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New pedagogical e-spaces:
Keeping pace with staff readiness

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Higher education teaching staff faces increasing pressures to consider digital technologies as solutions to meet external and internal demands. Significant drivers within the sector include evidence of quality assurance and academic standards at the programme level. The use of ePortfolios as a tool for student learning is one option addressing these drivers. Mixed methods research from a small regional university exploring staff perceptions of the value of potential ePortfolio implementation for student learning found that external and internal drivers for improved professional graduate standards motivated early adopter staff to incorporate ePortfolios into their learning and teaching practice. Reflection on the results highlights that although interested academic staff are pedagogically motivated, the impacts of the technologies themselves mean that teachers have to first negotiate the new virtual space, understand it and keep using it, while hopefully forming a pedagogy that capitalises on the affordances of this space. The pedagogical leadership role of the academic is crucial in forming e-spaces. The TPACK framework is considered as a possible model for supporting teaching staff to conceptualise how content, pedagogy and technology interact in the context of ePortfolio use. The authors conclude that ePortfolios can be one of these pathway tools as long as implementation is driven by a pedagogical agenda and conceptual and practical support is provided to ensure academic pedagogical readiness.

Keywords: ePortfolio, pedagogy, e-spaces

Introduction and Context

Digital technologies are attractive to meet the increasing demands faced by academic teaching staff in higher education. External and internal pressures to demonstrate improved professional standards motivate early adopter staff to anticipate inclusion of digital technologies into their practice. The introduction of an ePortfolio offers academic staff opportunity to engage with the technology for pedagogical gain. While literature explains the barriers and enablers of ePortfolios and other technologies (Joyes, Gray & Hartnell-Young, 2010; Hallam & Creagh, 2010; Madden, 2007), challenges in articulating the relationship between technology and pedagogy remain. This article critiques technocentric approaches to e-learning innovations (Papert, 1987) in the context of teacher pedagogical readiness in higher education. It argues there is an imbalanced focus on technology tools as answers to increasing

learning and teaching demands which overshadow necessary pedagogical reinventions required by these new e-spaces.

Response from the Australian higher education sector to more stringent and externally imposed standards drives role changes that digital technologies, including ePortfolios, can fill in demonstrating students' learning. Hallam, Harper, McAllister, Hauville and Creagh (2010) cite "national professional standards, the Tertiary Education Quality and Standards Agency (TEQSA), Australian University Quality Agency (AUQA) Australian Curriculum, Assessment and Report Authority (ACARA), industry skills council and formal professional accreditation" (p.28) as external drivers that support ePortfolio use. Accreditation authorities requiring evidence of student learning and continuing professional development requirements means students can progress into practice using the ePortfolio they learnt to use at university. ePortfolios are seen as an excellent tool to address these new requirements.

Workplace readiness and employability is a further sectoral agenda that helps to progress the introduction of ePortfolios. The Higher Education Council Australia (1992) report *Achieving Quality* defines graduate attributes as 'the skills, personal attributes and values which should be acquired by all graduates, regardless of their discipline or field of study'. The report argues that, as universities are often judged on the quality of their graduates, each university must take responsibility for defining and developing such skills within programmes of study. The most recent review into higher education, the *Review of Australian Higher Education Final Report* (2009), commonly known as the Bradley Review, indicated the needs expressed by employers for 'generic employability skills' such as communication and collaboration. ePortfolios are seen as a space for students to collect evidence or artifacts and reflect on learning through the duration of their degree (Von Konsky & Oliver, 2012). Many institutions enable students to organise this evidence and reflection in alignment with their institution's graduate attributes, giving students a language to demonstrate their employability and work readiness.

What is an ePortfolio?

