The creative graduate: cultivating and assessing creativity with eportfolios

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Changing demands for graduate capabilities lead to changing directions for undergraduate assessment. 'Creativity' is a widely promoted graduate capability that relates to many others, such as independent learning and innovative problem-solving. Assessment practices need to become more focused on the evaluation of generic capabilities, additional to assessment of discipline-specific knowledge. This has implications for the content, design and modes of assessment. Assessment <u>as</u> learning promotes an approach in which the learning activity and assessment task are one and the same, and authentic assessment design incorporating group work, problem-based, online and portfolio assessment enable the development of generic capabilities to be embedded in the discipline. The paper explores creativity as a graduate capability, the creative potential of digital media, and how changing directions in assessment practice could support the assessment of creativity, with a focus on using eportfolios in assessment.

Keywords: creativity, assessment, eportfolios, graduate capabilities, digital literacy

The creative graduate

Creativity is increasingly represented in higher education aspiration statements as an attribute that graduates require to successfully engage in contemporary and future professional life. Several other generic capabilities seem intrinsic to creative behavior such as independent learning, critical thinking, innovative problem solving and information and digital literacy, but how are these to be embedded into curriculum and assessment practice? Portfolios have been widely used in 'creative' disciplines in higher education, and are beginning to be more prevalent in disciplines where evidence of meeting professional standards across a range of capabilities is critical. The emergence of technologies to support eportfolios allows not only the aggregating of material in a wide range of formats, but also the embedding of peer review and selective sharing via social networks. Eportfolios have the potential to provide a platform for holistic development and assessment of a range of graduate capabilities related to creativity.

The importance of creativity as a graduate attribute

The cultivation of creativity, not as an arts-related addendum to school curricula, but as an educational approach in itself has been seized upon by educationalists and cultural commentators such as Robinson (2000), Florida

(2002) and Pink (2005) who maintain that apart from any individual humanist benefit, new millennium economic imperatives demand the development of a greater capacity for creativity, among other dispositions such as empathy and collegiality. Robinson (2010) makes a compelling argument for the dismantling of educational paradigms that were developed to suit an industrial age economy, and a great deal of effort has been expended in the UK in particular in renewing curriculum to accommodate a more creative approach. Higher education too has been paying attention to the development of 'creative' graduate attributes such as innovative problem-solving, creative leadership and interdisciplinary practice.

Some transformative learning theorists suggest that a radical critique of the form and function of education is required, which must urgently engender new visions to deal with complex global problems (Miles, 2002; O'Sullivan, 1999; 2003; O'Sullivan & Morrell, 2002). This recalls Barnett's "being-for-uncertainty", a quality that graduates need to develop to manage the 'supercomplexity' that is characteristic of the contemporary world, which is characterised by "certain kinds of disposition. Among such dispositions are carefulness, thoughtfulness, humility, criticality, receptiveness, resilience, courage and stillness." (Barnett, 2004, p.258).

Industry agrees with these views, asserting that university graduates need a range of generic capabilities. A 2010 global study of CEOs by IBM found that creativity was believed to be the most crucial factor for a company's future success (IBM, 2010), and the Business Council of Australia (2006) identified the importance of creativity among other related capabilities, and cited employer concerns that graduate skills are lacking in these areas. Amabile (1998) has long suggested that industry would benefit by providing opportunities for employees to exercise their creativity, and suggests that the qualities required for creativity in business are expertise, creative thinking skills and motivation.

What does it look like?
Creativity is now increasingly promoted as a desirable learning outcome in different disciplines, and more generically as a graduate capability in higher education, so how can it be characterised in this context?

