

Chapter 10

ePortfolios for Learning, Assessment, and Professional Development

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ABSTRACT

ePortfolios are becoming increasingly popular as a means to address a variety of challenges in higher education, such as academic assessment requirements, specific teaching and learning goals, and emerging student professional development needs. This chapter explores these three applications of ePortfolios to provide administrators and faculty the information they need to make informed decisions regarding ePortfolios in academic settings. The relevant history of portfolios, assessment, and associated pedagogies sets a context for this discussion. Current trends in ePortfolio usage are outlined, including a survey of available technologies. This chapter concludes with a primer regarding the management of ePortfolio campus implementations as well as a brief examination of the key questions regarding the future of ePortfolios.

INTRODUCTION

Drawing on literature from the areas of pedagogy, assessment, and portfolio practice, this chapter provides a comprehensive narrative regarding best practices of ePortfolios application in higher education. This chapter provides an overview of

ePortfolio applications and usage to help faculty, staff, and administrators make informed decisions regarding the adoption and implementation of these technologies to meet specific learning, assessment, and professional development goals.

While there exist as many definitions of electronic portfolios as there do uses, an ePortfolio can generally be described as an electronic means for students to collect artifacts and examples of their

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academic, co-curricular, and professional accomplishments, to reflect upon their work over time, to select materials highlighting specific strengths and interests, and to share these sub-collections with others via the web or other interactive forms of media. Because portfolios often employ processes of reflection, electronic portfolios have much in common with their print-based counterparts: for example, both incorporate reflection into the collection, selection, and demonstration of student experiences and achievements.

Portfolios bring together visibility, process, and reflection as students chart and interpret their own learning. Students are responsible ... for explaining what they did and did not learn, for assessing their own strengths and weaknesses as learners, for evaluating their products and performances, for showing how that learning connects with other kinds of learning (in the classroom and without), and for using the review of the past to think about paths for future learning. (Yancey, 2001, p. 19)

Further, portfolios encourage the inclusion of a variety of learning materials that help students, teachers and reviewers alike see patterns in learning that might otherwise go unnoticed. This inclusion of various materials also contributes to richer forms of formative and summative assessment. When ePortfolios are approached from a perspective that values student responsibility, reflection, and growth over time, they hold much of the value intrinsic to traditional portfolios. Additionally, they can potentially offer much more to their various constituents. As Yancey (2001) suggests, the main difference between print-based and electronic portfolios is ‘the interactivity both of the digital medium and of social interaction’ (p. 20), and it is from this perspective that this chapter is grounded.

ePortfolios also provide a unique means for addressing several student learning needs, including course-level challenges regarding the facilitation of learning, the transfer of knowledge from one

learning event to the next, and the synthesis of content over time. Due to easily accessible online storage, ePortfolios provide a streamlined method for students and faculty to keep past assignments and projects active, potentially beyond graduation. Pedagogies that require students to reconsider past work and reflect upon its place in the current project foster meaning-making and help students synthesise their educational experience as a whole. This chapter describes these pedagogies, including how to structure capstone ePortfolio experiences to foster student learning and the mastery of programmatic learning goals.

While student-learning goals help to support an interest in ePortfolios, often the most powerful drivers in institutional adoption are assessment and accreditation pressures. These processes are currently evolving, but the overarching trend is toward continuous data-driven improvement and accountability. Colleges and universities are no longer simply being asked to describe what students learn in their programmes. They must now provide evidence, and the holistic and customisable nature of ePortfolios makes them more attractive than other assessment options, such as standardised tests. This chapter provides an overview of the assessment, accreditation, and accountability pressures facing institutions and includes case studies from higher education where ePortfolios are being implemented to provide evidence of student learning. These cases offer models that can be implemented at various types of institutions.

In addition to these student learning and institutional assessment needs, ePortfolios are also being used to assist students as they make the transition from undergraduate to graduate school and from higher education to career positions. Students can easily share their best work and greatest accomplishments with any audience, including admissions specialists and potential employers. Descriptive statistics and case studies from academic departments and career services units

provide evidence and exemplars for those engaged in promoting student professional development.

While the core focus of this chapter is on student learning, academic assessment, and professional development, also discussed are the evaluation of ePortfolios and the creation of rubrics to assist that process. A range of current ePortfolio technologies is reviewed, and the merits and drawbacks of each technology are provided.

This chapter also includes information on the diffusion of innovations within the context of higher education. Specifically, direction is given for those attempting to launch an ePortfolio initiative on their campus. Examples are provided that offer models for successfully fostering institutional buy-in. This chapter concludes by reviewing emerging questions and what they suggest for the future of ePortfolios in higher education.

BACKGROUND

While portfolios have existed in one form or another for many hundreds of years (Johnson, Mims-Cox, & Doyle-Nichols, 2006; Taylor, Thomas, & Sage, 1999), it is in the last three decades that they have gained attention in the field of higher education. Much of the early work in portfolios began as responses from faculty unsatisfied with the ways in which assessment of student learning was being conducted at the end of the 20th century (Challis, 1999; Elbow & Belanoff, 1986). While portfolios were in use prior to this time, they received increased attention in the mid-1980s when teachers of college composition, such as Elbow and Belanoff (1986), lauded them as viable alternatives to standardised tests and proficiency exams.

