 Slide from an ePortfolio with evidence towards Standard 1 (Student C)

Unfortunately, the ePortfolio in this format is only accessible by the student author, and the marker, limiting the potential audience. Should the student wish to share the ePortfolio content with other parties, it would need to be converted to a more suitable format.

Although the ePortfolio serves to meet the purposes of supporting the synthesis of theory and practice, and offers opportunities for reflection on learning processes, the PowerPoint ePortfolios utilised within this degree fail to demonstrate a student's professional learning across time. This is due in part to their static format, and also to the students' limited perceptions of the nature and potential of ePortfolios and the role of ePortfolios as finalised assessment tasks.

Some students lamented this aspect of their ePortfolios, near to completion of their degrees. One student commented that he had consulted an ePortfolio that he had created within a unit of study early in his degree as he prepared to apply for a teaching position, but noted that evidence collected within early stages of his degree was limited.

> When I look at my evidence from my first prac, a good chunk of it was feedback from my supervising teacher, and that was the only real evidence I had to show. Now, if I was going to use my ePortfolio for accreditation, my evidence would need to be a lot more substantial than that (Student D).



The book by Naisbitt serves as a marker for frame of thinking I was able to bring to the table as I considered the role of technology and other resources in the classroom. Social forecaster John Naisbitt warns that our increased exposure to technology has "stir(ed) profound yearnings for a more emotionally satisfying existence" (Naisbitt, Naisbitt, & Philips, 2001). We would do well in education to look closely at the experience of technology in healthcare where patients are simultaneously attracted to, and alienated by, advanced technology. To truly benefit patients, high tech needs to be met with high touch (Rosen, 2013). I believe the same will hold true in education (Muller, 2014).

Fig. 7.4 Slide with accompanying reflection (Student C)

Other students regretted that they had lost their earlier assignment tasks due to faulty storage devices, or poor organisation of files. The notion of reflecting on earlier tasks seemed a surprising notion to these students, which suggests that reflective practice had not been explicitly taught or scaffolded into tasks. For example, a student commented during an informal discussion,

> I don't think I ever thought of what I was doing as an ePortfolio. It was just the assignment for each subject, so I didn't ever think about them being related or connected (Student E).

However, this group of students was very open to the idea of using ePortfolios for the sharing of evidence against the AITSL standards, or even for using within a job application to show skills and achievements:

> Wouldn't it be great if we could actually show video of us teaching children in a classroom to a Principal, so they knew what we could really do? And it would be very professional to have a collection of things to show and comment on in an interview (Student E).

Similarly, they saw great potential in the development of ePortfolios as a tool for use within primary school classrooms for the collection of work samples and documentation of student learning. This may have been influenced by recent experiences on practicum, as well as through their own experiences as parents.

The students identified several benefits of creating and utilising ePortfolios within a primary school classroom to supplement or replace current systems of documenting and reporting student achievement. These included:

- Reporting through ePortfolios need not only happen twice a year, but could be an ongoing communication of student achievement between teachers, parents and students.
- Since many classroom tasks are now completed electronically, they are suitable for collection within an electronic portfolio.
- Since primary school students are usually competent with technologies, they could prepare and assemble their own ePortfolios, which would allow them both ownership and responsibility.
- Since so many parents are currently working, and unavailable during school hours, an ePortfolio would allow for communication between parents and school staff at times convenient to both.

In discussing ePortfolios as a potential tool within the classroom, these preservice teachers displayed an enthusiasm not evident when discussing their own ePortfolios. This may have been due to their dual role as parents, since they could foresee several benefits for themselves in this aspect of their lives. Also, these students appeared to be in the latter stages of transitioning from their "student identities" to their "teacher identities". Together with their perceptions of their own assessment ePortfolios as final and complete, this transition of identity focused their thoughts on future ePortfolio potential. As ePortfolios become more commonplace and widely accepted by Initial Teacher Education students, their transformation into tools for primary and secondary classrooms would seem a natural progression.

Conclusion

Two instances of ePortfolio use within Initial Teacher Education degrees have been described within this chapter. The first, within an undergraduate Music Education degree, utilised a university-provided online platform for a series of reflective tasks, creating a cumulative documentation of personal growth and development. The nature of this ePortfolio allowed students to develop, showcase and reconcile various aspects of their musical and pedagogical identities. However, many students considered the platform difficult to use, and unsuitable for their personal needs.

The second instance of ePortfolio use, within a Master of Teaching (Primary) degree, was described in relation to a small group of mature aged students nearing the end of their degree. These students had created ePortfolios using the slideshow presentation program of PowerPoint for four different units of study, but had failed

to connect these separate ePortfolios in purpose or design. As in the Music Education degree, a significant role of the ePortfolios was to house evidence and associated reflections against the recently introduced Australian National Professional Standards for Teachers (AITSL, 2011), as is required for Teacher Accreditation in Australia.

Within both degrees, ePortfolios were created and/or developed as part of assessable tasks. As ITE continues to develop to meet the requirements of external accreditation bodies, and students become more familiar and comfortable with both concept and potential, it is likely that these future educators will adapt ePortfolio use to suit the needs of their prospective students.

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Chapter 8
Mindful Collections: Purposeful ePortfolios Planned Across an Undergraduate Degree

Jennifer Munday

Abstract ePortfolios are becoming more valued as the bridge between higher education and employment in a profession. Professional bodies and prospective employers are beginning to demand more detailed documentation of experiences, skills, and learning, as pre-service professionals vie for limited positions in the workplace. This chapter provides an example of an undergraduate pre-service teaching degree program that proposes a model for effective design and accumulation of artefacts for inclusion in an ePortfolio. At each stage of the degree program the ePortfolio assessment task requires thoughtfully planned combination of four main ePortfolio purposes: Reflection, Development, Assessment, and Showcase. The various ePortfolio assessment tasks are designed to record and demonstrate a different aspect of professional learning, and a wide range of professional teaching attributes and skills. At the conclusion of the 4-year program pre-service professionals are able to assemble convincing arguments for employment by 'showcasing' their achievements in professional practice, development of knowledge, and accrued skills, along with the ability to deeply reflect on professional teaching dilemmas and daily practice. The tasks that enable accumulation of artefacts for the ePortfolio are explained, and examples are provided to demonstrate a successful model of a student ePortfolio. The model is adaptable to other professional degree programs as it encourages a beginning professional to have an appropriate collection of artefacts from which to select and confidently demonstrate preparedness for employment in today's competitive workplace market.

Introduction

> *ePortfolios are the Information Age's version of the artist's portfolio in the sense that they not only summarize an artist's creative achievements but also illustrate those achievements* (Abrami & Barrett, 2005).

Since the introduction of software presentation programs and online learning management systems, higher education institutions have been able to adopt electronic

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portfolios (ePortfolios) which enable their creators to flexibly summarise and illustrate their achievements better than past paper portfolio versions. Indeed, a creator is now able to go far beyond merely summarising and illustrating, and ePortfolios can demonstrate the development of higher order skills such as analysis, persuasion, and reflective and critical thinking (Munday, 2014). As technology continually improves the ability to share information easily, professional bodies and prospective employers are demanding more detailed evidence of experiences, skills, and learning, as pre-service professionals vie for limited positions in the workplace. In 2010, a review conducted by Hallam & Creagh, described the use of ePortfolios in Australian Universities as "patchy", but with "an emerging sense of collaboration" and identified the value of using ePortfolios within streams of study (p 9). The present situation of linking ePortfolios to the job market means that members of senior management in tertiary institutions are promoting ePortfolios as a way for students to "enhance their learning experiences and strengthen their graduate career opportunities" (Sunshine Coast Daily: Lifestyle, 2015).

At Charles Sturt University (CSU) an ePortfolio environment is offered to all students and faculties and is described as a "private space you can use for managing your own learning and development" (CSU, 2014), although it is not prescribed for every student. CSU is considered a regional university, since most of its campuses are located in regional communities in New South Wales, Australia but has a mixture of urban students through the location of study centres and the provision of online education courses. The University motto is "For the Public Good" which in contemporary terms translates to its mission of "…education for the professions…" (Charles Sturt University, 2015, p 2). Students attending university have different needs than in decades past, and many more are entering university study and choosing professional degree programs, and approximately 63 % of all students combine either part- or full-time work with their tertiary studies (Parr, 2015).

Student attitudes to ePortfolios have changed over time: when first introduced, the time and effort to create an ePortfolio along with a lack of technology skills produced frustration in many students (Gerbic, Lewis, & Amin, 2011). With growing value assigned to an ePortfolio by professional accrediting bodies for students, graduates and practising professionals, higher education institutions are required to undertake more thoughtful planning and designing of curriculum (Andre & Heartfield, 2011). Prior to 2008, ePortfolio use at CSU was within single subjects or units of study, where academic teachers noted the success of the process for assessment and reflection (Keppel & Munday, 2010). Within the Faculty of Education, during the review of two Teacher Education programs, the decision was made to embed the processes of ePortfolio creation into the revised programs at planned and incremental points to enhance the value and meaning of ePortfolio for graduating students and professional teachers.

Although the embedding of ePortfolios across an entire degree program takes a great deal of thought and planning, it can be beneficial for pre-service professionals about to join their profession. It enables them to demonstrate their achievements and development not only to the academic teachers in the teaching program, but also to prospective employers. An ePortfolio provides a graduate with a vehicle to show-

case accumulated documentary evidence, and also develops and demonstrates the skills which are required to organise these evidential artefacts for each viewer of the resulting publication: i.e. skills of selection, critiquing, criticism and reasoning. This chapter provides an example of effectively designed stages embedded in an undergraduate degree program demonstrating a model for successful progressive accumulation of ePortfolio artefacts. At each stage of the program the ePortfolio is a thoughtfully planned combination of the four main ePortfolio purposes: Reflective, Development, Assessment, and, Showcase (Stefani, Mason, & Pegler, 2007).

Following a survey of recent literature leading to embedding of ePortfolios in higher education degree programs, this chapter discusses the planning, implementation, outcomes, and future directions for the embedded ePortfolio in the Bachelor of Education (Early Childhood & Primary) at CSU.

Current Situation

Electronic portfolios, as replacements for hard-copy portfolios have been in use since the turn of the century. Embedding of ePortfolios across degree programs has been a more recent purposeful design decision by several universities (Allan & Cleland, 2012; Dinmore, Kehrwald, & Bradford, 2011; Keppel & Munday, 2010). This change to a more mindful and purposeful approach to planning and designing learning and artefact collection required for effective and useful ePortfolio creation is in response to a number of issues related to the earlier ad hoc use of ePortfolios. These include: student responses to workload; effort and value in creating an ePortfolio; maintenance of technology skills of students and staff needed for effective implementation of ePortfolios; and, the value of the ePortfolio to the future workplace of graduates (Lorenzo & Ittelson, 2005; Ring & Ramirez, 2012).

Due to changing life pressures on students in higher education, curriculum designers can only expect a trickle of volunteers to trial new processes. In studies where educational designers have called for expressions of interest from students or academics to voluntarily create an ePortfolio the results have shown that without planned guidance and assessment strategies the attempts flounder (Kinash, Wood, & McLean, 2012). Therefore, ePortfolios have been placed into the stream of assessment tasks students must complete within a degree program. The emphasis on ‘e’ in ePortfolio as it was being introduced to higher education meant that some study programs used ePortfolios as a vehicle to teach students technology skills (Pelliccione & Dixon, 2008). A former frustration in the implementation of ePortfolios by learning designers had been the need to teach students how to learn to use and control the virtual environment before engaging in any of the possible learning processes. In a similar way, some academic teachers have struggled to engage with new electronic learning platforms since there have been many products, often using different terms and processes for the tools and icons provided (Munday, 2010). The need to gain and maintain the technological skills required to produce a professional ePortfolio is now decreasing as technology skills are more commonplace in an ever-

increasingly online work environment. Since many students are time-poor and ultimately need to compete for fewer professional positions in the workplace there is a call for more authentic assessments, so curriculum designers need to plan for learning and reflection to assist with a development of skills over time that can provide evidence to prospective employers (Emmett, 2011; McAllister, 2015).

As the online environment becomes more sophisticated and flexible, and formats and virtual spaces where ePortfolio artefacts and evidence can be stored and manipulated improves, accrediting bodies and employers can more easily view pre-service professionals' evidence of development through their degree study. These collections are being seen as a clear and meaningful purpose for ePortfolios that enable students to produce a good argument to an accrediting body or a future employer for their readiness to join the profession (Ferns & Comfort, 2014).

Initially, ePortfolios were designed as electronic forms within a Learning Management System, and students worked within a series of structured pages that could be shared with others for assessment (Cotterill, McDonald, Drummond, & Hammond, 2005). Purpose-built ePortfolio environments still use templates but now allow students and staff more flexibility in relation to the types of artefacts saved, demonstrated, and referenced. Higher Education Institutions tend towards the use of specific ePortfolio software platforms (Hallam, Harper, McAllister, Hauville, & Creagh, 2010). CSU has adopted PebblePad from Pebble Learning © as the set of ePortfolio tools available to staff and students and linked it within its Learning Management System, BlackBoard. Some academic faculty, however, prefer to use simpler reflective tools such as the BlackBoard blog and journal tools, and other academics are using a more multi-purpose platform such as WordPress. Students in two of the degree programs in the Faculty of Education use the PebblePad environment and tools, particularly the webfolio, to collect artefacts in embedded ePortfolios over the length of a degree and to flexibly produce assessment submissions for different purposes (Munday, 2010).

There have been three reviews of the undergraduate Bachelor of Education (Early Childhood & Primary) at CSU over the past decade, and in each instance ePortfolio processes have been mapped and embedded at each year level. The planning for embedment was influenced by the criteria cited by Stefani et al. (2007) for Alverno Liberal Arts College. This design:

- Assists students to reflect on their academic progress at key points in the curriculum and plans for future development…
- Provides a means for students to record their internships, volunteer and community service work and to build an electronic resume
- Enables students and faculty to view it anytime, anywhere they have access to the internet
- Stores multimedia – text, audio and video files
- Is fully relational and searchable (p 30).

Stefani et al. (2007) also clarify several main purposes for ePortfolio that provided a basis upon which to plan the embedment of consistent and recurring use of processes for ePortfolio within an undergraduate degree program. The four main

purposes are: Assessment portfolio; Showcase portfolio; Development portfolio; and, Reflective portfolio. Other academics have proposed that the main purpose of ePortfolios is reflective practice on student learning (Barrett, 2015; Shearing, 2012); however, the four categories provided by Stefani et al. (2007) exemplify the broader value of ePortfolio and provide a way to discuss the more complex processes of learning at each year level. The ePortfolio tasks are discussed in the section following, which explains how each process and product is a combination of the above ePortfolio purposes. Examples of student work with appropriate pseudonyms applied are provided.

Embedding ePortfolio

The Bachelor of Education (Early Childhood & Primary) is offered on four of CSU's campuses: Albury-Wodonga, Wagga Wagga, Bathurst and Dubbo which are all large regional towns in New South Wales, Australia. The majority of students are female and most come from the regional centres and outlying towns surrounding the campuses. Most of the units within the degree program are delivered on-campus with online-supported learning materials, although opportunities arise for students to undertake distance modules at various points in the degree. There is an emphasis on students becoming technology literate in all the degree programs at CSU. This emphasis on the online learning modes and materials is driven, in part, by the distance between CSU's multiple regional campuses and the high number of students who are studying in distance mode (Wills, Dalgarno, & Olcott, 2015).

At each year level of the undergraduate professional degree the ePortfolio is designed to record and demonstrate a different aspect of professional learning as well as a wide range of professional attributes and skills. The tasks that enable accumulation of artefacts for each year level of the ePortfolio will be explained and examples will be provided to demonstrate a successful model. The degree into which the ePortfolio was embedded was informed by a series of commitments, which shaped the course designers' decisions about the ePortfolio. For example, one descriptor for academic teachers is "… the determination to know our students well, and to care for and be responsive to their needs in terms of their learning and development over the period of the courses…" (Wood et al., 2015). With regard to students, the commitments state: "…many… are first generation tertiary candidates, and there is a significant proportion that is also mature-aged, bringing different backgrounds, experiences and aims to their cohorts…" Regarding expectations for a graduate of the degree program:

> Graduates from this course will be agents of change… teach for social justice and equity… demonstrate respect for children… have a strong practical sense… teach for student learning… understand good teaching… be collaborative teachers… share attributes of all those with a CSU degree and… contribute to their profession.

Year 1 – An ePortfolio for Reality and Aspiration

In the first year, the ePortfolio is used primarily to support students to identify their goals, as learners and professionals, and to take stock of the skills and experiences that they bring with them, which are considerable and varied. Students who enter the Bachelor of Education (Early Childhood and Primary) are a mixture of mature-age and school leavers. The high school graduates mainly come with university entrance scores in the mid-range and the curriculum has been devised to support their learning needs. One of the major challenges for academic teachers working with the new students is to help them with a more self-directed and self-managed approach to their learning. One of the main objectives of the first year ePortfolio is to help students value the experiences they have prior to beginning at university, whilst inspiring them in their chosen vocation with a beginning self-image as an early stage pre-service professional. They are, therefore, introduced to the CSU graduate attributes as well as the degree program outcomes in order to see their learning on a continuum rather than a series of beginnings and endings.

The CSU graduate attributes are a series of outcomes the University states publicly will apply as a skill-set to any graduate from the University in their chosen discipline. Graduate attributes at CSU are currently being reviewed as Graduate Learning Outcomes (GLOs). During the design phase of the embedded ePortfolio the following University statement regarding graduate attributes was used:

Charles Sturt University aims to produce graduates who are:

- well-educated in the knowledge and skills of their discipline or profession;
- effective communicators who have problem-solving, analytical and critical thinking skills and can work both independently and in teams;
- work-ready and able to apply discipline expertise in professional practice;
- able to develop and apply international perspectives in their discipline or profession;
- able to engage meaningfully with the culture, experiences, histories and contemporary issues of Indigenous communities;
- understanding of the responsibilities of global citizenship, value diversity and ethical practice;
- understanding of financial, social and environmental sustainability; and
- able to learn effectively in a range of environments including online (Charles Sturt University, 2015).

These goals over a 4 year undergraduate degree are introduced at the outset of the degree so students can be engaged in knowing about the graduate attributes, which helps acknowledge their developing expertise and establish their learning as life-long/life-wide, even at this stage as a beginning pre-service teacher (Barnett, 2009). Students reflect on whether they are already on their way to achieving any of the attributes in outside, or prior-to University experiences. These are then reviewed at various points in the degree program to evaluate progress.

An early unit in the first year program is entitled "Teacher as Learner," which assists students to examine their identity as beginning pre-service teachers and as novice scholars of teaching and education. In the first weeks of their learning students are provided with a table of the graduate attributes and in-class and tutorial support scaffolds the students through responses that allow them to map any experiences or skills they may have brought to their University studies (Table 8.1).

Within the degree program there is a strong commitment to community service and encouraging students to enhance their future employment opportunities by gaining skills both within and beyond their degree studies. After completing the prior-to-University skills and experiences table, a tool within the PebblePad environment, the Action Plan, is used to plan some learning that would 'fill a gap' in the attributes table. The Action Plan is one of a number of smaller thinking tools within PebblePad that have been very useful to the students in the degree program, since they provide clear and logical thinking stages.

The following screenshot (Fig. 8.1) shows the top of a published page resulting from student responses in the Action Plan tool in PebblePad. Students are scaffolded through thinking about how they see the current situation and gaps in their knowledge or learning, and how they would like to see themselves in an ideal situation. They must think through the steps that will lead them from current to ideal. They are guided through a SWOT process (Strengths – Weaknesses – Opportunities – Threats), and can articulate the types of Supporting Resources, such as people, texts, and opportunities, that will help them achieve their goal. The resulting webpage can be shared with academic teachers as a neatly formatted page with clear headings.

In the same unit of study, and to begin thinking of themselves as beginning preservice teachers, the students participate in five observation days in different learning settings (for children in prior-to-school settings and different year level school settings). During the period of these visits the students are required to take digital images of items or situations they identify as having meaning for them as preservice teachers, particularly as metaphors or symbols (rather than literal pictures of children and teachers at work). The ePortfolio task requires them to create a visual essay of the most meaningful images and to explain the images to an academic assessor. In the example below the student has customised the template provided by Pebble, and the words in boxes are the navigation pages. The page itself is one in a series provided by the student for assessment (Fig. 8.2).

In relation to the purposes described by Stefani et al. (2007) the first year level ePortfolio is for Assessment and Development. In an Assessment ePortfolio students are "expected to provide evidence of their competence in particular subject areas" (p 41). The students in this first iteration of ePortfolio supply evidence of their prior-to and outside-University experiences. The Development ePortfolio "is to support students' personal development planning" (p 43), which is achieved through the first Action Plan around the graduate attributes, and providing a starting point for describing themselves as future professional teachers through the visual essay.

