E-Portfolios in Higher Education Settings: A Literature Review

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Abstract: Questions on how to (best) implement e-portfolios and what instructional outcomes to expect are discussed on many university campuses. While it is often proclaimed that e-portfolios have great potential to engage students and promote deep learning, implementing e-portfolios is a complex process. What should administrators, students, faculty and instructors expect when implementing e-portfolios in their program or course? Instructional orchestration, pedagogical goals, infrastructures, curricular integration, procedures for portfolio development, as well as feedback and assessment processes differ across institutions, programs and courses. Through a systematic review of peer-reviewed literature, the article offers a tour d’horizon of e-portfolios in the higher education landscape over the past decade. The analysis focuses specifically on empirical reports of portfolio goals, implementation and outcomes in courses or programs and can inform practitioners and researchers alike.

Introduction

Though they originated in art-related programs and in disciplines with significant writing components, portfolios have been adopted in multiple domains since the mid 1990s both in secondary and higher education (Lorenzo & Ittelson, 2005). Regardless of the distribution mode, printed or electronic, students use portfolios to collect their work, select and highlight examples to showcase, as well as reflect, discuss and advance their learning. A well-designed e-portfolio is a systematically curated exhibition of work products. The electronic format makes it easy to link artifacts and reflections. The collection as a whole presents the student’s learning goals, learning processes, and learning outcomes.

Hewett (2004) distinguishes three basic types of portfolios that support different assessment purposes:

- Documentation portfolios show the growth toward achieving specific, pre-defined learning goals. They support diagnostic assessment and allow students and instructors to both plan and check how the learner is progressing.
- Process portfolios document the phases of the learning process and reflect upon the students’ journey towards mastery. They make students cognizant of how they learn best and support self-assessment of learning strategies.
- Showcase portfolios focus on the students' accomplishments and competences. They include the students' best works and reflections on how and why the work products were selected. They support summative assessment of students’ competences and learning outcomes.

Benefits of e-portfolios documented in the literature include the following:

- Fostering digital literacy and multimedia storytelling: By creating digital exhibitions spaces of their work, students gain technology, writing and multimedia communication skills en passant (Wakimoto & Lewis, 2014).
- Supporting career development: The digital collection of work samples and skill demonstrations can be easily shared with potential employers (Reese & Levy, 2009). Reports suggest that employers may value portfolios as an information resource (Reardon, Lumsden & Meyer 2004).
- Strengthening organizational ties: E-Portfolios link students to their alma mater even after graduation and can be used to connect alumni and prospective students (cf. Lorenzo & Ittelson, 2005; Reese & Levy, 2009).
• Encouraging reflection: E-portfolios enable learners to review their learning processes and outcomes by self-reflection and comments from peers (Roberts, Maor & Herrington, 2013).
• Promoting self-regulation: Portfolios that stress the reflective component have the potential to raise students’ metacognitive awareness (Abrami et al, 2008, Meyer et al, 2010).
• Improving knowledge management. The process of conceptualizing, implementing and developing an e-portfolio involves collecting, arranging, re-organizing and presenting information. E-portfolios can thereby facilitate knowledge management performance (Chang, Tseng, Liang & Chen, 2013).
• Acknowledging diversity and transfer learning: Portfolios are a natural fit for assessing networked learners in their personal learning environments. The e-portfolio brings diverse student outputs from a range of different learning and working contexts into one common format and thus facilitates assessment of diverse learners (O’Toole, 2013).

It is unlikely that a single e-portfolio process will yield all of these benefits. However, it is not clear what prompts will trigger specific outcomes. Balaban, Mu & Divjak (2012) characterized e-portfolios as “widely used but still not thoroughly studied in all their different dimensions” (396). Although portofolios are repeatedly reported to yield benefits for learning as summarized above, the practical implementation of portfolios is often marked by the discovery that students’ engagement with e-portfolios varies rather widely – as Chau & Cheng (2010) stated: “Implementing e-portfolios is a complex process fraught with challenges and dilemmas” (467). What should administrators, students, faculty and instructors expect when implementing e-portfolios in their program or course? A satisfactory answer to this question needs to address the wide variety of portfolio approaches. To this end, the article offers a systematic review of the literature on e-portfolios in higher education, documenting the context of each specific case.

