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ePortfolio as a Measure of Reflective Practice

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This instructional article outlines the qualities of effective ePortfolios and how reflection and student growth is measured. Student exemplars and assessment rubrics show how, despite changing tools and evolving standards, sustained collaboration and student coaching yields reflective practitioners in content areas and in technological knowledge. As part of summative assessment within a teacher preparation program, teacher candidates prepare an ePortfolio to demonstrate reflective practice and growth in learning across their arts and humanities programs (e.g., within the Music K-12, History and Social Sciences 6-12, and English 6-12 teacher licensure programs). This article illustrates the importance of privileging meta-cognitive practices that facilitate student ownership of their own learning and growth. Used not as compilation of artifacts, ePortfolios are instead positioned as a pedagogical space where teaching and learning are as transparent as possible. As such, ePortfolios examples and practices are exemplified and discussed within the pedagogical content knowing and technological pedagogical content knowledge frameworks.

ePortfolio as a Measure of Reflective Practice

Support for electronic portfolio (ePortfolio) use in higher education has increased over the past decade due to calls for greater accountability concerning student learning; ePortfolios' perceived promise to provide long-term storage for student work beyond the scope of their college careers; and the authentic and holistic assessment opportunities that a well-structured ePortfolio process can provide (Watson & Doolittle, 2011). As Watson and Doolittle (2011) explained, "what makes an ePortfolio [effective] . . . is the pedagogy within which the ePortfolio is embedded" (p. 30). Within this article, we will describe how three different teacher preparation programs collaborate in their use of ePortfolio to amplify pedagogical choices and to encourage and assess reflective practice. Within any university program, encouraging reflective practice is important to preparing thinking practitioners who show that they can adapt to new technologies, new standards, and new environments. Set within the context of our (a) discipline-specific national standards, (b) the need to prepare digital pedagogies for 21st century classrooms, (c) National Council for Accreditation of Teacher Educators (NCATE, now CAEP) and state teacher education standards, and (d) a recognition that learning to teach is a socially constructed process of self-organization and enculturation, ePortfolios have emerged as a capstone experience wherein teacher educators support and assess students' learning and development as they undertake their journey to the other side of the desk, from student to teacher. Collaborative work with ePortfolios in English, music, and history and social science education programs has emerged over the last decade as a signature pedagogy through which students are prepared to be reflective teaching practitioners and demonstrate reflective habits and behaviors. While faculty and platforms have changed, our programmatic

work with ePortfolios has been sustained, refined, and aligned across changing technologies and faculty attrition. Beginning in 2007, our programs have undergone a sustained self-study of our processes and requirements to facilitate student reflective practice. A key emphasis of our efforts has been to identify ways for our student practitioners to use the networked space of the ePortfolio itself and their public ePortfolio defense to present the case that in their journey from student to teacher, they have become capable of engaging in the type of reasoning that Aristotle referred to as *phronesis*; the deliberative reflective reasoning required of expert curriculum decision-makers that weaves together theory, context, and practice (Aristotle, 1976; Fenstermacher, 1994). This instructional article describes how ePortfolios have been theoretically and practically conceptualized, integrated, and sustained within, and through, the teaching and learning environments across programs; and how our work with ePortfolio integration has evolved to create the opportunity and space for our students to publicly demonstrate and reflect upon their learning and growth.

Teaching and Learning Environments: ePortfolio Use to Capture and Document Forms of Student Teacher Pedagogical Knowledge

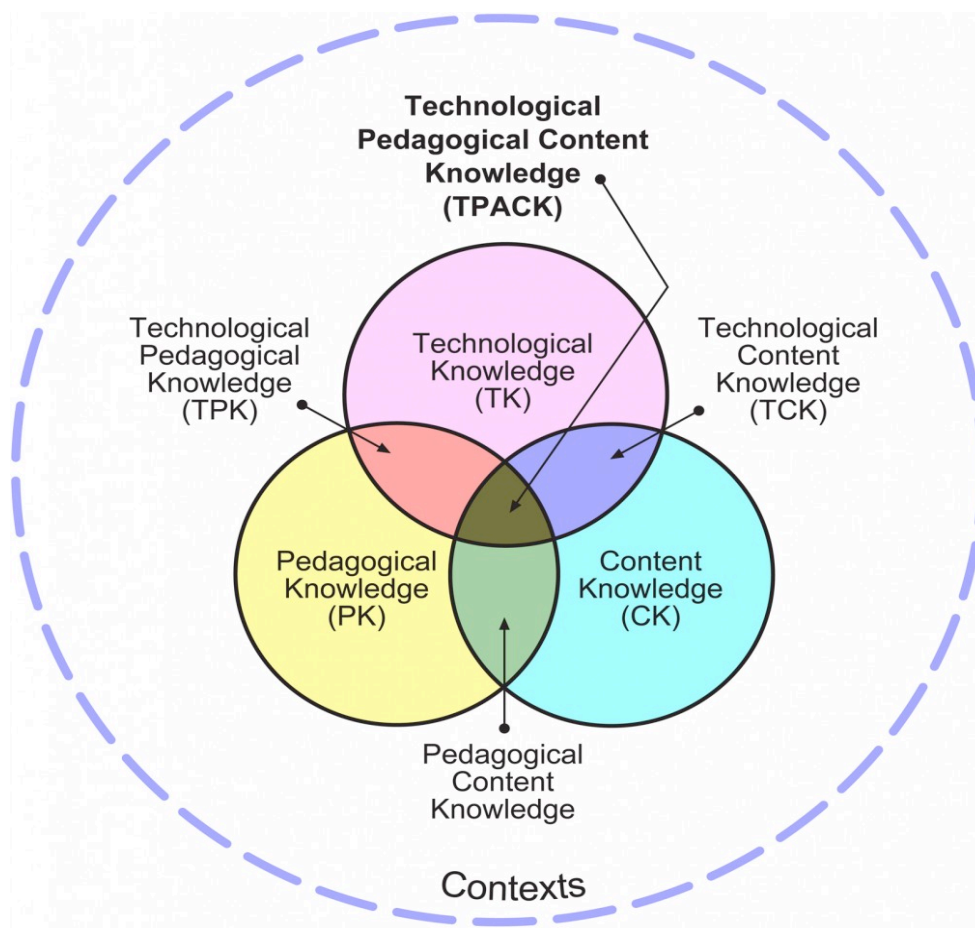
Over the last decade, ePortfolios have become an important tool and instructional scaffold providing our students with the opportunity to craft and present an evidence-based, professional account of their emerging knowledge, skills, and dispositions as self-aware, reflective beginning teachers of not simply content, but also of children in today's 21st century classrooms. EPortfolios have emerged as a way for students to begin to capture and illuminate the often elusive, ethereal, and context-specific complexities of knowledge growth in teaching, in terms of their emerging *pedagogical content knowing* (PCKg), as

referenced by Shulman (1986, 1992) and Cochrane, DeRuiter, and King (1993); and *technological pedagogical content knowledge* (TPACK) as referenced by Mishra and Koehler (2006; see Figure 1). PCKg, as defined by Cochran et al. (1993), is a teacher's emerging "integrated understanding of . . . pedagogy, subject matter content, student characteristics, and the environmental context of learning. PCKg development is continual" (p. 266). PCKg is the conflation of learning theory, individualized instruction, and content area knowledge. It is one thing to know the conventions of a particular field, but domain-specific pedagogical knowledge is the understanding of how to teach it. TPACK, as described by Koehler (2011), emerges from the construct of PCKg and reveals the intersecting foundational forms of knowledge necessary for the appropriate and authentic integration of technology to support teaching and learning in 21st century classrooms. As Kilbane and Milman (2003) explained,

Digital teaching portfolios are one of the best ways for teachers to communicate the level of their knowledge and skill within educational technologies. The increasing role of technology in learning environments makes the demonstration of technology competence more important now than ever before. Teachers who create portfolios in this way demonstrate their knowledge of hardware, software, and the integration of the two for the purpose of creating useful educational tools. Although the process of making traditional teaching portfolios helps teachers examine their competence and chart their future growth as professionals, the creation of digital teaching portfolios also provides them the opportunity to think more seriously about how their career will be affected by the role of technology in the classroom and society. (p. 6)

Developing an understanding of the nature and forms of knowledge growth in teacher education begins

Figure 1
Technological Pedagogical Content Knowledge



Note. Image reproduced by permission of the publisher, © 2012 by tpack.org

with the recognition that the ability to reflect on and in action is what defines the profession of teaching (Schön, 1987). Teachers are professionals and not technicians. Shulman (1986) noted:

The professional holds knowledge, not only of how—the capacity for skilled performance—but of what and why. The teacher is not only a master of procedure but also of the content and rationale, and capable of explaining why something is done. The teacher is capable of reflection leading to self-knowledge, the metacognitive awareness that distinguishes draftsman from architect, bookkeeper from auditor. A professional is capable not only of practicing and understanding his or her craft, but of communicating the reasons for professional decisions and actions to others. (p. 13)

ePortfolio construction and the subsequent public defense presentation provides students with a medium to reflect on and share their experiences across their graduate program and to create a contextually aware, evidence-based case of their developing professional selves from which to look forward into their future careers.

Conceptualizing, Integrating, and Scaffolding the Process to Support Student Learning

Over the years, we have learned that not all ePortfolios are equal. What is often lost in the rush to use digital technologies to foster and assess student learning is an understanding that an ePortfolio is not simply a storage site, database, electronic scrapbook, or simplistic archival collection of students' accumulated course work over their university career. Rather, an ePortfolio goes beyond simply collecting and storing artifacts toward leveraging digital technologies' potential to make unique linkages, connections, and reflections among multiple experiences and artifacts in ways that would not otherwise be possible with a traditional paper portfolio. The ability to select artifacts and make links among standards, learning principles, experiences, and beliefs provides students with the opportunity and virtual space to develop layers of reflections that set their past, present, and future in direct tension as they seek to explain and unpack how their ongoing pedagogical decisions and activities influence and shape their own students' growth.