Conceptions of creativity as differentiated between 'high' (large-C) and 'ordinary' or 'democratic' (small-c" have emerged in recent decades, to support the idea that creativity is not the domain of only the brilliant and eminent, but is achievable by everyone (Csikszentmihalyi, 1996; Craft, 2001). These ideas have more recently been characterised as second-generation (McWilliam & Dawson, 2008), emphasising the social/cultural context and universal and collaborative nature of creativity in contrast to more traditional, first-generation, conceptions of creativity as mysterious, individual, and dependent on inspiration and aptitude The second-generation focus emphasises a personal, practical and socially-oriented creativity, and "locates the creative enterprise in the processes and products of collaborative and purposeful activity" (McWilliam & Dawson, 2008, p.633). While popular conceptions may continue to reflect first-generation notions it is the second-generation focus on creative capacity building that provides a more useful platform in the educational context (McWilliam & Dawson, 2009), and is a better fit with the professionally-oriented attributes articulated in higher education aspiration statements and industry skill-set statements.

Recent research suggests that creativity is best characterised as behaviour in a context, rather than as a skill or a capability, demonstrated by output or product, and that it may be more appropriately defined as a disposition (Ivcevic, 2009). Behaviour characterising a creative disposition encompasses a range of abilities and attitudes, including taking risks, making connections between disparate fields of knowledge, and being a motivated and independent learner. Such attributes could themselves be considered in the realm of dispositions rather than quantifiable skills or capabilities, incorporating the affective as well as the cognitive dimension of learning. For instance, some of the cognitive characteristics of creative behaviour that have been identified by Tardif and Sternberg (Sternberg, 1988) in their review of creativity research are: articulate and fluent, good imagination, flexible and skilled decision-maker, copes well with novelty, and finds order in chaos.

Creativity in curriculum

Academic and student conceptions
Investigating both academic and student attitudes to creativity in higher education, Jackson et al (2006) came across a range of understandings and definitions that were complex and frequently contradictory. Some students and teachers maintain a lingering attachment to romantic and individualist aspects of creativity, and are sceptical that it can be taught. Australian research has also shown that academic teachers often have understandings about creativity that combine first- and second-generation conceptions (McWilliam and Dawson, 2009). However, both academics and students believe that creative teaching can enable students to be creative in learning

activities and outcomes. Students identified dialogic modes, where students' current understandings or beliefs are addressed, as supportive of creativity, while they felt strongly that prevailing modes of assessment (such as examinations) were generally inhibitive for creativity. Students also expressed frustration at a perceived conflict between being creative and conforming to 'academic' expectations (Oliver et al, 2006).

Academic conceptions across disciplines represented generic features of creativity such as: originality, use of imagination, exploration and risk-taking, making sense of complexity, and story-telling, and many academics believed that development of creativity was important, even though creativity was rarely explicit in learning outcomes or assessment criteria (Jackson & Shaw, 2006).

Creative teaching/creative learning

To accommodate these features of creativity in curriculum requires the setting of appropriate tasks in an appropriately flexible environment to both promote and support creative responses, and to allow risk-taking and mistake-making in a safe environment. Studies of school teachers have reported that while teachers apparently believe that most of their students have the potential for creativity, those students who display creative behavioural characteristics (such as playfulness, argumentativeness, independence) tend to be perceived by teachers as non-conformist and disruptive (Craft, 2001; Aljughaiman & Mowrer-Reynolds, 2005). It is not surprising then that students arrive in tertiary education with these behaviours repressed, and creative learning is unlikely to occur without a context in which creative behaviour is not only acceptable but supported and rewarded.

Sternberg (1996) has suggested that creativity is best taught through the teacher as a role model for creative practice. This is supported by Jackson et al (2006), who found that both academics and students believe that there is a close correspondence between creative teaching and the opportunity for creative learning. Teachers therefore need opportunities for innovating their own practice in a safe environment to enhance their self-perception as creative practitioners.

Assessment of creativity, even in creative disciplines, has tended to focus on assessment of product, whereas aspects of creativity such as process, person and place are all deemed to be critical to creative development (De la Harpe et al, 2009). The Studio Teaching Project (ALTC) has identified a range of identifiers in these different dimensions for the assessment of creativity, and has developed a holistic assessment model to support this.. The foci of this model are:
- Outcome dimensions: Product, process and person
- Knowledge and skills: underpinning and core
- Reflective and professional practice – acting like a [creative practitioner]