Concurrently, in the mid-to-late 1980s, in the UK, learning portfolios were becoming more prominent, partly through the Enterprise in Higher Education initiative (EHE) (Stefani, Mason, & Pegler, 2007) and the National Vocational Qualifications, which emphasised competence-based

assessment (Challis, 1999). The EHE initiative focused on personal development planning by emphasising transference of skills, connections between academic curriculum and professional work, adaptability to a changing world, active learning, and understanding and promotion of the skills related to lifelong learning. Portfolio development grew when the UK Open University gained funding to teach 'A Portfolio Approach to Personal and Career Development'. The Open University project was seen as 'possibly one of the first initiatives in the UK to emphasise, value, and credit 'the learning process'—through a portfolio of learning evidence' (Stefani et al., 2007, p. 23). Additionally, Challis (1999) has noted the use of portfolios within higher education as early as the late 1980s and the introduction of a professional portfolio in the field of nursing by the English National Board in 1991.

As a useful tool for documenting authentic learning and showcasing achievement in a variety of situations, portfolios have been used by artists, architects, students, and teachers for a multitude of purposes. As such, the term 'portfolio' has become increasingly harder to define; however, there are some fundamental qualities about which most can agree. An aggregation of several scholars' analyses of portfolios shows that all portfolios have at least some of these five qualities in common:

- They are purposeful and context-driven.
- They incorporate reflection and self-assessment into their creation process.
- They incorporate student responsibility, engagement, and ownership into their creation process.
- They demonstrate growth over time and enable students to project goals for the future.
- They are derived from a collaborative process, such as peer review, example portfolios, and teacher feedback. (Paulson, Paulson, & Meyer, 1991; Taylor et al., 1999; Yancey, 2001)

The great degree of disciplines using portfolios illustrates their capability of serving a variety of purposes; however, there are some broad categories into which many portfolios can be grouped, such as portfolios for learning, assessment, and professional development.

Learning portfolios, which often involve sets of classroom or course portfolios, can take many different forms and vary by elements such as type and level of course, objective of the portfolio, audience for the portfolio, and criteria for evaluation (Yancey, 2001). While they do vary widely, course portfolios typically all have one quality in common: student responsibility for including and contextualising pieces that exhibit learning of the course objectives. This process of interpretation of these learning objectives by the student helps to make learning more visible.

Portfolios for assessment often operate at the programme level and work to capture efforts of visible learning, usually in an attempt to review programme levels of effectiveness. Students show how effectively they have learned material, and programmes ascertain how effectively they are teaching (Knight & Gallaro, 1994). Students often complete programme portfolios to show that they have mastered a prerequisite for a major, to demonstrate senior capstone experiences, or to show that they have mastered areas for a degree and are qualified to join a professional community of practice. Johnson et al. (2006) emphasise two qualities typically inherent within all portfolios, reflection and facilitation of authentic assessment, that 'provide program developers with vital information about how well learners have integrated their values, knowledge, and meaning from their instruction and mentoring' (p. 9).

The act of reflection is a key feature of portfolio creation, and most 'portfolio advocates choose portfolios because of their understanding that reflection enhances learning' (Yancey, 2001, p. 17). Yancey (1998) defines reflection:

To reflect, as to learn (since reflection is a kind of learning), we set a problem for ourselves, we try to conceptualize that problem from diverse perspectives – the scientific and spontaneous – for it is in seeing something from divergent perspectives that we see it fully. Along the way, we check and confirm, as we seek to reach goals that we have set for ourselves. Reflection becomes a habit, one that transforms. (pp. 11–12)

The initial portfolio paradigm is described as one where students first collect all of their work, then select samples of work to share, and finally reflect on why they chose those samples, why the samples exhibit certain skills, or how their portfolio might help them plan for the future (Yancey, 2001). The act of reflection can occur throughout this entire process. Diez (1994) outlines three ways in which the portfolio encourages reflection. First, it supplies a structure which makes work visible to the student; second, by asking students to examine a collection of their work it provides the opportunity for self-assessment and peer assessment; and third, through self-assessment students can set goals for future growth and professional development. In many ways, portfolios remind us of the literal roots of 'reflection': 'The process of looking at one's development through a portfolio process functions like a literal mirror—when one sees one's own image or performance—the *literal* reflection sparks *internal* reflection' (Diez, 1994, p. 10).

Partly because of this reflection, richer forms of authentic assessment are often attributed to portfolios. During the last two decades there has been an increasing dissatisfaction with standardised testing along with an increasing demand for accountability among educational institutions (Shaklee, Barbour, Ambrose, & Hansford, 1997). As critique against standardised testing grows, there is a pressing need for forms of authentic assessment, which Johnson and Rose (1997) describe as 'performance-based, realistic, and instructionally appropriate' (p. 5). When assess-

ing programme portfolios, candidates' reflections can provide a breadth of rich qualitative data for programme improvement regarding programme strengths, weaknesses, and types of implementation. These reflections can also help serve as a map to help students see both where they have been, in regards to their learning, and where they would like to go (Diez, 1994). Self-assessment builds the portfolio as a map:

Using explicit criteria, the student develops the ability to look at her own work and determine strengths and weaknesses evident in a particular performance or across a set of performances. She begins to set goals to address the areas she needs to develop and to deepen her areas of strength. (Diez, 1994, p. 12)

When viewed through the lens of the map, we can see portfolio assessment as a way to chart student learning, as well as programmatic and institutional curricular development by providing the means to more authentic forms of assessment.