The ePortfolio is both a product to exhibit substantial learning artefacts and a site for significant learning processes to occur, providing a multitude of personal, pedagogic and professional uses (Hallam & Creagh, 2010). ePortfolios are repositories of digital written, visual and auditory artifacts created, stored and shared at the discretion of the learners. These artifacts are a collection of formal and informal learning, achievements and experiences that involve "rich and complex processes of planning, synthesising, sharing, discussing, reflecting, giving, receiving and responding to feedback" (JISC, 2008 p. 6). These processes provide opportunity for reflection and link theory with practice (Botterill, Allan & Brooks, 2008). ePortfolios are attractive, flexible tools that can organise content designed to support pedagogical and assessment purposes (Abrami & Barrett, 2005), however in practice, especially as new digital technologies are introduced, discussion around their use may focus on the tools rather than "the transformations in learning and teaching that such a domain and conceptual shift might support" (Hughes, 2008 p. 437). Additionally, ePortfolio implementation can be disruptive to existing pedagogical, technological and institutional systems (Joyes et al., 2010) and possibly "destabilises traditional notions and methods of learning, teaching and assessment which are often fixed in time and contexts and controlled

by the institution" (Hughes 2008 p. 437). One has to ask how these new spaces, in particular those created by ePortfolios, can extend the conceptualisation of pedagogy.

The Role of Pedagogy in New Learning e-Spaces

Pedagogy, as "the essential dialogue between teaching and learning" (Beetham & Sharpe, 2007 p. 2) is a domain constantly reinventing itself as more is learnt about how people learn, the methods to engage people in learning and the emergence of tools that support engagement. According to Leach and Moon (2008) the time is right to reconceptualise pedagogy because of the significant advances taking place in many research-related areas. They note students and teachers now have easily available technologies that change both the modes of working and the forms of relationship. Furthermore, the new pedagogical spaces created by digital technologies are new settings for learning, which they argue create an opportunity to re-examine pedagogy. Using digital technologies to support learning is one example of pedagogic innovation promoted for at least the last twenty years (Robertson, 2007) yet conceptualisations of how technology and pedagogy meet have not been fully explored. There is no agreement, for example, on what constitutes "digital pedagogy" linking technology with learning and teaching (Attwell & Hughes, 2010 p. 4). It can be argued that e-learning practice is often driven by technology rather than by understandings of pedagogy (Vogel, 2010). Research by Jasinsky (2007) suggests that successful embedding of e-learning practices necessitates a focus on e-learning pedagogy rather than exploring new e-technologies. Despite these uncertainties about the role of pedagogy in new e-spaces, e-learning and blended learning are part of the nomenclature in higher education. The recent introduction of terms such as mobile learning, BYOD (bring your own device) and PLE (personal learning environment) for example, describe ways learning can occur in new spaces using digital technologies. Consequently, teaching staff face challenges in understanding the relationship between their existing pedagogical approaches and the implementation of new technological tools.

Learning and Teaching in e-Spaces: Staff Readiness

As early adopter teachers and programmes welcome new technological tools the question arises as to whether teaching staff are pedagogically equipped to capitalise on their affordances. Increasing availability of these tools challenges traditional teaching methods (Rienties, Brouwer, & Lygo-Baker, 2013). Shifts away from a focus on teaching to student-centred learning brings new evaluation of teachers' roles and what constitutes learning (Attwell & Hughes, 2010). Features of a sound e-pedagogy Kuriloff (2005) suggests include redefining the teacher's role towards facilitation of a "positive learning environment that encourages individual responsibility" and spaces for student learning contextualised by self-expression, collaboration with peers, autonomy and "learning anywhere and at anytime" (n.p.). Technology no longer exists merely as a set of neutral tools but is closely connected to our personality and identity (Kaptelinin & Nardi, 2012). There is growing need for technical solutions to be cognisant of the needs of academic staff and students for enhanced learning experiences as a result of engaging with emerging technologies (Laurillard, 2009). This shift towards technologically-aided individualised student learning spaces brings new pedagogical challenges. It requires a paradigm shift that necessitates a rearticulation or renegotiation of the

pedagogy (Beetham & Sharpe, 2007; Puentedura, 2006) with learners who are now positioned differently because the learning occupies a new and unfamiliar e-space.