Table 8.1 Example of prior-to-University skills and experiences, leading to CSU graduate attributes

Portfolio information							
Charles Sturt University Graduate Attributes:	*Early Childhood knowledge*	*Communication skills*	*Analytical, critical and reflective skills*	*Addressing unfamiliar problems*	*Planning my own work*	*National and international perspective*	*Values-driven practice*
Examples	Worked in a childcare centre as a childcare assistant	Performed in a high school play	Devised and revised recorder lessons for primary students	Learned how to sing sol-fa by researching and practising	Performed with other musicians and artists to create a short film		
	Taught after-school recorder lessons at the local primary school						

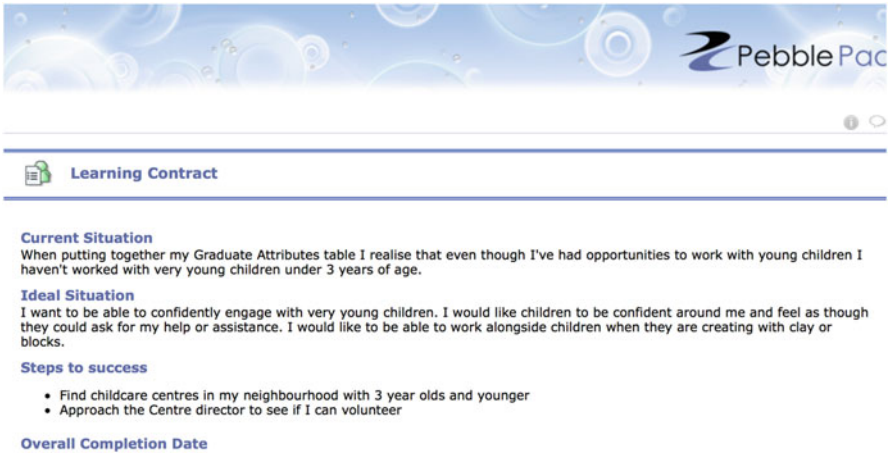

Fig. 8.1 Webpage created from Action Plan in PebblePad

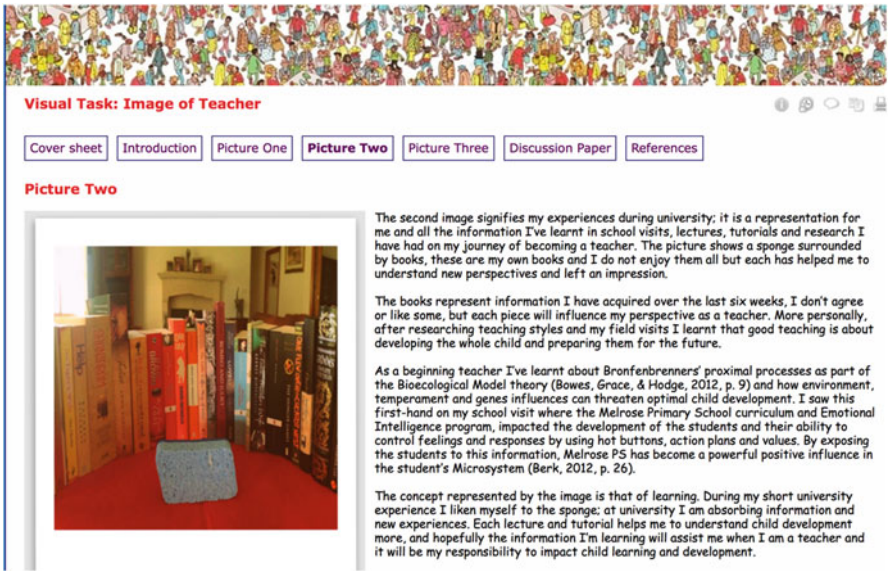

Fig. 8.2 Example of first year ePortfolio task: The image of the teacher

Year 2 – An ePortfolio for Documenting Professional Skills

In the second year the ePortfolio is introduced in a curriculum subject to assist the students with the basic skills of documenting children's work, and planning and evaluating learning experiences. In the second year of their pre-service teaching

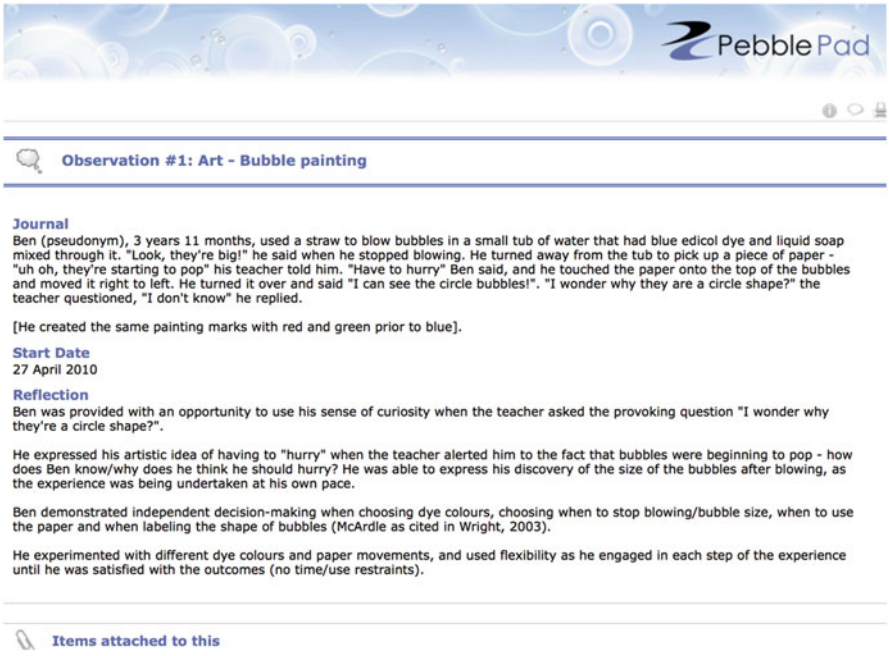

Fig. 8.3 Example of thought tool in PebblePad being used for the documentation of observations of children

degree the students have already experienced one teaching practicum and been introduced to several curriculum disciplines that provide the Learning Areas/Subjects for the Australian Curriculum in Primary School Learning (ACARA, 2013). In order to use the tools of technology to enhance their contemporary status of pre-professional teacher educator, guidance is provided for using simple PebblePad tools to observe children, plan for learning, and evaluate children's learning. For observing children, students use a small tool called 'Thought' where they can note what they are observing and describe the actions of a child on one section of the tool and then reflect and give meaning to the actions they have observed in another section. They are also able to attach a photo and other documentation, which could be the child's work. Following is an example of a piece of evidence stored as an asset in a portfolio (Fig. 8.3).

Later in the unit students are required to assemble observations and the outcomes of their planning and teaching as webfolio pages along with a review of themselves as progressing from the first year 'self-image' through an articulated teaching philosophy within the curriculum discipline. In the example below the student is introducing their work using a pseudonym for the child who is the focus of their observations and planning in the Creative Arts. The titles in boxes show the various pages the student has provided for assessment (Fig. 8.4):

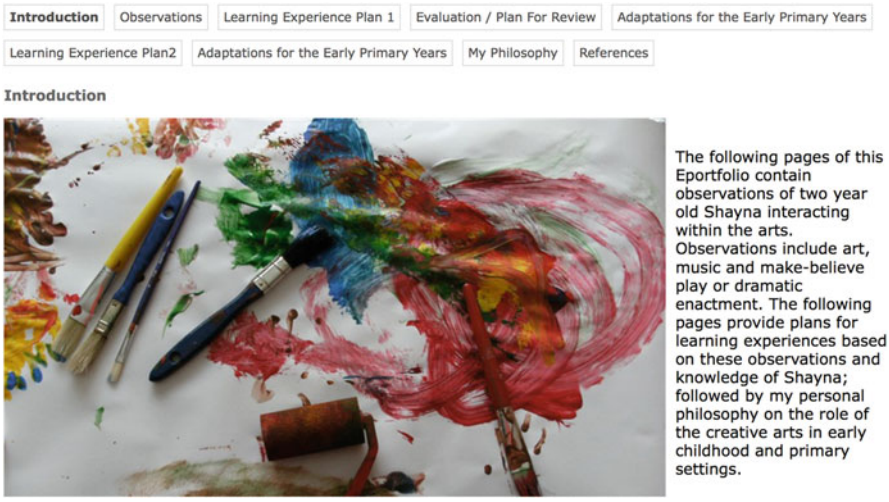

Fig. 8.4 Example of PebblePad webfolio as second year ePortfolio

For the designed purposes for the second year ePortfolio, Stefani et al. (2007) would classify these two purposes as Assessment and Reflective – Assessment since they are providing "evidence of their competence in particular subject areas… [and] may provide photographs, video recordings, reflective reports" (p 41), and Reflective because the "learner might be expected to show accomplishments and how these relate to learning goals" (p 43).

Year 3 – An ePortfolio for Developing Evidence as a Professional

In the third year, the ePortfolio becomes a place to ensure the students make substantial progress towards a comprehensive collection of evidence of achievement against the professional standards. At the beginning of third year the students are reminded they will have four further professional experience practicums across a range of settings during the remaining 2 years of their degree. In order to begin collecting evidence for the professional teacher accrediting body, the students are introduced to the professional standards of the Australian Institute for Teaching and School Leadership (AITSL) for Graduate Teachers. The intention is for the students to be self-directed over the final years of their undergraduate degree to collect evidence and to create a narrative about the development of their professional skills.

Pebble provide a tool called a Profile, where the academic teacher can create a template for students to complete progressively, which has attached evidence or Action Plans. In the image below the pages of expected graduate teacher standards are listed on the left, and the first two standards for Professional knowledge are

Fig. 8.5 Pebble Profile tool with graduate standards

shown on the open page. The icons to the right of each standard show the progress towards achieving the standard. The traffic light symbol is used to easily identify standards that are not yet started, underway, or achieved. The student may attach documentation as evidence of achievement, or include dialogue or description in the Chat section by any stakeholders in the pre-service professional's practicum work. For any standards that provide difficulty a student may complete a short Action Plan to think and step through a considered path to achievement. Once achieved the traffic light will indicate 'green', with an Action Plan showing as 'amber' (Fig. 8.5).

The purpose of the ePortfolio in the third year of the degree program is designed for Development because it "provides a means of tracking and planning the development of the students over time. It also provides a clear record of what each student has done…" (Stefani et al., 2007, p 43).

Year 4 – An ePortfolio for Drawing the Threads Together and Forward

In the fourth year, the ePortfolio is used for students to carefully choose from their collection to create a Showcase document for prospective employers. In the final year of their degree students are asked to reflect back on their learning and create a narrative and argument for themselves as beginning professionals. Students are asked to look back to the metaphorical images they took of themselves in the first year and consider the changes in themselves and the expanse of learning they have achieved in 4 years. These reflections can be quite deep and when applied to a new image or metaphor provide the students with a keen sense of their future professional 'selves' (Rowley & Munday, 2014).

The image in Fig. 8.6, taken by the student, metaphorically describes how she sees herself on the verge of her final teaching practicum:

> The bottom of the image where I am lying represents my four years of university, that I am looking back on. The road ahead represents my future career, a long road… I believe I am

Fig. 8.6 Image by Stephanie Clark (2015): fourth year visual metaphor for herself as a pre-professional teacher. With kind permission from Stephanie Clark

> an intellectually capable, culturally sensitive, compassionate and contemporary teacher… (Personal communication, 2015).

The revised metaphor is part of a final submission in a unit entitled "Leadership and Management" and provides the pre-service professional the opportunity to identify and narrate their attributes, both personal and professional, in anticipation for sharing with prospective employers. In earlier versions of the ePortfolio students share and collaborate on the effectiveness of the ePortfolios, however, in this final work, presentation of the electronic Portfolio combined with the presentation of 'self' is important.

The ePortfolio tasks described and presented here provide a platform for students to practice presenting themselves to their peers prior to doing so to possible employers, and in this way they can collaborate and provide feedback to each other to refine and improve their entre to the profession. The final version of the ePortfolio has the purpose of showcasing student achievement (Stefani et al., 2007, p 42). In a showcase ePortfolio:

> students are free to determine the content but they tend to display their best work. In addition to the work itself they may also display the 'workings' and any reviews or evaluations. A showcase portfolio could be used for presenting oneself to potential employers" (Stefani et al., 2007, p 42).

Findings

At the conclusion of the 4-year program the pre-service professional teacher is able to assemble a convincing argument for employment by showcasing their achievements in professional practice, development of knowledge and accrued skills, along with the ability to deeply reflect on professional dilemmas and daily practice. The diagram in Fig. 8.7 represents the ePortfolio space where during the 4-year period students can collect artefacts of their learning and achievement, so they may assemble an ePortfolio for different purposes at each stage of their degree program.

Although the processes of ePortfolio have been embedded into an undergraduate teacher education program in this instance, the general approach taken here is adaptable to other professional degree programs. The planning behind the design considers an approach in which the ePortfolio engages a student fully in preparation to be an early career professional at the conclusion of the degree. Reigeluth and Karnopp (2013) describe the changing needs of students and argue for a different skill-set in this "Information Age" (p 37). They list the new requirements as: Systemic thinking; Problem solving; Diversification of skills; Tech savvy-ness; Communication/

Fig. 8.7 Purposes of ePortfolio according to Stefani et al. 2007 – embedded into a 4 year professional degree program

collaboration skills; and, Self-directed learning (cited in Marquis, 2013). ePortfolio processes encourage and enhance these skill-sets and the product allows pre-professionals to collect evidence to argue for their achievement. Each requirement will be briefly addressed individually.

Systemic thinking means that students need to understand the "dynamic inter-relationships" within different systems in our culture" (Reigeluth & Karnopp, 2013, p 15). The ePortfolio processes throughout the years of the degree make evident to the student that they are living in a complex world where learning and professional requirements need to intersect. In some cases the intersection is made apparent to the student through their studies and curriculum, in other cases they, themselves, need to identify where their professional attributes have been derived from their learning.

Problem solving is often noted as an attribute for employment and requires creative and innovative thought (Marquis, 2011). At each year level the student needs to 'solve the problem' of the ePortfolio. During the 4 years they are scaffolded at times with templates and forms, however the content, design and structure along with the best way to present the work and provide an argument to the academic assessor for success, is part of the assessment criteria.

Diversification of skills means that students need to accumulate the expected broad range of graduate attributes but also follow their talents and interests. Professions are changing rapidly and the flexibility of the ePortfolio environment allows students to manipulate their collection of artefacts and evidence, including extra-curricular learning (Reigeluth & Karnopp, 2013). It is no longer a certainty that graduates move into long-term positions: an ePortfolio can be an evolving collection of artefacts reflecting current attributes, but may be considered valuable for its future usefulness and applicability.

"Tech savvy-ness" is one of the most apparent skills students demonstrate through the creation of various forms of the electronic portfolio, over the various tasks of the degree program as well as the Showcase at the conclusion (Marquis, 2013). The flexibility of the "e" in ePortfolio means that students can present a Showcase for different audiences.

Opportunities for **collaboration** occur in many units of study in the degree program, and students will document and reflect on these occasions as evidence of their learning. The final year ePortfolio is purposefully designed so students will use the synergy of their collective learning to support and mentor each other to produce the best possible Showcase ePortfolio prior to graduation.

It was stated at the outset that the ePortfolio is designed to assist students to be **self-directed**. Throughout the degree program students are encouraged to be proactive regarding the collection of evidence of their learning. Having control over the collection of evidence and the creation of documents and artefacts about their own development and success improves the opportunities for self-confidence in their university work, which in turn encourages students to show initiative and be self-directed.

Conclusion

The model of embedding ePortfolio into a 4-year teacher education degree program is based on pre-service teaching, but is adaptable to other professional degree programs such as Design, Social Science, Law, or Business, where the broad educational needs of the student are similar. For example, other discipline areas can use the following criteria for embedding ePortfolio:

Year 1: Introduction to tertiary study, valuing of existing skills and knowledge, and students regarding themselves as pre-professional;
Year 2: Basic skills of the profession;
Year 3: Building a collection of artefacts and evidence to show development of skills and knowledge;
Year 4: Preparing to enter the profession.

Designing a series of ePortfolio tasks based around this broad plan ensures the graduating professional has a deep and broad collection of artefacts from which to select and confidently demonstrate their preparedness for employment in a highly competitive workplace market.

The ultimate success of the model described in this chapter should be gauged by student response. The following quote by a graduating student came from an interview discussion regarding the final Showcase ePortfolio:

> I just synthesized a lot of what I had learnt. It really put me into re-visiting some important theorists that I really enjoyed and that I would use in my work… [my] knowledge, understanding and change as a learner and going through it and pulling all that together, it really allowed me to formulate the things that I would like to use… I think this brought this out a lot more so I could actually think about the future, what I want to do in education, where I am (Personal communication, 2013).

In future years, the degree program will undergo review. Assessment tasks designed for the ePortfolio learning space belonging to the student will be refined and adapted to changing professional needs and the inevitably changing and improved technologies in the online environment. However, the fundamental design for each of the year levels will remain to ensure pre-professionals will be given optimal opportunities for compiling a deep and broad collection of artefacts and evidence of learning.

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Chapter 9
Embedding ePortfolios in a Postgraduate Medical Sonography Program

Nayana Parange

Abstract Using an exploratory case study approach, this chapter examines the use of ePortfolios in three online postgraduate medical sonography programs at the University of South Australia. Students in these programs are required to create and submit digital portfolios as evidence of academic and experiential mastery of sonographer competencies in alignment with the accreditation guidelines of the Australian Sonographer Accreditation Registry. The purpose of ePortfolios in this context is to support student learning and to act as a catalyst for reflective practice. ePorfolios are also used as assessment of learning outcomes, and to track progress of clinical training in sonography. To explain this, the chapter articulates the rationale behind implementation of ePortfolios through a 3-year staged roll-out, support strategies, scaffolding processes and feedback on ePortfolios. Specific implementation strategies, such as identification of specific courses for ePortfolio use, provision of templates of suitable ePortfolio pages as exemplars, and establishment of communities of practice are investigated. Staff professional development, using skills and expertise from the university's Learning and Teaching Unit and information technology experts is discussed. Barriers and challenges experienced in the development, acceptance and implementation process in this online program are identified, and future plans for progressive implementation and monitoring are outlined.

Introduction

This chapter discusses the planning, piloting, implementation and evaluation of ePortfolios in the postgraduate medical sonography program at the University of South Australia (UniSA). This university offers three postgraduate medical sonography qualifications, which for the purposes of this discussion are referred to collectively as 'the program.' These three qualifications are: Graduate Diploma in Medical Sonography; Master of Medical Sonography; and Graduate Certificate in

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Breast Imaging. These are delivered completely externally, are provided online via flexible delivery, and are offered part-time. All are accredited by the Australian Sonographer Accreditation Registry (ASAR), enabling graduates to be eligible for accreditation by ASAR as medical sonographers.

The Graduate Diploma in Medical Sonography was designed to provide medical sonography students with competency to be employed as entry level sonographers, to be accredited by ASAR, be able to perform highly skilled ultrasound examinations on patients, and to diagnose many acute and chronic conditions in routine and specialised settings. The eight core courses which make up the Graduate Diploma in Medical Sonography develop knowledge, clinical skills, critical thinking and analytical skills for effective practice as a medical sonographer. The Master of Medical Sonography includes an additional four more subjects than the Graduate Diploma qualification. The Masters pathway has two options: a research pathway, and a project pathway. It has been designed to provide medical radiation practitioners and other allied health professionals with the mechanism to develop a new professional area in medical sonography and, if desired, to undertake research in this specialist area. The Graduate Certificate in Breast Imaging provides diagnostic radiographers with the mechanism to develop new skills and knowledge in specialist areas of mammography and breast ultrasound.

Being a large online, external program involving postgraduate clinical training, there are challenges in delivery of these professional qualifications. As they are run completely externally, and are delivered flexibly online, the number of students enrolling in them has continued to grow since 1999 when they commenced. Students come from varied professional backgrounds such as medical imaging, medicine, midwifery, nursing and other allied health backgrounds. Most of them are busy professionals working full time, juggling work and family responsibilities while studying part time. Students are located geographically in diverse locations around Australia and internationally. Due to the program's flexibility, scaffolding learning across it was challenging and meant that it needed a 'spine structure,' a way of giving the program a delivery and learning template that would work for students enrolled in it. Furthermore, students are required to secure their own training placements to complete 2200 h of supervised clinical scanning experience. As the university does not provide placements, students continue to train in a wide range of imaging practices where the level of supervision, training and feedback is variable.

Although students are required to undergo rigorous tutor assessments and clinical Objective Structured Clinical Examinations (OSCES) as their high stakes assessment in the capstone Clinical Sonography Portfolio course of the Graduate Diploma and Masters qualifications as a final hurdle before graduation, there were no formative clinical assessments along the way. Therefore this meant that problems such as unsatisfactory performance during clinical training, students not responding to informal feedback by tutors, and student failure to gain sufficient competence were identified too late in the program.

Based on the notion that assessment drives learning (Wood, 2009), it has been demonstrated that in order to change student learning, authentic assessments are needed, which are reliable, transparent and aligned with learning outcomes (Brown,

2008; Race, Brown, & Smith, 2005). Fitness of purpose is the guiding principle of program design, and a programmatic approach to assessment has been advocated along with a purposeful and optimal mix of instruments and method (Dijkstra, Van der Vleuten, & Schuwirth, 2010) to measure competence comprehensively. Additionally, and of relevance to this chapter, longitudinal data of individual learner progress can be captured and presented with an ePortfolio.

Use of ePortfolios in medicine and medical sciences has demonstrated that ePortfolios are helpful in building professional skills and career preparedness (Polly et al., 2013), are useful for assessments (Smith, Horton, Studdert, Griffin, & Symonds, 2011), can be used to evaluate competencies (Carracio, 2004) and are also a useful reflective tool (Toro-Troconis, 2010). It was therefore decided that ePortfolios were the most logical and useful choice for presentation and evaluation of student work. Mahara was selected as the platform for ePortfolios for several reasons, as follows.

The Learning Management System at UniSA is Moodle, and Mahara ePortfolio is embedded within it. Moodle is reported as user friendly, is customisable and beneficial as a personal learning environment. The online space is controlled by the user and allows collection of artefacts in various forms; blogs and journals can be maintained; files are saved in structured folders; templates of pages can be set up and copied; all user activities are locked and invisible to other users, allowing student confidentiality; a private URL is generated by each user, allowing sharing of views to different levels externally. Administration of contacts, groups and communities is also facilitated. Institutional support is available in the form of online advisor support, academic developer support and many online resources.

Every student in UniSA has access to their ePortfolios from the start to the end of their enrolment and this allows updating of entries until they graduate. This flexible, online space is student-controlled and allows access to ePortfolios not just within courses, but between courses. This is particularly useful if students are required to document their learning and clinical training longitudinally in diverse formats between courses. To ensure consistent student experience, a programmatic approach was adopted across all three medical sonography qualifications to enhance the curriculum and implement programmatic ePortfolios.

A staged roll out of ePortfolios was planned, intended to act in the following ways:

1. as an intentional first year curriculum enhancement – a transitional pedagogy "to scaffold, mediate and support the first year learning experience for contemporary heterogeneous cohorts" (Kift & Nelson, 2005, p 11), to support and enable successful transition to postgraduate studies, and to encourage student engagement and retention;
2. to document, demonstrate and evaluate progressive development of skills, clinical and professional competencies in clinical training across the program through authentic tasks;
3. to develop a robust 'spine structure' across the different courses in the program and to connect courses across the program for coherence between various learning experiences;

4. to provide a mechanism through which students demonstrate learning with authentic, experiential and evidence based approaches to meet graduate attributes (Oliver, 2011) program objectives, and accreditation standards;
5. to encourage a lifelong learning skill of curating digital evidence of achievement, and allow a mechanism where students can take their learning artefacts away with them, rather than leaving them as relics in the institution; and
6. to showcase student knowledge and skills in a way that that can be used for and by future employers.