This model, represented in Figure 1, could be adapted to be more widely applicable across disciplines.
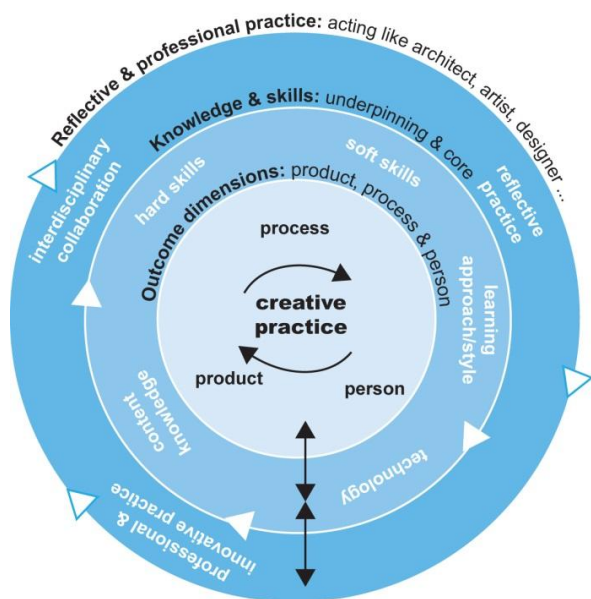
Figure 1. Model for holistic assessment in studio-based disciplines (adapted from De la Harpe et al, 2009, p47)

Assessing creativity with portfolios

The reflective aspects of this model are essential to provide the evidence for the 'process' and 'person' outcome dimensions, and the portfolio is an ideal assessment mode for these broader dimensions. Portfolios support the aggregation of selected pieces of evidence to demonstrate learning outcomes and achievements. To leverage the learning benefits of portfolio assessment, this usually includes a reflective dimension, where the learner analyses and evaluates their own learning processes.

Portfolios have the potential to support the development, demonstration and valid assessment of a wide range of personal, professional and academic capabilities, both inside and outside the study program, and develop good professional practice in the documentation and presentation of activities and artefacts. By allowing a degree of control over learning pathways and strategies, portfolio assessment promotes learner self-direction and motivation, and therefore engagement in learning activities. Because of the ability to aggregate different types of output, portfolios have been widely used in 'creative' disciplines, but are applicable to any discipline where the learning outcomes may require a range of types of evidence to be presented (Baume, 2001).

As Krause (2006) indicated "portfolios are a useful vehicle for facilitating critical reflection on one's learning and for compiling and demonstrating evidence of learning and skill development" (p.1) as they catch and preserve the evidence of learning. This critical reflection is imperative for higher education in supporting the development of graduate attributes. Provision of evidence of these capabilities often is driven by the student toward the end of the learning cycle as students gather evidence for resumes or CVs for accreditation to associations and professional institutions.

This reflection on learning is important for students as they exit higher education and seek employment in their respective disciplines. Reflective practice and self-assessment of learning is critical for remembering, conceptualising and analysing constructed knowledge after time. As Strampel and Oliver (2007) inferred, "reflection is a way of thinking; it is a form of contemplation that determines how one comes to act on new understandings" (p.980). Portfolios are useful tools for this conceptualising of practice in assessment. They encourage and facilitate student reflection while they compile and develop evidence of learning throughout the learning process and at the completion. Utilizing digital platforms for this reflection can further enhance the learning process, including ongoing thinking and reflection and action on reflection (Schön, 1987).

Creativity and digital media

Digital literacy

Digital literacy is another capability emerging as a critical skill for graduates to function as global professionals in many fields. Prensky's (2001) notion that 'digital native' students are well-versed in technology use in contrast to their 'digital immigrant' teachers has largely been discredited by subsequent research (Kennedy et al, 2008), who found that students are not homogeneous in their use of technology, which tends to be ad hoc and opportunistic. Students need support from their learning environment to not only learn how to use online learning systems, but also to identify, set up and evaluate a range of tools and networks and thereby apply digital production and networking skills to their study and work. While teachers may integrate and manage course elements in a learning management system (LMS), and that has great benefits for learners, practice for students in using a range of media, publishing and networking tools is likely to be more relevant to their professional lives.