Ideally, academic teaching staff ready to make these conceptual and pedagogical shifts to incorporate new technologically-based practices are well-supported and make smooth transitions. However in practice, Juhary (2011) suggests that technological possibilities have surpassed pedagogical theory advancements. This situation makes it difficult for staff to maintain focus on appropriate pedagogical foundations when implementing new technological tools. Limited staff time, availability and competing priorities are significant barriers (Jasinsky, 2007). Hallam et al. (2010) concur, citing "time, lack of academic interest, resistance to eLearning initiatives, reluctance to engage with reflective practices, and competing priorities" (p.29). Such barriers limit opportunities for teachers to reflect on, evaluate and where necessary, reinvent existing pedagogical approaches in new e-spaces and highlight the need for timely and strategic support.

Research Methodology and Results

Exploratory research was conducted in a small regional university about the need and viability of introducing an ePortfolio to support student learning. The University was neutral about the introduction of ePortfolios but cognisant of trends within the sector that needed investigation. Consequently, an initial feasibility study in late 2012 explored whether academic and associated supporting staff value the use of ePortfolios as a tool for student learning within the university.

Questions from the initial survey of students and staff, which were also pursued through later data collection methods, included:
1. What do you see as the main ways ePortfolios could be used?
2. How would you use ePortfolios as part of your teaching or learning repertoire?
3. What enabling factors do you see as necessary to successfully implement ePortfolios at the university?
4. What do you envisage as the main barriers or problems associated with the use of ePortfolios at the university?

Difficulty with gaining responses through an institution-wide survey brought a second data collection phase of discussion groups and interviews within faculties based on a snowballing sampling method. Further responses came from an ePortfolio email interest group which grew in numbers as the study progressed. Additionally, the project team developed a set of functionality criteria to evaluate a number of ePortfolio platforms potentially suitable for the university's purposes. Internal data was supplemented by the project team's participation in external cross-institutional gatherings with other ePortfolio practitioners.

The research yielded over forty formal responses and a number of informal conversations within the university staff community. The predominant response came from academic staff in professional degree programmes facing the pressures of providing evidence of student competencies to external accreditation authorities. The results from the data gathering activities demonstrated a strong focus on the functional capacity of the particular solutions being discussed. The researchers found themselves time and time again being drawn back to discussions that centred on technological knowledge and technology-based solutions, and

support for implementation. At the time of data-gathering, no pedagogical models for use of the ePortfolio were used to prompt academic staff responses. Only through analysis of the data and critical reflection by the project team has it become clear that unless a pedagogical model which incorporates technology was found, the majority of the implementation and staff training would centre on how to use the technological solution rather than its affordances for learning and teaching.

Technology-based solutions can be seen as effective ways to address increasing complexities in accreditation, professional development and employability expectations. Survey respondents made comments such as:

> "I see an ePortfolio as being an easy way to manage the [professional development] information."
> "I would use an ePortfolio for work-integrated learning."
> "As a prospective employer, I would look very favourably on this [ePortfolio] as a type of resume or application."

In focus groups, participants made comments including:

> "Accreditation is very important. At the moment it is hardcopy and not very stringent but it will become more rigorous."
> "Students are not sure how to be employable."

One interviewee commented that ePortfolios are

> "A necessity for employment: being better prepared for a resume and answering selection criteria."

The other important conversation from the research concerned the need to support ePortfolio implementation. The research participants confirmed that critical times for support include orientation to implementation, particularly with staff first and then with students, as well as an extended support commitment as the process rolls out. Three survey respondents explained the need for support as follows:

> "I can see the benefits for ePortfolios if there is support by the university."
> "Staff will need training on the use of ePortfolios for a successful implementation."
> "The main barriers include support and education."

Similarly, two focus group participants made comments including:

> "It [ePortfolio roll out] would truly enhance staff ICT skills."
> "We would only implement ePortfolios across the programme if there was strong support for the implementation process. Our current workloads are very heavy and a lot of things come without support."