Based on the observation by Tosh, Light, Fleming & Haywood (2005) that it is crucial to identify the pedagogical goals for using the e-portfolio and ensure that the e-portfolio is aligned with the rest of the course or curriculum, the literature review focuses on case studies that report the curricular integration, learning objectives, instructional delivery and implementation of the portfolio.

Method

The body of literature included in this review was accumulated primarily through queries in ERIC, with supporting research in Google Scholar, Science Direct, ResearchGATE and EdITLib, using the search terms ‘electronic portfolio(s)’ and ‘e-portfolio(s)’. The criteria for inclusion were

• Peer-reviewed journal article,
• English language,
• Higher education context,
• Published between 2004-2014,
• Context information on pedagogical goals, instructional design or assessment,
• Empirical data on portfolio outcomes in a specific course or program.

Each article was read carefully to document the curricular integration of the portfolio, the subject domain and degree, the institution, the country or region, details on class size or cohort, the goals and motivation for implementing the portfolio, the instructional design of the course or assignment, the portfolio assessment and the infrastructure deployed for generating the portfolios. In addition, the specific research questions and method of inquiry, information on the research subjects as well as outcomes of the research process were documented in a spreadsheet. Selected details are reported in table 1.

Rather than attempting an exhaustive picture of e-portfolio research and implementation, this review focuses on instructional practices around portfolios – adoption, outcomes, benefits for learners and challenges for students and faculty. As an example, the information systems success model for e-portfolios by Balaban, Mu & Divjak
(2012) was excluded because it did not offer context information on pedagogical goals, instructional design and assessment, or report effects on student learning. Likewise, the report by Reardon, Lumsden & Meyer (2004) on the university-wide implementation of an e-portfolio infrastructure was excluded because it chiefly reported technology-driven implementation and acceptance challenges.

In some cases, multiple publications reported upon the same course or program implementation of e-portfolios - for example Trent & Shroff (2013) and Shroff, Trent & Ng (2013) or Cheng & Chau (2009) and Chau & Cheng (2010). In this case, only one source (the most recent one) was included.

Based on the requirement to document portfolio outcomes for a specific course or program, cross-institutional studies were excluded. Examples are the mixed method study by Tosh, Light, Fleming & Haywood (2005) across different universities and programs and the report from two medical schools by O'Sullivan, Harris, Hughes & Toohey (2012). However, these sources were valuable to inform the discussion of results. Likewise, conference presentations, institutional reports and non-traditional publication outlets such as blogs are cited in the introduction and discussion section, but are not part of the literature review reported in the results section. The same applies to accounts that did not report empirical data, e.g., Guertin, Stubbs, Millet, Lee & Bodek (2012); Tran, Baker & Pensavalle (2005); Wray (2007).

It would be of interest to widen the focus in a second phase to review conference proceedings, reports on university-wide implementation projects as well as cross-institutional studies. Another limitation is that a substantial body of literature on media pedagogy is written in languages other than English.

Results

Based on these filtering criteria, a total of 33 articles were analyzed (see table 1 for an overview).

Table 1: Overview of Portfolio Literature – Institution, Country, Curricular Integration, Degree, Subject Area, Infrastructure.