Helping students understand the nature and purpose of the ePortfolio process is vital and begins early in their program. Students are provided with an orientation to the process within their first semester and given examples of exemplary ePortfolios from previous years. Additionally, a vital part of the orientation begins with the end in sight (Wiggins & McTighe, 1998). Each

incoming cohort of students is invited to the ePortfolio defenses of the current cohort as a way to not only show the process but also make the ePortfolio presentation a visible scholarly event that is open to a community of peers. Each cohort also has access to previous cohorts' portfolios, as all are public, and these are examined and unpacked within the methods courses as a way to provide examples and non-examples of strong professional reflective portfolios. Students are also provided with our ePortfolio assessment rubric (e.g., see Appendix A) so that they can begin to develop an understanding of the types of acceptable and appropriate evidence and indicators of their knowledge growth that might be layered within and through their reflective ePortfolio. The evaluation rubric of ePortfolios is modeled upon the themes and principles from the Interstate New Teacher Assessment and Support Consortium (INTASC), discipline specific National Standards from the National Council for the Social Studies (NCSS), the National Council for the Teachers of English (NCTE), the National Association for Schools of Music (NASM), the standards from the International Society for Technology in Education (ISTE), and state standards.

Upon working with students to help them identify desired results and determine acceptable evidence, the foundation is set for beginning the yearlong process of designing experiences and supporting assignments to help students in the ePortfolio construction and presentation process. Coursework and instruction are aligned so that students can follow four umbrella steps in creating their ePortfolios:

1. **Collect:** Throughout the year students learn the importance of collecting and saving artifacts from coursework across their programs and from their field experiences as potential sources of evidence to help illuminate the process of learning to teach, or in other words, their growth in terms of their knowledge, skills, and disposition as they negotiate and reflect upon their journey to the other side of the desk.
2. **Select:** Collecting the artifacts is simply the first stage; our students are then expected to develop a critical, evaluative, and inferential lens through which to make decisions regarding which key artifacts can serve as the most appropriate and meaningful evidence of their growth from student to teacher.
3. **Reflect:** Working with the concepts of critical incidents or well-remembered events, students begin to construct slices of evidence-based narrative reflections that describe how their experiences have influenced their transformation from content specialist to content teacher.

4. **Connect:** Students begin to look for associations and points of connection among their experiences, reflections, artifacts, and standards in order to construct and present a “portrait” of themselves as a beginning teacher who (a) is committed to all students, (b) knows the subject and how to teach the subject, (c) is responsible for managing and monitoring student learning, (d) can think systematically about their practices and learn from experiences, and (e) is an active member of a learning community.

We evaluate their ePortfolios for evidence of these five components. We believe that reflection is at the heart of the ePortfolio, as it most clearly shows us what our students think about what they are learning. Reflecting means being intentionally thoughtful about defining an experience, explaining that experience, and determining future implications and actions. Through explanations and demonstrations of model ePortfolios from past cohorts we seek to provide students with generative ideas for how to approach the iterative collect, select, reflect, and connect process. This level of pedagogical support reveals the porous nature of our methods classrooms, as students in each program meet with each other to discuss the nature of the ePortfolio and also to learn about the institutional networks of support that exist through campus technology support. By initially populating their matrix with artifacts/evidence that they *collect* over the year, they then *select* what they consider to be the most appropriate pieces for their portfolio, *reflect* on why these are important in illustrating their journey, and finally, find ways to *connect* their evidence based accounts and reflections together (see Gibson & Barrett, 2003). This process, we believe, allows our students the opportunity to work with “multiple forms of evidence” (Penny-Light, Chen, & Itelson, 2012, p. 61) to convey within a strong ePortfolio the depth of their understanding, their ways of knowing, and how they feel about their readiness to assume a teaching position.

In addition to the big picture strategies of supporting collection, selection, reflection, and connection, we also provide instruction and support at a more focused and disciplinary-specific scale. For while we teach the same methods and field internship courses, our students come from distinct disciplinary content areas (e.g., music, history and social studies, and English). Because our programs are sequenced, our students take these classes across the year, and we have aligned our general and disciplinary specific assignments and capstone projects deliberately and purposefully within our courses for the benefit of the students’ learning. By embedding tasks in the coursework and field experiences, we plan for students

to create the many artifacts that they will need. They are then able to select from these assignments the artifacts that they will reflect on and connect together in their ePortfolio. Students are able to make individual choices about their selections. We evaluate the many reflective tasks required to help students increase their level of critical thinking (e.g., in the blogs that they contribute to for the field class). Experiences within the courses that illustrate this are shown in Table 1.

Artifacts Supporting Reflective Practice in ePortfolios

As shown in Table 1, students collect artifacts to share in ePortfolios, and these show student reflection at different places within their program of learning: daily, weekly, and after units, courses, and programs of study. Artifacts, including tweets, video collages, vlogs, and blogs, show incremental reflection on learning that, when synthesized in an ePortfolio, demonstrate student development over time.

Twitter/Tweets

Tweets, in particular, show how students not only synthesize their learning in 140 characters or less, but it also connects them with a professional learning network beyond their university cohort. Teacher candidates tweet reflections bi-weekly as collaborative professional development. Tweets illustrate how a candidate might be feeling, acting, or thinking as a teacher—this often includes how they operationalize their beliefs in actions. This is also an important practice in students’ creation of a professional digital footprint. Students situate themselves as professionals in their public displays of learning. For example, Josh Thompson, a preservice teacher in the English Education program, reflected in his ePortfolio (<https://sites.google.com/a/vt.edu/josh-thompson-english-education-eportfolio/community-of-practice>) that Twitter allowed him to maintain weekly contact with members of his learning cohort and also enabled him to follow leaders in the field of English Education. Thompson explained that he was able to “see trends in the field of English Education as well as ways to meaningfully incorporate technology into my classroom” (<https://sites.google.com/a/vt.edu/josh-thompson-english-education-eportfolio/community-of-practice>). Cohort members shared ideas, asked for help, and were able to be less isolated in their internship experiences because of short Tweets (e.g., see <https://twitter.com/search/realtime?q=vtenged13&src=typd>) that could be easily checked on phones or student home pages. The screen shot shown in Figure 2 shows how a shared public hashtag can provide a way for students to connect with each other, ask questions,

Table 1
Course Assignments with Program Teaching and Learning Environments

	Fall EDCI 5724 Methods class 1	Fall EDCI 5964 Field Studies	Spring EDCI 5744 Methods class 2	Spring EDCI 5754 Internship student teaching
Selected examples across programs	<ul style="list-style-type: none"> Curriculum planning¹ Assess student learning² Teacher work sample website³ Case studies of students with special needs⁴ Journal review⁵ Petcha Kutcha 20x20 presentation⁶ Digital internship, wiki collaboration⁷ 10 NCSS themed Lesson plans. Lesson Study: Micro-teaching reflections on practice⁸ Educational autobiography and Teaching Metaphor This I believe video Literacy, Language and Inquiry essay review 	<ul style="list-style-type: none"> Observations⁸ Reflective blogs⁹ Lesson plans¹⁰ Discussion audit¹¹ Unit deconstruction collaboration Student shadowing¹² Synthesis vlog Classroom and teacher observations Prior Knowledge Interviews 	<ul style="list-style-type: none"> Unit plans¹³ Budget project¹³ Travel project¹³ Ning collaboration Lesson Study: Micro-teaching reflections on practice Measuring student growth Teaching Reasoning through Writing Research project and video Focus on student learning¹⁴ Using digital technologies to support student learning analysis Action research project and video presentation 	<ul style="list-style-type: none"> Reflective Vlogs Video collages¹⁵ Reflection-for-action tweets¹⁶ Teaching videos¹⁷ Lesson plans¹⁸ Curriculum mapping project
What the course leads to	Leads to meta reflection in ePortfolio	Leads to meta reflection in ePortfolio	Leads to meta reflection in ePortfolio	Leads to meta reflection in ePortfolio

Note. ¹ https://vt.digication.com/Wildt-ariele_wildts_eportfolio-May-2012/III_Teaching_professionally_Professional_and_Peda

² https://vt.digication.com/Wildt-ariele_wildts_eportfolio-May-2012/IV_Student_Learning_Assessment

³ https://vt.digication.com/danielupton_ArchiveMay2012/IV_Student_Learning_Assessment

⁴ <https://scholar.vt.edu/osp-presentation-tool/viewPresentation.asp?sakai.tool.placement.id=c2d3d432-2c3b-4fb1-80d3-18fe4c93475b&id=59678435F6EECF9E2359937181028A75&pageNumber=2>

⁵ https://vt.digication.com/Wildt-ariele_wildts_eportfolio-May-2012/I_Music_Content_Knowledge

⁶ <https://sites.google.com/site/shaunadamseportfolio/media#page-comments>

⁷ <https://sites.google.com/site/marileahshowalter/community-of-practice>

⁸ https://vt.digication.com/Wildt-ariele_wildts_eportfolio-May-2012/II_Teaching_Music_Pedagogical_content_knowledge_a

⁹ <http://teacherjumper.wordpress.com/>

¹⁰ https://vt.digication.com/Postman-nathan_postmans_eportfolio-May-2012/III_Teaching_professionally_Professional_and_Peda

¹¹ https://docs.google.com/document/d/1j-vo0YTKAfNxBCEtyfP5_x4ZMLJnUiPLN8o89x8bCg/edit

¹² <https://docs.google.com/document/d/1GzYpVjz3NpFDamOnLHjyrom6eJctApV8UCWFGxnEjqw/edit#https://docs.google.com/document/d/1GzYpVjz3NpFDamOnLHjyrom6eJctApV8UCWFGxnEjqw/edit>

¹³ https://vt.digication.com/danielupton_ArchiveMay2012/III_Teaching_Professionally_Professional_and_Peda