Although the predominant foci of the research responses were technology and support, threads of the importance of using ePortfolios for pedagogical reasons were consistently

evident. Survey results and focus group participants saw pedagogical affordances as including reflective practice, assessment and feedback opportunities, experiential and work-integrated learning facilitation, and evidence of experience with graduate attributes.

The research resulted in the project team:
1. Deciding that in order to balance pedagogical concerns with those of technology and professional accreditation, a conceptual framework that included both technology and pedagogy should be sought.
2. Recommending to the university the implementation of ePortfolios for student learning and in particular the adoption of the PebblePad software platform.

Discussion: Understanding the Relationship between Pedagogy and Technology

The feasibility study results and the consequential planning for a staged implementation process including support for two programmes to use an ePortfolio as early adopters, prompts a number of questions around staff readiness for ePortfolios adoption. These questions centre on three main aspects; firstly, the nature of change in teacher roles in relation to student learning; secondly, the important elements required for supporting staff in these changing processes; and finally, a framework for conceptualising how content, pedagogy and technology interact in new e-spaces.

Scholarly literature recognises the over-emphasis on technology occurring at the expense of pedagogy (see Vogel 2010). Laurillard (2009) reminds us that although new technologies invariably generate excitement about their possibilities for use, they are rarely designed with teaching and learning in mind. Further, Jasinsky (2007) suggests that successful embedding of e-learning practices necessitates a focus on e-learning pedagogy rather than exploring new e-technologies. However, this is difficult when change necessitates a high technological learning curve for users who may not be confident. The authors of this article argue that the search for an agreed "digital pedagogy" (Attwell & Hughes, 2010 p.4) is not necessary but rather existing pedagogical approaches need adaption to enable teachers and learners to enter and learn in new spaces. In doing so it investigates the utility of the boundary provided in the TPACK model (Mishra and Koehler, 2006) between technological knowledge and pedagogical knowledge to focus on technological pedagogical knowledge, as an indicator for staff readiness.

Reconceptualising Pedagogical Roles

The domain of the teacher in higher education might be seen foremost as content expertise. Traditional teaching approaches in higher education are usually defined by formal group lecture or tutorials where the teacher is seen as an expert. This series of formal interactions that constitute a course or subject generally last for a maximum of fifteen weeks, and then both the teacher and the students move on; the task complete. The increase in uptake of new ICT by academic staff results in changes to traditional teaching and learning approaches (Rienties et al., 2013) that will force a reconceptualization of the role of the teacher.

ePortfolios give students opportunity to take control of their formal and informal learning (Botterill et al., 2008) through a "rich and complex process" (JISC, 2008 p. 6) for the duration

of their time at university and beyond. Throughout this time they can increase their expertise and deepen their experience by determining the value and purpose for each artifact through self-reflection. Students can establish their own personal learning space, potentially inviting collaboration with peers and others. Research participants reinforce the benefits of ePortfolio flexibility and capacity which allows opportunity for students to build a repository of their own multimedia artifacts, re-purpose and export content at discretion, and to develop sophisticated metacognition skills. Teachers are invited to facilitate learning within this student-centred environment which encourages individual responsibility and expression (Kuriloff, 2005) but this means a shift from traditional teaching roles and adapting existing pedagogical approaches to new e-spaces.

Participants in our research were interested and motivated to change their relationship with students in the new e-space, with the caveats they provided with regard to support. They saw the opportunities and affordances likely to arise from students taking an ematic view of their learning and saw the shift in responsibility for learning as a desirable outcome.

Providing Pedagogical and Technological Support to Staff

Whilst the desire to embrace new technological tools is commendable it is important that early adopters (and followers) are equipped with appropriate pedagogical strategies to enhance the student learning experience. Although most participants in our study talked about reflective practice and other pedagogical elements, it cannot be assumed they are all at the same stage of integrating these elements into practice, either in face-to-face mode or through use of technological tools. The challenge for any implementation of an ePortfolio tool is to address the range of pedagogical approaches in interaction with a continuum of technological expertise; otherwise the main point of using ePortfolios is missed.