Diez (1994) warns us not to view the portfolio as something that can *do* our assessment work for us: 'The portfolio may provide a form, but the agency remains with the teacher's and student's use of the form' (p. 6). The analogy of the sonnet can be used to describe the form provided by the portfolio: the sonnet form provides a structure, which the poet employs for expressive purposes (Diez, 1994). The type of portfolio best described by the sonnet metaphor is one in which the creator chooses a set of 'best' pieces to show a range of performance and skills achieved. This type of portfolio is usually projected toward a specific audience, with a specific objective in mind. It may be guided by a set of required elements, but it is the student's choice of materials to match those elements coupled with the student's voiced reflection about those materials that make the portfolio an individual expression of the student's learning. Teachers can then use this expression and self-assessment as a moment of significant learning,

about the student and about the curriculum, but the portfolio does not do that assessment without the student's and teacher's close involvement with the learning processes.

A portfolio that showcases best practices can certainly be used as a learning portfolio or one for assessment, and it can also contribute to professional development. Because the creator chooses pieces that best showcase her or his skills and achievements, the portfolio for professional development requires discipline. Diez (1994) asserts, 'In the work world, a similar discipline is required for communicating about one's qualifications to a potential employer' (p. 7). The types of self-assessment and reflection that go into building professional portfolios draw connections between lessons learned in school and the skills and criteria that make them professionally qualified.

Portfolios, then, can be seen as tools for the facilitation and assessment of students' reflections on learning and professional development. Portfolios also engender a certain type of thinking – what has been called 'folio thinking' (Chen & Mazlow, 2002). 'Folio thinking' values reflection and its role throughout the process of learning, and it views students as collaborators who are actively engaged in constructing and taking ownership in their educations (Garis, 2007; Roberts et al., 2005). When all of the processes of the portfolio are taken together—map, mirror, and sonnet—they can serve creatively and constructively to enhance student learning and promote forms of authentic assessment (Diez, 1994). However, as Johnson and Rose (1997) remind us, 'When we only focus on portfolios as a product, we've missed their potential power, which comes from the process of creating them' (p. 8). The process of creating portfolios is one on which we focus as we turn our attention to their popular, new electronic forms of development and presentation. Citing John Keats's poem, 'On the Sonnet,' Diez (1994) encourages us all to take as much liberty as needed to make the form serve our own purposes, helping our students make their portfolios "interwoven and

complete”, weighing “the stress of every chord” (p. 8). Electronic portfolios are the next step in ‘stressing every chord’ of student learning.

ePORTFOLIOS IN HIGHER EDUCATION: LEARNING, ASSESSMENT AND PROFESSIONAL DEVELOPMENT

From Folio to eFolio Thinking

Though portfolios have been used in academic settings for decades, the shift to students who are often digital natives creating portfolios has wide-ranging implications on the pedagogy, design, and deployment of portfolios in higher education. With the possibility of combining digital learning objects—video, audio, or animation to name just a few—with technologically mediated social interaction offers both new challenges and new potentials (Yancey, 2001).

Paper-based portfolios were and are good methods of bringing process-based pedagogies to classroom instruction. ‘Folio thinking’ has proven to be a useful way to encourage students to ‘document and track their learning, develop an integrated, coherent picture of their learning experiences, and enhance their self-understanding’ (Stanford Center for Innovations in Learning, 2002). However, paper-based portfolios have limitations that most research recognises. Non-electronic portfolios can be difficult to compile and distribute, depending upon the medium of distribution. All elements have to be conveyed on paper, or be able to be converted to some form of paper-based representation. Students and faculty alike find them to be exceptionally time-consuming to create and to assess, often requiring excessive incentive to motivate students to value their creation and to encourage faculty to take the instructional time necessary to encourage good portfolio practice. And everyone can relate to the frequent difficulty in finding all of the necessary

and required components of portfolios, as students lose drafts and input from peers. Finally, the accumulation of hundreds of portfolios over time can make the physical storage a pressing issue.

Electronic media provide affordances that make ePortfolios useful for overcoming the limitations of paper-based portfolios. This is a clear shift from ‘Folio thinking’ (Stanford Center for Innovations in Learning, 2002) to what might be called ‘eFolio thinking.’ It might serve best to organise these around a familiar organisational scheme, that of the portfolio process itself: collection, selection, reflection, connection, and evaluation.

In terms of collection, ePortfolio development and ‘eFolio thinking’ encourage the creation of digital formats for student work. These digital formats will be usable and re-usable for the longevity that some assessment efforts require. Digital formats encourage instructors to involve new forms of digital, participatory submissions to student portfolios, such as blogs, video, and audio podcasts.

Locating these resources online, typically in Internet-accessible environments, centralising the collection of portfolio elements so they are accessible to students, classroom instructors, and assessment administrators, eases selection processes. In past portfolio creation, multiple paper copies would have to be created for each individual viewing of the portfolio, requiring quite a few costly resources. In digital formats, each view of the portfolio can access the same digital artifact without creating permanent physical copies.