Once the decision for ePortfolios in the program was made, the strategy to get a 'buy in' from the staff involved 'working with the willing'. Contact was established with academics in the university who had previous experience with ePortfolios, to learn from their experience. Individual courses within the program were selected strategically to launch 'low risk' assessments and assess the uptake and impact of use of ePortfolio in these courses with the intention to expand to other courses as students progressed. The ultimate aim was to introduce standardised compulsory, formative, programmatic assessments, which would allow academics to monitor the quality of clinical training, and identify learning problems early. These formative, programmatic assessments would provide opportunities for conversations between students and supervisors early, and allow timely intervention and remediation if required. These assessments would eventually lead to the high stakes capstone course's summative assessments in the last course'Clinical Sonography Portfolio'. In contrast to this, ePortfolios in individual courses did not take this standardised, whole program approach. Rather, these were individualised representations of the ways students met required competencies and requirements of courses. As the program was off-campus it was clear that a format of cross border standards was essential.

Based on this context and preliminary background information, this chapter explores ways in which active learning and clinical training have been documented via ePortfolios in the medical sonography program at UniSA. Specifically, it focuses on ways to develop a holistic, programmatic approach towards development of critical thinking as well as professional capabilities and clinical competencies essential in an accredited medical sonographer.

Methodology

A case study methodology applied on a single postgraduate, external, online program has been employed in this chapter. The chapter uses a holistic, embedded, evaluative case study approach arising from an interpretivistic paradigm. The holistic level is about how and why ePortfolios were implemented across the program, and the embedded level includes data collected from analysis of student ePortfolios. An evaluative case study seeks to understand what is happening within the specific examples analysed (Bassey, 1999).

The case study employed narrative inquiry to enable a broader understanding of the process of implementation, student engagement and performance in assessments. Data rich in depth and content has been derived from evaluation of student ePortfolios which were developed as products. Data has also been derived from direct observations in the field setting as well as in-depth conversations with the respective course coordinators. The case study methodology offers a detailed narration of student experiences and performance. Through an interpretive approach, it examines the influence of sonography students' electronic portfolios on their learning, identity, and assessment. The author's role was that of both insider and outsider to this research situation. The ongoing, developmental nature of the ePortfolios is described, based on the ongoing evaluation of them by the course coordinators in a quasi-experimental way. The unit of interest is learning effectiveness at course level and level of analysis is at program level.

In each of the examples discussed, an overview of the process of implementing ePortfolio tasks within a specific context to achieve authenticity is provided. Student experiences and learning outcomes are discussed along with a reflection upon problems faced, and articulate responses to these problems.

Practical considerations are deliberated on to support and enable students in the context of an online, external program through ePortfolios, and strategies to obtain buy-in from academic staff members as well as strategies for training and support of faculty are discussed, to make implementation of ePortfolios unproblematic and effective. As this multi-qualification program covers varying degree structures, a range of individual courses, students from diverse backgrounds and varying levels of staff experience of ePortfolios, there was the need to design and implement a robust process for introducing ePortfolios to achieve maximum benefit. The chronology of how ePortfolios were introduced into and integrated across this multipurpose context, from a pre-implementation stage involving accreditation of the postgraduate medical sonography program, to the initial implementation of ePortfolios in three discrete courses follows. Problems that had been encountered in the initial implementation stage are then considered. This is followed by analysis of the second year of implementation, and then examination of longitudinal assessment and feedback. The final stage presented covers the introduction of the programmatic ePortfolio. All of these areas of staged introduction then contribute to the chapter's discussion of issues that emerged as the process was undertaken.

Pre-Implementation – August 2013: Accreditation of Program Documentation via ePortfolio

The programs underwent the reaccreditation process by ASAR. This process is a nationally recognised evaluation of medical sonography programs based on the accreditation framework which established the standards, policies and procedures within which courses and programs are granted accreditation for a specific period of

time, having met transparent and defined requirements (https://www.asar.com.au/accreditation/courseaccreditation) of international standard. This process helped us assess our programs. The accreditation process necessitated a detailed examination and reflection of our program goals and outcomes, individual course content and outcomes, teaching and learning arrangements and assessments, especially as it was fully online and available in any location. This also involved obtaining employer satisfaction surveys in relation to our graduates as well as analysing lecturer and course feedback data in detail.

In order to understand the process of learning how to use ePortfolios, and gain firsthand experience of curating information and submitting artefacts via ePortfolios, a strategic decision was made to submit the accreditation documentation via Mahara ePortfolios. Evidence was organised and accomplishments of the program were showcased and displayed in a variety of formats such as videos, pictures, slideshows, charts, reports in formats such as Excel spreadsheets and pdfs.

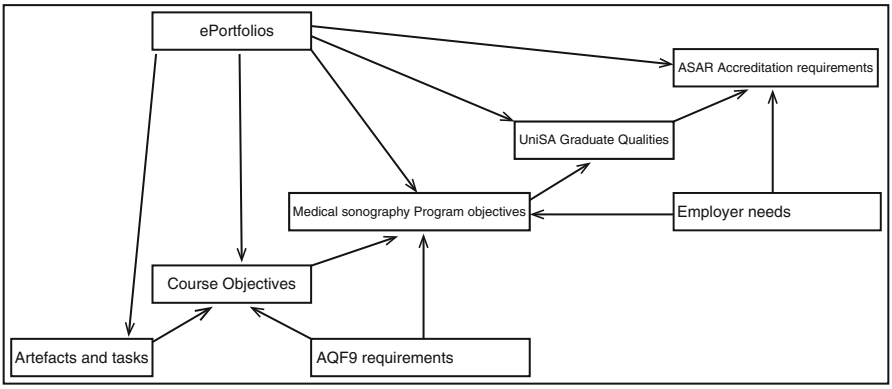
Our experience suggested that despite some challenges (discussed later in the chapter), an ePortfolio is a robust tool for extensible authentication. Through the process of evidence-based thinking and using the framework of ePortfolios, we were able to provide a richness and depth of evidence which could not have been showcased by standard methods of reporting. This led to a favourable review and positive feedback from the ASAR accreditation panel, and successful reaccreditation.

In addition to its role in showcasing evidence, our accreditation ePortfolio also prompted an in depth review of current practice in the eight professional standards specified, and identified aspects of the program which could be improved to enhance the learning experience. The main findings that came to our attention while reviewing our current practice was the need for more student engagement, robust assessments and the need to be able to capture longitudinal learning academically as well as progress in clinical training across the program. This was a driver for change leading to many brainstorming sessions, enthusing the academics within the Program to contribute to innovations and redesign for increased student engagement.

To explore course learning outcomes, a program mapping activity was implemented post accreditation. This was in alignment with program objectives, graduate qualities of the university, and accreditation requirements and employer needs. It could be translated into actual assignment tasks that the students would understand, as demonstrated in Fig. 9.1.

This program mapping activity led to a redesign of assessments within courses and also identified courses which would be strategic in terms of introducing ePortfolios to students in the program. Figure 9.2 shows the ePortfolio mapping grid across the Masters and Graduate Diploma programs. Mapping was based on learning outcomes, and courses were selected based upon the ‘buy in’ of the staff teaching the course.

Our experience of using ePortfolios for accreditation gave us an insight into the logistics, barriers, challenges and opportunities with ePortfolios from the user end, which helped with preparation for implementation of ePortfolios for students. An instruction booklet was prepared and made available to all students online. This described systematic, step by step instructions on every function of the Mahara ePortfolio, and instructions on how to create and update ePortfolios. Institutional assistance



Key

- ASA- Australian sonographer accreditation registry
- AQF 9: AQF 9 requirements describe the elative complexity and/or depth of achievement and the autonomy required to demonstrate that achievement for Masters degrees (http://www.aqf.edu.au/aqf/in-detail/aqf-levels/)
- UniSA- University of South Australia

Fig. 9.1 Mapping sonography ePortfolio tasks and assessments to individual course, program and accreditation requirements (Adapted from Kelly, Beers, & Daly, 2010)

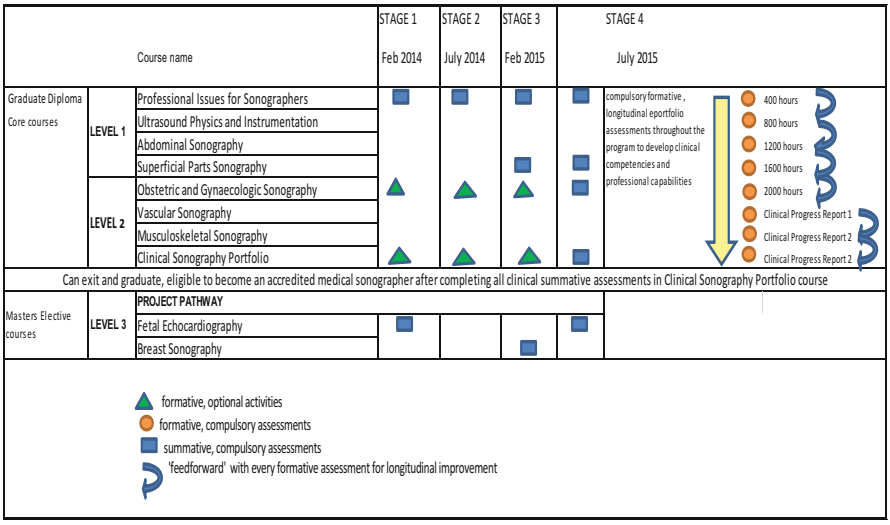


Fig. 9.2 ePortfolio mapping grid demonstrating stage-wise implementation of ePortfolios in individual courses and across the program in the Graduate Diploma and Master of Medical Sonography qualifications

included technical support by online advisors. A set of online support resources was also available. Pedagogical support was provided by academic developers. Figure 9.3 provides a visual summary of the role of ePortfolios across the medical sonography program as well as potential for lifelong learning beyond the program.

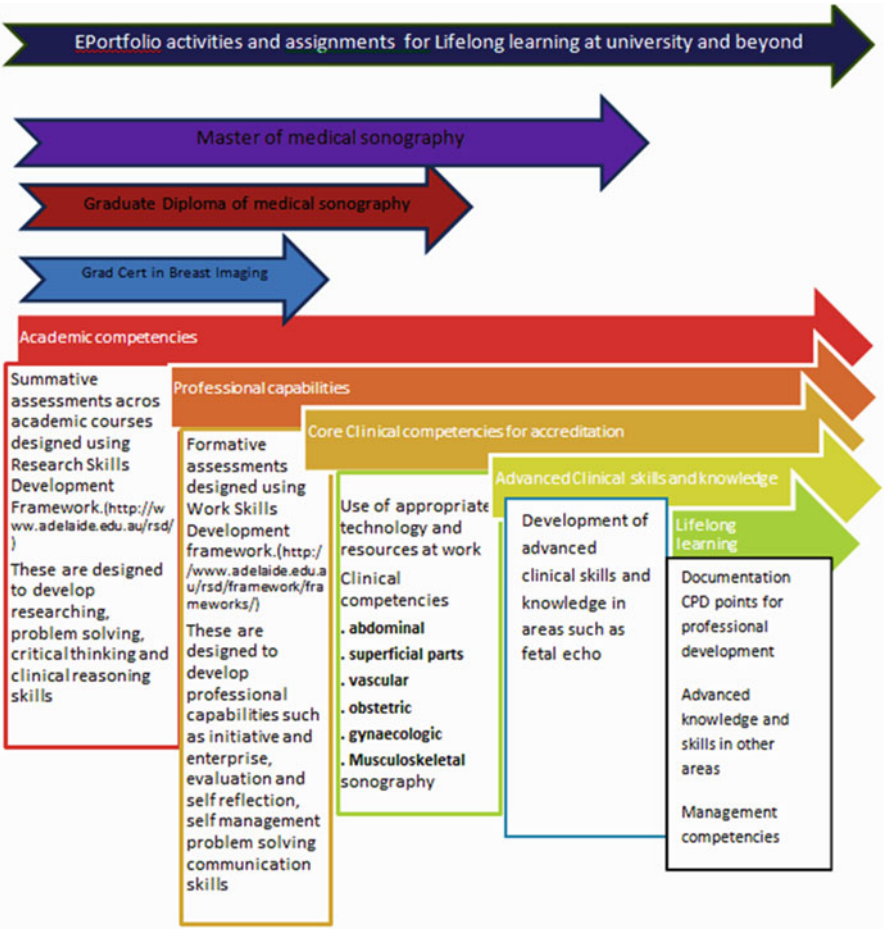


Fig. 9.3 Sonography ePortfolios for lifelong learning

Stage 1 – Feb 2014: Initial Implementation

Three courses, *Professional Issues for Sonographers*, *Fetal Echocardiography*, and *Obstetric and Gynaecology* were selected for a pilot run of ePortfolios as shown in Fig. 9.2. Each of these is now described separately.

Professional Issues for Sonographers This is the first course all students complete when they enrol in the program, and it is offered twice a year. The cohort of students includes a large number of mature age students from diverse educational and professional backgrounds most of whom are new to postgraduate learning and returning to university study after a long time.

All students were asked to log into ePortfolios and complete a simple summative activity to get them started on their ePortfolio journeys. As a summative assessment introduced in the beginning of the program, students were asked to create a personalised ePortfolio page introducing themselves and to share it with peers in their courses. The intention was to get students to explore and familiarise themselves with ePortfolio and its functions as a prelude to establishing its use in the program for collecting, storing and presenting artefacts for assessments in a creative and innovative manner. Students were encouraged to use multimedia, and to learn how to upload images and videos. A template page was provided to them as a model, and instructions in the form of screen captures were provided for them as guidelines.

Staff observed that this activity of developing personalised pages and sharing them with peers developed a sense of collegiality and rapport among students. Although the task was seemingly simple, there were challenges, as a large number of students were not very computer savvy. They expressed frustration, anxiety and confusion about learning the technology as well as understanding the relevance of the activity. To address this, the following semester saw changes in the ePortfolio assessment and in strategies for training students for the task. This was a significant realisation for staff working on ePortfolios, and demonstrates the ongoing developmental nature of ePortfolio work in its introductory phases in this context.

In July 2014, the task was expanded from a simple introduction to an assessment item in which students were asked to develop a CV as an ePortfolio component. Students were required to write a narrative about their professional and academic backgrounds, to talk about their motivations for pursuing sonography, and to reflect on what they hoped to achieve in and through the program.

This was an authentic task, rather than an abstract one, as it was geared towards helping students seek a training position. In this way students could relate to the significance of the task. It led to more engaged learners who reflected on identity, what attributes they possess, and what they aspired to by undertaking learning and training in medical sonography and it was noted that creativity developed as they constructed their personalised ePortfolios. This ePortfolio task also helped students discover and develop attitudes and abilities to provide a strong sense of ownership of their professional identity. This experience also set them up for subsequentt ePortfolio based activities and assessments later in the program.

Fetal Echocardiography This is a Masters elective course undertaken over one semester. It is done online after completion of all core courses, and helps students learn to diagnose complex congenital heart disease in the fetus. Students in this course are fully qualified practitioners in ultrasound. The student cohort includes a small number of recent medical sonography graduates and a larger number of practising sonographers, cardiologists, radiologists, obstetrician-sonologists and most often, senior tutors or heads of sonography departments in hospitals. All of them are required to have prior experience in clinical sonography. Since this is a specialised area, student numbers are small, averaging about 25 each year.

ePorfolios were introduced into this course in February 2014 as a form of compulsory summative assessment, and to develop problem solving skills. Students had

to create an ePortfolio collection of digital artefacts showing how they could, perform authentic tasks relevant to diagnosis of complex fetal heart structural and functional anomalies, demonstrate application of evidence based practice to research, and blog about each task. To support this task, a template collection was provided as a sample. To ensure timeliness of entries, deadlines were set for submissions.

The blogs also included reflection on students' current professional practice and development of advanced clinical protocols, which could be directly applied to their clinical work in their imaging departments and bring about a change to clinical practice after acquiring new knowledge and skills. A fetal echo group was set up and all of them had to respond to two other blogs within the group. Students shared their ongoing work and ideas, and also information about complex congenital heart cases. Peer feedback as well as ongoing lecturer feedback, along with prompts to promote reflection, led to dynamic interactivity and a positive environment for collaborative learning through the requirement that all of this work and interaction between students was to be managed through ePortfolios.

Due to the asynchronous nature of the blogs, students had ample time to review and rethink previous contributions before they composed their responses as feedback to their peers. They repeatedly revisited previous postings and reflected on the complex concepts presented as well as blogged about how they were improving their own work. They were excited to look at others' creations, so began responding to each others' posts and responses, even if they were not expected to comment on all of them. They began sharing articles, cases, websites, and images, and had avid discussions on 'hits and misses' in diagnoses. Airports, conference venues, and clinics became learning environments enabled through the portable, digital nature of ePortfolios. One student, for example, a qualified cardiologist, shared his notes on a recent conference in the UK while in transit. Enhanced student engagement was observed, with 'more awake' learners, experiencing the joy and benefits of learning. Some students continued with ePortfolio work after completion of this course, to reflect on their learning in other Masters elective courses even when ePortfolios were not a mandatory task. Some students who undertook a research project decided to document details of their ongoing research in ePortfolios. One student presented her ePortfolios experience in an oral presentation as well as a workshop, at an ePortfolios Australia, the national conference on ePortfolio use. Clearly ePortfolios could be shown to have strong advantages and successes for students in this course in many ways (Parange & Deslandes, 2014).

There were also some challenges related to ePortfolios in this course. As the overall weighting of ePortfolio tasks was low (10 % of the total grade), there was an amount of initial resistance from students. Again, technical challenges were experienced, and although a template collection was provided as a sample, students struggled somewhat to learn how to navigate through the different functions of ePortfolios. To address these problems with ePortfolios, the first weeks of the semester were spent troubleshooting and problem solving, leading to many telephone conversations trying to support and reassure the students, inadvertently adding to the lecturer's workload.

Learning from this experience, changes were made to the ePortfolio task, and the level of scaffolding was increased to support students better the following year. To address the workload issue and minimise resistance from students, the ePortfolio weighting for the fetal echo cohort in July 2015 was increased from 10 % to 30 % weighting of the overall grade. The guidelines for the task and the marking guidelines for it were made more explicit. As with introduction of ePortfolios into *Professional Issues for Sonographers*, discussed above, introduction of ePortfolios was a fluid site where problems were analysed and used as the impetus for the ongoing integration of ePortfolios into the Medical Sonography program as a whole.

Technical orientation was provided in the form of a video as well as a virtual classroom recording to help students who were not so tech savvy, and the template collection was reinforced. In addition, the course materials were made available online to students 3 weeks ahead of time, so that students could browse through the requirements and have preliminary time to 'play' with their ePortfolios.

A recent graduate's reflections, in the form of a video testimonial about her own experience with ePortfolios, were also made available to all students. In her words:

> When I first discovered I had to learn a new online platform when I began my Masters, I was a little overwhelmed as it seemed like a huge task. I found that by just logging on and having a play around, I was able to pick it up very quickly. As time went on I found it was actually very easy to use, and because it allowed for so much interaction between students, I was able to pick up tips from the others in my class. Over the term I came to love learning with the ePortfolio, especially the interaction it allowed with other students. Some of them were over 1000 kms away, but it felt there was no distance at all!

In the video, this student expressed her own journey with ePortfolios, talked about how this helped her learn and stay on task, and mentioned that she was able to present a paper in a national conference about her work with ePortfolios and how this had helped her learn (see http://helix.unisa.edu.au/flash/54028427_hi.mp4). She urged the students to start early and make the most of their ePortfolios. This video from a peer served as a powerful catalyst and motivator for students. It minimised resistance to ePortfolios and encouraged students to carry on the ePortfolio tasks to achieve intended learning objectives.

Obstetrics and Gynaecology This is another core course in the program, offered twice a year. This is a Level 2 course (see Fig. 9.2) with about 80 students each semester. Students enrolled in this course are half way through their clinical training, and some of them are close to graduation. Students learn knowledge and skills needed to perform obstetric and gynaecologic ultrasound scans to detect abnormalities in the fetus and complex pelvic pathologies in women.

ePortfolios were introduced into this course as an optional formative activity. Students were given the opportunity to create an ePortfolio and use it as a repository for collection of all the essential documentation for the course, such as clinical progress reports. They were also encouraged to use ePortfolios as a reflective tool and a study tool, where they could save interesting cases they had scanned, store back up images and study notes, and keep links to interesting websites relevant to their study, including Youtube videos, etc. They were also encouraged to archive certificates of any continual professional activities they had undertaken.

Staff observed that there was a very poor response to this activity even though students were prompted and encouraged to participate. Students complained about the extra work, and did not see the relevance of this activity. Since it was an optional formative activity, students did not see the need to complete it; a handful of students who did use ePortfolios as a repository, simply uploaded basic files as PDFs or Word documents and did not engage with ePortfolios comprehensively. Students found this activity irrelevant, especially those students close to graduation, as they did not think they would ever use it later.

Similar student behaviour was also observed with a different cohort in the following semester, even though more scaffolding was provided. From this staff concluded that students did not engage with ePortfolios in this task because it was not a summative task. Staff have now introduced ePortfolios as a compulsory summative assessment in the subsequent iteration of this course in July 2015, have made marking criteria more explicit, and will be monitoring student learning outcomes via ePortfolios.

Stage 2 – July 2014: Lessons Learned

The first stage provided valuable learning experience with ePortfolios for both staff and students. Students in *Professional Issues of Sonographers* were new to the program, new to online learning, and new to postgraduate studies. Despite some anxiety and trepidation expressed in the beginning, students took to this activity wholeheartedly, especially since it was geared to helping them obtain a training position. Students in *Fetal Echocardiography* also engaged well with ePortfolio assessments, adding artefacts across a range of media, despite the fact that there was a low weighting for this task. Students in *Obstetric and Gynaecology* did not engage with the ePortfolios at all, as it was optional and there were no definite tasks to be performed. Staff had left it to students to decide how they wanted to use ePortfolios, which was not very fruitful.

This led to several important insights into student engagement with ePortfolios. It has been widely believed that assessments can be powerful educational tools (Krupat & Dienstag, 2009). This probably explains the fact that if an activity is optional, students will not find it relevant, and are not convinced that it is worth time and effort. To get a 'buy in' from students to engage with the activities, staff agreed that a clear direction was needed in terms of directly aligning ePortfolio activities to learning outcomes. In addition, marking criteria involving ePortfolios needed to be clearly articulated.

In order to articulate marking criteria clearly, staff planned to develop rubrics for all assessments, so that students could clearly see what they needed to achieve. These rubrics were designed to be teaching tools, to give students a clear sense of the standards for high performance, and how they can be achieved (Allen & Tanner, 2006). As Cox, Morrison, and Brathwaite (2015) has observed, good rubrics can

meticulously capture student learning, and also enhance learning experience by means of constructive, rapid and timely feedback to enable them to reflect on learning outcomes. The university's Research Development Framework was utilised as the basis for rubrics so that students could demonstrate development of discipline specific research skills, and display evidence for this in their ePortfolios (http://www.adelaide.edu.au/rsd/).