Digital literacy inevitably overlaps with information literacy as students have available to them a morass of online information of varying quality and validity, and need to develop the skills to navigate, evaluate, select and contribute to online information. Matthew Allen (2009) refers to 'knowledge networking' as a new paradigm in professional and scholarly practice, and has developed strategies and identified available web applications to support teachers and students in higher education to develop the digital literacies required (Allen, 2011).

Technology can provide a platform for teachers to model and scaffold creative activities and outputs. Individual teachers may not be able to develop expertise in all the available technologies, but they need to be able to demonstrate a facility with an open and collaborative way of working, including the ability to learn on one's feet when confronted with unfamiliar technology. This is an area where students and teachers could profitably learn from each other.

Creative digital tools

Digital media provide a plethora of opportunities for the design, development and presentation of creative work – the tools for creative production have arguably never been so accessible, with almost every student in Australian universities having access to a digital still or video camera, a desktop and/or laptop computer with image, audio and video editing capability, and high-speed internet access to a huge range of productivity software and publication platforms. The social orientation of Web 2.0 tools is highly supportive of the development of communication and networking skills. These are powerful resources for teachers and learners in the development of the broad range of capabilities intrinsic to creativity. What is required is the scaffolding for learners to produce, critique and publish work relevant to their field of study, in a way that will leverage this potential.

If key characteristics of creative behaviour are being able to take risks, step outside of one's comfort zone, and to think both divergently and convergently around different domains of knowledge, this is a meta-capability beyond the scope of any particular communication or publication tool. From this perspective, the design and scaffolding of the learning activity is of primary importance, and is where the creativity of the teacher has the most impact.

In the E-Learning and Social Networking Handbook, Mason and Rennie (2008) map a list of student learning needs and examples of related learning activity to a range of emerging technologies. The list does not specify that any of these learning needs or activities are related to learning creativity, or learning creatively. Yet it is not difficult to envisage how they may be employed to that end - the critical element is the creative focus being present in the intention of the teacher, the understanding of the learner, the design of the learning activity and the assessment of the learning outcomes. For example, see Table 1.

Table 1. (from Mason & Rennie, 2008, p.49)

Student learning need	Example of student activity	Extended/emerging technology
Developing understanding	Linking information from different sources	e-portfolios, Mashups
Linking theory to practice	Learning by doing	IMS tutorials, Screencasting
Practising articulation of ideas	Reflective journal	Blogs, Podcasts
Practising teamwork	Group projects	Social bookmarking, Wikis

Some of the Web 2.0 tools discussed by Mason and Rennie are: blogs, wikis, podcasts, e-portfolios, social networking, social bookmarking, photo sharing, Second Life, online forums, video messaging, e-books, instant messaging, Skype, games, mashups, mobile learning, RSS feeds and YouTube. Many others are available at: http://www.go2web20.net/.

Assessing with eportfolios

> "[Eportfolios] have the potential for transforming … curricula through the linking of practice-oriented learning and the development of graduate attributes" (Housego & Parker, 2009, p.409)