Reflective processes are most aided on two levels. Through the use of highly detailed, varied modes of prompting, instructors are able to scaffold deep reflective activities by their students. In addition, online environments allow easier integration of the artifacts and reflections. For example, clips of audio or video can be brought in alongside commentary from the learner, the learner’s peers, and the classroom instructor, all within one page of an ePortfolio. The ability to create templates of reflective prompts in many

portfolio systems also has important ramifications for the assessment capabilities of ePortfolios. Form-based collection of reflection prompts turns student thinking into meaningful, qualitative (or quantitative) data regarding the student's actual learning during course activities.

The growing social technologies on the Internet have changed the collaborative nature of ePortfolio projects. Now, rather than costly resources being devoted to reproduction and sharing of paper-based portfolios, Internet-based production allows for easy access by many parties. Often the student can control and limit access or choose to publish a portfolio to a wider, public audience for purposes of professional development or community participation. The work at Penn State University using blogging software as a base for their student learning portfolios is a good example of such a system (Education Technology Services, 2009). Indeed, as students in our classes are more comfortable working in digital environments, it becomes important to incorporate the types of media they are comfortable producing as artifacts of their own learning. Blogs and podcasts, video and animation, all become legitimate media for displaying evidence of student creativity, knowledge, and learning.

Finally, in terms of evaluation or assessment of portfolio work, again the centralising of data within institutional learning management systems greatly aids the ability for faculty and administrators to organise systematically the types of artifacts that they require to assess student learning, whether on a course, programme, or institutional level. While it was possible to organise this vast amount of information with paper-based portfolios, the effort was often very costly and time-consuming, particularly at the programmatic and institutional levels. With the advent of digital distribution and easy, centralised access to student learning portfolios, assessment teams have access to complex datasets, often alongside sophisticated assessment tools, managed through an online interface. eP-

ortfolio tools allow for a balanced approach to student learning and assessment (Barrett, 2009).

The shift to electronic environments poses a great opportunity for folio thinking to develop into a new mode of pedagogy, eFolio thinking. In this mode, students and faculty alike can find new ways to collaborate on the steps of student learning. This emerging pedagogy is at the heart of the most current trends regarding ePortfolio usage.

Current ePortfolio Trends

The interactive and social nature of ePortfolios speaks to current trends in higher education. Because ePortfolios allow for documentation of and central storage for various materials that can be accessed from multiple avenues, they can help contribute to two ongoing demands in all levels of education: accountability and authentic assessment (Reese & Levy, 2009). While these calls for accountability and authentic assessment are not new in the field of education, with the advent of the Spellings Report in the USA, there is increasing pressure on higher education to provide substantive evidence of student learning. Susan Kahn (2001) addresses electronic portfolios' authentic accountability: 'Web-based institutional portfolios are not only public and highly accessible to stakeholders; they are also especially useful tools for communicating evidence-based information demanded by higher education stakeholders' (p. 137). ePortfolios offer ways to answer these calls for assessment from a student-centered perspective. Since most ePortfolios involve deriving and describing a set of outcomes or objectives, and since they can be connected across courses, programmes, and institutions, they have the potential to facilitate dialogues that make competencies and outcomes central to curricular discussions. Moreover, since ePortfolios commonly make student involvement and responsibility a high priority (Yancey, 2001), assessment through portfolios is often student-centered.

The social element of electronic portfolios addresses a third trend in higher education: students' increased use of multimedia in their daily lives. Reese and Levy (2009) state that today's undergraduates share their experiences through such web-based multimedia outlets as Facebook, Flickr, and YouTube and are capable of utilising various media to communicate their ideas. When surveying the different trends in portfolio usage, it becomes clear that portfolios have been in use for a long time and are currently being used for a vast variety of purposes. Johnson et al. (2006) identify nine areas that show the multiple uses for portfolios; Cambridge, Kahn, Tompkins, and Yancey (2001) emphasise three main types of electronic portfolios; and, Abrami and Barrett (2005) describe three types of portfolios. Our discussion focuses on ePortfolios for learning, assessment, and professional development, with the understanding that many of the disparate uses of ePortfolios fall into one or more of these categories.

Zubizarreta (2004) describes a portfolio for learning, electronic or otherwise, as a 'flexible, evidence-based tool that engages students in a process of continuous reflection and collaborative analysis of learning' (p. 16). When portfolios established at the programme level include an emphasis on student learning, they can 'lead students to deeper reflection on programmatic goals and objectives that are promulgated to wider audiences' (Reese & Levy, 2009, p. 4). Ultimately, learning portfolios work to engage students in processes of inquiry, help to establish reflective learning environments that challenge students to evaluate and synthesise their learning in addition to stating and analyzing preexisting information, and ask students to reflect on what they have already learned and then project goals and improvements for future learning (Yancey, 2001; Zubizarreta, 2009). ePortfolios focused on learning facilitate processes of collaboration and mentoring between the student and teacher and can even provide 'an interactive, web-based set of goals, directions,

advice, and models developed as a virtual mentor or guide to portfolio development' (Zubizarreta, 2009, p. 38). Learning-focused portfolios allow students to select and organise their content, which engages them in the assessment and evaluation process (Abrami & Barrett, 2005). This can lead to students being more engaged in their learning process, and it can contribute to more authentic forms of assessment (Abrami & Barrett, 2005). ePortfolios for learning provide authentic ways to gauge students' understandings of course and programme curriculum.