<table>
<thead>
<tr>
<th>Short Title</th>
<th>Curricular Integration</th>
<th>Subject Domain (Program Type)</th>
<th>Institution, Country</th>
<th>Research Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>An &amp; Wilder (2010)</td>
<td>Course Assignment</td>
<td>Teacher Education</td>
<td>William Paterson University, United States</td>
<td>1. How teacher candidates perceive the benefits and setbacks of the portfolio experience. 2. Whether and how the teacher candidates continue to develop their e-portfolios voluntarily throughout the program.</td>
</tr>
<tr>
<td>Bairral &amp; Santos (2012)</td>
<td>Course Assignment</td>
<td>Mathematics Teacher Education</td>
<td>Federal Rural University of Rio de Janeiro, Brazil</td>
<td>Explore dimensions of mathematical thinking among pre-service teachers learning through the use of e-Portfolios.</td>
</tr>
<tr>
<td>Bollinger &amp; Shepherd (2010)</td>
<td>Course Assignment</td>
<td>Education (Graduate)</td>
<td>University of Wyoming, United States</td>
<td>Student perceptions of communication, connectedness, value, and perceived student learning.</td>
</tr>
<tr>
<td>Brandes (2008)</td>
<td>Course Assignment</td>
<td>Educational Technology (Graduate)</td>
<td>University of British Columbia, Canada</td>
<td>How do students move from a description of what they have learned, to an analytical discussion of how they have learned?</td>
</tr>
<tr>
<td>Chambers &amp; Wickersham (2007)</td>
<td>Program Requirement</td>
<td>Secondary Education (Graduate)</td>
<td>Texas A&amp;M University, United States</td>
<td>Investigate whether the e-portfolio process assisted in the development of self-knowledge, technology skills development, and knowledge and skills transfer.</td>
</tr>
<tr>
<td>Chang, Tseng, Liang &amp; Chen (2013)</td>
<td>Course Assignment</td>
<td>Information Technology</td>
<td>National Taiwan University, Taiwan</td>
<td>Can e-portfolios enhance university students’ knowledge management performance?</td>
</tr>
<tr>
<td>Chang, Tseng, Yueh &amp; Lin (2011)</td>
<td>Course Assignment</td>
<td>Educational Technology (Graduate)</td>
<td>National Taiwan University, Taiwan</td>
<td>1. How do students organize their e-portfolio structure? 2. Do they emphasize process or outcome in the portfolio?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Type</th>
<th>Degree</th>
<th>Institution</th>
<th>Research Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chau &amp; Cheng (2010)</td>
<td>Course Assignment</td>
<td>EFL</td>
<td>Hong Kong Polytechnic University, China</td>
<td>Investigate university students' use of technology in an e-portfolio environment for improving their language skills, focusing specifically on the effect of digital video use.</td>
</tr>
<tr>
<td>Cheng &amp; Chau (2013)</td>
<td>Course Assignment</td>
<td>EFL</td>
<td>Hong Kong Polytechnic University, China</td>
<td>Explore the relationship between students' self-regulated learning ability and their portfolio achievement in a language enhancement program.</td>
</tr>
<tr>
<td>Fitch, Peet, Reed &amp; Tolman (2008)</td>
<td>Course Assignment</td>
<td>Social Work</td>
<td>University of Michigan, United States</td>
<td>Effectiveness of the e-portfolio approach.</td>
</tr>
<tr>
<td>Hopper, Sanford &amp; Bonsor-Kurki (2012)</td>
<td>Program Requirement</td>
<td>Teacher Education (Graduate)</td>
<td>University of Victoria, Canada</td>
<td>Effectiveness of the e-portfolio approach.</td>
</tr>
<tr>
<td>Hung (2012)</td>
<td>Course Assignment</td>
<td>EFL (Graduate)</td>
<td>National Kaohsiung First University of Science and Technology, Taiwan</td>
<td>Positive and negative washback effects of e-portfolios.</td>
</tr>
<tr>
<td>Hyland &amp; Kranzow (2012)</td>
<td>Program Requirement</td>
<td>Education Leadership (Graduate)</td>
<td>Argosy University, United States</td>
<td>1. Does the e-portfolio process increase self-directed learning? 2. Does the e-portfolio process lead to a change in schema (is it transformative)?</td>
</tr>
<tr>
<td>Lambe, McNair &amp; Smith (2013)</td>
<td>Program Requirement</td>