¹⁴ <https://scholar.vt.edu/osp-presentation-tool/viewPresentation.asp?sakai.tool.placement.id=&id=835ED102FF8CD339FF547E6715E3F8CB&pageNumber=4>

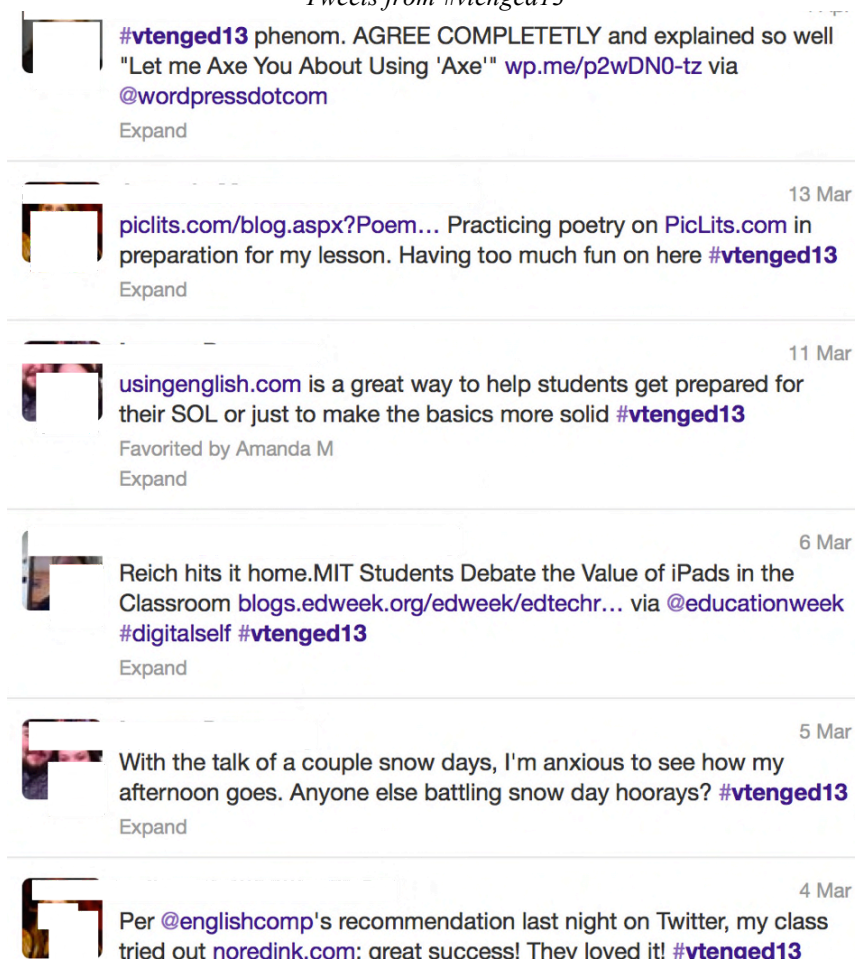
¹⁵ https://vt.digication.com/danielupton_ArchiveMay2012/IV_Student_Learning_Assessment

¹⁶ <https://sites.google.com/site/emilyreedlove/community-of-practice-1>

¹⁷ <https://sites.google.com/site/shaunadamseportfolio/unpacking-practice>

¹⁸ <https://docs.google.com/file/d/0B3IN3PuDF7nYUnR3TXlob20yU1E/edit>

Figure 2
Tweets from #vtenged13



share ideas, and garner support. Effective use of public tweets includes a professional online persona and positive reflection that results in changes in practice that then are manifested in classroom practice. The challenges students overcome as they monitor their own improvement in practice in the classroom are minimized. Students do not need to wait for a supervisor or Clinical Teacher to tell them what needs improving; they learn quickly from the collage videos the areas that need improvement. As Kelsey, a pre-service teacher in Music Education, suggests, "I could do big but really needed to work on small" in terms of non-verbal gesture in the music classroom; the emphasis is on her own self-assessment and her advice to herself for improvement.

Video Collages

Video collages, also called montages (see Figure 3), show students' reflection on their growth over time. Students take data on their work in the form of video and create a montage of scenes that make

explicit their personal growth over time. The video is a short, three-minute reflection of their growth in a focused area across one month. The way these clips of teaching across each month are put together shows how students reflect on practice in their teaching. For example, Kelsey, a music education student, included a video collage (https://vt.digication.com/Lund-kelsey_lunds_eportfolio-May-2013/My_Goals) to show her growth in the process of musical conducting. She shows a video of herself teaching early in her internship and writes, "After watching these videos, I understand why students always play forte [loud]. In the next two [video] clips, I told the classes to start piano [soft]. Unfortunately, my pattern size doesn't match my request." (e.g., see bottom of Student Learning [Assessment] page, in https://vt.digication.com/Lund-kelsey_lunds_eportfolio-May-2013/Contact). Working on something as specific as pattern size in the teaching of music and reflection on this growth in a video collage together demonstrate how an ePortfolio can use the affordances of multimedia displays to create an

Figure 3
Video Collage



effective place for reflection. In assessing such reflection, we look for changes in practice that are seen by the students, so that we are supporting and nurturing dispositions of reflection and thoughtfulness that students, once they have left our programs, will take into their first professional teaching positions.

Weekly Blogs and Vlogs

In order to have benchmarks of reflective practice, students use blogs to connect with university supervisors and faculty and their own cohort. Through these blogs and vlogs, students measure their own growth one week at a time (see Figure 4). Teacher candidates reflect weekly via vlog (i.e., video logs) and blog (i.e., web logs as text) posts as a way to unpack their practice and to support other teacher candidates. Some candidates comment on the pages of other candidates, widening the professional learning community and deepening their own knowledge. The students are given a choice as to when they wish to create a video log (i.e., a talking head video recounting their week's progress) or a blog post (i.e., a written text piece recounting their week's progress). In previous research, we found that giving students a choice of which modality they chose to reflect improved their level of reflective practice (Kajder &

Parkes, 2012). While the weekly blogs/vlogs can stand alone as evidence of reflective practice, we have found that as part of the ePortfolio creation process students revisit their posts and treat them as relational artifacts/narrative records that can be connected thematically and then re-connected in different ways—often alongside other artifacts such as lesson plans, and student work—to demonstrate challenges that have been overcome and those yet to be overcome, and/or growth over time within specific areas of their teaching. For example, students have taken individual posts created throughout the year to then illustrate and make sense of their emerging abilities to (a) use digital technologies to support the teaching and learning process, (b) manage and monitor student learning, (c) design and implement standard-based units and lesson plans, and (d) implement specific learning strategies to support student learning.

Often students would use their blogs as a space to share the provenance of their activities, reflect on the implementation of their activities, and detail lessons learned for the future. In his ePortfolio presentation, Ben initially acknowledged his initial reluctance to blog/vlog as an assignment and only saw its value as a space to capture his experiences and as a reflective tool as he moved through the year:

Figure 4
BLogging and Vlogging

Here is my vlog for this week!



[Leave a Comment](#)

Posted in [Uncategorized](#)

week 10 Posted by: [hunterkopczynski](#) | April 3, 2010

This week started off quick! On Monday, M. was out so I got to teach at the middle school all day on my own which was great. The eighth graders were a bit talkative but that was the only problem. M. wrote up a few members of the percussion the next day, as they were the source of the talking problems. I was not going to write them up, but I supported M.'s decision because it has been an ongoing problem. One of the parents asked for specific details as to why their son was written up, so I got to write a letter to the parent — good experience! (I've attached the letter below). The student's parent wrote back to me promptly via email after receiving my letter. She said she was impressed with the professionalism and succinctness of the letter and said she'd address the problem at home. Success! And the percussion section has been on task and eager to learn the rest of the week — I think they simply needed to be reminded of the expectations for the class.

The rest of Monday was great! I got to work with the seventh graders for the first time (generally I leave for the high school after the second 6th grade class). It was a lot of fun working with them and I felt very comfortable with the groups.

The rest of the week went by fast. I was back on my normal MS/HS routine on Tuesday. Theory is continuing working on an arranging project. I'm working on concert pieces at the middle school and teaching concepts through that (such as form, march form, keys,

When we first got this assignment I was not really looking forward to this at all. I had never done a blog before. I did not see myself as really writing everything down. That really was not my thing, but I have really come to enjoy this and I plan on continuing it after graduation and into my first job, and it was just a great place for me to write about what happened that day . . . and it [if] it was a stressful day I could go and sit down and write . . . and what is really great about it is, I could come back and read it. I would do a lesson that did not go very well and I would get on the blog and write something and come back and look at it and know how to improve for next time. It gave me time to get down out of my head real quick and then be able to reflect on it later. So it was a great tool for me that I plan to continue using.

Importantly, Ben also used one of his later Vlog posts to begin to reflect on the distinction between being a teacher of students and a student of content. He used this post to articulate and give value to the range of strategies he had used during his student teaching, strategies that he would continue to use and develop in his first year to engage students and move him away from being the stereotypical history teacher who does little more than take on the role of teller of the tale of the past. Ben suggested that the strategies he now had in his “toolbox” gave him a leg up, creating lesson plans and units . . . I really feel that these tools are just a key part of teaching. You can know all of the content in the world, everything about history, but if you can’t communicate it in a way that students understand, it is not going to do you much good. These different strategies help engage students, and engagement is huge, because if you engage them it means they are going to hold onto that information longer than just “here is a lecture, here is a piece of paper and take some notes, study them and take a test” . . . that fosters rote learning and . . . I don’t want that in my classroom. I want students to dig into the information and really feel like they are growing from it, rather than just learning it for the sake of taking a test.