These changes were timely, as the courses were also undergoing changes to meet the Australian Qualification Framework (AQF) requirements, the national qualifications framework (http://www.aqf.edu.au/). The principles behind AQF are similar to the Qualifications and Credit Framework in England, Wales and Northern Ireland (http://www.accreditedqualifications.org.uk/) and the Scottish Credit and Qualification framework (SCQF) in Scotland (http://scqf.org.uk/).

In alignment with the AQF nine requirements, assessments were redesigned for all courses with authentic tasks such as case scenarios, to allow scaffolding and development of research mindedness, problem solving, critical thinking and clinical reasoning relevant to the sonography profession. Some academics in the program were still not convinced about ePortfolios, so program meetings were held to discuss preliminary experiences, and training sessions were offered. Staff members were also encouraged to create their own ePortfolios to help them become familiar with the process. ePortfolios continued through the select courses in the program (Fig. 9.2), with changes to iterations as outlined in descriptions of the introduction of ePortfolios in the three courses presented above as Stage 1.

Stage 3 – Feb 2015: Second Year of Implementation – Updates and Expansion

The next course selected for ePortfolio implementation was *Superficial Parts Sonography*. This is another core course in the program, offered twice a year. This is a Level 1 course, to be undertaken after completing *Professional Issues for Sonographers*. There are large numbers in this course, usually around 120 students every semester. This is a course which teaches advanced knowledge and skills required for clinical work. Most of the students have either not commenced scanning as they are still seeking traineeships, or have only just obtained traineeships and begun scanning. Students enrolled in this course learn knowledge and skills to perform sonography of superficial structures (such as thyroid, neck, scrotum, breast, and eye), interventional, and paediatric scanning (including neurosonography and musculoskeletal applications in the neonate and child).

ePortfolios were introduced here as a summative assessment. An ePortfolio community of practice for the course was provided, and students had to submit a case scenario assignment as an ePortfolio collection. Specific topics for case scenario were allocated to each student, who had to perform the three tasks, as follows:

1. complete a SIMTICS module which is a specific module in simulation based learning, specific to superficial parts sonography, helping students learn skills to scan in a particular area;
2. complete an image interpretation worksheet to aid the radiologist report as performed by a fully accredited medical sonographer in day to day practice; and
3. address the case from the theoretical aspect, using directed questions. They were encouraged to submit ultrasound images, anatomy diagrams, videos etc. as part of their ePortfolio to support their discussion.

A template was provided for the collection of artefacts, and a marking rubric (developed as outlined in Stage 2) was provided. Once assignments were submitted, feedback was provided via the rubric.

It was observed that many students, having had experience with ePortfolios in *Professional Issues for Sonographers*, embraced ePortfolio use and created well-written, clinical case studies, showcasing their learning using various forms of multimedia, and manipulating all the functions of ePortfolios. Those students that had not engaged earlier presented basic ePortfolios with Word and PDF documents alone. However, the assignment demonstrated learning outcomes. There was much positive feedback from students about ePortfolios, but staff were also interested in negative ones to help improve delivery, integration and uses of ePortfolios. The negative feedback mainly revolved around a perceived lack of support for online learners.

Another problem was that the Mahara ePortfolio version available in our university does not 'talk to' Turnitin software, which is the software used in our university as a plagiarism detector. Turnitin is a 'text matching 'software, and hence will not work with videos and other similar forms of digital representation. This led initially to some confusion among students and markers. To address this problem, markers had to manually check for plagiarism. In order to solve this problem, changes were made in the next iteration of the course for July 2015; students were asked to submit a copy of text and images via Turnitin as well, to provide them with an opportunity to rectify any plagiarism issues before the final submission was made via ePortfolio.

Preparation for Implementing Longitudinal Programmatic Assessments and Feedback

In addition to clinical competencies and cognitive capabilities, staff also wanted to be able to assess continual learning and longitudinal development of professional capabilities and discipline specific work skills necessary for sonographers in imaging departments to perform scans efficiently. Staff wanted to devise formative assessments during clinical training that were optimally paced, provided timely feedback from clinical supervisors at workplaces, allowed opportunity for self reflection and self assessment by students, and allowed goal setting for future

improvement in discussion with clinical supervisors. It was necessary to have a system that would record and store these longitudinal assessments across the program, to be able to compare with past performance.

Longitudinal development of learners has been described as a learning trajectory to observe learning patterns and a shift from assessment of learning to assessment for learning; a shift from short term, corrective feedback towards feedback with a developmental approach (Gerrel & Gray, 2013). This development can be facilitated by feedforward along with feedback, so that it offers constructional guidance to improve work (Gray & Ferrell, 2015). Longitudinal development and learning is also supported by ipsative approaches to feedback, where progress is assessed against the learner's previous performance, to improve the learning experience and motivate learners (Hughes, Okumoto, & Crawford, 2010).

The three fundamental purposes that should be united within an assessment program are outlined as: "a programme that maximally facilitates learning (assessment for learning), a programme that maximises the robustness of high-stake decisions (on promotion/selection of learners), and a programme that provides information for improving instruction and the curriculum" (van der Vleuten et al., 2012, p 206). According to Biggs (1996), constructively aligned assessments and feedback lead to better learning outcomes. Good feedback, as (Nicol & Macfarlane-Dick, 2006) has outlined, has to meet the following six principles:

1. Clarify what good performance is;
2. Facilitate reflection and self-assessment in learning;
3. Deliver high-quality feedback information that helps learners self-correct;
4. Encourage teacher, learner and peer dialogue;
5. Encourage positive motivational beliefs and self-esteem; and
6. Provide opportunities to act on feedback.

In view of the above, it was decided that ePortfolios would be the best tool to meet expectations for longitudinal development.

Having gained confidence with the implementation and delivery of course specific ePortfolios, conversations and planning for programmatic assessment to assess these qualities with ePortfolios began in earnest. The next step was to decide what needed to be measured and how to capture it. This led to several brainstorming sessions and the decision to use Work Skills Development Framework as the basis to design formative assessment rubrics (http://www.adelaide.edu.au/rsd/framework/frameworks/). The assessments had to be fit for purpose and constructively aligned with the ASA Competency Framework for sonographers (ASA, 2011) and UniSA graduate qualities. The assessments had to positively motivate students, provide feedforward, encourage reflection and self assessment, be clear enough so that students could navigate and understand where students should be when they graduate from the institution (PennyLight, Chen, & Ittleson, 2012), and enable them to achieve the clinical competencies required to graduate from the program and become eligible for accreditation with ASAR as a graduate entry level sonographer. ePortfolios were utilised as a medium where longitudinal assessments, feedback as

well as feedforward were recorded to document continual improvement in clinical training progress, as discussed below.

Stage 4 – July 2015: Programmmatic ePortfolios Introduced

All students enrolled in the Graduate Diploma and Masters qualifications, currently training to undergo accreditation as a fully qualified sonographer, are now required to complete a programme of formative assessments. These assessments are aligned with the ASA Competency Framework, the Medical Sonography program objectives, and UniSA graduate qualities, as outlined in the previous section of this chapter.

Every student has to be in a supervised training position for 2200 h. Compulsory Formative Assessments Milestones (FAMs) have to be submitted at the end of 400 h, 800 h, 1200 h, 1600 h and 2000 h. These help students in preparation for their clinical summative tutor assessments and OSCEs in their final capstone experience course, *Clinical Sonography Portfolio*. Students are also required to submit Clinical Progress Reports for the Level 2 courses as outlined in Fig. 9.2. The FAMs provide students with an indication of a number of qualities which staff refer to as 'professional capabilities.' These are: initiative and enterprise; learning evaluating and reflecting; self-management; problem solving; communication skills; and use of technology and resources.

These assessments do not attract a grade, but instead allow supervisors to provide constructive feedback and reinforcement of desired skills and attitudes. As part of this assessment, students are also required to self-assess their performance using the same criteria. This not only allows for self-regulation by students, but helps start the conversation with their tutors around students' performance in a non-threatening manner. It allows for mentoring and goal setting to progress towards the next milestone. It also allows staff to monitor students' clinical training, and is also useful in identifying any performance concerns early, so that these can be addressed with appropriate support, intervention and remediation if necessary.

One of the challenges of this exercise was to find a way to store information, access ePortfolios, retrieve assessments and provide ongoing feedback across the program. Information technology was one of the greatest barriers, as until recently, the learnonline system, UniSA's digital learning and teaching support facility, was only enabled across semesters, and not across the program. This meant that once students completed a semester, they no longer had access to the learnonline system. In addition, there is reasonable flexibility in selection of courses within the various levels of the program, as it is part time, so it is not possible to embed longitudinal assessments across individual courses. At this stage, staff did not have the facility to store and monitor longitudinal assessments. This predicament led to numerous discussions with the Information Technology (IT) team.

The IT team created a special programmatic Moodle learnonline page. This page was made available to every student enrolled in the Graduate Diploma and Masters qualifications. This programmatic learnonline page was then developed further and

a series of portals established for submission of all the FAMs and Clinical Progress Reports were set up. Students are now able to submit their 'secret URLs' for their ePortfolios. All academics have been given access to these portals, and academics have been allocated to specific portals so that they have access to all assessments. When FAMS are unsatisfactory, this enables staff and students to review the previous milestone if milestones are not satisfactory, to see if there has been any progress in comparison to the previous milestone. This assists staff to provide constructive and ipsative feedback to help students progress towards the next level of competencies, and students to reflect on and self manage their training and learning accordingly, to progress successfully.

To support students with this activity, multiple instruction videos have been developed and made available. Staff have also interviewed a recent graduate from the Masters program who had used ePortfolios as part of her *Fetal Echocardiograpahy* course, successfully completed the tasks exceptionally well, and had given a conference presentation based on her ePortfolio work (Parange & Deslandes, 2014).

Discussion

Staff observed that a majority of learners who were self-reliant, felt empowered and took to ePortfolios well. The following student reflection from an online post in *Fetal Echocardiography* is an example of the positive experience of the students:

> Ah the bittersweet last blog, just when you get familiar with ePortfolio it's finished! Well, I must say these blogs have been interesting to put together! Certainly something I have never done before but I am extremely proud of what I have managed to produce. The topics covered have required a fair bit of research and effort, but have been rewarding given the extra knowledge of the fetal heart which I have been left with. It's been great to see the amazing work everyone enrolled in the subject has managed to produce- we're all from different parts of the country but with the same goal of improving knowledge and self development. I will remember this experience all my life….

Many other students who were not familiar with online environments, found this activity overwhelming at first, but developed confidence as they progressed with tasks. As one student *Fetal Echocardiography* reflected in 2014:

> … (my) journey is nearly at an end academically but the journey will continue. As much as I complained about the ePortfolios to start with … I have learnt lots … It has been a super busy six months and I really feel a huge sense of achievement!

In addition to meeting course outcomes, the ability to share ePortfolios and practice in groups helped students build their professional identities and thrive in their forum discussions and debates. This also helped enhance student engagement and create social networks and study groups, which in turn enriched collaborative learning. ePortfolios encouraged creativity, and students developed a sense of pride and ownership in their own work.

Staff were able to explore the effectiveness and flexibility of ePortfolios across individual courses at different levels of complexity, before introduction of the holistic programmatic ePortfolio. That staff were able to use their own ongoing evaluative position in relation to ePortfolios in a quasi-experimental way, and allow this to guide ongoing, developmental applications of ePortfolios was a major benefit in this case study, and work is ongoing, evolving and possibly expanding to other courses in the program.

However, staff did encounter several challenges, especially in the first semester of implementation. Technical issues were a challenge due to the online nature of the program, and many students complained about the increase in workload, as they felt this as an 'add-on activity'. Technical expectations were also a challenge for staff, and there was an initial reluctance to adopt ePortfolios as this was a move away from traditional assessment processes and formats. Addressing technical issues was also time consuming, and lecturers spent a lot of time over the phone, fielding individual enquiries. Large classes led to an increase in staff marking loads as well. As success and sustainability with ePortfolios depends heavily on buy in from students and staff, several strategies were employed to improve student as well as staff experience, and make it easy for them to operate. Student support strategies involved development of resources, such as mini videos and synchronous virtual classrooms. Communities of practice were set up at program level as well as course levels. Peer to peer support was encouraged in online discussion boards and forums so students could support each other. Issues in relation to data security and storage as well as student etiquette in relation to professional behaviour were discussed at the beginning of the semester and guidelines established.

To support and help staff develop an ePortfolio culture, professional development was enabled using skills and expertise from the Learning and Teaching Unit of UniSA, and from IT experts. Ongoing program meetings are held at regular intervals, with ePortfolios as a recurring agenda. Academics are encouraged to share experiences with ePortfolios, talk about highlights of student ePortfolio submissions, and conference presentations that are being made by academics in ePortfolio forums (Osborne, 2014; Parange, 2014; Parange & Deslandes, 2014). Communities of practice have been set up for staff, and help has been provided to build exemplars of effective ePortfolio practice for students. Staff are also encouraged to develop their own personal ePortfolios as a form of professional development. Our ePortfolio experience in *Obstetrics and Gynaecologic* suggests that if unassessed, many students do not see the purpose of learning a new platform for reflection, and do not engage with it.

Conclusion

This chapter has discussed the planning, piloting, implementation and evaluation of ePortfolios in the postgraduate medical sonography program at the University of South Australia (UniSA). In order to enable students to become familiar with

relevant technology, explore the use of ePortfolios for assessments of learning (as a product) as well as assessments for learning (as a process), ePortfolios were introduced as a staged approach as described above. Our experience has shown that ePortfolios have to be purposeful and well thought out; they need to be embedded as integral components of courses. In order to achieve good learning outcomes, ePortfolio exercises need to be authentic, meaningful, and relevant to students' intended professions. Through this introduction and evaluation of ePortfolios, staff also learnt that although it takes time, it can work well and can track student learning and progress effectively.

A staged roll out approach has worked well in our online program, as ePortfolios in our program align well with UniSA's Digital Strategy 2015–2020 initiative to deliver "an engaging and digitally enriched curriculum, support students to become productive professionals in a digital age, offer expanded flexible learning arrangements, develop our academics as leaders in the digital learning experience and inspire and support lifelong learning" (p 5). They also align well with program objectives, accreditation requirements and graduate qualities of UniSA, as expressed in the *Postgraduate medical sonography supervisor guide 2015*: "The Postgraduate Medical Sonography programs have been designed to produce graduates who are life-long learners who can cope with an environment of rapidly changing technologies, with the necessary skills, knowledge and attitudes to enable them to gain accredited practitioner status" (p 19). The flexible nature of ePortfolios also allows lifelong learning and how our ePortfolios address employers' needs and expectations remains the next stage in our ongoing development and implementation of them in the context of training of medical sonographers.

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Chapter 10
Perceived Usefulness and Relevance of ePortfolios in the Creative Arts: Investigating Student Views

Diana Blom and Matt Hitchcock

Abstract While research into ePortfolios in educational environments has increased in the past 15 years, the focus has been most strongly on the views of academics, those instigating use, and rarely on students (the users). This chapter intentionally draws out the views of three cohorts of undergraduate music students in two Australian universities, seeking their responses on use of a variety of ePortfolios approaches. These range from a proprietary ePortfolio platform chosen by one university, to self-selected systems leveraging cloud-based and social media platforms at another. In doing so, the study not only adds to a growing literature about ePortfolio use in the creative arts, it also offers student views across the self-selected/non-selected platform issue and longer term and short term use of the ePortfolio. The study sought responses on students' perceived usefulness of the ePortfolio platform for their current and future career post-graduation needs. Shaping the discussion is a perceived usefulness of ePortfolios and technology acceptance model drawn from other new technologies in contexts beyond universities, but tailored by our findings, into a creative arts version of the model.

Introduction

While e-learning research shows that learner usage and satisfaction are essential factors in assessing the success of learning systems, student views on their engagement with the technology of ePortfolios are not often sought. Instead, ePortfolio research has focused on epistemological challenges, canvassing most frequently, the views of academics and, at times, university leaders. This chapter discusses the

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views of two cohorts of Australian music students in relation to their perceived usefulness of ePortfolios in their current education and career post-graduation. The chapter's study responds to two research questions:

- How do creative arts students respond to the ePortfolio and what is their perceived usefulness of the platform?
- How can creative arts students' responses shape a perceived usefulness/technology acceptance model (TAM)?

The chapter begins with a short history of the use of ePortfolios then analyses literature about the views of creative arts' students in music, dance and creative writing working with ePortfolios, seeking an understanding of what they perceive to be useful to them. The methodology, including discussion of a technology acceptance model (TAM), is outlined and findings discussed. Finally, conclusions draw together views of the study's cohorts, plus those from literature, investigating how all fit within a broader context, and why some perceived the ePortfolio as currently and/or potentially useful while others did not.

The Portfolio and the ePortfolio – A Brief History

A portfolio, as a conveyance of a person's achievements, has had its professional genesis in the creative arts since the early 1800s. From the 1900s, graphic design, photography, architecture, music and fine arts have relied heavily on the use of portfolios for career purposes. Early use of portfolios in education dates back to the 1970s during a time of reform in schools "…when one of the objectives was to encourage complex thinking and student ownership and agency regarding their work" (Brookhart, 2008, p 445). Portfolios are still widely used as a professional career object where "all kinds of evidence can be brought together in those portfolios that, in combination, give the possibility to draw valid conclusions about competence" (Van Tartwijk & Driesen, 2009, p 729). Buehler, Hafer, and Blankenburg (2007) contend portfolios imbue the ability to systematically develop and demonstrate knowledge and competencies crucial to increasing employment opportunities in the "knowledge economy" (p 141).

Over time, ePortfolios developed as a result of the digitisation of bulky traditional paper based portfolios, "the information Age's version of the artist's portfolio" (Meyer, Abrami, Wade, Aslan, & Deault, 2010, p 84). Whereas portfolios originated in the visual and written arts, ePortfolios originated as mainly textual works in text-based disciplines such as English studies (Connolly, Gould, Hainey, Waugh, & Boyle, 2010). This was because early ePortfolios were limited to text-based forms due to challenges with handling media in the early days of the Internet. Text limitations came as a result of technical limitations including bandwidth, speeds, codec inefficiencies and cross-platform problems.

As digital technologies and capabilities grew, however, Siegle (2002) notes ePortfolios came to provide advantageous solutions to challenges often found in

traditional portfolios. Perhaps most germane, Cleveland and Cleveland (2004) contend that in an age when much of the conceptual and creative process utilises digital tools, a representative sampling of work should be created in a digital and dynamic platform (Fitzsimmons, 2008) with the ability to reach an unlimited number of people (Rowley, 2008).

Student Views of ePortfolios Across Disciplines

This book and several articles (for example, Sherman, 2006; Reese & Levy, 2009; Walz, 2006) name many possible functions the ePortfolio can offer students. There is also a body of literature about ePortfolios in the creative arts from the perspectives and observations of the teacher/instructor, for example in theatre studies (Cleveland & Cleveland, 2004; Mitchell, 2009); dance (Alter, 2002; McGreevy-Nichols, 1999; Oreck, 2007); visual arts (Buehler et al., 2007; Castiglione, 1996; Evans, 2007; Fitzsimmons, 2008); music (Dillon, 2007; Dillon & Brown, 2006; Silveira, 2013; Upitis, Abrami, Brook, Troop, & Catalana, 2010;); and music education (Bauer & Dunn, 2003; Hill, 2008). This chapter, however, is interested in seeking the views of creative arts students themselves, albeit through the lens of an academic's research question, and it focuses on studies drawing on the responses of creative arts students in Europe, the USA, and Australia.

Forty-two dance students from Belgium, Austria, Hungary, The Netherlands and USA, in an international dance program (Leijen, Admiraal, Wildschut, & Simons, 2008), used a Claroline virtual learning environment to engage in practical tasks, individual and collaborative writing and discussion assignments. Students were inexperienced using the platform in their learning so questions were focused on issues other than technology. Of relevance to our study is their dissatisfaction with "feedback provided by teachers…and the interaction part of the pedagogy" (p 154) which was slow. Most interaction difficulties were encountered when working on collaborative assignments using the e-learning format, although students enjoyed "sharing experiences in more open discussions" (p. 159).

Rowley and Dunbar-Hall (2016) canvassed the views, about using ePortfolios, of 90 Music Education, 21 Composition, 12 Musicology and five Performance undergraduates in an Australian university. For the Composition and Musicology students, the ePortfolio was especially useful for job applications, both groups recognising the confidentiality of the platform and the opportunity to present oneself professionally with the ePortfolio acting as a curriculum vitae. The Music Education students focused on job application factors with their ePortfolio as a place to show teaching skills, a teaching philosophy, to upload evidence-based materials showing progress, to think about a future career as a music educator and display a multiple-identity as teacher/performer. Many realised that an ePortfolio would be part of their teaching life. The Composers and Musicologists viewed the ePortfolio as a digital version of, and support for, a paper-based portfolio, rather than a different presentation medium. Some students had sought help to use the

platform properly, security issues were raised with Composition students talking of intellectual property breaches, and time required to design and maintain an ePortfolio, was a concern. Technology insecurity prompted concerns about whether an employer would be able to reliably see a job interviewee's ePortfolio. Concerns were raised about the institutionally-provided ePortfolio platform, including its unprofessional appearance, lack of navigational ease and lack of facility for playing film and audio clips.

In an undergraduate music education course in the USA, Berg and Lind (2003) investigated the use of electronic portfolios, drawing on responses from ten students. Students were to build a professional portfolio that included a resumé, philosophy, teaching competencies, national teaching standards and reflections. When discussing their teaching goals, video clips, lesson plans, emails from "cooperating teacher" (p 23), curricular materials developed for their practicum and journal entries were linked into the ePortfolio. Students identified several "reflective-thinking stages" (p 23) that they engaged with through the ePortfolio; while some students felt they needed more "flexibility in portfolio design" (p 24) in order to make it more meaningful, others wanted more "concise directions on what to include in the portfolio" (p 24). Technology support and help were insufficient, despite a "substantial amount of additional time outside of class" (p 26) being provided and more was needed to handle all of these varied uses. The issue of security in relation to student identity and video material was also raised.

Forty-three music education majors and 14 student music teachers responded to questions about an ePortfolio program which had been in place for 6 years in a US university (Thornton, Ferris, Johnson, Kidwai, & Ching, 2011). The ePortfolio was felt to be helpful by some current students and student music teachers for their job searching, and both cohorts were positive about the opportunities it provided for creative expression. ePortfolios were seen as useful by both groups for gathering evidence during their studies with student teachers finding the ePortfolio useful for reflecting on their learning. Overall current students did not envision using the program after graduation but student teachers indicated they would use an ePortfolio after graduation "in their teaching or performing career" (p 71) and encourage their own students to develop one. Both groups noted the need for more technology support and assistance, with several wanting assistance with uploading videos.