<td>Special Needs and Inclusive Education (Post-Graduate Certificate)</td>
<td>University of Ulster, Northern Ireland, UK</td>
<td>Effectiveness of the e-portfolio approach.</td>
</tr>
<tr>
<td>Lin (2008)</td>
<td>Course Assignment</td>
<td>Teacher Education (Undergraduate)</td>
<td>Plattsburgh State University, United States</td>
<td>Effectiveness and value of e-portfolios.</td>
</tr>
<tr>
<td>Maher &amp; Gerbic (2009)</td>
<td>Program Requirement</td>
<td>Science Teacher Education</td>
<td>AUT University, New Zealand</td>
<td>Investigate whether self-study is a valid form of research and how rigor might be demonstrated through e-portfolios.</td>
</tr>
<tr>
<td>Mason, Pegler &amp; Welller (2004)</td>
<td>Course Assignment</td>
<td>Online and Distance Education (Graduate)</td>
<td>Open University, UK</td>
<td>Effectiveness of the e-portfolio approach.</td>
</tr>
<tr>
<td>Masters (2013)</td>
<td>Course Assignment</td>
<td>Teacher Education</td>
<td>La Trobe University, Australia</td>
<td>Acceptance and use of PebblePad</td>
</tr>
<tr>
<td>Mok (2012)</td>
<td>Course Assignment</td>
<td>Teacher Education</td>
<td>University of Hong Kong</td>
<td>Effectiveness of the e-portfolio approach.</td>
</tr>
<tr>
<td>Parker, Ndoye &amp; Ritzhaupt (2012)</td>
<td>Course Assignment</td>
<td>Teacher Education (Graduate)</td>
<td>University of North Carolina at Wilmington, United States</td>
<td>Which facets of e-portfolio development were most meaningful and challenging to students?</td>
</tr>
<tr>
<td>Pelliccione &amp; Raison (2009)</td>
<td>Program Requirement</td>
<td>Teacher Education</td>
<td>Curtin University, Australia</td>
<td>Determine whether a structured reflective tool can enhance students' ability to engage in a reflective cycle.</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Type</td>
<td>Subject Area</td>
<td>Institution</td>
<td>Summary</td>
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<tr>
<td>Ruiz et al. (2009)</td>
<td>Program Requirement</td>
<td>Medicine (Graduate)</td>
<td>University of Miami Miller School of Medicine, United States</td>
<td>Effectiveness of the e-portfolio approach.</td>
</tr>
<tr>
<td>Shroff, Trent &amp; Ng (2013)</td>
<td>Course Assignment</td>
<td>Teacher Education</td>
<td>Hong Kong Institute of Education, China</td>
<td>How does the portfolio affect students' finding personal value, feeling in control, and taking responsibility? Do their attitudes towards learning affect the portfolio outcomes?</td>
</tr>
<tr>
<td>Siu (2013)</td>
<td>Course Assignment</td>
<td>EFL</td>
<td>Hong Kong University, China</td>
<td>Effectiveness of the e-portfolio approach.</td>
</tr>
<tr>
<td>Thang, Lee &amp; Zulkifli (2012)</td>
<td>Course Assignment</td>
<td>ICT / EFL (Undergraduate)</td>
<td>University Kebansaan, Malaysia</td>
<td>Uncover the impact on student development of computer and language learning skills</td>
</tr>
<tr>
<td>Wakimoto &amp; Lewis (2014)</td>
<td>Course Assignment</td>
<td>School Counseling / School Psychology</td>
<td>California State University, United States</td>
<td>Explore graduate students' perceptions of the value of creating e-portfolios and ways of improving the e-portfolio process</td>
</tr>
<tr>
<td>Welsh (2012)</td>
<td>Course Assignment</td>
<td>Education (Undergraduate)</td>
<td>University of Strathclyde, Scotland, UK</td>
<td>Effectiveness of the e-portfolio approach to foster students' ability to self-regulate learning.</td>
</tr>
<tr>
<td>Woodley &amp; Sims (2011)</td>
<td>Course Assignment</td>
<td>Business and Law</td>
<td>Victoria University Melbourne, Australia</td>
<td>1. Examine the extent to which students present e-portfolios to prospective employers in applying for jobs. 2. Explore business students’ views about using e-portfolios</td>
</tr>
<tr>
<td>Zawacki-Richter, Hanft &amp; Bäcker (2011)</td>
<td>Course Assignment</td>
<td>Education Management (Graduate)</td>
<td>University of Oldenburg, Germany</td>
<td>Applying the competence explorer from Heyse and Erpenbeck as an instrument for making students’ competencies visible in their portfolios.</td>
</tr>
</tbody>
</table>