Artifact Inclusion in ePortfolio

Students themselves choose what to integrate from all the class-work activities, assignments, and products into their ePortfolios, as per the constructivist paradigm, acting as autonomous, self-aware, self-regulated, and self-mediated thinkers. We as faculty meet and decide in advance how we will align and sequence this process. Our intensive, on-going revisions started in 2007, but our programs have had a long history of using ePortfolios. Discussions among the music, history/social science, and English

education faculty in 2008 led us to explore our processes and requirements for student reflective practice. We analyzed our methods coursework and student artifacts, and after conducting content analyses, we discovered that our students had different levels of aptitude for thinking and writing reflectively about becoming a teacher. In 2009, we immersed ourselves in self-study of the literature on reflective practice and devised new pedagogies for our students. We required them to complete blog posts (i.e., weblogs) and vlog posts (i.e., VideoLogs). We transcribed and analyzed student reflective data (after student graduation, IRB exempt #08-777) and found that levels of reflective practice differed between these two modalities. We added Video Collages and Twitter to our curricula for our 2009-2010 students to consider using as vehicles for reflection. After transcribing again the material and analyzing the content of the reflective posts, we observed that students were more deeply reflective when they Vlogged and created the Video Collages. We created an overall rubric to guide conversations with students about their professional dispositions and asked our students to reflect on their beliefs and behaviors in their reflective practices (e.g., blog, vlog, tweets, collages). Our 2010-11 study data showed a deepening of all reflective practice in our students, as we created and administered a rubric to evaluate levels of reflective practice both in class and in the ePortfolio. Candidates who reflect both in and on practice possess an important professional disposition. The reflections that students create give us insight into their accounts of their understandings and misunderstandings and also into their thinking as teachers, especially when candidates link theory to practice and consider the moral and ethical implications of their teaching beliefs and behaviors. When students were given choices of modalities, the quality of reflections improved.

As practitioners who use ePortfolios, our primary goal is to be exemplary teachers; our collaboration has only strengthened our individual teaching skills and the learning of our students. We have analyzed pages of student reflective data to ascertain whether our approach was working and whether we had adhered to best practices for our students in using reflective practice as part of teaching and learning (Kajder & Parkes, 2012; Parkes & Kajder, 2011). We found that students gained deeper levels of critical thinking skills when they were afforded the choice of reflecting with a variety of multi-modal methods. By questioning our pedagogical techniques and analyzing student data for evidence of improvement, we were able to increase our students’ skills and we learned more about ourselves. We, in turn, became more reflective teachers ourselves in terms of designing ways to integrate ePortfolios within and through our courses and establish a

collaborative teaching and learning environment to support the ePortfolio creation process.

How we integrate ePortfolios into our courses. Students experience immediate, formative, and summative feedback (i.e., assessment) that facilitates the use of their reflective practice about their own classroom contexts. Within the methods classes, we give our students assignments that contain reflective prompts (https://docs.google.com/document/d/1hzvGLAqUagiOi3hrX_w-2bba9uRTVyjlVch6QjEEC4s/edit?pli=1), as suggested by Larrivee (2008) and Rickards et al. (2008). For example, when they conduct a peer-teaching episode, they watch the video to examine their teaching to evaluate their and write a reflective paper about what they saw and how they might improve their future work. While students are in field internships, we are able to respond to students quickly and with evaluative comments (e.g., see <https://docs.google.com/document/d/1D-y1uWvLIIPBbeizZy0pMhnb2umt7ttvC9awrMmMEcw>) through the blogs they keep about their observations in schools and their perceptions of their own learning. They question old beliefs and look for new information; they re-examine their knowledge, their thoughts, experiences, and behaviors as developing teachers in the K-12 setting. The timely feedback we give them is critical in the pedagogical instructional cycle, and while criteria based, it is particularly formative for both the students and us as teachers. After receiving feedback on reflections or class products, the students know immediately where they need to improve. By asking them to self-assess with rubrics and criteria before they submit their work, we find that when asked to review and reflect on their efforts, our students show a willingness to monitor and deliver outstanding quality work of their own volition. With increasing opportunities to share and collaborate in class and out, with the use of blogs, the discussion threads, and e-mail communication, students often problem-solve issues and find and share solutions rather than just make a “one-stop” learning goal, such as, “What is on the test next week?” An example of this collaboration is exemplified by this student’s e-mail sent to members of his cohort:

I recommend you take a look at the videos just to listen to H coach you through the process. H has the creation matrix part down. If you have questions on creating the interface hit-up the blog for some help . . . H's coaching is very good. Here is the link. (http://www.youtube.com/watch?feature=player_embedded&v=YYLXY9OuV_E)

to the related student-made video tutorial. We regard this student-created tutorial, unprompted by faculty, as an illustrative example of how the ePortfolio creation process not only helps facilitate autonomous, creative,

and intellectual thinking but also offers possibilities for encouraging interaction and collaboration among cohort members. Such collegial collaborations reflect the kind of dispositions one needs in order to become a forward-thinking colleague in any professional learning community.

The mix of independent and collaborative problem-solving exhibited throughout the year with the ePortfolio process ultimately makes an impact on student-teachers’ own learning, and critically, on their teaching and learning practices as professionals in K-12 settings. This gives them quality artifacts from which they can select to craft their narrative accounts of their growth in their ePortfolio. They take this reflective work, connect it, and then reflect again as part of the process constructing their teacher identities as reflective practitioners. The meta-reflective practices that surface in the ePortfolio are also assessed summatively.

The teaching and learning environments. Collectively, we each teach a section of four classes that are paired, two in the fall and two in the spring. Each semester, one class is set on campus and the other is set in the field, in K-12 schools where students are learning to teach. Our students’ learning is enhanced by experiencing and using these technologies because they are able to show us how they think, as well as what they know and can do, first as a student and finally as a teacher; they can illustrate this to us most effectively using audio, video, text, and reflective practices within the course management system, blogs, and later, the ePortfolio platforms. Their ePortfolios are then richly multimodal products of their journey from student to teacher; and as a product, they become a space to celebrate the student-teachers’ learning. It is, however, the process of creating the ePortfolios that strongly impacts and shapes our students’ learning paradigm.

Looking Ahead

When our programs began working with ePortfolios, sustainability was an issue because of technological difficulties, such as lost and broken links to past artifacts that stymied efforts to effectively move forward in the intent to incorporate effectively the practice of reflection within and across programs of study. Our work is now held on different platforms in order to give more ownership to the students, allowing them to take their ePortfolios onto the job market and into their first jobs. We use Scholar (a Sakai platform) so that they experience a Learning Management System, and we have allowed them choice by experimenting with a variety of different platforms to host their ePortfolios: from Netscape to Dreamweaver to Filebox, a variety of different storage sites, and

Weebly, GoogleSites, and Digication. We give students these choices so that they can sustain their work as developing practitioners into their lives as lifelong learner-teachers.

Because the tools of technology change constantly, it is important that ePortfolio implementation be made with colleagues and that deliberative decisions be made within the engaged scholarship of teaching (Boyer, 1997; Hatch, 2005). We have in process a research study to refine further and calibrate our ePortfolio assessment rubric. Testing our reflective-practice assessment tool and ascertaining agreement between judges is important to assuring that we are measuring what we propose to measure and that we do so consistently from year to year.

Our future goal is simply to articulate the concept of meta-reflection in ePortfolios and to encourage meta-reflection in our students. Our ongoing efforts are clearly aligned with our conception of the scholarship of teaching. This, as Shulman (2011) pointed out, should be “public, subject to peer evaluation, and subject to use by members of one’s disciplinary community” (p. 4). For us, it’s not a question of how we will sustain our dedication to effectively integrate ePortfolios to improve student learning. Our primary goal is now to reflect and refine our processes to continue supporting student learning with ePortfolio beyond their graduate careers and toward National Board Certification, long after teacher candidates have left our programs.

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Appendix A
Rubric for ePortfolio

ARTS AND HUMANITIES – DEPARTMENT OF TEACHING AND LEARNING
GRADUATE MASTER OF ARTS – EDUCATION EPORTFOLIO EVALUATION RUBRIC

Student name (Printed) _____ Date of defense: _____

Evaluator name (Printed) _____ Signature: _____

The chair and each member of the committee will be required to evaluate each ePortfolio individually.
Evaluations will be averaged to give a final score.

This evaluation is modeled after recommendations from the Interstate New Teacher and Support Consortium, along the guidelines set forth by the National Council for Accreditation of Teacher Education. Please complete the evaluation using the following rubric and give one score per area I-V.

3 Exceptional (Distinguished) The candidate exhibits superior mastery of the knowledge, skills, or dispositions required by the standard. The candidate substantially exceeds expectations by providing multiple layers of connected and convincing evidence to show exceptional performance in meeting the professional standard or principle.

2 Strong (Proficient) The candidate exhibits intermediate to advanced performance in relation to essential knowledge, skills, or dispositions required by the standard. The candidate exceeds satisfactory expectations by providing multiple sources of clear evidence to make a strong case for meeting the professional standard.

1 Competent (Basic) The candidate exhibits minimum performance in relation to essential knowledge, skills, or dispositions required by the standard. The candidate meets minimum expectations by providing at least 3 pieces of evidence to meet the professional standard.

0 Unsatisfactory. The candidate exhibits unacceptable performance in relation to the essential knowledge, skills, or dispositions required by the standard. The candidate provides little or no evidence for meeting the standard and does not meet minimum acceptable expectations.

Scoring 13-15 Exceptional, 10-12 Proficient, 5-9 Competent, 0-4 Unsatisfactory

TOTAL SCORE: _____

NCATE Standards	INTASC 2011 Standards/ Principles	Elements / Focus	Indicators of success	Score
I. CONTENT KNOWLEDGE (1.a) Teacher candidates have in-depth knowledge of the content that they plan to teach as described in professional, state, and institutional standards. They demonstrate their knowledge through inquiry, critical analysis, and synthesis of the subject. All program completers pass the content examinations in states that require examinations for licensure. Candidates in advanced programs for teachers are recognized experts in the content that they teach.	Standard #4: Content Knowledge The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and creates learning experiences that make these aspects of the discipline accessible and meaningful for learners to assure mastery of the content.	Knowledge of music Analyses Conducting skill Performance skill Aural skill Musicality Knowledge of music history	Score analyses and rehearsal guides Review of materials Lesson plans Listening guides Reflection about teaching Teaching video evaluations Lessons taught	Score: I.