Ten first year under-graduate students at an American university responded to their first experience with an ePortfolio through a writing project (Price, 2006). Two key findings emerged – ePortfolios "…increased their sense of investment [in the writing] project" (p 267) making technology less intimidating, finding the medium motivating in relation to creating one's own web page; and a strong sense of "having created these eFolios for themselves, not for an anonymous authority…" (p 268) was noted.

The views of students in the creative arts using ePortfolios focused on how it encouraged reflective thinking, useful for job applications and professional presentation, storing materials plus the need for clear directions, time required, technical skills and flexible platform design.

Methodology

Participants Two cohorts of Australian university Bachelor of Music (B Mus) undergraduate students were invited to participate in the research for the uses of ePortfolio in their learning. In *Cohort 1*, from a class of 62 final-year B Mus students enrolled in a professional practice, capstone subject at Western Sydney University (WSU), 32 responded to a questionnaire (2012). This subject required students to take their music practice into the community, to write a reflective essay about the community project and place the essay plus video/photograph/sound file documentation of it into their ePortfolio. Students were also required to prepare a CV, a cover letter and a professional photograph, for inclusion in the ePortfolio. The thinking behind the subject was for the ePortfolio to be a first step towards showcasing oneself to a potential employer.

Cohort 2 was drawn from students studying the Bachelor of Music Technology (BMusTech) at Queensland Conservatorium Griffith University (QCGU). The BMusTech degree is a music program where the main 'instruments' used to create, capture and disseminate music comprise electronic technologies. Therefore, hard-copy (e.g. paper and CD/USB) portfolios remain relevant as assessment items in subjects where students generate creative-outputs. Portfolios are specific to each subject, are treated as assessment items, are largely private between student and tutor, and form a major part of a student's overall assessment (typically 40 %) each semester. In contrast to portfolios, students build an ePortfolio in their first year, continuing to develop the ePortfolio throughout their program as the ePortfolio is a program requirement rather than a course requirement. Students are encouraged to share their ePortfolios, to make them public and use them as displays of identity and capability. The ePortfolio is assessed at the end of each year (10 % of marks in their major course).

A change in access to different forms of software meant that this cohort was treated as two sub-cohorts. Cohort 2a (prior to 2009) was restricted to using proprietary ePortfolio software. Cohort 2b (post 2010) was instead required to use freely available cloud-based solutions (for example, WordPress in conjunction with YouTube and SoundCloud).

Data Collection Short questionnaires (WSU & QCGU) and panel discussions (QCGU) were used to elicit views of students. The panel discussions at QCGU were open-ended discussions of student views. Cohort 1 comprised thirty-two 3rd year students (50 %) at WSU; Cohort 2a comprised eight 2nd year students (36 %), and Cohort 2b comprised ten first year (33 %) and five second year students (18 %), with a further 40 students responding to a detailed questionnaire.

The two questionnaires and panel discussions, while not offering identical questions, sought student perceptions on: identity and career goals; usefulness of ePortfolios as a current student, to the careers, for potential employers; the roles of Portfolios, ePortfolios; reflections on their creation of an ePortfolio; and challenges in the creation of ePortfolios. (For specific survey questions contact the authors).

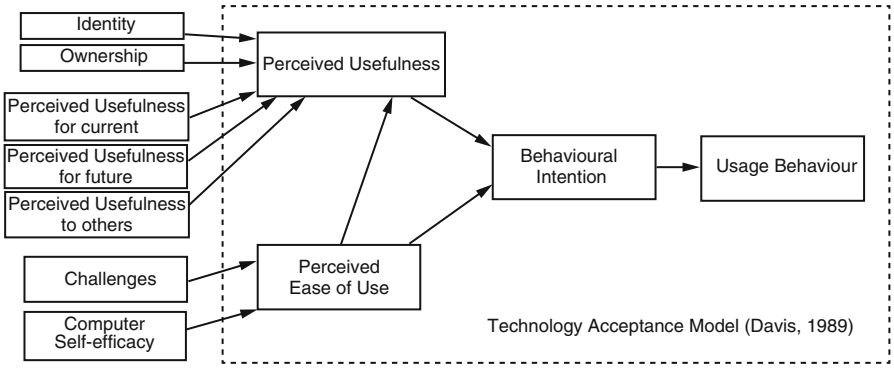


Fig. 10.1 TAM-CA. The extended technology acceptance model for the creative arts

Analysis of Data To investigate how creative arts students respond to the ePortfolio and their perceived usefulness of the platform, a response-categorisation model was sought. As the concepts of perceived-usefulness and perceived ease-of-use are core tenets of the Technology Acceptance Model (TAM) (Davis, 1989), we chose TAM as a core construct in interpreting results. These two acceptance indicators, perceived ease-of-use and perceived-usefulness, respectively refer to "the degree to which users believe that adopting a particular technology would be free from effort …[and]…the degree to which a person believes that using a particular system would enhance his or her job performance" (p 320).

Drawing the original TAM into a creative arts domain presented an opportunity to extend the model to fit creative arts disciplines which, from the review of literature on responses of creative arts students, seemed to have particular requirements. After analysing this literature, therefore, our extensions to the model included aspects of: identity and multiple-identity; perceived relevance to current self, to future career self, perceptions of relevance to a potential employer and perceived use in the future; software ease-of-use; and challenges which may include facilitating conditions, support, technology background and issues arising. These are depicted in Fig. 10.1, TAM creative arts model (TAM-CA).

There are four key concepts in TAM-CA:

1. Identity: is an important aspect in this research context not only to understand students' self-perceptions, but because many of our music students, and those in the creative arts literature, are known to continue on to portfolio careers (Handy, 1989; 2011) where an 'employer' is typically replaced by a range of employers and clients, and full-time employment is replaced by some blend of employment, self-employment and other activities. This is especially so within the creative arts where a musician, for example, can have a career as a teacher (at different educational levels), composer, arranger, performer, sound producer, journalist, among many others, either singly, or several at the same time.

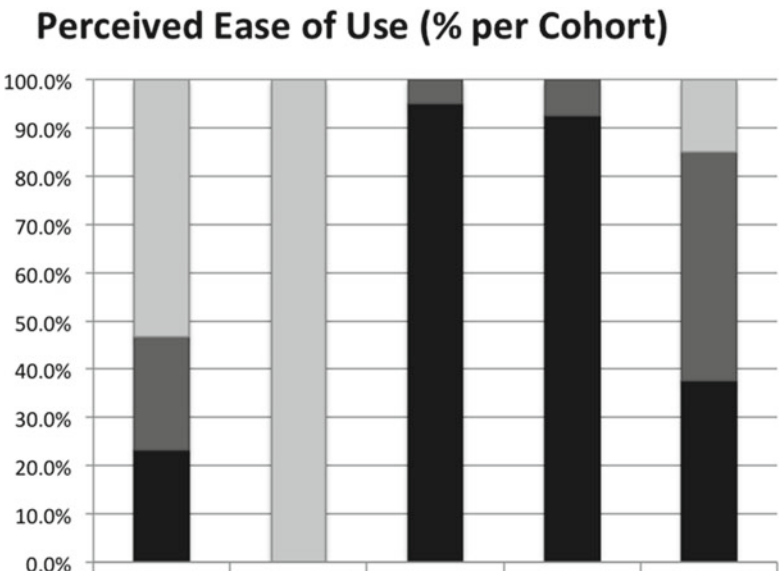
2. Perceived Ease of Use: refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p 320).
3. Challenges: can include facilitating conditions, support, technology skills, among other challenges.
4. Perceived Usefulness: is the degree to which "people tend to use or not use an application to the extent they believe it will help them perform their job better" (Davis, 1989, p 320). In our context, the degree to which an individual perceives usefulness of an ePortfolio is in relation to four goals. These are perceived usefulness for (a) a student, (b) career, (c) an employer, and (d) the future. The construct of usefulness to an employer is largely guesswork on the part of each student but speaks to the students' frames of mind and motivation to create and use an ePortfolio.

Findings

Findings from the two cohorts are discussed in relation to the four concepts in the TAM-CA model – identity; ease of use; challenges; and perceived usefulness for student, for career, to an employer, intention to future use.

1. Identity: Asking Cohort 1 students to determine their primary career goal moved the participants into five career sets – (i) those who want to be teachers (primary, secondary, private instrumental studio); (ii) performers; (iii) composer/arranger/songwriter/sound engineer/producer; (iv) music journalism/special needs/events management/arts industry; and (v) those who want to be a musician. In both cohorts students often self-identified with multiple identities, where identities were seen to be fluid and contextually sensitive, and both had fairly large groups of students who identify as musicians, but no further. The emphasis on teaching and performing in Cohort 1, and on music production and sound design in Cohort 2, reflected the degree programs. While the B. Music is not a music teacher training degree, many students already teach privately while studying.
2. Perceived ease of use (system): Students in Cohort 1 were first-time ePortfolio, and in fact portfolio, users. Half of the students found it difficult or very difficult to use the proprietary ePortfolio platform, the other half found it fairly easy. Cohort 2a found the proprietary system to have a large workload associated with navigating what students variously called 'cumbersome', 'uninspiring', 'poorly designed', 'anti-creative', 'ineffective' and even 'impotent'. By 2013 however, YouTube and SoundCloud were commonly used by Cohort 2a students outside study-life. Any issues arising mostly related to not reading site-specific instructions. Certainly, responses indicated no students struggled with these systems (see Fig. 10.2).

Aggregating systems were new to most of the students in Cohort 2b and therefore posed a greater challenge. Six students self-identified as struggling, three self-identified as failing to meet their own expectations (all first-year students). Students



	Cohort-1 Proprietary	Cohort-2a Proprietary	Cohort-2b SoundCloud	Cohort-2b YouTube	Cohort-2b Aggregator
Problematic	53.4%	100.0%	0.0%	0.0%	15.0%
Challenging	23.3%	0.0%	5.0%	7.5%	47.5%
Easy	23.3%	0.0%	95.0%	92.5%	37.5%

Fig. 10.2 Perceived ease of use by cohort

attributed their "failure" to underestimating the complexity of ePortfolio-creation and subsequent last-minute attention to the necessary detail. Figure 10.2 depicts the range of responses pertaining to Perceived Ease of Use of the different ePortfolio systems in use across the cohorts.

3. Challenges: The cohorts of this study used a range of ePortfolio systems. Cohort 1 used a proprietary ePortfolio system. Cohort 2a used a proprietary ePortfolio system. Cohort 2b used cloud-based systems (SoundCloud & YouTube & a text-based aggregator of their choosing). Seven students chose Wix, 16 students chose Weebly, 13 students chose Wordpress and four students opened their own web domain. It was not possible from the data gathered to determine which aggregator software aligned with each of the Ease of Use categories. It was also not within the scope of the data gathered to determine what system the students with their own web domain were using.

The term 'Challenging' is framed as a positive challenge in contrast to an issue perceived as a problem. Cohort 1 received a half-lecture on the institutionally-provided proprietary ePortfolio platform but no tutorials. As the platform was being trialled by the university in three disciplines – engineering, medicine and music – a dedicated support person was available for staff and students. Support was also

available via purpose-built online documentation and fast turn-around email communication. Despite this, around 60 % of the students indicated that they felt they had little or very little support for using the ePortfolio platform, and one suggested that more time was needed to introduce the platform, "over several years would be ideal", while others felt there was sufficient or a lot of support. Students responded they would like to choose a different platform, redesign it, would like more support in relation to uploading documents successfully, and issues such as "no word count facility" were noted. Overall 16 students stated the platform itself was problematic, eight stated the context was problematic and 17 stated there was insufficient help available for their needs.

The Cohort 2a *vox populi* elicited strong agreement between students that the technical issues were considerable (as raised previously in this chapter) and this had strongly impacted their negative feelings towards ePortfolio use. Within Cohort 2b however, expressed challenges were dominated by aspects of self-identification with only a few raising web technology as a cause for significant concern. Student responses on perceived challenges were sorted into five categories, with students sometimes appearing in multiple categories. These categories are:

- Web Technology mentioned in a positive light (19 students);
- Identity (20 students);
- Complexity (15 students);
- No challenges (only where explicitly stated as none) (6 students); and
- Web Technology mentioned in a negative light (3 students).

The positively framed challenges commonly position a new grasp of web technologies as an achievement, including learning a new technology, overcoming web technology challenges, being encouraged to seek out information on basic web design and aesthetics, with many stating this contributed toward gaining a heightened sense of self-confidence or achievement.

The most significant challenges students raised were matters of personal identity and the complexity associated with portraying this concisely. Typically students felt they had no right "just yet" to publicly use some of the terms they would use to describe their desired career identity (the act of 'becoming'), whereas they would normally use these same terms to identify themselves (the act of 'being') to their peers and close friends. Some students summed up the views of many when they stated, "I am afraid to oversell or undersell", "I don't want to be accused of misrepresenting myself" and "I did not know where the line was between confident and cocky". Many students suggested job-style criteria would have assisted them, but others said they saw the challenges as healthy ones never before considered. The complexity category was where students specifically raised challenges associated with portraying a complex and often diverse range of skills, tastes, abilities and achievements. Three students stated that interfacing with new web technologies was frustrating at best, one also noting the process had been "discouraging." These three students self-identified as having negative experiences including failing to meet their own expectations. A subtle trend appeared during data analysis, suggesting complexity was of more concern to first year students (possibly related to newness

of task), and third years, (possibly related to pressures of their final year of study around imminent graduation). The data gathered, however, is not sufficient to substantiate any conclusions.

In contrast to Cohorts 1 and 2a, Cohort 2b had no support mechanisms provided via the University or faculty department, and there were no student expectations of institutional support raised by students. Support was limited to peer interactions, online reading material and occasional brief lecturer assistance in relation to more obscure web-design terminology/vocabulary. While this was largely successful, there were three self-identified non-achievers, two self-identifying as late-engagers. Overall students felt well-supported with ubiquitous tech (YouTube and SoundCloud), but had much less familiarity with aggregators, websites that collect related items of content and display them or link to them. The extent of software-related online support materials and personal help from online discussion boards was voluminous and easy to access, and while initially time-consuming, system use rapidly became more intuitive with the result the content soon became the focus rather than the tech or processes.

Student responses show the aggregators that seemed the simplest at face value became more problematic as they tried to exert more control. A shallow learning curve meant a faster start but it was more time consuming to exert more control in completing their portfolios.

4. Perceived usefulness: student, career, employer & future: While Cohort 1 often gave a negative response to questions about using and uses for the ePortfolio platform, a range of alternative responses were given offering perceived uses for using an ePortfolio. As students, Cohort 1 perceived the institutionally-provided ePortfolio platform to be very useful for centralising work including building a portfolio, organising work, research, uploading assessments and for mapping progress. Shared learning included blogs, journals, reflective writing, templates for writing, discussion of uploaded work, collaborative tasks, feedback and accessing academics' blogs. Uploading creative files, whether videos, sound files, photos and arranging, was important. One learning approach suggested was using the ePortfolio for small weekly tasks rather than fewer large tasks; and one student felt they "lacked knowledge" about the platform.

In relation to a future career, perceived usefulness of an ePortfolio for Cohort 1 was uploading creative files for professional use, centralising material and accumulating research, as a teaching tool in schools, and for retaining contact with the university. The career sets who perceived the highest number of useful roles for an ePortfolio after leaving the university were teachers, performers and music journalism/special needs/events management/arts industry. The composer/arranger/songwriter/sound engineer/producer, and musician career sets saw very little, if any, future for ePortfolios in their careers. However, some who identified their career goal as a teacher could see no use, while some performers didn't find the ePortfolio necessary for their performing career, or noted a minimal role. Those who identified as musicians often felt the platform was a waste of time and didn't like the layout. Response about using an ePortfolio in relation to a career was often negative for

composers/arrangers/songwriters/producers while for music journalism/special needs/events management/arts industry career goals, negative comments focused on how confusing the platform was, and lack of instruction for uploading documents. However, all perceived possible uses for the ePortfolio.

Perceived usefulness to an employer for Cohort 1 included a site for resumés, CVs, portfolio for an employer to view, for generally, for future employment. Many were not sure if they would use the ePortfolio in the future. One would use a more popular streamlined platform and another a longer-term platform, five students indicating a future intention to use and 26 students expressing no desire to continue to use an ePortfolio.

Cohort 2a students felt ePortfolios were largely an academic construct to get students to think about their work more holistically but the proprietary system failed them beyond this provocation. Students felt hard-copy portfolios were faster and easier to create, distribute, make attractive, edit and refine, therefore much more relevant to them and peers. Expanding on this, some students stated the ePortfolio felt artificial, had little real sustainability, and while it fostered good practice, was not inviting or inspiring. Students agreed their ePortfolios did not represent the artistic and creative side of the student, further contributing to their perceptions of ePortfolio irrelevance. In contrast, 34 Cohort 2b students perceived ePortfolios as relevant to learning with five students doubtful (first year students). One student (third year) stated they saw no relevance to themselves for student, career or employers, stating social media was the most important form of online engagement. Comments indicative of themes common amongst respondents included:

- Students saw "selves" (identities) and how they have changed/not changed, some reconsidering how they see their past and future;
- Students experienced a cohesive view of their body of work, overall standards and gaps in work for the first time;
- Students often experienced enhanced confidence, an enhanced sense of identity, with final year students thinking of themselves as professionally capable;
- Students were raising standards and benchmarks and being more selective on choices; and
- Typical future-career concerns for Cohort 2a were about relevance for getting work.

With respect to Cohort 2a and usefulness for future career, social media was starting to consume attention at the time, with eloquent students making the case that lots of technology-applicability prophecies had not transpired, thereby suggesting this might just be another one. Overall, students agreed the ePortfolio in its current form was largely irrelevant. However, Cohort 2b surveys show a significant swing toward relevance to their future careers. Reasons for this included: career-oriented networking or collaboration (23 students); online 'showcase' of intellectual and creative engagements (11 students), an online CV/resumé (21 students), demonstrating aptitude as well as ability (8 students); and easy accessibility (20 students).

Opinions and concerns were raised by Cohort 2a that no employers appeared to be interested in portfolios – and those who had spoken to employers about ePortfolios reported paperwork and media were in-favour with employers. Perceptions have not significantly altered in relation to ePortfolios and employers for Cohort 2b. As previously discussed, this construct was included because it contributes to understanding student motivations. Eight students believed ePortfolios would be relevant to potential employers, 21 expressed doubt, and 11 responded in the negative. Despite most of these students considering portfolio-careers post-university, students interpreted the term "employer" as meaning a 'boss' in a job-oriented workplace and excluded the concept of clients being employers. Connecting with a fan base and networking was generally deemed more important than connecting with 'employers', and this aspect lent relevance to the ePortfolio for career purposes.

In explaining their perceptions of relevance, students raised differences between their hard copy portfolios and their ePortfolios as important. These are summarised as:

The hard copy portfolio is worded more casually, longer, and between two people (student and assessor). The ePortfolio is shorter, public, less technical, and presents a more professionally oriented identity developed over an extended period of time:

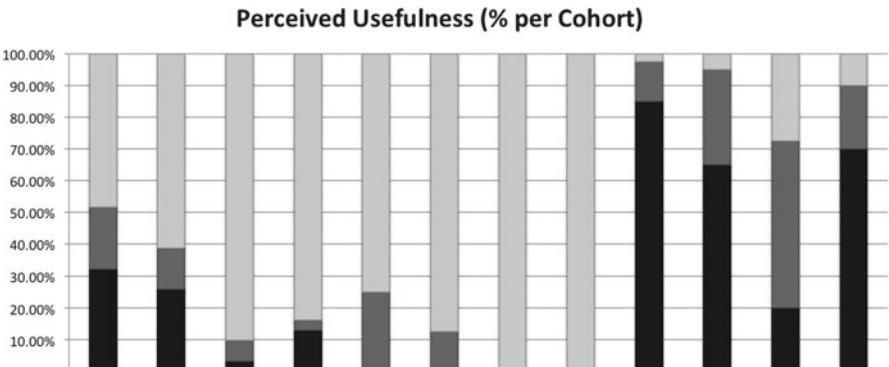
- the portfolio is transitory, forgotten, momentary. The ePortfolio is living;
- establishing an ePortfolio has more pressure and is more difficult – less boundaries and more complexity; and
- hardcopy portfolio allows you to critique and disassemble your work, and removes the professional feel. The ePortfolio dismisses fault to present your work as a commercially viable product.

It was also evident that whereas the 2a Cohort saw their ePortfolios as owned by the university, all students in the 2b Cohort saw their ePortfolios as being wholly and completely owned by themselves.

Students from Cohort 2a discontinued their ePortfolios after the semester's assessment. However, it is known some of these students continue to use social media and/or maintain their own web sites. The 2b Cohort survey elicited 28 students who intended to continue using an ePortfolio after graduation, 13 already using their ePortfolio externally, eight doubtful they will continue use post-graduation and four definitely not.

As perhaps could be expected, perceived usefulness for both cohorts was stronger for student current use, becoming less so as students looked into the future, and what employers might find useful about an ePortfolio was predicted or known by very few. However, when a platform is self-selected, as for Cohort 2b, future uses are perceived and adopted. Figure 10.3 summarises students' ePortfolio usefulness perceptions.

How creative arts students responded to the ePortfolio depended on several factors: current experience with the platform; context being self-selected or institutionally-provided; whether they have a career goal in mind at the time of



	Cohort-1 Student	Cohort-1 Career	Cohort-1 Employer	Cohort-1 Future	Cohort-2a Student	Cohort-2a Career	Cohort-2a Employer	Cohort-2a Future	Cohort-2b Student	Cohort-2b Career	Cohort-2b Employer	Cohort-2b Future
No	48.39%	61.29%	90.32%	83.87%	75.00%	87.50%	100.00%	100.00%	2.50%	5.00%	27.50%	10.00%
Maybe	19.35%	12.90%	6.45%	3.23%	25.00%	12.50%	0.00%	0.00%	12.50%	30.00%	52.50%	20.00%
Yes	32.26%	25.81%	3.23%	12.90%	0.00%	0.00%	0.00%	0.00%	85.00%	65.00%	20.00%	70.00%

Fig. 10.3 Summary of perceived usefulness by cohort

responding; and their technology skills. This discussion, shaped around the TAM-CA concepts, draws on the responses of the two program cohorts plus student views from literature on ePortfolios.