One of the benefits of a portfolio mode of assessment is that it scaffolds the compilation of evidence and artefacts in a range of media, which is then compiled into a presentation format, or formats, for a variety of purposes. An eportfolio approach provides additional affordances, in that it not only aggregates artefacts produced in digital form using technologies such as those listed above, but that it is integrated into online networking and communication tools to allow a wide range of connectivity and presentation options. The dimensions of practice, learning and research that can be aggregated and organised, and the range of purposes for which an eportfolio can be used is illustrated in Figure 2.
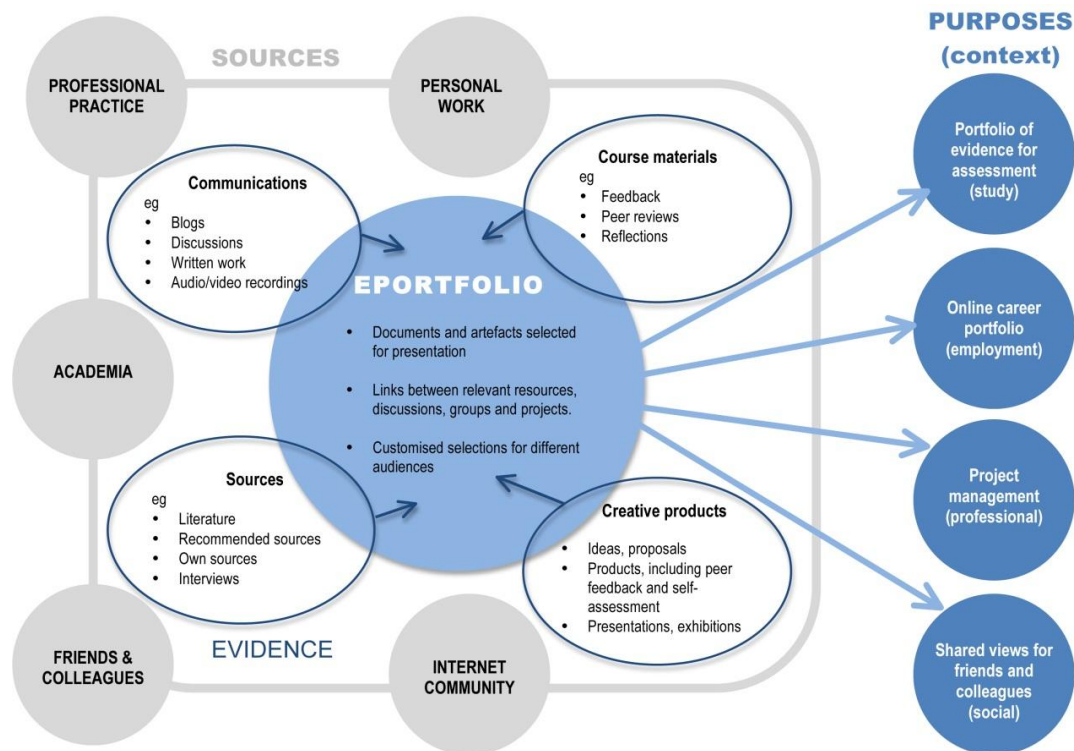
Figure 2. Model for eportfolio practice

As a pedagogical tool, eportfolios differ from more traditional folios of practice. In the 21st century, as Web 2.0 tools develop, eportfolios have the potential to address the lack of integration across existing programs because they can be used across teaching programs and contain all electronic documents related to learning from assessment tasks, tests, feedback and student work samples. As eportfolios are goal driven, students are self-directed and ownership of the portfolio helps students take responsibility for their own learning, and for publishing and disseminating their own content. For an example of how this could work to integrate student learning with professional practice, see the Scenario below.

Scenario

Alice Lee is an environmental engineering student, in her second year. The curriculum for her program includes many authentic activities and assessments to ensure that she develops broad professional skills alongside her discipline-based knowledge. With the new eportfolio assessment mode, it is her responsibility to see what skills she needs to develop and what assessment tasks she can complete to achieve the required outcomes.

Looking at her assessments so far, she has been doing well in evaluations of her achievements in creative problem-solving and self-directed learning. To demonstrate these capabilities she proposed an innovative solution for minimising pollution from fish-farming, and independently conducted a research project on the feasibility of her proposal. She now needs to do some team-work to gather evidence on her ability to lead and work within a team. A group project will also allow her to get peer feedback on her oral and written communication, and to demonstrate her ability to give and receive feedback.

Alice knows that her creative approach to projects is one of her strengths, but that it can be challenging to other team members. She selects a problem-based team project where her creative abilities will shine, and she hopes that through her leadership she will be able to help other team members develop their own creative abilities – being able to see problems from multiple perspectives, make connections between fields of knowledge, and take risks in proposing and testing possible solutions.

The curriculum materials include a project work template that is helpful in suggesting ways that the group can work to maximise creativity in their outcomes, as well as practice several other generic skills. The first strategy is for members to use a role-play activity to critique their own perspectives, and to develop some shared understandings of the problem, as well as awareness of the range of possible perspectives. One of the group members suggests that they use a social media network as they work on this – it allows them to easily publish their own thoughts, comment on others, and introduce any internet and other sources that they find. They will also be able to extract content from here to publish in the final eportfolio presentation. Alice finds this challenging as she has tended to be a solo worker, but knows that it will give her the opportunity to develop important digital literacy skills.