<p>II. PEDAGOGICAL CONTENT KNOWLEDGE (1.b) Teacher candidates reflect a thorough understanding of the relationship of content and content specific pedagogy delineated in professional, state, and institutional standards. They have in-depth understanding of the content that they plan to teach and are able to provide multiple explanations and instructional strategies so that all students learn. They present the content to students in challenging, clear, and compelling ways, using real-world contexts and integrating technology appropriately. Candidates in advanced programs for teachers have expertise in pedagogical content knowledge, and share their expertise through leadership and mentoring roles in their schools and communities. They understand and address student preconceptions that hinder learning. They are able to critique research and theories related to pedagogy and learning. They are able to select and develop instructional strategies and technologies, based on research and experience that help all students learn.</p>	<p><i>Standard #1: Learner Development</i> The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.</p> <p><i>Standard #2: Learning Differences</i> The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.</p> <p><i>Standard #8: Instructional Strategies</i> The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.</p> <p><i>Standard #3: Learning Environments</i> The teacher works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self motivation.</p> <p><i>Standard #5: Application of Content</i> The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.</p> <p><i>Standard #7: Planning for Instruction</i> The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.</p>	<p>Plans for lesson</p> <p>Modeling</p> <p>Imitation</p> <p>Verbal association</p> <p>Symbolic association</p> <p>Learning from the familiar</p> <p>Movement</p> <p>Direct instruction</p> <p>Creativity</p> <p>Diagnostic and pre-prescriptive teaching</p> <p>Positive and efficient class & rehearsal environment</p> <p>Learner-centered activities</p>	<p>Arrangements</p> <p>Audio recordings</p> <p>Lesson plans</p> <p>Lesson plans adapted for children with special needs</p> <p>Reflection about teaching children with special needs</p> <p>Score arrangements</p> <p>Website resources</p> <p>Journal reflections</p> <p>Score analyses</p> <p>Listening guides</p>	<p>Score: II.</p>
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<p>III. PROFESSIONAL AND PEDAGOGICAL KNOWLEDGE SKILLS (1.c)</p> <p>Teacher candidates can apply the professional and pedagogical knowledge and skills delineated in professional, state, and institutional standards to facilitate learning. They consider the school, family, and community contexts in which they work and the prior experience of students to develop meaningful learning experiences. They reflect on their practice. They know major schools of thought about schooling, teaching, and learning. They are able to analyze educational research findings and incorporate new information into their practice as appropriate. Candidates in advanced programs for teachers reflect on their practice and are able to identify their strengths and areas of needed improvement.</p> <p>They engage in professional activities. They have a thorough understanding of the school, family, and community contexts in which they work and collaborate with the professional community to create meaningful learning experiences for all students. They are aware of current research and policies related to schooling, teaching, learning, and best practices. They are able to analyze educational research and policies and can explain the implications for their own practice, and for the profession.</p>	<p><i>Standard #8: Instructional Strategies</i> The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.</p> <p><i>Standard #3: Learning Environments</i> The teacher works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self-motivation.</p> <p><i>Standard #5: Application of Content</i> The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.</p> <p><i>Standard #7: Planning for Instruction</i> The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.</p> <p><i>Standard #6: Assessment</i> The teacher understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision-making.</p> <p><i>Standard #9: Professional Learning and Ethical Practice</i> The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.</p> <p><i>Standard #10: Leadership and Collaboration</i> The teacher seeks appropriate leadership roles and opportunities to take responsibility for student learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth, and to advance the profession.</p>	<p>Expectations for behavior</p> <p>Efficient handling of materials, music and instruments</p> <p>Pacing, enthusiasm, and teacher intensity</p> <p>Conducting skill</p> <p>Analysis of music</p> <p>Clear learning goals & instructional procedures</p> <p>Active engagement of students</p> <p>Activities based on curriculum standards</p> <p>Short and long term planning</p> <p>Lesson plans</p>	<p>Assessment tools</p> <p>Teacher work samples</p> <p>Lesson plans</p> <p>Budget projects</p> <p>Self evaluation of teaching video</p> <p>Classroom and rehearsal management plans</p> <p>Anecdotal observations of student response</p> <p>Lesson and rehearsal plans designed to develop sound fundamentals, aural skills, and performance with understanding</p> <p>Journal reflections</p> <p>Curriculum plans</p> <p>Travel projects</p> <p>Responses to journal articles</p> <p>Case study of IEPs</p>	<p>Score: III.</p>
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<p>IV STUDENT LEARNING (1.d)</p> <p>Teacher candidates focus on student learning and study the effects of their work. They assess and analyze student learning, make appropriate adjustments to instruction, monitor student learning, and have a positive effect on learning for all students. Candidates in advanced programs for teachers have a thorough understanding of assessment. They analyze student, classroom, and school performance data and make data-driven decisions about strategies for teaching and learning so that all students learn. They collaborate with other professionals to identify and design strategies and interventions that support student learning.</p>	<p><i>Standard #1: Learner Development</i> The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.</p> <p><i>Standard #2: Learning Differences</i> The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.</p> <p><i>Standard #6: Assessment</i> The teacher understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision-making</p> <p><i>Standard #9: Professional Learning and Ethical Practice</i> The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.</p>	<p>Sequential age appropriate music instruction</p> <p>Activates prior knowledge and experience (learn from the familiar)</p> <p>Using assessments to diagnose student readiness, to understand learner progress, to inform future instruction, and make summative evaluations about student achievement.</p>	<p>Journal reflections that observe student learning and / or motivation</p> <p>Teacher work sample – assessment tools</p> <p>Pre-post tests of student learning</p> <p>Reflections about pre-post testing of student achievement</p> <p>Self evaluation of conducting video</p> <p>Reflective practice about one's own communication via gesture</p> <p>Lesson plans</p> <p>Case studies of students with special needs and students for whom English is not their first language</p>	<p>Score: IV.</p>
<p>V. PROFESSIONAL DISPOSITIONS Candidates work with students, families, colleagues and communities in ways that reflect the professional dispositions expected of professional educators as delineated in professional, state, and institutional standards. Candidates demonstrate classroom behaviors that create caring and supportive learning environments and encourage self-directed learning by all students. Candidates recognize when their own professional</p>	<p><i>Standard #9: Professional Learning and Ethical Practice</i> The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.</p> <p><i>Standard #10: Leadership and Collaboration</i> The teacher seeks appropriate leadership roles and opportunities to take responsibility for student learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure</p>	<p>Reflections on teaching</p> <p>Professional growth</p> <p>Participation in school district events</p> <p>Awareness of community resources</p> <p>Respective and productive communication with families</p>	<p>Philosophy statement</p> <p>Rationale for music in the schools</p> <p>Review of participation in national / state organizations</p> <p>Journal reflections about teaching one's peers</p> <p>Attendance at faculty meetings</p>	<p>Score: V.</p>

dispositions may need to be adjusted and are able to develop plans to do so.	learner growth, and to advance the profession.	Self awareness of dispositions Willingness to respond to supervisor/ clinical faculty suggestions	Attendance of field hours, direct instruction and observation Disposition self or professor evaluations Professional Resume	
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Scoring: 13-15 Exceptional, 10-12 Proficient, 5-9 Competent, 0-4 Unsatisfactory

TOTAL SCORE: _____

Reflective Practice Component of ePortfolio

Capstone or macro-reflection in ePortfolio	Level 0 (Unsatisfactory)	Level 1 (Basic) 70-80	Level 2 (Competent) 80-90	Level 3 (Distinguished) 90-100	Score
Reflection on practice	No reflection on practice is given	Does not recognize change to practice but discusses it Does not perceive relationships between student learning and teaching practices but discusses them Does not engage in critical criticism of one's own teaching but discusses one's teaching	Is unclear which changes to practice occurred Perceives relationships between student learning and teaching practices Engages in critical criticism of one's own teaching	Acknowledges and articulates changes in practice Analyzes relationships between student learning and teaching practices Engage in critical criticism of one's own teaching offering alternatives for future practice	
Critical reflection of growth	No reflection of growth is given	Does not perceive area of change in beliefs or assumptions Does not observe self in the process of thinking Does not question commonly-held beliefs Does not craft narrative using past experiences, reflections, or learning	Is unclear which changes to beliefs or assumptions have occurred Partially observes self in the process of thinking Questions commonly-held beliefs without offering alternatives Narratives refers minimally to past experiences, reflections, and learning	Acknowledges and articulates change in beliefs or assumptions Observes self often in the process of thinking Questions commonly-held beliefs offering solutions Narrative weaves richly between past experiences, reflections, and learning	
Total Score					/200

Faculty Professional Development: Advancing Integrative Social Pedagogy Using ePortfolio

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This article highlights the work of three faculty members across two different professional development seminars at LaGuardia Community College. It illustrates how their work was guided and is linked together by a common thread—the use of ePortfolio to foster integrative social pedagogy—as a result of their participation in these seminars. This connection highlights the interdependent relationship that exists between faculty members’ professional development and students’ learning in the classroom. The nature of the professional development seminars discussed in this article—Art of Advising: Learning and Implementing Holistic Advisement Skills and Connected Learning: ePortfolio and Integrative Pedagogy—rests firmly on the integrative social teaching and learning experience that faculty members strive to provide for students. In this article, two faculty members discuss how they were able to localize and integrate ideas explored in the Art of Advising: Learning and Implementing Holistic Advisement Skills seminar in two Principles of Accounting I courses to foster advisement as integrative social pedagogy. Another faculty member describes incorporating the ideas examined in the Connected Learning: ePortfolio and Integrative Pedagogy seminar in a General Chemistry I course section to facilitate reflection as integrative social pedagogy. The activities and classroom practices used to facilitate interaction, engagement, and learning among the students in the courses are described. Through analysis of student surveys and reflective writings, the results of the implementation of these practices are also discussed.