In relation to the TAM-CA tenet of *Identity*, most responses from our two cohorts identified specific career goals although many gave 'musician', a broader term which encompasses many roles. This could indicate uncertainty as to how to talk about one's multiple-identity as a performer/composer/producer, for example, but could also mean that what aspect of music a career will be forged is as yet unknown. The ePortfolio was a medium for creative expression and self-expression.

Perceived ease of use focused on the ePortfolio platform itself, whether self-selected or institutionally-provided. Positive aspects were similarities between social media and PowerPoint programs and ePortfolios, with some acknowledging they were part of the technology generation. Clear trends between problematic proprietary systems that try to suit multiple agendas and easy-to-use cloud-based systems were evident across both cohorts. Within Cohort 1 (institutionally-provided ePortfolio), half found it difficult, half fairly easy, despite all having had sound technology as a compulsory first year study area. Cohort 2 self-selected their own text-based (aggregator) platform but used cloud-based systems such as YouTube and SoundCloud. However, for many in the study (Cohort 1) and the literature, the knowledge from current technology use was not sufficient for working with a new platform. Concerns were raised about the need for help with multimedia skills – editing, uploading, facility for playing video clips – with navigating and using the platform itself and being able to adapt the platform design identified. Some wanted to redesign the institutionally-provided platform, and others wanted to self-select a different ePortfolio platform.

We noted combinations of determinants in relation to perceived ease of use – students who are positive about their current use of ePortfolios and positive about

future applicability; those negative about current use, finding it difficult, stressful, but positive about future applicability; and students negative about current and future use. We suggest that career identity is important, but for many students the future is uncertain or a long way away.

Beyond the ePortfolio platform itself, student-identified *challenges* focused on identity, efficiently portraying complexity, collaborative work, uploading multimedia files, the time required to learn and use the ePortfolio deeply, insufficient technology support and security issues in relation to documents uploaded. One positive 'challenge' was creating an ePortfolio helped make technology less intimidating. This suggests an ePortfolio is an opportunity to explore more ways of drawing technology into one's learning, future career and life.

Perceived usefulness of the ePortfolio was at the heart of the study. While several uses focused on the current student role, many intersected with career-thinking – shared learning, storing/organising and keeping track of documents and multimedia files, storing to show others and reflecting – and married with responses from the literature. However specific uses such as being given small weekly tasks rather than fewer large tasks and accessing academics' blogs for dialogue, both potential learning/teaching strategies, remind us to keep an eye out for 'the odd cases we can use to advance our thinking' (Becker, 1998, p 88). Another example is Rowley and Dunbar-Hall's (this anthology) group of composition and musicology students who felt that the ePortfolio complemented the hard-copy portfolio, another unusual, but potentially useful view of this way of gathering/storing/organising information.

Perceived usefulness for ePortfolios in relation to a career as raised by students include housing a CV, resumé, a job application, professional portfolio including multi-media files and research, facilitating self-promotion and keeping in touch with one's alma mater. Specific career goals allowed students to target specific uses for ePortfolios. Music education students named career-oriented documents, some planning to engage their own students with ePortfolios and use the platform as a teaching tool in schools. However, music students, rather than music education students, who identified a teaching career, struggled to find a role for an ePortfolio in their chosen career because they were not in a study program focused on a teaching outcome. Performers felt the ePortfolio could be useful for their career but couldn't identify how, some seeing no role at all. Those thinking of internships and exchange programs saw a use for an ePortfolio. Overall, this professional practice use for an ePortfolio encouraged reflection on one's future career and in doing so gave an insight into the type of interview questions which might be asked.

Students perceived the housing of resumés, CVs and portfolios for future employers to view as useful to future employers, but some questioned the reliability of the online format in presenting this material. Closely linked to perceived uses for career and employer, future uses were generally viewed negatively as not useful, or adopting a different platform – more streamlined, longer term. The musicology students viewed an ePortfolio as too flashy for what they felt was a conservative area of the music discipline, and generally not required in musicological research. Overall, perceived use decreased in intensity the further from the present students were required to project. Many current uses, short-term future uses, but few uses

were perceived in the long term, or from an employer's perspective, especially for students using an institutionally-provided platform.

The creative arts students' responses shaped a perceived usefulness/TAM model, TAM-CA, which embraced key aspects of previous TAM models but attempted to draw in some of the specifics of the creative arts disciplines. It was found that the four key concepts served discussion well, but within them sub-issues emerged which could be highlighted in the model. These were particularly prevalent in relation to challenges. Ease of use was strongly influenced by who chose the platform – the student or the institution. This selection factor could be identified in the model in relation to institutionally-provided ePortfolios in contrast to self-selected platforms to see if ease of use ceases to be a core tenet in the model. The four aspects of the perceived uses concept served the analysis well, revealing a large number of responses for current use, less for career possibilities, fewer still for the employer's perceived interest and the future. For our study of creative arts students, identity was an important first tenet, giving B. Music students a chance to think about what their career goals are before perceiving uses for an ePortfolio in that career. The music degree student usually has multiple identities and the course reflects this diversity as this is a very different program from music education students who, while also having multiple identities, are studying in a course which is focused on one career outcome.

Conclusion

Several implications for the ongoing and developmental use of ePortfolios in higher education creative arts settings emerged from the study. Having a career goal, and therefore a focused identity as a creative artist, helped students see relevance and therefore perceive the usefulness of ePortfolios. Creative artists, however, often have to present multi-identities – performer and composer, choreographer and dancer, visual artist and teacher, for example, and students need to be able to present themselves in this way. This requires thorough teaching about the human aspect of ePortfolios, career and professional practice in relation to identity thinking, with examples presented to students. If the teachers themselves use an ePortfolio presenting a professional multi-identity, so much the better for making a case for students. Musicology is encouraged to introduce e-learning and ePortfolios with a specific use, which can include research storage, as mentioned in this study by participants, but also building a profile as a musicologist for personal development and for showing future employers. We found that if students are introduced to ideas, they will work with them and develop them. Music programs are encouraged to invite employers to talk about job-seeking from their perspective, allowing students to understand ePortfolio use from a viewpoint other than their own.

While all studies, including this one, raised negative aspects of ePortfolio use, these were often concerns rather than rejection of ePortfolios, although the institutionally-provided proprietary software platforms were often problematic.

These findings are consistent with Garrett (2011) who suggests that "portfolio software should be redesigned to be more open, social, and easy to use" (Garrett, 2011, p 201).

We suggest, from our experience in this study, that an institutionally-provided ePortfolio platform can be a way of starting ePortfolio use with students, preferably available over the length of a course of study, but releasing students to select their own platform has demonstrated strong advantages worthy of further research. Cloud-based technologies offer a superior experience because of: flexibility of choice; lack of storage limits; lack of access restrictions; no obstacles to ownership or transferability; open access to highly developed software support mechanisms; and the included levels of guided or unguided learning of the technology. Findings from Deneen (2013) note a rejection of single-purpose ePortfolio technology in favour of more multi-purpose systems which is the case with Cohort 2a in our study and what Cohort 1 in our study are now using. The two cohorts illustrated this by raising many negative 'ease of use' and 'challenges' comments, with few negative comments from Cohort 2 where they self-selected their platform and engaged in continuous portfolio and ePortfolio use.

There is a need for longer and deeper training in the ePortfolio process and if learning or engaging with technology is not the main point, online ePortfolio tasks should be designed for low-threshold engagement for students and academics. Institutions and teachers should not underestimate how much intervention and assistance bespoke or proprietary systems require of technology beginners, especially when dealing with media. For students to have a broad technology knowledge is not enough. The more frequently a system is used, the deeper the use is of the system and therefore the deeper student learning. As one student in the study wrote:

> basically I think it is a great idea to use it in the future and I understand that it has to be tested. But in future I would implement it at a slower pace to get students used to it. Maybe start in first year with one or two assignment submissions. Frankly, my main problem with it was that I never fully understood what its purpose was.

Without understanding the purpose, introducing ePortfolios is largely without merit, although one student from the study pointed out the need to encourage others to view challenges as a positive, as a way forward in their technology experience and in thinking about how to use ePortfolios, rather than concentrating on the negative. ePortfolios are here to stay and have potential for a valuable place in the lives of creative arts students within university programs and beyond.

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Chapter 11
A Strategic Approach to Institution-Wide Implementation of ePortfolios

Christine Slade, Keith Murfin, and Priscilla Trahar

Abstract The introduction of ePortfolios at the University of the Sunshine Coast was a key component of the university's Blended Learning Strategy: 2014–2016. The main purpose of this three-phased project was the embedding of ePortfolios across program curricula, particularly focused on student learning enhancement. The use of ePortfolios is a way universities can meet the industry push for work-ready graduates and the corresponding necessity for students to develop lifelong learning habits. In practice, however, such an implementation is not always easy to achieve. The aim of this chapter is to present the lessons learnt from one approach of implementation through an action research frame based on the critical reflective narration of processes undertaken by the ePortfolio team in the Learning and Teaching Unit. Key success indicators centre on strategic planning and responsiveness, effective leadership, stakeholder management, communication and program sustainability, and confirms the importance of firmly maintaining project objectives. The use of an agile and multi-faceted approach, facilitated by ongoing yet responsive critical reflection process is necessary to achieve effective integration of ePortfolios into multiple programs across an institution.

Introduction

The introduction of ePortfolios was a key deliverable for the University of the Sunshine Coast's *Blended Learning Strategy* and was undertaken across three phases (see Fig. 11.1). In late 2012 the University's Centre for Support and Advancement of Learning and Teaching (C-SALT) undertook an ePortfolio feasibility study (Phase 1). The outcomes revealed strong demand amongst academic staff for use of ePortfolios to meet both pedagogical and professional needs of students. The project launched in 2013 with an early adopter phase (Phase 2) involving

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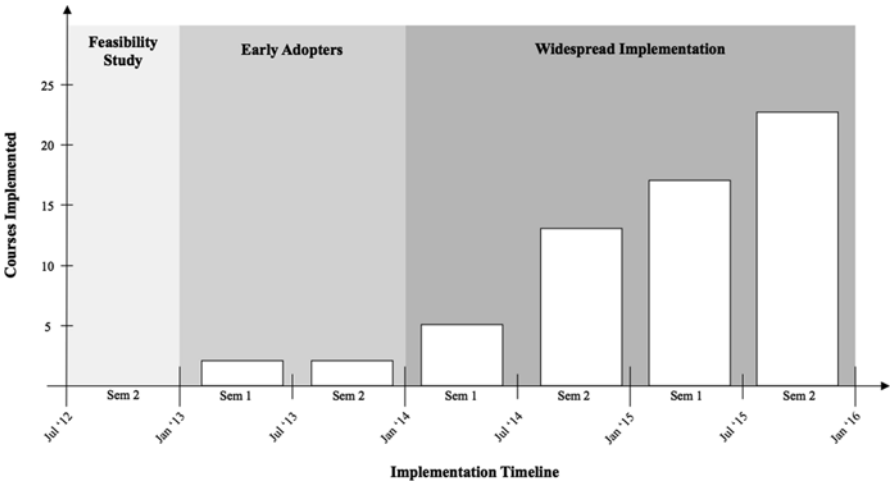

Fig. 11.1 ePortfolio implementation phases 2012–2015

150 students. The university-wide implementation (Phase 3) began in 2014 and in mid-2015 there are around 3500 students actively using PebblePad, the University's chosen ePortfolio software platform. The main purpose of this three-phased project was embedding of ePortfolios across program curricula, and to assure longevity in the use of educational technology, particularly for students. The use of ePortfolios is one way universities can meet the industry push for work-ready graduates and the corresponding necessity for students to develop lifelong learning habits. In practice, however, such an implementation is not easy to achieve.

Introducing a new technology can be disruptive and potentially problematic if not aligned to institutional needs and strategically implemented (Slade & Readman, 2013). Strategies need to consider organisational culture and offer solid support to all stakeholders (Guiney, 2013). Effective implementation of such an educational technology is dependent on the capacity to resource a carefully selected project leadership team who understand the sector; are confident in the benefits of the technology; believe in the aims of the project; and work strategically to achieve them. While top-down and bottom up strategies both have merit (see Sabatier, 1986) this work adopted a middle-out approach with the main change agents, the ePortfolio team, situated in the C-SALT, enabled with agency and capacity to act on the project's strategic design (Parag & Janda, 2010). In this case the ePortfolio leadership team consisted of the following members:

- an academic developer and project leader whose work included curriculum mapping with program coordinators to establish consistent ePortfolio use and leading the collaborative research and evaluation processes across all phases;
- an IT functional analyst who facilitated interoperability between PebblePad and the university's learning management system, and contributed to the project's strategic decision-making particularly in phases 1 and 2; and
- a learning designer who developed customised pedagogical, assessment and professional accreditation resources and just-in-time online video support for academic staff in phase 3.

The team reported to the director of C-SALT, who was also the business system owner and project sponsor.

Project sustainability through routinisation into existing organisational structures and processes is an important element of the project design and ongoing implementation rather than considered near the end (Pluye, Potvin, Denis, Pelletier, & Mannoni, 2005). The inclusion of ongoing evaluative processes provides feedback to guide this planning (Scheirer, 2012). Fostering project sustainability, according to Zehetmeier (2014), includes the perceived benefit to users; support from innovators; fit between the innovation and institution; institutional capacity to receive the change; sufficient resourcing; effective communication between colleagues; ownership of the innovation by stakeholders; and innovation integration into normal institutional operations. The short-term nature of projects only builds limited capacity which, in turn, naturally diminishes or is lost when resources cease, unless planning and action translates into long-term outcomes.

In this chapter we present the key factors in our approach to embedding a new educational technology in a higher education institution, in the hope that it may be beneficial to other middle agents and innovators in a similar situation. We use an action research cycle to structure our case, drawn predominantly from the ePortfolio team's ongoing critical reflective commentary on established objectives, explicit values and responsiveness to contextual change. The cycle includes three main stages: 'plan', 'act', and 'evaluation', resulting in recommendations that initiate re-planning as the beginning of a new cycle as depicted in Fig. 11.2.

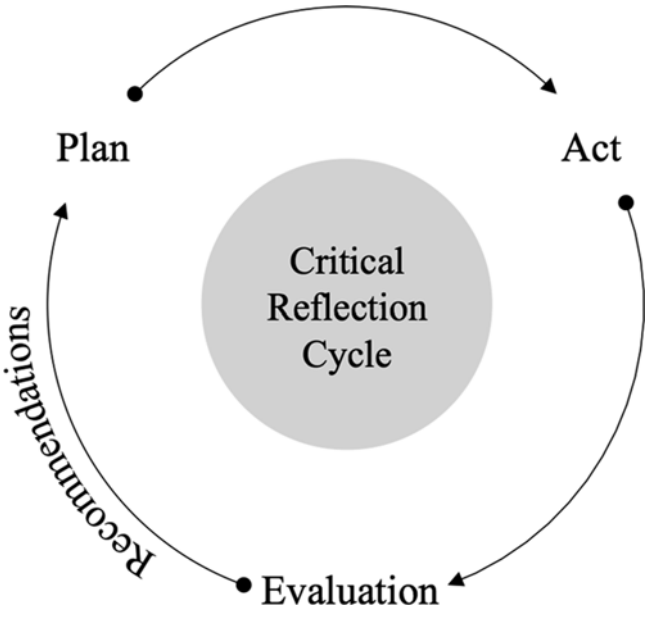

Fig. 11.2 The three stages of the critical reflection cycle

The next section explains the way in which the ePortfolio team undertook the leadership of the overall project. It is divided into the three main project phases, which are then subdivided into the stages of the iterative action research cycle used. Although appearing in such a structure as a succinct linear pathway from planning to action, evaluation and then re-planning, the progression from one stage to another was often overlapping and somewhat messy. There was a constant need for the ePortfolio team to re-plan and respond to contextual changes while still remaining grounded in their firm commitment to the project objectives, values and priorities and robust inter-team communication.

Phase 1: Feasibility Study Late 2012

In this phase we explored whether the university community saw value in using an ePortfolio system particularly for student learning. A detailed account of the processes and outcomes involved in this phase can be found in Slade, Murfin, and Readman (2013). The ePortfolio team was asked to:

1. Investigate the purposes that academic faculty and professional staff have for using an ePortfolio within the context of blended learning, current university systems and resources, and the higher education sectoral experiences;
2. Develop a set of criteria regarding the functional requirements of an ePortfolio at the university, taking into account existing systems and resourcing;
3. Investigate available technologies for achieving these purposes; and,
4. Make recommendations to the university's senior management regarding ePortfolio use at the university.

Plan Given this mandate the team started planning the strategies to find answers. Establishing underpinning values for the project proved to be vital. Without realizing at the time the long-term implications of this step the ePortfolio team agreed to explicitly reiterate to the university community the following core values:

- the opinions of staff about ePortfolios were valued by the ePortfolio team and intricately linked to any decision-making; and
- any future ePortfolio system implementation process needed to be a positive experience for both staff and students.

These values remained in place throughout the whole project and enabled increased 'buy-in' by staff to later ePortfolio implementation.

During this phase there was much excitement in the sector about the perceived benefits of using ePortfolios as an innovative technology but the team was mindful that this was not a solid basis for decision-making. Therefore, they clarified that individually they had no vested interest in the university having an ePortfolio system. Further, they acknowledge that if a system was chosen out of this process, they had no pre-empted bias towards a particular system and the choice would be based

on merit. This agreement legitimised the value of the work because it was not muddied by the wishes of the ePortfolio team or individual champions but rather based on an institutional decision for the benefit of students.

Act The ePortfolio team took a collegiate approach in asking the university community what they wanted. This was challenging at times as there were different levels of ePortfolio knowledge across the community, ranging from no knowledge to a sophisticated understanding of both pedagogical and professional benefits. All levels needed to be addressed simultaneously while still remaining focused on the phase's objectives. A variety of data collection methods were used including a staff survey, learning and teaching week promotion, small group interaction and a volunteer user trial.

While the focus of the feasibility study was internal, the ePortfolio team recognised the benefits of learning from other institutions' experiences both in system choice and implementation strategies. Two major opportunities arose at this time; an invitation as part of the Regional Universities Network (RUN) to shadow Southern Cross University's ePortfolio implementation, and participation in the recently formed *Australian ePortfolio Forum* held in Sydney in 2012. On the back of this Forum the University of Sydney held a *Student ePortfolio Showcase* as part of their Australian Office of Learning and Teaching (OLT) funded research into ePortfolios for the Creative Arts, Music and Arts Students. Another key factor in our decision-making process was the announcement by Blackboard (our learning management system) at the time that they were not going to undertake any significant improvements to their ePortfolio tool.

Effective communication was seen by the ePortfolio team as vital to planning and responsiveness, and to enable successful management of all stakeholder groups. Internally structured and just-in-time communication between ePortfolio team members provided the ability to progress the project and stimulate quick response to new challenges. More widely, initiating communication processes both up and down the stakeholder ladder enabled all stakeholders to be informed and included where needed in decision-making processes, thus making the project outcomes easier to achieve. One example of this process was the formation of a staff email interest group which attracted the early adopters, who later were asked to participate in a short software user trial and then provided valuable user information back to the ePortfolio team.

As a result of these investigations, recommendations were submitted to the University's Learning and Teaching Management Committee to adopt an ePortfolio system and proposed a solution. The ePortfolio team believed there was sufficient evidence, based on pedagogical and professional feedback from a diverse number of learning and teaching areas within the university, to support the implementation of the PebblePad personal learning and achievement system for student use. The recommendations were accepted by the Committee.

Reflective Evaluation and Recommendations The ePortfolio team spent formal and informal times together reflecting on the impact of their planning and actions as

they considered this iterative process vital to the ongoing success of the project. These reflective conversations provided strong foundations for the future phases of the work because they enabled adjustments to existing plans and actions to adapt to contextual changes and stakeholder needs. The results were satisfaction in:

- gaining early institutional buy-in and the rigorous nature of the software platform selection processes used;
- developing internal capacity;
- establishing positive and workable values;
- building institutional awareness; and
- identifying the importance of user support, training and resource development.

The major anticipated outcome of this phase was to develop an application for strategic internal funding in preparation for a university-wide ePortfolio implementation process in 2014, which would focus on student learning and ensure adequate staff resourcing and suitable licensing arrangements.

Phase 2: Early Adopters 2013

The decision to proceed with investigations and planning for a university-wide implementation had an unexpected outcome. The Bachelor of Occupational Therapy program leaders who were consulted in the feasibility phase were keen to start ePortfolio use in their recently reviewed program at the beginning of 2013 rather than waiting to 2014; thus creating an Early Adopter phase.

Plan In response to this request, there emerged an opportunity to establish internal capacity building processes that would inform the strategic planning of the later university-wide implementation (Phase 3). Therefore, the Master of Midwifery program was invited to join this phase, which gave the team one undergraduate first year cohort (140 students) and one postgraduate cohort (15 students) plus associated academics, as early adopters.

The values underpinning this planning phase remained the same as in the earlier feasibility phase. We were mindful that for the implementation to be successful we had to devise a sustainable approach to introducing ePortfolios into a program or course. The key factors were identified as staff ownership and self-efficacy in using ePortfolios so they would be able to support their students in their use of the ePortfolios. We worked within a short timeframe to design and establish a three-pronged approach to partnering with the academics involved, namely substantial support for teaching implementation; partnership in researching the aspirations and experience of their students' ePortfolio use; and engendering a sense of belonging in the emerging ePortfolio community.

Act In line with project values and planning strategies previously mentioned, the project leader undertook two initiatives: curriculum planning and establishing a

research collaborative with the early adopters. First, to maintain a consistent experience for students the project leader worked with program leaders to map how ePortfolio use would be threaded through the program curriculum. In each semester of the program at least one course was identified to use ePortfolios so that students maintained continuity and built up their body of evidence to support their accreditation application on completion of their degree. Second, the project leader facilitated the ePortfolio research collaborative, leading the research design and gaining human ethics permission to survey, interview and conduct focus groups with students. Learning and teaching staff collected the data, predominantly at this stage from pre and post-usage student surveys, and at the end of each program the project leader shared this information with the academics involved for use in reflective evaluation of their implementation and research dissemination purposes.

The IT functional analyst conducted training and individual support sessions with the course coordinators immediately using ePortfolios in the next semester to build up their knowledge and confidence so they in turn could support their students. There were two different approaches to training at this time. In the smaller midwifery cohort all student training was provided by the ePortfolio team during lecture and tutorial time. In the larger occupational therapy cohort the IT functional analyst trained the course coordinator who, with support from an eLearning support officer, ran training sessions in a computer lab outside course time. This method, however, proved ineffectual due to poor attendance. In response the course coordinator, again with the support of the functional analyst, produced six short just-in-time instructional videos which explained to students how to login, perform basic functions and submit their reflective assessment task. This method proved particularly successful and this strategy was used again in Phase 3 of the implementation.