These models for learning overlap with the forms of assessment deployed throughout universities to improve student learning: 'A portfolio allows the student the opportunity to reflect and record learning process while offering teachers an authentic integrative approach of evaluating student growth and achievements as well as acting as a feedback mechanism for their teaching practices' (Abrami & Barrett, 2005, p. 8). Because electronic portfolios provide central spaces for storage, access, and presentation of student learning materials, they can provide the means for internal and external departmental review, as well as other forms of institutional accreditation and assessment (Reese & Levy, 2009). The task of integrating ePortfolios within an educational institution can renew critical interest in curricular development at the programme level, and ePortfolios can promote authentic assessment throughout every level of higher education accountability. ePortfolios are often associated with authentic assessment because they accommodate virtual exhibitions of competencies. Because of this, they can be useful for ascertaining prior learning, experiential learning, and non-credit forms of learning, which can be especially useful in the assessment of 'immigrants, minorities, and mature learners where life experiences, rather than credentials, are especially relevant to judge' (Abrami & Barrett, 2005, p. 4).

Because of their authentic nature, ePortfolios can contribute to forms of professional develop-

ment and life-long learning. Ward and Moser (2008) recently conducted a survey of 5,310 employers, finding that 56% of all respondents planned to use ePortfolios as part of their applicant review process; the authors recommended faculty and career services encourage student use of ePortfolios. Turner (2007) claims that a well-designed work portfolio can provide students with a great advantage over other qualified candidates for competitive professional positions, noting that 'a good work portfolio can provide visual evidence to back up your verbal and written claims of competency' (Turner, 2007, p. 19). In regard to promoting professional development, ePortfolios can be used for academic advising and career planning (Reese & Levy, 2009). The ePortfolio can provide a useful tool for an academic advisor to review a student's degree progress and it 'illuminates a structured workflow toward academic and professional goals, making it easy to review past activities' (Reese & Levy, 2009, p. 4). In addition to the type of advising that reviews academic achievement and charts progress toward professional expertise, ePortfolios also offer students a comprehensive overview of their academic, extracurricular, and co-curricular achievements, and they provide a medium for students to present those activities, along with self-reflection and supporting evidence, to prospective employers. Ring and Foti (2006) note the relationship between portfolio creation and student connections between theory and practice, asserting, 'The ability to make these links contributes to the professional development of our students. A student's ability to make informed decisions about what best represents him/her as an educator reflects a high level of professional knowledge' (p. 344). Ultimately, the interactivity, reflective processes, and authentic forms of evidence that are so often associated with ePortfolios can contribute to more reflective professionals graduating from our institutions of learning.

The three types of portfolios we distinguish overlap in many ways and only represent one form

of categorisation. There are in fact many uses for these tools, and they are being utilised in K-12, secondary, and post-secondary educational institutions the world over. ePortfolio tools, however, are just that: a set of tools. They can facilitate learning and provide alternatives to traditional forms of assessment, but they must be employed with those values in mind. Much like their namesake, ePortfolio initiatives often develop through iterative processes of reflection that value student engagement, curricular reform and refinement, and forms of experiential, authentic assessment. When viewed from this vantage point, ePortfolio initiatives within institutions promote notions of life-long learning. Taylor et al. (1999) cite a statement on life-long learning from the National Record of Achievement Review:

Many people are increasingly likely to live so-called 'portfolio lives', constantly needing to update their skills and knowledge in order to take advantage of opportunities as they arise. Their skills need to be transferable. ... This changing world will thus place much greater emphasis on individuals taking responsibility for reflecting on what they have already experienced, setting future learning goals and preparing plans for how these will be achieved. (as cited in Taylor et al. 1999, p. 147)

Institutions of higher education should promote life-long learning, and ePortfolios provide a meaningful way to assist this process.

Assessment Strategies with ePortfolios

As suggested above, growing institutional assessment needs are facilitating interest in ePortfolios in higher education. For many institutions, this is often the central driver of ePortfolio adoption (Bass & Eynon, 2009; Schneider, 2009). Even if the assessment is done on an individual, student-centered basis, one of the features that mark an

ePortfolio as different from personal websites, social networking sites, or blogs, is that an ePortfolio should be guided by a sense of goal, purpose, or direction.

Take for instance, the often-cited definition of portfolios generated in a conference of the Northwest Evaluation Association in August, 1990:

A portfolio is a purposeful collection of student work that exhibits the student's efforts, progress and achievements in one or more areas. The collection must include student participation in selecting contents, the criteria for selection, the criteria for judging merit, and evidence of student self-reflection. (cited in Paulson et al., 1991, p. 60)

Nested within this definition is student self-assessment of progress. From this student-centered effort, much research has shown how students can learn to reflect on their own learning and professional development (Angelo & Cross, 1993; Davis, Ponnampuram, & Ker, 2009; Johnson, et al., 2006; Murphy, 1997; Riedinger, 2006; Taylor, et al., 1999). Classroom instructors should be able to assess personal instructional practices and activities by looking over a class-sized sample of student work, not to mention having a richer method of assessing an individual student's progress in a course. Sliding up the scale, by sampling from potentially hundreds of student-created portfolios, entire programmes, departments, colleges and universities could have a more representative sampling of the work the students in the university are producing, which can be used for broad measures of assessment and to plan long-term programmes of development.

This section reviews the learning and assessment theories that ground work in electronic portfolios, and then turns to an exploration of the potential uses of ePortfolios within higher educational assessment settings, from an individual to an institutional framework.