Randy Bass and Heidi Elmendorf defined *social pedagogies* as

design approaches for teaching and learning that engage students with what we might call an “authentic audience” (other than the teacher), where the *representation of knowledge* for an audience is absolutely central to the *construction of knowledge* in a course. (Bass & Elmendorf, n.d., para. 2)

This definition echoes the theories posited by Dewey (1963) and Vygotsky (1978) regarding the social nature of human learning. Vygotsky (1978) contended that “human learning presupposes a specific social nature and a process by which children grow into the intellectual life of those around them” (p. 88), while Dewey (1963) argued that when the classroom operates as a social group, learning becomes a process of exchange in which all have a share.

At LaGuardia Community College (LaGuardia), an explicit educational goal is the development of the whole student who can integrate the knowledge and skills gained in each course into a coherent whole and develop a strong connection to peers, faculty, and the community. ePortfolio is seen as a core tool for promoting this development and the conversation around the use of ePortfolio as a tool to advance the practice of integrative social pedagogy points back to professional development. Fostering teaching and learning excellence that prompts and strengthens dialogue, connections, and inquiry among students is best realized when faculty participate in professional

development activities that promote these types of practices. Most professional development activities offered by LaGuardia’s Center for Teaching and Learning are one year in length; the first semester is usually marked by guided experimentation and reflection, while the second semester lends itself to implementation.

This article highlights how the work of three faculty members across two different professional development seminars was guided and linked together by a common thread—using ePortfolio to foster integrative social pedagogy—as a result of their participation in these seminars. This connection highlights the interdependent relationship that exists between faculty’s professional development and students’ learning in the classroom. The nature of the professional development seminars discussed in this article—Art of Advising: Learning and Implementing Holistic Advisement Skills (Art of Advising) and Connected Learning: ePortfolio and Integrative Pedagogy (Connected Learning)—rests firmly on the integrative social teaching and learning experience faculty members strive to provide for students. The richness that emerges from experimenting, reflecting, and implementing integrative social pedagogical practices using ePortfolio results in a greater attention to student connections—with peers, between and across courses, across disciplines, with audiences other than the faculty, inside and outside of the classroom—made visible by using ePortfolio. These activities reinforce the concepts of integrated learning and the necessity of helping students to connect their learning to their previous experiences both inside and outside of the

classroom, across the curriculum, and to their future studies. A related and equally important benefit is the improvement in the connection to peers that students experience; this has been identified as a key factor in student retention and satisfaction (Endo & Harpel, 1982; Tinto, 1997).

The challenge then facing faculty is how to localize these ideas to shape their own teaching and learning practices in order to advance integrative social pedagogy using ePortfolio. Thinking about a particular course, a program, a discipline, and a group of students, how can faculty bring these concepts home?

Professional Development Seminars

Art of Advising: Learning and Implementing Holistic Advisement Skills

At LaGuardia, Art of Advising is a newly formed professional development seminar that is currently in the experimental stage. The integrative nature of this seminar allows faculty and staff to work together in order to go beyond the common perception of advising as course selection, and examines factors critical to how the Council on the Advancement of Standards in Higher Education (2013) defined advising as assisting “students in the development of meaningful educational plans” (p. 4).

Working with largely first-generation college students, faculty and staff participating in this seminar seek to explore the following:

- How do we guide students’ educational growth and change?
- How can we help students envision and build new identities as learners and emerging professionals?
- How can ePortfolio be employed as an advising and pedagogical tool to encourage student discussion and the linking of academic, transfer, and career issues in their disciplines?

In addition to the above-noted questions, the seminar aims to explore, adapt, and demonstrate ePortfolio practices to help students identify and reflect on their interests, skills, strengths, and challenges and to facilitate their transfer between courses, between semesters, and from LaGuardia to a senior college and to career opportunities. So this begs the question, how can faculty integrate these ideas into their daily classroom practices in order to facilitate interaction, engagement, and learning between students?

Two accounting faculty members, one a seminar participant and the other a seminar leader, chose to collaborate to find an innovative way in which to

address this challenge by approaching advisement as a community affair. So, picture these two faculty and 70 students using ePortfolio to build, connect, and sustain advisement efforts within, across, and outside two Principles of Accounting I courses. After all, “ideally, social pedagogies strive to build a sense of intellectual community within the classroom and frequently connect students to communities outside the classroom” (Bass & Elmendorf, n.d., para. 2).

Connected Learning: ePortfolio and Integrative Pedagogy

At LaGuardia, Connected Learning serves as one of the foundational professional development seminars for faculty who want to integrate the use of ePortfolio into their classroom practices. Faculty participating in the seminar use the Fall semester as a time for learning and exploration, as well as classroom experimentation, through the use of assignments created during the seminar. The Spring semester serves as a time for piloting, in a targeted course, assignments that have been reworked based on feedback from colleagues and seminar leaders. Throughout the year, seminar participants and leaders from across all disciplines share and learn from each other’s work, as well as from student work, and explore useful ways to incorporate ePortfolio into the classroom authentically, rather than as an appendage to the syllabus. Moreover, participants are required to build and use an ePortfolio over the length of the seminar, thereby allowing them to not only become familiar with ePortfolio, but also have all their work archived for future reference.

Specific goals for the seminar include:

- introducing faculty who are new to ePortfolio to its technology and pedagogy;
- drawing upon the expertise of veteran ePortfolio practitioners to support new faculty learning, while at the same time challenging experienced faculty to deepen their practice;
- considering new and proven approaches to fostering integrative learning, student interaction, and connection through ePortfolio;
- maximizing ePortfolio’s potential as a teaching and learning tool; and,
- creating/critiquing course syllabi, assignments, and projects to support integrative pedagogy.

The goal of the Connected Learning professional development seminar is thus to introduce faculty to ePortfolio as not only a technology, but more importantly, a tool to foster integrative pedagogy. ePortfolio stresses the necessity of helping students to connect their learning to their previous experiences both inside and outside of the classroom, across the

curriculum and academic disciplines, and to peers, faculty, and external audiences (Eynon, 2009).

One faculty participant who taught chemistry selected the General Chemistry I course as a vehicle through which to integrate ePortfolio in a way that was thoughtfully designed to facilitate reflection as a means to foster integrative social pedagogy. The faculty member incorporated various activities in the course that prompted students to:

- reflect on their own lives (past, present, and future), and on others' lives;
- reflect on group and peer mentoring activities; and
- reflect as a tool for their professional development.

Elements Critical to the Application of Integrative Social Pedagogy

As participants in the Art of Advising and Connected Learning professional development seminars, faculty explored *inquiry*, *reflection*, and *integration* as key ingredients for using ePortfolio to promote integrative social pedagogical practices.

- **Inquiry:** Students explore key questions that allow them to think about the future self: Who am I? Who do I want to be? Why do I want to be that person? What would it take for me to be that person? What knowledge and skills do I need?
- **Reflection:** Students share, learn, and build a supportive structure and community for exploring academic and career success: "Reflection needs to happen in community, in interaction with others" (Rodgers, 2002, p. 845).
- **Integration:** Students think about the path to academic and career success in terms of its totality, thereby "transferring learning to new, complex situations within and beyond the campus" (Association of American Colleges and Universities, 2009). Students gain an understanding of how the course, the major, the discipline, and the career path fit together.

In this article, the faculty's thinking about inquiry, reflection, and integration in the design of ePortfolio activities to foster integrative social pedagogy centers on contextualized learning. Dewey (1915) pointed to contextualized learning as a means for students to apply experiences garnered in their daily lives to their classroom learning, while constructing knowledge that can be applied to new situations.

The Role of ePortfolio

Writing in the *Handbook of Research on ePortfolios*, Tosh, Werdmuller, Chen, Light, and Haywood (2006) promoted what is described as a "Learning Landscape": a framework for thinking about student learning that includes the technology and media that are part of the students' daily lives, the contributions of co-curricular and social activities to learning, and the value of social interaction to learning and personal development. ePortfolio is very well suited for providing this learning landscape because it furnishes familiar technology and media, a means of community building, a venue for mentoring, and an intellectual space for self-exploration of one's academic and professional development. Furthermore, ePortfolio's ability to act as a central repository for student work allows students the opportunity to integrate, reflect upon, apply, and share what they have learned: "ePortfolios can demonstrate what students have learned because, at their best, ePortfolios make visible the production of knowledge" (Johnsen, 2012). In the execution of the Principles of Accounting I and General Chemistry I initiatives, faculty examined the benefits of using ePortfolio versus a learning management system (LMS). Faculty concluded that unlike an LMS, which is course-based, ePortfolio facilitates students' ongoing access to their learning, which remains visible after they have left the course and even after they have left LaGuardia. Looking back at the ePortfolios and their contents provides support for students because elements of the afore-mentioned initiatives become especially applicable when students prepare to transfer and/or enter the workforce. Furthermore, an LMS does not provide the ability to cut across courses in the way that an ePortfolio does; this was a feature that was crucial to the Principles of Accounting I initiative, in which ePortfolio allowed two separate classes to connect and converse in one space. Finally, an LMS is faculty-driven, with ownership residing predominantly with faculty; therefore, faculty did not consider the use of an LMS to be appropriate, as the aim was for students to have autonomy and a sense of ownership and authorship during the initiatives. The use of ePortfolio, which is student-driven, facilitated this student-centered approach.