Another action out of the strategic planning was continual promotion of the benefits of using ePortfolios to raise awareness and build interest. While a large volume of material was available to use in this promotion from external sources, it was more challenging to address requests for showcasing a range of our own customised resources and student ePortfolio exemplars because they were still in the early stages of production. However, we embraced a number of internal and external presentations, produced short promotional videos and published our experiences in the sector in order to build awareness and garner project credibility.

Reflective Evaluation and Recommendations The Early Adopter phase provided us with an opportunity to use our model with a small cohort in preparation for the wider rollout in 2014. Invaluable insights for reflection in readiness for planning the larger implementation phase included:

- a measured and staged implementation increases the likelihood of success because it allows time for curriculum development and opportunity for supporting staff and students. It confirmed that taking a ‘program level’ approach was right;
- the need to establish a formal but supported process for new programs thinking of introducing ePortfolios into their curriculum; the endorsement of such an ini-

tiative from the associated Head of School; and recognition of the value of the support given by the central learning and teaching centre;
- realisation that is was not feasible for the ePortfolio team or central e-learning support staff to provide training for students. It was also evident that when dealing with a large volume of students, the pragmatics of scheduling venues and staff resources within class time to conduct training in computer labs was not possible. Further, attendance was almost non-existent when computer lab training was offered outside of scheduled tutorial time;
- The importance of assigning assessment weighting to student tasks when using PebblePad. As students are inherently motivated by grades, we found they did not engage with PebblePad when there was no or very little value assigned to using the ePortfolio tool; and
- the critical need to acquire sufficient funds to resource the right mix of project staff for Phase 3. We estimated that it would take 3 years to complete a foundational university-wide implementation.

An internal funding application was developed based on our reflective evaluations of Phases 1 and 2, and submitted to our Strategic Asset Management Projects (SAMP) process to secure funds for a university-wide implementation project spanning 3 years from 2014 to 2016. The strategic elements included the request to fund a staged license cost for the application over 3 years and to employ an academic developer and a learning designer for the duration of the project.

Phase 3: Widespread Implementation 2014–2015

The application for funding was successful but for a 2-year timeframe rather than 3 years. The project leader from Phases 1 and 2 continued as the academic developer (ePortfolios)/project leader for Phase 3 and a learning designer was engaged. The IT functional analyst's time allocation in the project was gradually reduced during this phase. Given the agile and strategic nature of the project and the ongoing re-evaluation that was integral throughout the process, the next section will detail the plans, action and evaluations of Phase 3 on a semester-by-semester basis.

Semester 1 2014

Plan Based on the reflective evaluation from Phase 2 the ePortfolio team planned to introduce Expression of Interest (EoI) and Service Level Agreement (SLA) processes for new programs wanting to use ePortfolios at the beginning of 2014 facilitated by the academic developer. Further, it was decided to continue the ePortfolio research through 2014 and into the first half of 2015. It was anticipated that a Community of Practice would emerge from the cross-disciplinary research collaborative as mentioned in Phase 2.

Further, in order to maintain support levels when adoption was more widespread, it was important for the learning designer to develop a suite of in-house resources and training materials to support academics, particularly within the scope of the values and objectives of the project. This support would initially be available for the early adopter programs to ensure that the initial momentum was maintained. Additionally, two other degree programs, Education and Nursing, had shown interest in implementation. It was important that these programs were encouraged to engage with the team resources to plan successful implementations. At this stage of the Phase, the importance of staff training was paramount to ensure that academic staff were able to use and understand the system and had confidence to introduce it to their student cohorts. Training was planned as 2–3 h workshops for each teaching group (course coordinators and sessional staff where possible). These sessions were designed to give a contextual overview of ePortfolios in general and then specifically equip staff with skills in PebblePad, including being able to assist students with learning and using the platform.

Act As soon as the SAMP funding was approved, the learning designer joined the ePortfolio team and began working with course coordinators from the early adopter phase and for the first time, an Education course. To prepare these coordinators for the semester, the learning designer worked one-on-one with them to determine the best approach for designing assessment resources in PebblePad that supported student learning. Knowing that students attached meaning to tasks with assessment weighting, it was important to select assessment tasks appropriate to the technology and, therefore, not try to retrofit assessment in order to make it useable within the technology. It was clear in this process that academics needed to understand how templates worked within PebblePad and that they had to be engaged in template creation. This was effective because it increased ownership over the process and academics began to gather skills in editing and creating resources, aligning with the project values of creating a sustainable approach to developing self-efficacy for participating academics.

Initially, each teaching cohort was offered team training so that they could understand the platform, the capabilities and then be confident to introduce PebblePad to their students. One teaching team engaged with this training however, because of the varied ways that PebblePad was being used in different programs and also due to difficulties in having entire teaching teams together in the one place at the same time, team training was discontinued.

Student training took a mixed-model approach this semester. The early adopter courses that were running for a second time had counted on the ePortfolio team leading student-facing training sessions. The team had already decided that this was not sustainable in the long term. The new education course coordinator did not have classes scheduled in computer labs and the cohort was too large to move them for one training session so with the help of the learning designer and IT functional analyst, the course coordinator developed a screen-cast video showing students how to find and use the bespoke assessment resources. This decision came about after reviewing the success of the videos produced for the occupational therapy cohort in

the early-adopter phase. This video proved to be a valuable resource as well as a valuable lesson for future training delivery.

Throughout this semester, the academic developer/project leader continued to engage new programs through a newly established Expression of Interest (EoI) process and then introduced academics to the learning designer to assist with resourcing. The EoI process was introduced to ensure consistency between initial student use and the long-term goals of using ePortfolios across program curriculum and facilitate the process to identify the next wave of programs to start using ePortfolios. Rather than prescriptive, this process was a supported one in which the academic developer assisted programs to perform their course and curriculum mapping, gain support from their colleagues and obtain school recognition. A Service Level Agreement (SLA) was also put in place to both confirm the ePortfolios team's expectations and support obligations and the commitment from the staff and Head of School involved. In larger schools an ePortfolio liaison officer was appointed to assist staff on a first level inquiry basis.

The ePortfolio research project expanded into a research collaborative across a number of discipline areas. Academics enjoyed meeting others from different disciplines and cross-discipline publications were encouraged. During 2014 this approach proved very successful as it allowed academic staff an opportunity to meet their research obligations while improving their engagement with technology and the ePortfolio team. They were provided with student feedback without putting in undue effort and they could evaluate their implementation. Upon reflection, the process of collecting data from students was modified from just face-to-face to a mix of online and face-to-face. There were several reasons for this change; address the fact that a number of students were out on placement at the time of administering the post-use survey and the ease of data analysis having students submit to Survey Monkey online. It was decided that the optimal data collection strategy was to put an invitation to participate, including a link to the survey, in the announcement section of course's Blackboard site. The ePortfolio team would still go into the classroom to administer the survey but given a large number of students bring a mobile device with them, they could complete the survey online in that context or outside of class. This strategy produced a solid sample size in most courses.

At this stage of the project PebblePad was not integrated with Blackboard, the University's learning management system (LMS). This meant that all new PebblePad user accounts and workspaces in ATLAS (the Active Teaching, Learning and Assessment Space in PebblePad) were manually created. Batch creation was available, however, which allowed for faster processing, particularly for the two larger student cohorts.

PebblePad held the bi-annual 'PebbleBash' conference in Australia for the first time (14–16th April 2014), and the ePortfolio team presented three case studies (see www.pebblebash.co.uk/2014/) and networked with representatives from other universities and the Pebble Learning Team. This collegial environment proved invaluable in both making further ePortfolio community connections and learning new techniques from the practices of colleagues at other institutions. Upon returning from this event, the ePortfolio team was able to increase the variety in solutions for

academics and began to run Q&A sessions on campus in an attempt to reach academics beyond existing user programs.

Reflective Evaluation and Recommendations Following the success of the Education course submission we evaluated the reasons that the first-year, first-semester cohort were able to use and submit their templates with so few problems compared with cohorts in the early-adopter phase and other cohorts running concurrently in Semester One. The narrated screen-cast 'how-to' video seemed to be the differentiating tool for success. This model was then used more broadly in Semester Two 2014 and embedded thoroughly throughout 2015.

It was clear that the Learning Tools Interoperability (LTI) link between PebblePad and Blackboard was essential to be able to manage larger cohorts in account creation and also for grades to be able to be transmitted from PebblePad to the grade centre in LMS Blackboard, rather than academics having to manually enter this data. It was decided that the IT functional analyst and learning designer would work through numerous account creation scenarios and begin liaison with PebblePad's technical team to enable the process.

The use of the EoI and SLA process was accepted and enabled conversations between the program leader/s and the academic developer about assuring consistency of use for students and mapping ePortfolios into curriculum progressively over the program to achieve the desired goal/s for students at graduate level.

The Q&A session brought ePortfolios into the forefront for some faculty areas where there had not been previous interest. It was decided to continue to run these at roughly monthly intervals.

A rethink was required concerning the most appropriate time to ask students to complete the post-use survey. Initially, this process was completed at the end of the first semester of use but in discussions with course coordinators it was decided that there could be a longer lag time between pre-and post-use surveys.

Semester 2 2014

Plan The interest in ePortfolios had grown considerably and numbers increased from four courses in Semester One to 12 courses in Semester Two. Course setup and account creation was still happening manually so the learning designer had to be systematic in planning and accommodating these processes. Training was now being planned on an individual basis as well as through the one-on-one resource design process which was running smoothly and the learning designer was able to build capacity in teaching academics to be able to develop their own resources. Further Q&A sessions were scheduled for the remainder of the semester and realising the link between Blackboard and PebblePad was ongoing.

Act As PebblePad and Blackboard were not yet set up to exchange information the twelve courses this semester had to all be manually created, including user accounts.

This meant a massive workload for the learning designer (supported by the IT functional analyst) and keeping on top of the individual course requirements with differing timelines was a challenge. This highlights the importance of the support team – without a dedicated learning designer in these early stages it may have proven impossible for academics to setup the workspaces themselves.

There were three more Q&A sessions over the semester (having held one in the mid-semester break as well), which meant six had run in total. These sessions were very useful in publicising ePortfolio use and the team was able to give different examples of assessment types and uses as the semester went on. It was clear that once academics could see other real-life examples of assessment that they could see more clearly how such a tool could be implemented in their own courses and programs.

Staff training was still an evolving process. In the mid-semester break, and prior to Semester Two, the team ran two training sessions simultaneously, one for first-time implementers/beginners and then an advanced session. While these sessions were popular, there were still issues with differing digital literacies, different implementation methods in different programs and not being able to get everyone in the room who needed to be there due to scheduling conflicts.

ePortfolio engagement in the wider sector was further enhanced when the learning designer attended the annual *Australian ePortfolio Forum* at La Trobe University, Melbourne which brought users of all ePortfolio platforms together for practical workshops, information sessions and presentations. The learning designer facilitated a round-table discussion. Further connections were made, new methods learned as well as the ability to workshop with other ePortfolio users around different modes of use. The academic developer and learning designer also delivered a presentation about the ePortfolio student experience research at the University's Research Week which promoted the work to a wider audience.

Reflective Evaluation and Recommendations The team reflected on academic staff training sessions delivered during the semester and decided that academics did not need to be PebblePad experts, but rather guides for the students to be able to find and use their resources in the system. This decision represented a major shift in focus and enabled the learning designer to design a suite of just-in-time resources to support teaching academics in guiding students using the platform. Once again the concept of how-to videos was revisited and the learning designer began using these to support training for both academics and students.

Nearly 600 students had been surveyed so the academic developer decided to cease taking new courses into the research project and further, the post-use surveying under the current human ethics approval would cease in 2015. This would allow time for data analysis and dissemination of results within the project timeframe.

The Community of Practice had not been as active as originally hoped or anticipated over this semester. This was seen to be largely due to increased workload within the ePortfolio team and therefore the ability to drive this initiative was hin-

dered. Upon reflection it was decided that an academic from outside the ePortfolio team needed to champion this group.

Semester 1 2015

Plan After manually managing the user and workspace setup for the previous year, it was essential now to have the link working between PebblePad and Blackboard. The ePortfolio team planned to ensure this was working and thoroughly tested in the time between Semester Two 2014 and Semester One 2015. Liaising with internal IT infrastructure managers as well as the support team at Pebble Learning was sometimes difficult with competing priorities, workloads and different time zones. The IT functional analyst and learning designer facilitated discussion between the IT teams, and worked to ensure the tool that would create the link between PebblePad and Blackboard met the requirements of our users and students.

The ePortfolio team was focussed on reaching a level of institutional adoption at the start of this second year of widespread implementation. In order to achieve this, one of our large first-year courses needed to come on board. While initially it was anticipated that Nursing would provide significant user numbers, the Nursing school had competing priorities and were not ready to bring ePortfolios into their courses at this stage. Our institution runs a very large compulsory first-year communications course that prepares students for many of the assessments and technologies that they will encounter throughout the rest of their degrees. While this course did not represent a programmatic approach to implementation, it did mean that the vast majority of students who went on to use the platform in other programs would have been exposed to and ePortfolio and that other students whose programs had not implemented PebblePad would still be exposed to the tool for their personal learning. To this end, the ePortfolio team had discussions with the course team and it was agreed to trial implementation in Semester One 2015. This cohort was expected to number 2500 students and therefore the implementation required a lot of planning.

Act As at the start of semester, a total of 17 courses being using PebblePad, including nine courses that had not previously implemented PebblePad. The ePortfolio team advised academics that students would now be able to access accounts directly through Blackboard and that grades in ATLAS could now be communicated back to Blackboard's grade centre. This was met with enthusiasm by academics as it now provided a seemingly seamless process for students to access their PebblePad accounts. Links were setup in Blackboard that would take students straight into their accounts (and create accounts for any user that did not previously have one).

The wider roll-out of course and task-specific training videos proved to be popular and eased academics' fears that they needed to be experts in the platform. How-to videos were narrated and annotated and uploaded to YouTube with links back into Blackboard. This meant that students could find all their PebblePad resources in the

one space and were able to access just-in-time training at times that were convenient to them.

During this semester, significant inroads were made with the Blended Learning (BL) School Plans that would demonstrate how the schools were meeting BL targets. Each school or faculty in the University had a Blended Learning 'Champion', responsible for overseeing the school plans which were ultimately signed off by each Head of School. PebblePad featured significantly in many of these plans and with this increased focus the Community of Practice was again raised as an area where experienced users could share knowledge and experience.

Also during this semester, the academic developer worked with PebblePad's consultant, over a number of weeks to write an application for a national *LearnX Impact Award*, in the Best New Technology Implementation – eLearning widespread adoption category. The learning designer included supporting examples of resources as evidence and provided expertise in the visual presentation of the application, which was submitted to the judges as a showcase portfolio using PebblePad software. The ePortfolio team was awarded as Platinum category winners for their successful widespread implementation project. At the end of semester the ePortfolio team submitted another application for a national award in the *ATEM/Campus Review Awards for Best Practice in Tertiary Education Management*. The team received a commendation in The BoardPad Award for Excellence in Innovation category. These awards raised significant institutional awareness and highlighted that being responsive to the needs of users while maintaining such a scale of implementation was not achieved by accident.

Implementing in the large first-year communications course proved to be more difficult than in other courses. Several factors at both an institutional level and the course level meant that the teaching team were not as prepared to take on the implementation as initially planned. Sessional training was offered however less than half of the teaching team elected to attend training. This meant it was difficult to ensure that all students were receiving the same message and providing support was difficult with such differing levels of knowledge of the platform. However, there were a number of gains from this experience:

- There were over 1600 submissions in PebblePad which proved the robust nature of the platform.
- A workbook was developed to support and enhance the group process. While the assessment task only 'marked' the presentation component, the accompanying learning process for students over a period of weeks was invaluable. A combination of process and presentation could be built into the total grade for the assessment task in future.
- Students measured their progress in developing three of the University's Graduate Attributes mapped through this task. The workbook asked the students to rate themselves against the attributes of Communication, Collaboration and Organisation both week to week and as a final reflection. Student answers (which were voluntary and numbered at well over 900 in each category in the final reflection) showed that students are making links between their coursework, other courses, and future employment.

Reflective Evaluation and Recommendations This semester ran very smoothly as a whole and taught the ePortfolio team that the addition of the link to PebblePad via Blackboard further normalised the platform into courses. There were lessons learned from offering PebblePad in the large first-year communications course including:

- there should have been more lead-time to prepare the large teaching team and sessional team for PebblePad use;
- starting with a smaller second-semester cohort may have been a better idea given that this group ended up number over 2200; and
- a need to define more clearly the roles and responsibilities of the teaching team.

Semester 2 2015

The focus in this final semester of widespread implementation is to move from being project-based to normalising these processes and support in the centralised learning and teaching unit. It is important to ensure that this handover happens sustainably as per the initial project aims. To this end we have:

- aided in the establishment of an academic-led community of practice;
- developed a suite of generic just-in-time self-help resources for both students and academics;
- introduced an optional e-portfolio approach to the University's PPR (professional performance review) cycle through a series of staff development workshops;
- communicated with ongoing Academic Developers and Learning Designers to ensure that current practices in program curriculum mapping and resourcing are continued;
- trained the educational technologies support team to be the first point of call for academic support; and
- concluded the current project's human ethics approval with the view, in discussion with involved academics, that a new ethics application be developed to build on the initial application to research program level progress and the longitudinal use of ePortfolios by students.

These measures are hoped to build the long-term capacity needed for the project systems and procedures to become embedded as normal practice within the institution.

Key Learnings from This Implementation Approach

In this section we briefly discuss five key principles that contributed to the effectiveness of this institution-wide implementation that may be useful for other learning and teaching staff, academics and/or practitioners in the ePortfolio sector nationally

and internationally. We acknowledge that this is only one implementation approach at a regional university but can envisage that these principles have currency for other sized institutions, both in Australia and in other countries.

This project demonstrated that it is essential to clearly define and articulate a project's goals and milestones, and to continually be thinking of how a situation can benefit strategic goals. Creating project values and ensuring that they are always upheld, and remaining agile enough to adjust planning to new opportunities and challenges became factors that we encountered. Consider timing, current institutional context, the importance of capacity building, and long-term benefits for students all became clear objectives, as did the need to work at a program level, and establishing a solid foundation before moving to other priority areas, such as student services, careers, co-curricular, and staff. Just-in-time resourcing and training, rather than assuming that users need to know everything upfront, became parts of our practice.

In the area of staffing, brainstorming ideal staffing arrangement to suit ePortfolio implementation, and advocating to decision-makers for this staffing model is essential. There is a need to manage stakeholders effectively and to develop and maintain strong communication links with all stakeholder groups, institutional leaders, funding bodies, heads of schools, program leaders, course coordinators, individual academics, support staff and students. This can be facilitated by having proof of impact and evidence of success by research outputs, such as publications. Working within institutional policies and priorities ensures that objectives and outcomes are branded as institutionally significant. Regular evaluation and promotion of progress can be assisted by embedding evaluation processes into the design of implementation processes. Strategies that can value add in this include publishing on the nature and outcomes of the process, applying for external awards to recognise work, collating and presenting resources from the process.

Conclusion

The use of ePortfolios is a way universities can meet the industry push for work-ready graduates and the corresponding necessity for students to develop lifelong learning habits. In practice, however, such an implementation is not easy to achieve. This chapter provides insights into the strategic decision making processes involved in such an implementation and confirms the importance of firmly maintaining project objectives and values throughout all the phases to concomitantly focus on achieving specific goals and the consistency of promoting positive processes founded on collegiate values. Furthermore, a hallmark of this project was the use of a multi-faceted strategic approach by the ePortfolio team that was flexible enough to digress temporarily from a straight path to meet objectives and respond to serendipitous events or negative contextual changes. Another facet of this strategic approach was the ePortfolio team's capacity to manage multiple levels of stakeholder groups facilitated by mature communication skills and processes. Finally, the

ePortfolio implementation benefitted from the ongoing formal and informal critical reflection processes used by the ePortfolio team that enabled clear decision-making and readjustments.

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Chapter 12
Building Professional Capabilities: ePortfolios as Developmental Ecosystems

John Taylor and Jennifer Rowley

Abstract In this final chapter we explore the concept of the portfolio 'ecosystem' in relation to student professional identity development. Evidence of how creating an electronic portfolio contributes to a complex relationship with students' learning and development is provided through students' comments. In addition, we propose a model that indicates a building of desirable graduate capabilities through students' experience of developing their ePortfolio incrementally throughout their degree – thus supporting students' learning and identity development. Within the context of the broader teaching and learning literature, the chapter draws together the previous 11 chapters into a conceptual theoretical framework across relevant fields to reflect aspects of portfolio use in Higher Education. This concluding chapter critically assesses the students' voice in the development of a professional identity and draws on recent data from students engaging in creative ePortfolio development across disciplines. We propose that educator engagement with ePortfolio development can help refine our understanding of some of the fundamental commitments and dynamics of learning. The chapter concludes by highlighting a number of learning pathways that may enhance the sense of self-efficacy for Higher Education students and life-long learners.

Introduction

The preparation of graduates is arguably more challenging than ever before and employability is emerging as a critical concern across the Higher Education sector (McIlveen et al., 2011). The role of teacher is crucial in graduate preparedness and the process of creating an ePortfolio assists students to actively engage in a scaffolded journey of development, which increases the value of their learning (for example, making meaning). As noted in the previous 11 chapters of this anthology, an ePortfolio is a collection of electronic evidence assembled and managed by a user in their own learning space and, unlike other learning tools, the ePortfolio

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provides a longitudinal view of learning that encapsulates a holistic picture of students and graduates professional self as they gain experience in collecting, curating and classifying evidence while reflecting on discipline-specific knowledge, learning and tasks. Students who embrace the process show skill in manipulating their learning artefacts to be presented in a demonstration of achievement in different content areas and to develop skills for other arenas, such as work readiness and identity development (Rowley & Munday, 2014).

Skills learnt in the creation of a student ePortfolio can be translated into the tools required for work readiness. For example, students at many tertiary institutions prepare a script and practice a "one-minute me" (an elevator pitch[1] style summary of themselves) in their final year of study and have this at the ready for potential job applications and interviews. This has immediate relevance for the 'real world' communication skills (such as clear and concise messages tailored to certain audiences and appropriate communication at the appropriate times) and real world problem-solving skills (such as situational analysis, developing creative solutions and following through on action plans) identified by employers as desirable in new graduates. A study by Procter and Whatley (2011) investigated the use of ePortfolios on work placement and reported that they led to deeper learning about their experiences and provided an enhanced channel of communication. Research detailed in this book demonstrates that portfolio development allows students to engage in skills identified as lacking in graduates (i.e. real-world communication and problem-solving skills) and studies show ePortfolios can assist in building capacity for employability (Oliver, 2013).