Walvoord (2004) defines academic assessment in clear language: 'Assessment of student learn-

ing is the systematic gathering of information about student learning, using the time, resources, and expertise available, in order to improve the learning' (p. 2). ePortfolios offer an opportunity to enhance that systematic gathering of student learning, including non-traditional, but direct, evidence, such as videos of oral presentations and group work, blog posts, and a wide array of multimedia. This potential has gained recent attention from organisations such as the Association of American Colleges and Universities (Schneider, 2009). Assessment requires a 'systematic gathering of information about student learning,' (Walvoord, 2004). Portfolio assessment seems to stand in opposition to traditional modes of assessment, but, as the president of the AAC&U, Carol Geary Schneider (2009) recently put it, 'after nearly a century of experimentation with standardized testing in college admissions, we know that students' scores tell us much more about the test-takers' resource base—or lack of it—than about their potential or their capacity to learn' (p. 2).

Electronic portfolios offer an opportunity for unique forms of assessment on several levels: for the individual student, for the classroom instructor, and for programmes or even institutions. For the individual learner, an electronic portfolio can be an opportunity to reveal desirable, personal learning outcomes, and to chart progress towards those outcomes. In addition, typical uses of electronic portfolios as 'electronic résumés' offer an opportunity for student learners, typically novices in communities of professional practice, to demonstrate that they have skills desirable of that community. This goes beyond typical modes of 'résumé' sharing that merely list skills with no capability to demonstrate teamwork, communication, or design skills effectively, for example. Assessment, in this sense, allows individual learners to improve and to target their learning on a set of self-directed, but communally significant, skills.

For the classroom instructor, there are two levels of assessment that can benefit from ePortfolio use. The first is perhaps the most obvious: having

students create electronic portfolios provides a method for assessing elements of student learning that are not captured through multiple-choice tests or even essays. As only one example, one faculty member in a secondary English education programme has her student teachers use vlogs, or video-based blogs, to capture their experiences with instruction. After they videotape themselves teaching a lesson, they are asked to record a 3–5 minute reflection on that lesson. Then, as part of the programme's final portfolio, the student-teachers are asked to compile a narrative using 10–15 second clips from the array of collected reflections, focused on the question of their developing skills as classroom instructors, informed by the standards of practice of the National Council of Teachers of English. This provides a powerful tool for the instructor to assess her students' individual progress, not only on content knowledge in English or in theoretical classroom practice, but in observable classroom presence and activity.

The second level at which electronic portfolios provide a good mechanism for classroom instructors begins when the instructor participates as well, collecting not only student portfolios, but creating a portfolio of his or her own alongside the students'. There is a long-standing, and growing, tradition in education of course portfolios. A quick search will find institutions such as Indiana University, the University of Wisconsin, the University of Nebraska, Georgetown University, Xavier University and others with organised efforts at supporting instructors in creating reflective course-development portfolios. Course portfolios can be especially beneficial if there are more than one faculty teaching a shared set of learning outcomes. They give the opportunity for the instructor to take the elements of a course—syllabus, assignments, lectures and course materials—and to create a reflection space around those elements. In an electronic environment, this is particularly easy, and using blogging software, for example, an individual instructor or a team of instructors could provide examples of student response,

analysis of effectiveness, and recommendations for revision. At the end of the semester, a good electronic course portfolio would provide a tool for more effectively assessing the activities of the course and the effectiveness of the learning environment. In addition, the electronic environment can provide a unique opportunity to collect forms of student-produced 'data' that might not typically be easy to organise or process (Bass, 1997).

Extending that work, a third level that benefits from electronic portfolios is the programme or institution (Kahn, 2001). This arena has garnered much international attention on assessment. In America, the Association of American Colleges and Universities' VALUE project seeks 'to contribute to the national dialogue on assessment of college student learning. It builds on a philosophy of learning assessment that privileges multiple expert judgments of the quality of student work over reliance on standardized tests administered to samples of students outside of their required courses' (Association of American Colleges and Universities, 2007). ePortfolios play a central role in this new form of assessment that the VALUE project supports:

Educators around the country are pointing to an accountability strategy that can provide, simultaneously, a framework for raising student achievement, evidence of progress over time, and transparency about the extent to which students are achieving.... The strategy—well attuned to the technologies of our time—uses e-portfolios ... ePortfolios enable us to see what a student is working on over time, to discern an emerging sense of purpose and direction, and to review samples of writing, research projects, and creative work as well as progress in integrating learning across multiple levels of schooling and multiple areas of study and experience. An e-portfolio also opens windows into a student's field-based assignments by creating opportunities to present supervisor evaluations or even videos showing real-world performance. (Schneider, 2009)

For academic programmes and departments, and indeed entire institutions, electronic student portfolios provide a set of unique learning and programme assessment data (Blair & Takayoshi, 1997). Rather than course grades, graduation numbers, or retention rates, instead data from student responses to course assignments across the programme, as well as work samples representing specific programme outcomes are readily accessible to assessors.

In order to increase the effectiveness of portfolio collection schema, experts from the different communities of practice can be drawn into the portfolio assessment process (Dubinsky, 2003; McNair, Paretti, Knott, & Wolfe, 2006). For example, criteria for portfolio artifacts and reflection prompts for learners can be derived from asking experts in the field what types of artifacts are most often produced and are necessary for practitioners to master. In addition, alumni boards provide excellent candidates for assessment teams: practitioners in the field provide a valid, external source of expertise that can assess the effectiveness of the student's representation of learning in an electronic portfolio.