Classroom Practices: Localizing the Ideas

Keeping all of these critical elements in mind, the three faculty members were able to identify key questions relating to the implementation of integrative social pedagogy, such as: How can advisement for personal and professional growth be social? How can reflection be used to build community? What role does the authentic audience play? What role does the faculty

play? How can the integrative nature of ePortfolio help to facilitate community building? These questions formed the basis of the assignments and activities developed in the Principles of Accounting I and General Chemistry I initiatives.

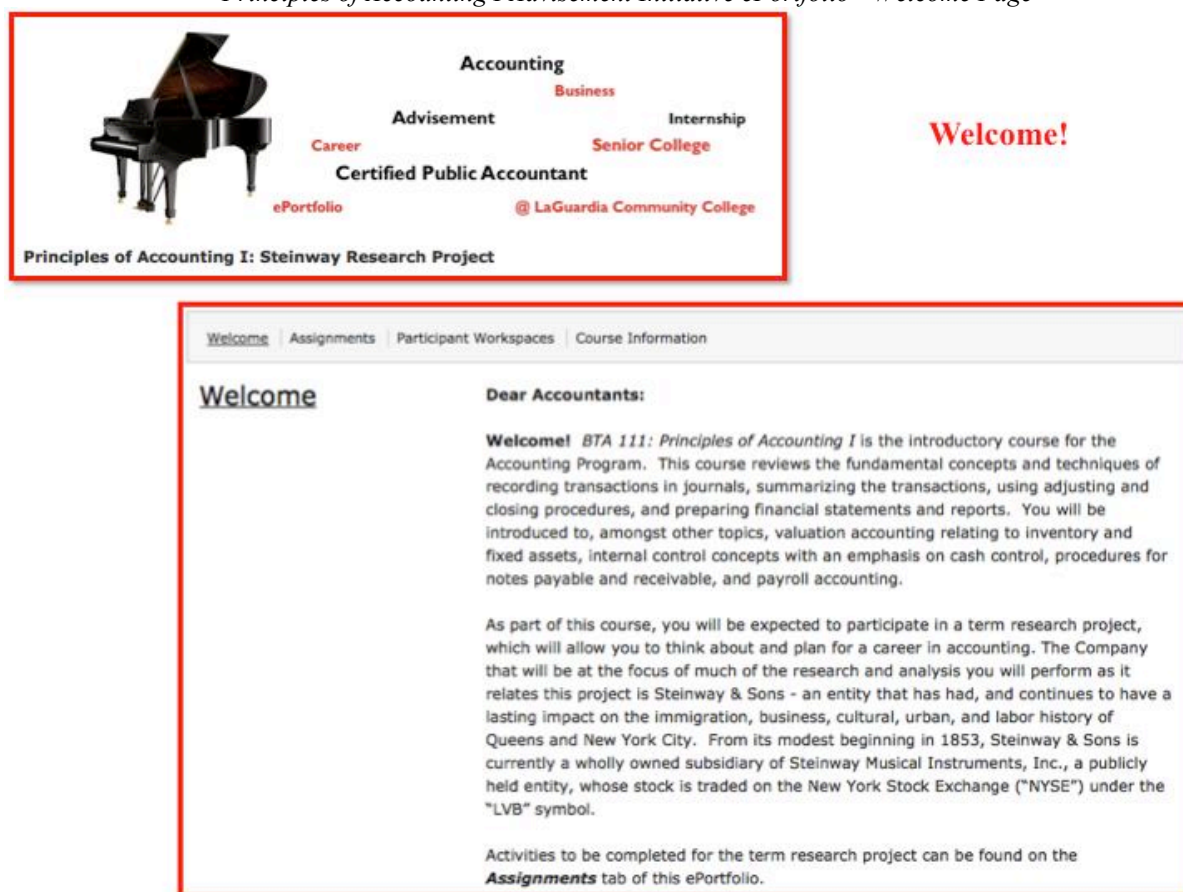
Advisement as Integrative Social Pedagogy: Principles of Accounting I Advisement Initiative

The Principles of Accounting I advisement initiative centered around the concept of career-readiness, which is ingrained in the discipline, and it was unique, not only because the learning was connected across two classrooms, but also because the group of students was composed predominantly of individuals who had just entered college and would not generally be exposed to assignments focusing on careers until a later time in their college journey. The faculty recognized that having students explore career readiness within the context of the accounting profession lends itself to short- and long-term goal setting, which helps students to define and/or refine their academic and career plans for success.

The Principles of Accounting I advisement initiative was structured as six assignments and two workshops, which students completed over the course of a semester. Each Principles of Accounting I class was divided into two groups, Group 1 and Group 2. The members of each group were then paired across classes. This structure facilitated a student-centric approach, in which faculty created and communicated assignments but for the most part remained in the background, with dialogue and peer mentoring occurring across and within the classrooms through the use of ePortfolio. The assignments, which were staged, were set in the context of a student preparing for a career in business, with an emphasis on accounting. To provide students with a realistic experience, faculty incorporated a real-world company, Steinway & Sons, into the initiative. Details of the assignments and the workshops are included in Appendix A, and a description follows. See Figure 1 for a screenshot of what students saw when they logged into the Principles of Accounting I advisement initiative ePortfolio.

Assignments and workshops. Drawing on one of the fundamental questions explored in the Art of

Figure 1
Principles of Accounting I Advisement Initiative ePortfolio—Welcome Page



Advising professional development seminar, as it relates to guiding students' educational growth and change, the Principles of Accounting I course assignments started with goal exploration and community building and then moved on to company research, resume building, and interview preparation. The assignments were coupled with two workshops led by professors who specialize, respectively, in resume and interview preparation. The objective of Assignment 1 was for students to provide a brief description of themselves and then explore their short- and long-term goals, while also learning how to use ePortfolio. This was followed by Assignment 2, which had each student review their partners' responses to the first assignment. The second assignment was developed to foster a sense of community among students and to allow students the opportunity to engage in peer mentoring in a non-threatening way. In response to Assignment 1 and Assignment 2, the following represents excerpts of a conversation that happened between Student # 1 and Student # 2 that highlights the level of self-exploration, engagement, support, and community these assignments sought to build.

Student # 1's About Me:

Growing up, I was always the shy one who never really spoke to anyone. Speaking out loud, was just not my thing. If you get to know me though, that'll all change. Even with this quality, I don't allow anyone to take advantage of me. Public speaking—speaking out loud, that's my weakness . . . it's what I need to work on! There are some qualities about me that make me who I am today. Hard worker, confident, strong, courageous, determined and shy, of course. I could be the sweetest person, but just know that if you treat me a certain way, even with my shyness, I most probably won't stand for it.

I have a way with numbers! I mainly enjoy problem solving though. That's my thing! A major in Mathematics is something I've always considered—probably become a math teacher in the near future—who knows. Presently though, accounting is what I'm majoring in—its okay so far—can't complain. Who knows though, maybe I might change my mind!

Goals need to be set in order to become successful. My long term goal is to try to get to a 4.0 GPA while I'm in college. This can be achieved simply because I am hard-working and determined. My attitude towards college and my education will allow me to achieve great heights.

Later, Student # 1 wrote: "My short term goal includes paying attention in class, completing given

assignments on time, actively participating and doing homework daily are going to be my main priorities in achieving this goal."

Student # 2's Response:

I really enjoyed reading your profile. I've always respected folks who "come to terms" with what they would like to work on (in this case, your being timid). I always [have] been one to believe that if you have the drive to achieve something, your "weak spots" will become irrelevant—even to the point of them no longer being an issue or a setback. I believe your passion for math is something that will bring you out of your comfort zone, perhaps leading to tutoring others & (like you mentioned) even teaching. I also like how committed you are. In the midst of all the "college daze" and hoopla, you seem to be focused, driven and ready for whatever is about to come in your direction—whether it may be a difficult exam or even doing a math problem on the board and explaining to the class (!) how you came to your answer. That's incredibly admirable, and I applaud you for that. I hope nothing but the absolute best for you, [Student # 1]. Continue to stay focused and inspire others to do the same.

See Figure 2 for ePortfolio screenshots of Student # 1's full About Me and Student # 2's response.

We may all, at some time, have encountered a student or acquaintance preparing for an interview who asked us about potential interview questions and responses. To that end, Assignment 3 pointed to faculty work in the Art of Advising professional development seminar, which required faculty to explore, adapt, and demonstrate ePortfolio practices to help students identify and reflect on interests, skills, strengths, and challenges. Assignment 3 was structured to have students engage in dialogue across and within classrooms by researching and developing interview questions and drafting responses to those questions. Each student in Group 1 was required to develop two interview questions, while each student in Group 2 was required to answer any two interview questions. This assignment thus gave students insight into some of the typical questions that they might be asked during an interview, and it allowed them to gauge their ability, and that of their peers, to respond to the questions. The following represents a sample of interview questions and responses researched and developed by students in response to this assignment. In response to Question 1, "What are your strengths and weaknesses?", one sample response was:

My strength is my flexibility to handle change. As customer service manager at my last job, I was able

Figure 2

Principles of Accounting I Advisement Initiative ePortfolio—Student Work

Student # 1's About Me

*** is the name. I was born on October 13, 1994--17 years old. (Libra) from Brooklyn, New York. Growing up, I was always the shy one who never really spoke to anyone. Speaking outloud, was just not my thing. If you get to know me though, that'll all change. Even with this quality, I don't allow anyone to take advantage of me. Public speaking--speaking outloud, thats my weakness...its what I need to work on! There are some qualities about me that make me who I am today. Hardworker, confident, strong, courageous, determined and shy, of course. I could be the sweetest person, but just know that if you treat me a certain way, even with my shyness, I most probably won't stand for it.

In my spare time, I mainly enjoy hanging out with friends, going to the movies and shopping. Unlike most girls, I love sneakers!!--once lined up at 4:00a.m. until probably about 10:00a.m. waiting for the release of one. Some people would never do it and probably consider it pointless; but thats just me....if theres something i like Ill most likely do whatever it takes to get to it!