Literature Review

The ePortfolio has existed as common educational practice across a range of disciplines from the early 1990s and has become an object of research in higher education globally (Dunbar-Hall, Rowley, Brooks, Cotton & Lill, 2015). In teacher education contexts, ePortfolios have been shown to have strong effects on how students learn (Conkling, 2002; Rowley, 2011), and on identity construction and understanding for future career development (McAlpine, 2005; Williams, 2007). Electronic portfolios were introduced to higher education for various purposes, with a main purpose being to serve as an inventory of acquired knowledge and skills (Hartnell-Young, 2006; Stefani, Mason & Pegler, 2007). Since the introduction of ePortfolios, researchers have described varied impacts on student learning through their use (Tzeng, 2011). Current literature focusing on ePortfolio and identity shows that a student develops a self-constructed identity through narrative: selecting, reflecting and critiquing one's own work achievements (McAlpine, 2005). Identity has a strong effect on career-related behaviour, acting as a cognitive compass that

[1] An elevator pitch is a statement designed to sell your idea in 30 sec or less, indicating the time it takes to go from the first floor to the top of the building in an elevator (Reimers-Hild, 2011).

directs, regulates and sustains individual learning, job creation and career building strategies (Bennett, Rowley, Dunbar-Hall, Hitchcock & Blom, 2016). So, we see a trend in the literature that supports the notion that an ePortfolio has the ability to give students a learning space to practise and test a professional identity before they enter their professional practice.

The use of the electronic portfolio has led to a mode of learner reflective practice called "ePortfolio thinking," that "situates and guides the effective use of learning portfolios (using) experiential learning, metacognition, reflective and critical thinking" (Stanford University, 2012, n.p.). The clear message from those writing about the impact of ePortfolio in this anthology is that they can enhance learning by emphasising self-realisation, problem solving, decision-making, independence of thought and reflection. In asking appropriate and pertinent reflective questions the creator of the portfolio is assisted in assembling their knowledge and experiences in meaningful ways throughout the portfolio process. Students creating ePortfolios feel rewarded intrinsically and can explain a certain 'conscious valuing' for their future or current profession and show a growing sense of self (Rowley & Munday, 2014). By beginning to exert *self-regulation* the creation of the ePortfolio itself becomes internally rewarding.

Background

ePortfolios as learning tools create a complex relationship with students' learning and development. It is evident from the chapters in this book that this learning development applies to students of a wide variety of disciplines, ranging from the sciences and arts to teaching and professional trades. When other environmental supporting functions are operational – such as institutional support, availability of the technology to the student, and other facilitative aspects of ePortfolio development– the ePortfolio has the potential to form what can be described as a 'developmental ecosystem' (Taylor, Dunbar-Hall & Rowley, 2012).

Business strategist James F. Moore (1996) first presented the term 'ecosystem' in 1993, when he described how each business has an ecosystem of companies that it deals or competes with, and the ways in which they must co-evolve or develop with these companies in order to survive. Such systems are commonplace within the technology industry since very rarely do technology companies own every level of a supply chain.

Using this metaphor of co-evolution and development, we can align ecological and business perspectives into ePortfolio use within educational systems. Particular parallels can be drawn with the knowledge economy of the student, the development of the student over time, their changing motivations for learning, the evolution of their identity, the marketing of their identity, and their ultimate performance in the wider professional market. Each of these aspects is facilitated and supported with ePortfolio use (exclusive of the supporting functions described above). In this

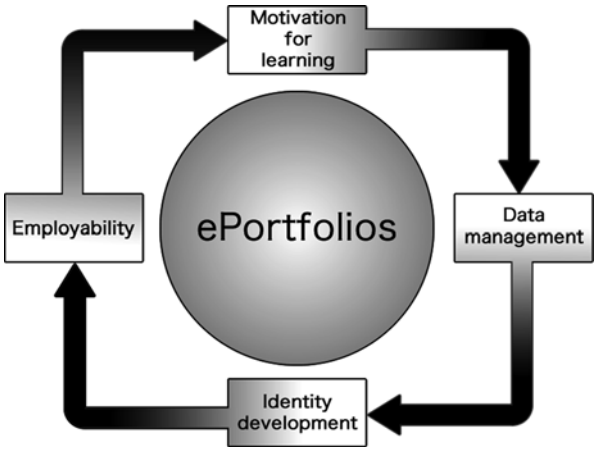

Fig. 12.1 The ePortfolio ecosystem as a function of building professional capabilities

sense, we can describe ePortfolios as developmental ecosystems for building professional capabilities. This is shown in Fig. 12.1.

All ecosystems evolve and develop over time, and the ePortfolio ecosystem is no exception. The ePortfolio ecosystem begins with a motivation for learning, which then informs the data management of the ePortfolio and the associated technological components of generating an ePortfolio. This is then channelled through identity development, which can act as a *self-regulating* function for the purposes of employability and professional practice. Of course, this notion is not strictly limited to students during their university studies, but it is during this phase of their lives that students are developing their professional capabilities and identity. Consequently, motivations for learning are susceptible to change: even if the direction is changed, the evolutionary and developmental path remains constant.

In gaining a greater insight into the different aspects of the ePortfolio ecosystem, and the ways in which the different aspects are manifested, student voices from different disciplines were captured during a recent OLT research project referred to in Chap. 6. These are used to provide a description of these various aspects within the Fig. 12.1.

Motivation for Learning

The term 'motivation for learning' relates primarily to extrinsic motivations, specifically the reasons an individual would undertake a degree in their chosen field. In the majority of cases, this is usually related to a general study options towards a chosen career path. However, students report the development of a portfolio across the degree program also provides a feeling of intrinsic motivation. For example, DA, a music education student stated that:

> [We wrote down] what our philosophy of music education is, so that was a really valuable way of reflecting on what it is for us, but also if we were to share this with someone, for them to see straight away what we believe in.

This is not a unique perspective, and LM, a music technology student, concurred with that view:

> What I tried to do with this ePortfolio is give it a bit of personality because I think that personality for a musician is extremely important. I think music is a by-product of culture, and on a smaller scale I think the musical output of a person is very much related to their personality. So I tried to give the impression that I have a personality.

It is clear that both DA and LM want to their ePortfolios to reflect their personality and identity, and although both are demonstrating motivations for learning, LM describes how selling his professional capabilities are also important:

> I wanted people to think of me as someone who has a lot of different skills, and someone who is genuinely interested in helping them make good music or sound…I wanted to convey that I'm modern, I can use technology.

SW, also studying music technology, stated their motivations for learning as

> wanting to acquire work experience, and I'm fresh out of school and fresh into a career and getting an idea of what it's going to be like.

When thinking about specific skills, a student may wish to learn something new and then subsequently communicate the acquisition of this skill as either a personal aspect of their identity, or towards their employability. JN, a music student, describes how ePortfolios are useful for learning new skills for the purposes of enhancing their career:

> I think for singers wanting to make their own sort of webpages and biographies wanting to get it out there, it's a good thing for them to get used to designing something.

Similarly, KR a creative writing student described how she considered ePortfolios as strategic tools for employability:

> Ultimately you'll be able to sort of direct yourself rather than just sort of fall into whatever you end in at the end of your degree.

SW also identified how

> it keeps me on path but it also shows me an overview of 'yeah I'm on track', learning a heap of different things whilst I still have a destination that I want to reach,

and continued by describing how

> [the ePortfolio] is good to look back at where I've been and where I'm going, and to be able to show family and friends on a casual basis.

However, the synergy between motivations for learning and employability are not always as obvious, with a focus on more intrinsic motivations. For example, DA described how "I just chose a few different pages to show the different things that I'm involved in", while KR "found that all the things I included in my ePortfolio were things that I personally very much enjoyed", this being one example of intrinsic

motivation that underlines a student's identity development through showcasing positive learning activities and affiliations.

Other motivations for learning derived from using ePortfolios are manifested in the way that students approach creating exemplars. This is demonstrated by LM who described how linking assessment tasks with ePortfolios increased their motivation to learn by inspiring them to do the best work possible, essentially, by using the ePortfolio as a "live training exercise". Although employability remains the underlying motivation, the immediate focus of LM's ePortfolio centred on quality control and data management:

> With this ePortfolio in the back of my mind, I think well, no one is going to look at someone and go 'oh you know, they did enough to pass'. They want people who did a really good job, so with that in the back of my mind, it makes me work harder because I think 'I'm going to publish this, it has to be of a standard' and I don't want to have anything out there that I'm not 100 % happy with, and that even comes down to the details of the actual [ePortfolio] website as well.

LM's use of creating quality data as a method for improving motivation to learn is an example of how motivation to learn can affect the way in which the data (content and layout) contained within an ePortfolio is managed. However, there are many aspects of data management that are not only relevant to ePortfolios, but are important parts of developing professional capabilities.

Data Management

One of the single most important aspects of ePortfolio use lies in the inherent use of data management practices. Although data management as a discipline comprises a range of aspects related to data resources management, there are a few similarities between data management in industry and the creation of an electronic portfolio. It is useful to consider these in the context of a university student operating their own ePortfolio.

An ePortfolio user can be considered a data custodian; that is, the person with administrative control of their data, who grants access to, and protects the data from the third parties. This role is particularly crucial where the ePortfolio is behind firewalls and on secure servers (as opposed to a website that is instantly available to the world). In cases where assessment tasks are submitted via their ePortfolio a student's privacy is maintained by the teacher ensuring that the ePortfolio platform has the facility to anonymise submitted work in a repository, and/or by university administrators ensuring that user access is hierarchical and that users are assigned the correct role/access (Rowley & Dunbar-Hall, 2012).

One of the most fundamental aspects of ePortfolio use is the ability to upload data, in which the benefit of using an ePortfolio as a type of 'cloud storage' or archiving platform was described students across disciplines. For example, "it's very simple to upload any file, and then you can just download it straight from the page" (HC, music education); "an electronic storage facility for work that you can

basically use to showcase if you include in application letters" (KR); and "it's such a good way to keep all your pieces, and it's such a good place to archive everything, and have it all in the one place" (NS, studying creative writing). Additionally, the data will "be there for a long time, and you can continually add to it, mix and match various assets [data artefacts] and experiences" and conveniently for many students, "a lot of these assets [data artefacts] I have on my computer anyway" (BF, music education).

Quality ePortfolio data is dependent on whether there is motivation for high quality data. If there is little or no motivation, then it is unlikely that the data will remain in the ePortfolio or be used as an exemplar for professional capability. This is described by LM:

> Something which I reflectively now think about my portfolio is that it really helps me to focus on the details of assessment, and it's kind of a bridge between the walls of the institution and the outside world, because this is published stuff that I give out to anyone, it doesn't just exist between the assessor and myself.

This may contribute to the student's acquisition of exemplar-producing skills: for example using video editing software applications or technical skills related to sound recording. As the student acquires higher levels of experience with such applications, the quality of the data presentation improves which, aside from the actual content of the data, is an additional way in which students can assess the quality and reflect on their learning.

SW (music technology) described his/her ePortfolio data content as being something that requires particular attention:

> with my ePortfolio, it's more of an overview and a select amount of content that I place on it, and I choose the content that I feel best represents the strongest skills that I've learnt.

However, SW anticipated that the types of data uploaded to his/her ePortfolio would develop in the future:

> Once I have a bit more of a professional career, it [the ePortfolio] will be a bit more honed in, professional, more direct in its content, rather than just a splurge of a heap of different things and a heap of different reflections, and more things that are more personal to me I think, than now it is quite basic and sterile.

This reflection by SW describes how he/she intended to maintain the data, and where data considered less 'professional' in the future may be decommissioned and removed from their ePortfolio. This may be replaced with updated exemplars, or by exemplars that demonstrate a superseded skill. Literally speaking, such maintenance may also include ensuring that external hyperlinks are active or that file formats are still relevant within the technological evolution of the ecosystem. This is particularly important as external hyperlinks are frequently used within ePortfolios, as students include external content at is relevant and of interest:

> it's very easy to link externally to content, I mean a lot of professional websites do that themselves, just link straight to YouTube" (HC).

SW's notion of developing data is synergistic in evolution with a student's identity during the course of their studies, and can be informed by their data management

abilities, and/or by their developing professional identity: "[the ePortfolio is] such a good thing for development in my opinion, because like you, it develops naturally" (BG, music education).

Another aspect of data management is the layout and design of the content of the ePortfolio, with HC describing how he employed technical skills in order to improve the layout of his ePortfolio:

> I've done again, just in terms of layout, a little bit of a fancy thing here with, this is actually a table, it's an invisible table you can't see the borders, so I've put a picture here and some text next to it which you know, can just give that professional layout aspect to it.

The phrase 'professional layout' indicates that HC's goal is to make the ePortfolio as professional looking as possible, and is a recurrent theme in many of the responses reported in this chapter. In terms of data management, the evolutionary development and acquisition of data management skills is a key component of achieving professional looking ePortfolios, which is informed by a student's motivation to learn and by identity development.

Identity Development

A students developing professional identity can manifest itself in two forms: first, in the design of the ePortfolio, and secondly in the content of the ePortfolio. LM describes how they organised their ePortfolio to establish their identity:

> [The front page of my ePortfolio] establishes my identity, which is something that I'm still coming to terms with myself, I mean I'm just a first year 'mature age' student turning 26 this year so I'm at a point in my life where this is want I want to do with my life. I made that a conscious decision last year. I said 'you know what? I'm going to make music with my career' because I was unhappy doing anything else. So for me everything in my life at the moment is focussed on having a career in music, and this ePortfolio and all my work at Uni.

For some students, establishing an identity in their portfolio is done by way of mission or philosophy statement, which in many disciplines such as music education and creative writing are usually written early on in the degree program. The student is then able to measure the development of their identity by reflecting on the writing of their philosophy of their chosen discipline, which not strictly limited to just a statement, but to all exemplars:

> we see this constant adding of material over the years, and when you go back and look at your original philosophy of teaching and music education that you think 'did I really think that back then'? (BG, music education);

and on an ongoing basis

> you can just continually add [artefacts] to that, and it shows who you are and your development as a professional, in whatever field you are using the webfolio for (BF, music education).

Furthermore, the ePortfolio facilitates identity development goals, by being able to quantify identity with acquired skills and motivations, which can be viewed upon as a *journey* of a student's learning:

> I like to look back and reflect of where I've come over the past few years including back in 2011 when I did guest honours in year 12. And I like to see all the different goals I have achieved and what I need to do say in my third year, to improve on those, or maybe to expand on ideas (SW, music technology).

For some students, the ePortfolio represented a snapshot of their identity that was constantly evolving: "this ePortfolio really captures me at this point in my life and is something that will forever change" (SW, music technology), while for other students, their ePortfolio was designed to showcase the journey and evolution of their identity:

> The direction I wanted with this was…it's an implied progression, so hey this is what I was doing then, this is where I am now, look how much I've improved, and look how much I'm going to continue to improve, especially if you employ me (LM, music technology).

By organising the ePortfolio content chronologically, LM is able to access specific exemplars and be able to analyse their progression over time, and in turn, see his/her professional and personal identity develop. Self reflection and analysis of the ePortfolio content can also be used for decision-making purposes, particularly in relation to past and present personal/professional statements:

> by highlighting your strengths and weaknesses, you actually get a sense of where you want to go, what sort of positions in the workforce you'd be interested in (KR, creative writing),

which can have an effect on the motivation to learn and in their data management.

For other students the communication of identity is manifested through documented experiences, both personal and professional: "the whole point of the ePortfolio is essentially to have an online collection of your experiences" (BF, music education), but since identity development is ongoing, the ePortfolio excels in that it "provides a dynamic record of learning and achievement and presents a CV in the language that we communicate with now" (BS, music education). This strength of the ePortfolio allows students' to "present yourself as exactly who you want to be when you are applying for a job or professional development" (BF, music education).

Employability

Employability is an important part of the longitudinal development of a portfolio across the years of a degree program. In discussing their ePortfolio BS (music education) describes how his/hers is ultimately for "showing employers what I can do". In fact, the major recipients of electronic portfolios, particularly in the Arts, are likely to be both employers and potential clients: as LM (music technology)

describes it, "this ePortfolio is my business card for my career". One advantage of ePortfolios in improving students' employability is the use of mixed media evidence of professional capabilities, as described by BF (music education):

> I can certainly see that you can use this to prove to people that you are a professional and that you've had these experiences, and it not just relying on you insisting that you are a professional, you have got this documented proof to present yourself professionally.

This is further supported by HC (music education), who described how ePortfolios are very good at allowing students to show off their samples of work when applying for positions:

> I think this [the ePortfolio] works a lot better as a portfolio than as a CV, so I've got all these different samples of work, and samples of things that show off who I am, and it functions more as kind of a centralised portal to all these different things…which is a lot more applicable I think, to the kinds of professions that a lot of the [music] students here are going to be ending up in with performance, where there's not these very specific job descriptions, it more just a very broad look at 'these are the different things I can do'.

The potential for prospective job applicants to use an ePortfolio to provide an employer with evidence demonstrating professional capabilities affords a significant advantage over those applicants that use traditional methods of paper CV. This is recognised among students, particularly KR (creative writing):

> I think [the ePortfolio] is fantastic in terms of adding that little bit extra to your resume when you are 1 of 100 applicants. If they want to look at your work they have the opportunity to do so.

This is demonstrated by SW (music technology) who used his/her ePortfolio when applying for work experience during the university holidays, and who described how the ePortfolio positively portrayed their professional capabilities and identity:

> I applied for some holiday work experience just at a talent agency. The first thing they would have seen at the top of my CV was a link to my ePortfolio. They clicked on it, saw the layout design, saw that I took care in representing myself in a professional way, as well as adding a lot of personal character to it, they really admired those qualities and as I found out that was one of the biggest reasons they took me on board…because it related to a lot of the qualities that they were looking for.

However, towards the end of an undergraduate degree, it is more common that employers will be looking for specific skills and professional competencies. The development of motivations for learning, quickly changing from work experience outcomes to professional employability, required a change in SW's data management approach, commensurate with the development of their professional identity:

> In 2nd year when I did an internship it was with a music company…they want to see that I actually have the skills to be able to do a lot of the tasks such as listening skills, production, technology skills, to be able to handle the computer equipment they use, so the best way of representing that was in my ePortfolio. They were able to have a search through it and have a good idea that I had those skills, because I did get the internship in the end.

This is particularly relevant towards mixed media evidence since SW describes how their ePortfolio has a variety of evidence in different formats, to demonstrate professional capabilities:

> I've selected a variety of different things to put within my ePortfolio. I've got sound clips, I've got a video and I've also got written essays and assignments. So it gives a perspective of this is what I sound like, these are my writing skills, these are my hands on skills, these are the things that I do, these are the things I do outside of assignments.

SW demonstrates a clear trajectory in the evolution of their ePortfolio ecosystem, with developments in motivation for learning, data management, identity and employability as all being important aspects of developing professional capabilities, and in seeing how the ePortfolio ecosystem facilitates these. The benefits of using digital technology for employability are summarised by BS, music education:

> I think it's really great to utilise this [ePortfolio] in an educational setting, utilising digital technology in a formal way, so providing students a way to communicate effectively to potential employers to present what they know and what they can do.

LM describes how they try to balance their ePortfolio between displaying personality versus professionalism, where they try to "give the impression that I have a personality, and trying to be professional at the same time". Demonstrating this balance requires drawing on experience with motivations for learning, data management and their own sense self of a developing professional identity.

Conclusion

ePortfolios were introduced to Higher Education for various purposes and since their introduction, different researchers have described varied impacts on student learning through their use. In this book we have seen authors relate their experiences of ePortfolio use in educational discourse, which has shown creating the portfolio as supportive of constructivist learning in that it can assist students in the production of knowledge and understanding in response to learning activities. Using the theory of constructivist learning, we have explored student uses of ePortfolios to show that the process of creating ePortfolios assisted students in becoming active, independent and motivated learners; developing electronic portfolios promoted a technology-enriched environment for students to cultivate their learning and knowledge.

ePortfolios are beneficial as a tool for learning and can be valued as a training aid for professional identity development when embedded into carefully planned curriculum across whole programs. They are vital in our twenty-first century education creed of technologising learning, as they serve as a vehicle for students' submission and assessment of academic work, for archiving and curation of learning, and for what can be seen as a longitudinal representation of the outcomes of an academic program. With employers maintaining their plea to Higher Education for graduates with problem solving and critical thinking skills, the portfolio encourages

collaborative peer interaction as well as self-realisation and reflection. As a tool for managing self-promotion in professional settings, for accreditation and continued professional development, the ePortfolio contributes significantly to students' pursuit of a professional self. In effect, students' lives outside learning institutions could be brought closer to those inside them through effective implementation of the ePortfolio process as students reported that the diverse possibilities of ePortfolios allowed for a variety of different artefacts, information and examples to be included to show evidence of their abilities as professional practitioners across a range of disciplines.

It is clear from the discussion and student comments in this concluding chapter that the ePortfolio ecosystem is a complex one; the various subcomponents are equally important, with each influencing the other at various points. The ecosystem itself has engrained evolution in a variety of aspects relating to professional capabilities, and should be considered an evolving, cyclical process, with each aspect influencing the next and drawing influence from the previous. The discussion by users of various ePortfolio platforms, together with the examples of their use, and their thoughts on various aspects of ePortfolios, are all common and overwhelmingly positive. To quote the words of SW, "my ePortfolio will always help shape who I am and that is a lot more than just words on a CV on a piece of paper".

In relation to reflective and critical thinking, the creation of the ePortfolio assists students in their development of self-concept, self-awareness and self-efficacy; development of thinking about current studies in relation to future career directions; individuals' positions among their peers; and shifts in thinking about learner and professional identities.

The pedagogical aspects of ePortfolios and their viability in the development of graduate generic skills in problem solving, decision making, self-realisation, and identity formation form the basis of their use in teaching and learning contexts and have become agreed benefits of ePortfolios among many researchers and users detailed in this book. While substantial literature on ePortfolios in university settings exists there is little published information on the their use upon graduation. Understanding the relationship between ePortfolios in Higher Education and in subsequent professional positions may influence student ePortfolio contents, construction, theorisation and utilisation, adding a level of professional expectation of ePortfolios to existing recognised pedagogic ones for both tertiary students and teachers.

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