The team decides that their final presentation will be a website, which will allow them to aggregate a variety of media to show their project outcomes, and then easily publish to the internet for future use such as employment portfolios …

… It is four years later, and Alice is now employed at a regional council as environmental engineer. The course work she completed on her own as well as the group projects have been valuable in securing her career as through the eportfolio she was able to easily select and present the relevant work, and show evidence of the broad range of skills she developed. She's really happy, now that she's working away from the city, that she also learned so much about online networking and communication, and regularly runs workshops for other council employees on using digital tools.

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The transformative potential of eportfolios

Transformation suggests a significant perspective change, which could apply personally to the learner and the teacher, as well as to the curriculum design and the teaching situation.

Intrinsic to transformative learning is the learner's experience of a disorienting dilemma which propels them into a cycle of critical reflection and dialogue, provoking them to question assumptions and 'try on' new perspectives (Mezirow, 1991). There are several aspects of eportfolio use that learners may find confronting or disorienting, including the development of efficacy with the relevant technologies, the incorporation of self- and peer-assessment into the learning process, and a more-or-less public enactment of the reflective cycle. For the transformative potential of eportfolio assessment to be realised this process must be scaffolded and supported – the simple provision of the technology is not sufficient. Effective assessment through eportfolios encourages critical reflection as students gather digital artefacts and evidence to demonstrate the development of their knowledge, skills and competencies. Eportfolios can further this gathering approach for folios by acting as an official record of a student's work. As (Housego & Parker, 2009) inferred, eportfolios "enable students to integrate their experiences at the University and make a substantial contribution to their personal development" (p.409).

The engagement of teachers in the practices and technologies of eportfolio use is important if they are to model creative practice, and this may be as confronting and transformative for teachers as it is for learners. Teachers are likely to be already engaged to some degree in development of their own portfolio of work, research and personal activities, and that this could be the basis for the development of their own eportfolio practice. This academic development process likewise needs to be supported and scaffolded, ideally through a community of practice where they are able to participate in critical reflection and dialogue with peers.

Hughes (2008) has asserted that eportfolios could be characterised as transformative technology in that using these in assessment requires a change to traditional assessment practices, and to learner and teacher roles in assessment: "Adopting eportfolios as genre and practice requires us to engage with our learners in meaningful individual and collaborative activities, it requires us to cultivate dialogic cultures which make connections

beyond the immediate and it demands that we interrogate notions of authorship and audience" (p.439). Such questions of identity, communication and expression are intrinsic to conceptions of creativity as socially-mediated behaviour. Eportfolio assessment is able to focus on both cultivating and providing evidence of creative identity and voice, by scaffolding process and supporting evaluation across developmental dimensions (see Figure 2).

Krause (2005) indicated that while eportfolios have the potential to transform pedagogy; this potential cannot be realised without real curriculum change. Leveraging the use of technology for curriculum transformation is a complex process, explored by the JISC project 'Transforming curriculum delivery through technology: Stories of challenge, benefit and change' (2011). One critical finding of this study, which involved 16 institutions, was the importance of involving learners themselves in curriculum change:

> "The empowerment of learners through technology-enabled innovations is arguably the most far-reaching outcome from the programme. Work by the projects both enhanced learning and placed learners at the heart of curriculum change. Tools and processes to help learners make sense of the curriculum and adopt increasingly more active roles in its development and delivery"
> (JISC, 2011, p.9)

Key points relating to this were that "small but crucial interventions can result in transformative effects" and "greater learner empowerment requires an increased focus on digital literacy skills". (JISC, ibid, p.9)

Their 'Achieving transformation' graphic, representing some of the findings of this project, can be found at: http://www.jisc.ac.uk/media/documents/programmes/curriculumdelivery/Achieving_Transformation_figure.pdf