Portfolios are implemented with various pedagogical goals and instructional prompts, in numerous subject areas, different curricular settings, with diverse technical infrastructures and divergent assessment criteria. Consequently, the success measures of e-portfolios cannot easily be transferred from one approach to another. The following summary identifies recurring themes across publications.

- **Curricular Integration:** Portfolios differ in their curricular integration. Portfolios can be introduced at the beginning of the program for students’ ongoing engagement with the process of selecting and reflecting on learning products. Students document growth and development as they navigate the curriculum (cf. Hopper, Sanford & Bonsor-Kurki, 2012; Tran, Baker & Pensavalle, 2005). More typically, portfolio courses are offered as a graduation requirement course during the last term. In some cases, instructors use e-portfolios as an individual course assignment in elective or required courses.

- **Infrastructure:** The systems and tools reported comprised self-developed solutions, specialized portfolio platforms (Blackboard ePortfolio, Mahara, PebblePad, TaskStream, Open Source Portfolio), Microsoft Office components (Word, PowerPoint), HTML-editors (Frontpage, Dreamweaver), and web 2.0 tools (blogs, wikis, GoogleSites). Half of the articles reviewed did not provide any details about the technical infrastructure deployed for implementing the portfolios.

- **Motivation and pedagogical goals:** Why implement portfolio processes in the first place? Common drivers for portfolio integration at a program level are accreditation standards and the goal to enable competence-oriented assessment. Other frequently stated reasons for using portfolios are fostering reflection, self-regulated learning and development of metacognitive awareness, e.g., ‘creating independent learners able to monitor their own learning’ (Siu, 2013), ‘enhance students' ability to
Engage in a reflective cycle’ (Pelliccione & Raison, 2009). Related goals are reflective leadership and reflective professionalism: ‘Enter a shared-goal conversation that values the educational leader and his or her expertise’ (Hyland & Kranzow, 2012), ‘Fostering critical reflection as means of developing expertise, as critical self-surveillance whereby professional experiences are revisited and explored’ (McNeill, Brown & Shaw, 2010). Other motives are to increase student autonomy as to what they choose to present or withhold for assessment, offer a digital space where students can present evidence of employability skills and create a community of practice that extends interaction beyond class time.

- Scaffolds: Most portfolio processes include some kind of scaffolding to help guide student development (Fitch, Peet, Reed & Tolman, 2008). Instructors have a key role to play when students are called upon to construct e-portfolios to enhance deep reflection and analyze what they learned (Brandes, 2008). As Fitch et al. (2008) stated, scaffolding may be especially instrumental in helping students reflect on and integrate their various classroom and field experiences. Portfolio guides, rubrics, frequent instructor feedback, technical support through portfolio workshops and peer learning opportunities contribute to positive portfolio outcomes. Few publications provide details on the scaffolds or instructional prompts associated with the portfolio. An exception is a course design described by Brandes (2008), in which students were asked to find metaphors to highlight their understanding of teaching, learning, and the use of technology. The students then used these central metaphors to structure their portfolios.

- Assessment: Although portfolios are often praised as an authentic assessment strategy, little is known about how to establish fair and transparent processes for assessing the portfolio itself. Very few publications discuss the assessment aspect and describe how portfolios were evaluated. Rubrics, marking criteria and evaluation templates appear to be a common approach to generate transparency and clarify expectations (Mason, Pegler & Welller, 2004; Rowley & Dunbar-Hall, 2012; Wakimoto & Lewis, 2014; Zawacki-Richter, Hanft & Bäcker, 2011). Brandes (2008) described a course in which students developed criteria for the evaluation of portfolios. As Fitch et al. (2008) reported, faculty may struggle with the idea why one should assess assignments already graded.