By taking advantage of contemporary learning theories, electronic portfolios provide a new approach to assessing learning in higher education. Walvoord (2004) reminds us that assessment should use 'the time, resources, and expertise available, in order to improve the learning' (p. 2). Rather than focusing on data that simply provides accountability for a programme or institution, assessment of student learning centered on ePortfolios can begin to focus on data that provides real evidence of student learning.

Rollout and Adoption Strategies

With interest in ePortfolios being driven by student, curricular, and institutional pressures, administrators and technology directors are in need of guidance that will enable them to implement their initiatives successfully. There are a

number of general strategies useful to that end. Additionally, strategies from the field of diffusion theory specific to higher education provide valuable rollout direction.

Whether considering a small pilot or an enterprise-level launch, it is important that those in charge of these projects develop strategies to ensure the sustainability of their endeavour. A key strategy to reach this objective is to align the ePortfolio initiative to departmental, college, and/or institutional stated goals and missions strategically. For instance, finding language in a university's mission statement or strategic plan consistent with the goals of an ePortfolio initiative provides a skeletal framework onto which arguments for funding can be placed in the future. As Virginia Tech's Learning Technologies group launched its enterprise-level ePortfolio initiative, they paired discussions and presentations of capabilities with language taken directly from their institution's strategic plan. 'A culture of continuous improvement' and 'integrating learning technologies to enhance the teaching and learning process' were among the phrases used to generally describe ePortfolio's logical role and place within the university's future (Fowler, Watson, & Zaldivar, 2009).

In addition to this rhetorical strategy, Learning Technologies also developed and nurtured key partnerships with stakeholders who had parallel or similar missions across campus. The Vice Provost for Academic Affairs and the Director of Academic Assessment were among these collaborators and were dealing with institutional challenges associated with accreditation. By offering a viable alternative to less attractive assessment methods, such as standardised tests, that still aligned with institutional goals, advocates at the administrative level emerged (Fowler, et al., 2009). Other key partnerships include faculty development groups, teaching and learning centres, institutional research, campus technology support groups/units, career services, student affairs, and alumni relations. All the while, senior leadership

should be kept aware of progress and status, as they will be able to advocate for the project as opportunities arise.

Prior to or in concert with partnership building, it is advisable, if possible, to run lengthy pilots. This will enable a project team to understand the capabilities of the system deeply, as well as learn its limitations. Being able to respond to critiques and criticisms with a thorough understanding of the issues will foster a sense of trust in those leading the project. These opportunities for relationship building are essential. Additionally, as pilots are being planned, it is wise to select carefully the faculty that will participate, as well as the projects that will ultimately serve as exemplars to the next round of adopters. Faculty who have a high tolerance for technical issues are ideal for early pilots. As the project continues, it is then essential to engage and include those that have a high degree of opinion leadership. Rogers (2003) defines opinion leadership as 'the degree to which an individual is able to influence other individuals' attitudes or overt behavior in a desired way with a relatively high frequency' (p. 388). Within the faculty ranks, department heads/chairs, full professors, and award winning faculty are likely to possess a high degree of influence while still being perceived a peer to other faculty. As adoption grows and resources are requested, these faculty will serve as key, influential advocates in support of your project.

Faculty development also serves as a key component to ePortfolio adoption; however, given the complexity of the concept and the commitment required by faculty to integrate ePortfolios into their course or curriculum, a sustained, ongoing commitment to engage faculty is required. Diffusion of innovations theorists agree that adoption is a process rather than an event, and ongoing contact with adopters is required to ensure adoption occurs (Ellsworth, 2000; Hall, 1979; Rogers, 2003). The Concerns-Based Adoption Model (CBAM) embraces this understanding and was developed

to provide strategies to those managing adoption processes (Hall, 1979).

This model provides direction for the types of messages that should be provided to different audiences at different stages. For instance, given that the typical response from adopters in the first stage (awareness) is concerns about the self and what the adoption might mean in terms of time investment, learning curve, etc., messages to those faculty should be appropriately tailored to include clear messages about benefits to the individual. As faculty progress in their consideration of ePortfolio, the messages should shift to address the concerns that are present in the audience/individual. This logic holds true as adoption campaigns turn their attention to students as well.

Institutional climate and context also play a role in the successful rollout of any initiative, and Ely (1990) has identified and validated eight conditions that facilitate change efforts and diminish resistance associated specifically with instructional technology in higher education. A practical way to apply these conditions is to phrase each one as a question (Ely, 1990). For instance, 'Are most in the university pleased with current academic assessment methodologies?' 'Is it clear to faculty who is sponsoring our ePortfolio project on campus?' While project managers may have limited ability to change some of the answers, awareness of these answers will enable leaders to understand the reasons for slow adoption or outright resistance. This information should then influence the structure, timeframe, and communication plans associated with rollout activities.

Challenges to ePortfolio Adoption

While electronic portfolios have the potential to be transformative at the course, programme, and institutional level, possible limitations and obstacles to adoption should be addressed when considering the launch of any ePortfolio initiative.