Eportfolios and graduate capabilities

Many characteristics intrinsic to creative behaviour are reflected in graduate capabilities that could be evidenced by eportfolio For instance the University of New South Wales (UNSW) Graduate Capabilities statement aspires to graduates as scholars who are: "understanding of the discipline in its interdisciplinary context, rigorous in their analysis, critique and reflection, digitally literate, able to apply their knowledge and skills to solving problems, are information literate and capable of independent and collaborative enquiry" (UNSW). This globally-focused UNSW graduate should be a leader in their field who demonstrates a life-long learning approach to professionalism and demonstrates creativity and innovation. These capabilities lend themselves to the objectives of an eportfolio, where students collect evidence in an authentic context, generating artefacts that demonstrate their problem solving skills and constructed learning through reflection, critique and analysis.

Designing eportfolio assessment

As educative spaces, eportfolios enable both a self-directed and an individualised approach to learning that can promote life-long capabilities in a program of study. As students develop the appropriate skills to self regulate their learning and become responsible for their learning beyond the walls of the classroom, they can engage both individually and collaboratively in the eportfolio. For educators seeking to develop personalised learning spaces or environments in their assessment, eportfolios have enabled this transition and opportunity. Hughes (2008) suggested the four cognitive skills required for self directed students in an eportfolio are 'collect, select, reflect, connect'. To support these skills to develop and be reflective in students' assessment, Krause's (2006) eight initiatives for successful integration of an eportfolio assessment in a program include:

4. Start small; plan the implementation slowly and clearly by integrating the concept of a portfolio into the course with some electronic components.
5. Build a program led approach to support and build a new culture in assessment, this takes time. Eportfolios have the potential to transform pedagogy; they cannot be implemented without real curriculum change.
6. Develop a strong resources plan for technical rollout, if possible participate in a pilot project and spend time developing technical proficiency among the team.
7. Collaborate with staff among the program and course structure, implementing a whole course rather an individual place the concept to the portfolio in a stronger position in the students mindset.
8. Align the learning outcomes to the eportfolio, defining the purpose of the portfolio with students and staff clearly.
9. Make the eportfolio a sustainable assessment tool rather than another add-on, ePortfolios can be used to track and gather resources f students from year 1 onwards.
10. Establish clear professional development and skill based workshops and support through initial face-to-face meeting.
11. Prepare the evaluation to support enhancement, exclusion and improvements early and throughout the course

and use of the eportfolio.

As these initiatives preface, time is imperative in the successful integration of this form of assessment. Like other forms of transformational technologies, they cannot be 'added-on'. Time to establish an eportfolio for assessment in a course or program is needed to learn the appropriate skills needed for both student and staff implementation, the required technical proficiency for both staff and students and the ability to critically reflect and select work for assessment. One of the challenges of this assessment practice is the time to 'reflect, collect, write, and respond to their feedback'. Eportfolios have the potential to provide ways for students to use feedback from assessment and utilise it to support their future learning.

Further development in assessment of creativity with eportfolios

This paper has briefly explored how changing directions in assessment practice could support the assessment of creativity, with a focus on using eportfolios for assessment. A study is being done with UNSW academics who are currently using eportfolios for assessment, to investigate how they are being used and perceptions of the effectiveness of this approach. A wider research project is in development to explore how technologies can support the development and assessment of creativity, and will report on academic and student perceptions and experience in a range of disciplines. This will build on findings from several recent projects that have explored case studies and developed support materials in the areas of both teaching in creative disciplines and online teaching and assessment. Australian projects include ALTC supported projects: Australian ePortfolio Project (2009), Studio Teaching Project (2009), Assessing Creativity: Strategies and Tools to Support Teaching and Learning in Architecture and Design (due 2011) and Matthew Allen's Learning in Networks of Knowledge (LINK) project (2011). UK JISC projects include: 'Effective Practice with e-Portfolios' (2008), 'Effective Assessment in a Digital Age' (2010) and 'Transforming Curriculum Delivery through Technology' (2011) projects. These will be invaluable resources in defining the potential and scope of eportfolios in particular, and the digital environment in general, for assessing creativity.

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