Feedback from other institutions' attempts to implement ePortfolios acknowledges the focus is often on the student's learning and engagement with ePortfolios. Academic teaching staff needs direct and consistent technologically and pedagogically balanced support as facilitators of the tool. Technical support may be easier to provide because of its contained nature within the software and the acceptance that being 'tech-savvy' is not yet a requirement for an academic position, although clearly desirable. Pedagogical support can be difficult to enact because of diverse needs, lack of clear articulation and the hesitancy by some academic staff to seek support. This situation necessitates the development of an ongoing, up-to-date and interactive professional development programme (PDP) founded on a framework such as TPACK which continues to elevate the importance of pedagogy.

The Technological Pedagogical and Content Knowledge Framework (TPACK)

This conceptual framework published by Mishra and Koehler in 2006 is useful to explain the relationship between technology and pedagogy. This framework develops Shulman's (1986) well-known concept of pedagogical content knowledge (PCK). Shulman argued that effective teachers need to have knowledge of content or content mastery and knowledge of pedagogy or how to teach generally but that neither of these is enough on its own to teach successfully. He believes that pedagogical content knowledge is the specific knowledge about how to teach the content most effectively and the likely pitfalls and misconceptions students will have as they come to know the content.

Mishra and Koehler (2006) took Shulman's PCK concept into the technological realm, producing a framework presented as three overlapping circles of knowledge types in a Venn diagram; technological, pedagogical and content (see Figure 1). The epicentre is named Technological Pedagogical Content Knowledge (TPCK), which later became technology, pedagogy and content knowledge (TPACK). Various intersections in the diagram were named Pedagogical Content Knowledge (PCK) after Shulman's concept, Technological Content Knowledge (TCK) and Technological Pedagogical Knowledge (TPK) to make a total of seven types of knowledge needed by teachers working in twenty-first century learning contexts. In arguing for the inclusion of technology in the model, Mishra and Koehler (2006) believe that since the 1980s "technologies have come to the forefront of educational discourse primarily because of the availability of a range of new, primarily digital, technologies and requirements for learning how to apply them to teaching" (p. 1023).
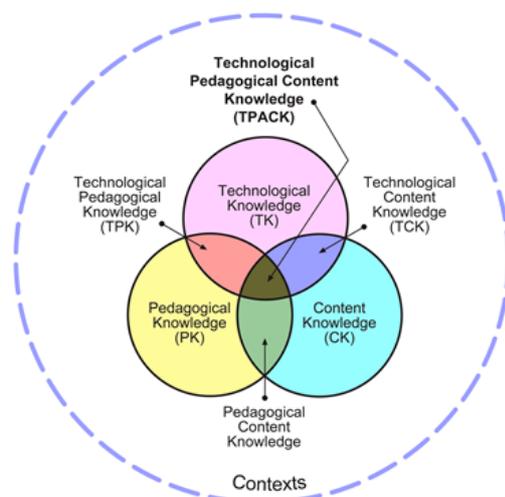

Figure 1: Visual Depiction of the Relationships between Content, Technological and Pedagogical Knowledge (Source: Mishra & Koehler, 2006)

The TPACK framework is extensively used in the K-12 sector to promote teacher readiness for teaching with technology but the same explicit application is not presence in the higher education sector. Yet Ward and Kushner Benson (2010) believe as academic staff begins to transition from face-to-face teaching to more blended and online approaches, an alternative schema to a pure focus on learning the technological tools must be introduced. They propose reframing the discussion to focus on the areas of knowledge identified by TPACK. Further, Koehler, Mishra and Yahya (2005, p. 740) argue that "effective technology integration for teaching subject matter requires knowledge not just of content, technology and pedagogy but also of their relationship to each other." In practice for example, during the introduction of ePortfolios this framework may provide some direction in terms of understanding the interplay between technology, pedagogy and content and their roles in advancing students' learning.