Whenever any new technology is considered in the field of education, the question of access

needs to be addressed. While the concern for the 'digital divide' might be less prevalent today, it should be noted that as of 2000, 'seven percent of lower income households have a computer, compared with 32 percent in the \$30,000–50,000 income bracket, 53 percent in households making more than \$50,000 annually, and more than 70 percent in those with incomes higher than \$75,000 annually' (as cited in Cambridge et al., 2001, p. 10). In many instances, educational institutions may provide computers for student and faculty use; however, additional resources should be supplied to prepare and support student and faculty use of these technologies. The issue of access to technology, while important, is not the only potential challenge to ePortfolio adoption. Electronic portfolio scholars have shown a wide range of ePortfolio tools that span the spectrum of accessibility and cost (Barrett, 2008; Cambridge et al., 2001). For this reason, it is possible to build an ePortfolio using easily accessible tools for minimal, if any, cost.

Perhaps more significant than access, student and faculty attitudes toward ePortfolios can greatly influence prospective adoption. From a faculty perspective, even armed with the best intentions, there are several obstacles that faculty have to overcome in order to successfully adopt an ePortfolio project. Some of the impediments to ePortfolio adoption may be related to the necessity of implementation; adoption may be directly related to whether or not the use of ePortfolios is mandated from the university. Required ePortfolio use may provide a catalyst for adoption, but it may not ensure that faculty see and utilise the benefits of ePortfolios and eFolio thinking. Conversely, optional ePortfolio use removes pressure from faculty but may not result in institution-wide ePortfolio adoption.

Additional challenges to ePortfolio adoption include time, pedagogical planning, and ease of technology. Faculty are often committed to multiple institutional and scholarly duties and may not have the time required to embark on a

transformative ePortfolio initiative. Moreover, incorporation of ePortfolio into current curriculum may require time to revisit and revise curricula at the course, programme, and institutional levels. These concerns can be magnified depending on the ease of available technology.

On all of these fronts, it is best to view ePortfolio adoption from a long-term perspective. As described above, consider starting with small pilot projects and plan for growth and expansion over several years. Electronic portfolio projects do not need to begin with sweeping change; it is usually best to target one main priority, such as assessment of two or three goals or objectives or a particular common learning activity. Approaching portfolios from the perspective of learning, assessment, and professional development, it might also be suggested that one start an ePortfolio project by focusing on one of these three areas and work to incorporate the remaining two over time. Finally, additional conditions for ePortfolio success, gathered from multiple resources and cited in Knight, Hakel, and Gromko (2008) include thoughtfully incorporating ePortfolio into the curriculum; faculty promotion of the value of ePortfolio; multiple opportunities for and inclusion of feedback on ePortfolios; time allotted for development; inclusion of engagement and personalisation within ePortfolios; provision of multiple examples of ePortfolio; and provision of technical support (pp. 11–12).

While the challenges to ePortfolio adoption are not limited to those listed, and while the potential obstacles are significant, the school culture, or institutional attitude, towards learning, assessment, and technology may play the most important role in ePortfolio adoption and utilisation (Cambridge et al., 2001, p. 11). As Cambridge et al. (2001) suggest, 'As more technology becomes more and more universally available, institutions that have developed a culture of practice around student learning and a culture of assessment around improvement will be ready for the rich possibilities of electronic portfolios' (p. 11).

FUTURE RESEARCH DIRECTIONS

It is expected that ePortfolio usage on college and university campuses will increase as accountability continues as a growing practice in higher education. Regional and disciplinary accrediting bodies' requirements continue to evolve and become more rigorous, and the probability is high that holistic assessment methods, such as those that utilise ePortfolio, will continue to grow in popularity.

As a result of this powerful facilitator, questions associated with pedagogy, assessment, and professional development will certainly become more complex and intertwined. For example, how can a single ePortfolio initiative or system meet course-level pedagogical needs while still serving the assessment needs of the institution? Given the variety of ePortfolio systems on the market, is it possible to provide some sense of standardisation that would enable portability for students who might bring ePortfolios to campus and then wish to take them to graduate school and beyond? What are the long-term fiscal implications and liabilities for an institution that purchases a vendor-based solution for its ongoing assessment and data warehousing needs? What new capabilities are needed, given the breadth and power of numerous Web 2.0 applications, to ensure key data is captured to enable meaningful assessment? These are among the broad emerging questions.

Thinking specifically about teaching and learning, researchers are beginning to verify the value of ePortfolios. A recent pilot study at Bowling Green State University found that 'students with e-portfolio artifacts had both significantly greater cumulative grade-point averages and credit hours earned than undergraduates without e-portfolio artifacts' (Knight, Hakel, & Gromko, 2008). While correlation is not causation, this study does suggest an exciting line of inquiry as well as a desire to quantify the value of ePortfolios within the curriculum outside of the realm of academic assessment.

CONCLUSION

In many ways, the trajectory of ePortfolios resembles that of e-learning in the late 1990s. The concept is receiving a great deal of press, praise and promise are currently high, a variety of disciplines are engaging with the technology, and a broad spectrum of colleges and universities are exploring its efficacy. While the concept of web-based portfolios has existed almost as long as the World Wide Web, a unique triangulation of complimentary needs (assessment, pedagogy, and professional development) has brought ePortfolios to the forefront of e-learning discussions. Given its current historical placement and the variety of institutional pressures that continue to facilitate interest, this chapter was authored *in medias res*; however, the pedagogies and practices described above provide an overview of the foundations of ePortfolio usage in higher education now and for the foreseeable future.

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