- Reflection: In what ways can e-portfolios contribute to reflective practices? Many portfolio projects stated the goal to ‘create reflective leaders’, ‘reflective professionals’ or ‘engage students in a reflective cycle’. As Chau & Cheng (2010) observed: “Regardless of whether or not writing is in the form of self-reflection or peer feedback, students may conceive and shape written messages based on institutional requirements” (475). McNeill, Brown & Shaw (2010) stated that further research is needed to explore factors that enable or inhibit the use of the e-portfolio for reflection and whether recorded reflection is a true picture of the cognitive process involved. The authors raise the question as to whether participants who did not have fluent writing skills were able to fully convey the cognitive processes involved in reflection, or indeed, whether participants who were accomplished writers could appear to attain deeper levels of reflection.

- Portfolio Learning: It seems that the reception of portfolios is a crucial aspect of the portfolio process: “We must consider viewing the e-portfolios as learning opportunities for the students who construct them, as well as those who view them” (Brandes, 2008). Experience with portfolios across different settings suggest that students learn from other students’ portfolios, e.g. Wakimoto & Lewis (2014, 57): “Students were also encouraged to share access to their eportfolio with their fellow cohort members. This created an interactive community of practice where students could discuss, reflect, and evaluate individual understanding of professional practice”. Likewise, on a program level, portfolios offer insights into the ways how students perceive, interpret and transform the learning objectives underpinning the curriculum. Portfolios provide the faculty with means to support and monitor student learning toward expected standards of the program (Parker, Ndoye & Ritzhaupt, 2012).

Discussion & Outlook

Are e-portfolios the silver bullet for implementing authentic, competence-oriented assessment or yet another educational technology-fad, inflated with unrealistic expectations? The answer to this question is as diverse as the e-portfolio landscape itself. Instructional orchestration, pedagogical goals, infrastructures, curricular integration, procedures for portfolio development, as well as feedback and assessment processes differ across
institutions, programs and courses.

Challenges of implementing portfolios include finding a suitable technical infrastructure, clarifying the purposes and expectations for student portfolios, scaffolding the portfolio process, fostering peer feedback and improvement, and developing strategies and tools for assessing portfolios.

Though it is often stated that portfolios offer a powerful tool for reflection (e.g., Greene & Ferrell, 2006), “the promotion of reflective thinking and practice [...] are not an automatic result of creating a portfolio” (Wray, 2007, 458). The recurring observation that portfolios may prompt students to mimic reflection based on institutional requirements aligns with findings from a cross-institutional survey of students’ experiences with and attitudes towards e-portfolios by Tosh, Light, Fleming & Haywood (2005). Tosh et al. (2005) criticized that oftentimes portfolios offer pseudo-authentic student voices, and are viewed as ‘just another assignment’. Instead of valuable reflection, students produce what they think the instructor or program requires.

It remains an open question how well different types of portfolio enable specific benefits – and inhibit others. For instance, a portfolio that emphasizes reflection and fosters metacognitive awareness may not be the best tool to support career development – and vice versa. To harness portfolios for both learning and as evidence of achievement, we need to understand the tensions that exist between these uses (Trevitt, McDuff & Steed, 2014).

What makes portfolios contribute to learning and reflection? Two factors seem crucial: Instructor scaffolds and peer feedback. However, few publications offer details on the support students receive for completing the portfolio assignment. In addition, very few publications report on challenges from the instructor perspective. Those that do highlight faculty workload as a problem. A student-centered portfolio support group has the potential to create and foster the development of a ‘portfolio culture’ (Wray, 2007).

In terms of curricular integrating, it seems that portfolios that serve as a requirement for graduation work best when they are anchored in competence-driven curricula that are organized around programmatic standards that a student graduating the program should know and be able to do (for an example see Greene & Ferrell, 2006).

The effectiveness of e-portfolios cannot be discussed in abstraction of context and purpose. It requires careful reflection of pedagogical motives, organizational context and instructional setting to successfully orchestrate an e-portfolio process to trigger reflection and learning – for the individual student, the peers, the instructor and potentially the program. This literature review is an attempt to enhance the understanding of what portfolio processes may work in what context. It also points to areas of interest for future research, particularly in the area of scaffolding and assessment of portfolios.

References