The Value of the TPACK Framework to Staff Readiness in ePortfolio Implementation

The TPACK framework provides opportunity to balance technology, pedagogy and content knowledge shifting the emphasis from reliance on technocentric responses (Papert, 1987) and

raising the profile of sound pedagogical approaches to promote student learning. TPACK is a conceptual framework in development because, as Graham (2011) points out, its capacity to provide explanations for phenomena or predict outcomes has not yet been fully tested, although its prevalence is increasing as academics seek less technocentric methods of responding to changing patterns of teaching and learning. This article, seeking to understand the research results it reports, utilises elements of the TPACK framework to understand possible futures for the ePortfolio in a university context, focusing on how to ensure and enable staff readiness.

Developing an understanding of ePortfolio use in student learning requires not only knowledge of both pedagogy (PK) and technology (TK) independently but where they intersect. The main boundary of interest in this article is between pedagogical knowledge and technological knowledge to explain the research results. Mishra and Koehler (2006, p. 1028) call this relationship Technological Pedagogical Knowledge (TPK), explained as "knowledge of the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, and conversely, knowing how teaching might change as the result of using particular technologies." More simply explained, Fransson and Holmberg (2012, p. 197) describe TPK as "knowledge about pedagogical constraints and the potential of technological tools when used in different ways and situations in a specific subject or disciplinary context". The implementation of ePortfolios as a contemporary student-focused personal learning space exemplar evidences the necessity for supporting staff to understand this boundary between technology and pedagogy. ePortfolios are a technological tool intended to enhance students' learning experiences through pedagogical rearticulation (Beetham & Sharpe, 2007) requiring staff to be able to accommodate both the capacity of the tool itself and the pedagogical skill required to make the most of its use.

The results of the ePortfolio feasibility study highlight the discordance between the elements of pedagogy and technology. Reflection on these findings by the project leaders directed attention to the need to begin conversations with a new 'schema' for working in the e-space created by the ePortfolio (Ward & Kushner Benson, 2010) i.e. the boundary of TPK. The pedagogical shift suggested by Leach and Moon (2008) earlier in this article does not alter the foundational principles of effective pedagogy but rather highlights the need for contextual adjustment in new e-spaces. This research highlights that teaching staff need support to draw on these pedagogical foundations and adapt them to digital expressions. Further, it shows pedagogical drivers are important to academic staff when considering a new tool such as ePortfolios and while they can be overshadowed in the evaluation process, these drivers are not lost. Given the current lack of experience with emerging technologies and the pedagogies that drive them, staff (and students) will have to be supported to extend their existing schemas and renegotiate what works in the new learning and teaching e-space. The results have served as a reminder of the importance of pedagogy in the consideration and implementation of ePortfolios within higher education. As this project moves into its implementation phase the development of a suitable PDP for academic teaching staff is a vital element for success.

Conclusion

A reflection by Laurillard (cited in Conole, Smith & White, 2007 p. 48) acknowledges the academic community is still in the learning processes of using technology properly and developing structures, training, habits and access to engage effectively with the proper use of

the various technologies. ePortfolios have the potential to be a conduit for a greater number of academics to begin to make the transition to more blended modes of engagement that support institutional drivers, such as retention and employability. ePortfolio implementation at the institutional level has the capacity to focus on pedagogical purposes, is flexible and small consistent learnings can be made over a longer time period, exploring from initial steps to more advanced uses. Academic support staff has an important role in facilitating this learning process and creating a sense of readiness that crosses the boundary between technological knowledge and pedagogical knowledge. This support enables academic staff to meet the challenge of ongoing technological developments by applying their pedagogical knowledge to decide how and when to apply various technologies in service of learning. ePortfolios can be one of those tools as long as implementation drives a pedagogical agenda and provides conceptual and practical support for pedagogical readiness.

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