Math has always been my passion from a young age. Throughout my educational career, I have taken several math courses. This includes Algebra, Geometry, Trig, Pre-Calc and is presently taking Statistics. I have a way with numbers! I mainly enjoy problem solving though. That's my thing! A major in Mathematics is something I've always considered--probably become a math teacher in the near future--who knows. Presently though, accounting is what I'm majoring in--its okay so far--can't complain. Who knows though, maybe I might change my mind!

Goals need to be set in order to become successful. *My long term goal* is to try to get to a 4.0 G.P.A. while I'm in college. This can be achieved simply because I am hard-working and determined. My attitude towards college and my education will allow me to achieve great heights. Not only that, but I need to work extremely hard in all of my courses--always willing to put in time and effort into any given or extra work.

My short term goal includes paying attention in class, completing given assignments on time, actively participating and doing homework daily are going to be my main priorities in achieving this goal.

Getting to Know Your Colleagues

Student # 2's Response

I really enjoyed reading your profile. I've always respected folks who "come to terms" with what they would like to work on (in this case, your being timid). I always been one to believe that if you have the drive to acheive something, your "weak spots" will become irrelevant--even to the point of them no longer being an issue or a setback. I believe your passion for math is something that will bring you out of your comfort zone, perhaps leading to tutoring others & (like you mentioned) even teaching. I also like how committed you are. In the midst of all the "college daze" & hoopla, you seem to be focused, driven & ready for whatever is about to come in your direction--whether it may be a difficult exam or even doing a math problem on the board & explaining to the class (!) how you came to your answer. That's incredibly admirable, & I applaud you for that. I hope nothing but the absolute best for you, ***. Continue to stay focused & inspire others to do the same.

to turn around a negative working environment and develop a very supportive team. As far as weaknesses, I feel that my management skills could be stronger, and I am constantly working to improve them.

In response to Question 2, "What are some of the projects you spearheaded and their outcome, like did they save the company any money?", one sample response was:

At one of my first marketing and public relations positions, Shape Salon, I created a marketing plan to help increase their local business. I encouraged the salon to offer locals (and those they recommended) incentives to visit and get their services done there--get a free blow out with any chemical service, ten percent off retail products, etc. I also reached out to local businesses and offered similar incentives. By implementing this marketing plan the salon saw a 33 percent increase within six months.

The quality of students' questions and the depth of their responses demonstrate the level of ownership and accountability when the teaching and learning experience is a shared process and students become engaged in communities of practice, which was defined by Wenger, McDermott, and Snyder (2002) as "groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis."

As educators, we are often faced with the challenge of framing discussions around social media and the use of technology in ways that encourage dialogue, as opposed to critique. While faculty in this initiative encouraged students to be social, the objective of Assignment 4 was to stimulate dialogue about the appropriate use of technology and social media within a work and classroom setting. Students were thus able to challenge their own and others' perspectives about social media and technology etiquette.

In Assignment 5 students gained valuable exposure to the LaGuardia & Wagner Archives, which is home to

the Steinway & Sons collection of artifacts. Students were also required to calculate key financial metrics for Steinway & Sons, compare their results to those of their partner, and, if applicable, propose revisions. Therefore, this assignment provided students with the history of the company and with relevant financial information that they could use in preparation for an interview with the Human Resources Director of Steinway & Sons (see Assignment 6).

Based on faculty conversations about helping students envision and build new identities as learners and emerging professionals in the Art of Advising professional development seminar, Workshop 1: Resume Preparation Workshop aimed to give students an opportunity to edit existing resumes or to create a resume. During the workshop, students received and discussed valuable information regarding appropriate resume language and information. Workshop 2: Job Interview Preparation Workshop exposed students to the effective use of verbal and non-verbal communication in an interview setting. Moreover, simulated interviews allowed students the opportunity to interview each other using some of the interview questions they had generated in response to Assignment 3 and the techniques they had learned in the workshop. After the simulated interviews, students spent time discussing what they had learned.

Assignment 6, the final assignment, provided students with an opportunity to integrate what they had learned from the previous assignments and workshops in order to develop thoughtful responses to questions that could be posed during an interview at Steinway & Sons. Because LaGuardia has an internship program, the fact that this initiative concluded with having students prepare for this interview was very helpful for the students, as they are bound to engage in interviews during the internship process. This assignment also brought students full circle, as they reflected on their learning and growth and the learning of their peers during the semester.

The culminating piece to this semester-long project entailed students having a dialogue with one another and with industry professionals who do the hiring. On May 1, 2013, students participated in an event titled Career Advisement Forum: Planning for Success. This event consisted of two parts: a panel discussion and a career fair. The panel discussion provided students with the opportunity to interact with each other and with business professionals from Steinway & Sons, AOL Inc., Corporate Board Member—an NYSE Euronext Company, Delonghi, and Collaborative Arts Project 21—to strengthen students' understanding as to what it takes to create and navigate a roadmap for career success. The panel discussion was followed by a networking and career fair, which presented students with the opportunity to network with one another and

with representatives from various companies to learn more about those companies and about the internship and career opportunities that they offer.

At the conclusion of the semester, the faculty conducted surveys to gauge students' perceived improvement in their development as it relates to career readiness as a result of their involvement in the Principles of Accounting I advisement initiative. The survey has been included in Appendix B with detailed results in Appendix C. The survey results indicated that 38.46% of respondents rated their knowledge about career readiness as strong or very strong prior to the commencement of the initiative. 97.56% of respondents perceived a significant or very significant improvement in their knowledge at the conclusion of the initiative. Of the respondents polled, 57.69% rated their knowledge of ePortfolio prior to completion of the initiative as strong or very strong. 94.87% of respondents saw a significant or very significant improvement in their knowledge of ePortfolio.

Reflection as Integrative Social Pedagogy—General Chemistry I Initiative

In the General Chemistry I course, the aim was to use reflection as a tool to foster integrative social pedagogy. Some of the design elements and goals of social pedagogies, as defined by Bass and Elmendorf (n.d.), are that students participate in an intellectual community so that they develop the ability to give and get feedback, that they engage with authenticity and difficulty so that they develop deep and contextualized understanding, and that they represent knowledge for an authentic audience so that they develop a sense of voice and purpose specific to a domain or community.

The practice of posting written reflections on their learning in response to particular assignments and the course as a whole, as well as the process of learning, is an integral part nationally of ePortfolio practice (Eynon, 2009). Reflection can be described as a process through which students can actively examine and articulate their thoughts on a course, a learning artifact, or more general experiences (Tosh et al., 2006). It focuses on the writer's learning experience itself and attempts to identify the significance and meaning, primarily for the writer, of a given learning experience (Fink, 2003). Reflection can also develop critical skills for functioning effectively in diverse and complex practical realities (McGuire, Lay, and Peters, 2009), such as those encountered in professional practice. In the General Chemistry I initiative, reflective writing within the ePortfolio fostered social pedagogy by helping to create within the class an intellectual community that engaged with authenticity and difficulty and in which students learned to think and write like a scientist. It did so by facilitating social interaction between the students

for the purpose of improved learning and by providing an intellectual space for students to reflect on this social interaction and the opportunities it provided for personal, academic, and professional development.

Initiative structure. At the start of the semester, students in General Chemistry I were assigned to three-person teams for the laboratory section of the course. Within these teams, students would conduct experiments and prepare collaborative laboratory reports on a weekly basis. Students were assigned reflective writing assignments at the beginning and the end of the semester, as noted in Appendix D.

Students reflecting on self and others. For the first reflection assignment at the beginning of General Chemistry I, students were asked to write an About Me essay in their ePortfolio. This was an introductory essay, which focused on the students' educational goals and prior curricular and co-curricular experiences. In light of the approaches faculty examined in the Connected Learning professional development seminar for using ePortfolio to foster integrative learning, student interaction, and connections, students were then asked to read the About Me page of their team members and respond with a short reflective piece about what they found interesting or unexpected about each one. Students shared this reflective essay with each other and the faculty through the ePortfolio.

The ePortfolio About Me assignment asked students to become more aware of themselves as learners in the context of their past, their present, and their future aspirations. It also asked them to reflect on themselves as team players, detailing the skills and qualities they already had and the skills and qualities they needed to develop. By asking them to reflect on others' essays, the assignment also proved successful as an icebreaker activity by introducing team members to each other on more than a superficial level. From the outset, the team members seemed to develop respect for each other's accomplishments and goals and discovered that they shared similar backgrounds and interests. For example, one student commented:

Like me, *** is the first person in her family to attend college. She and I both moved to the US while we were very young and were raised by strong single mothers . . . she inspires me to keep doing well for myself and my family.

This recognition of commonalities, as well as accomplishments, would certainly have contributed to the harmonious working relationships observed over the semester. This reflection assignment thus became the first step in building the trust and respect necessary to create a vibrant intellectual community.

Peer mentoring and collaboration. The laboratory teams in General Chemistry I were designed

to model the workplace environment; in the description of the team assignments, students were told that most scientific work today takes place with teams of scientists, sometimes multidisciplinary, who bring their own particular skills and resources to a research problem and write the final articles submitted to peer-reviewed journals. Similarly, students would have to work with peers to conduct experiments and write laboratory reports. Every student was assigned specific tasks for each report, which was then reviewed by the other team members; the feedback obtained was then used to improve the report prior to final collation and submission to the faculty.

In keeping with the Connected Learning seminar goal of fostering student connections, the teams were deliberately constructed by the faculty to include a range of academic abilities and experience with chemistry in order to facilitate peer learning and peer mentoring. Prior to this initiative, students self-assigned to lab groups and worked together only to carry out the experiments; the collaboration ended once they left the laboratory. This team structure was therefore another important way of promoting learning through social pedagogy; as students formed an intellectual community within their teams, they engaged with authenticity and difficulty in the form of the laboratory inquiries that they had to carry out and the writing of reports that conformed in both format and voice to the standards of the scientific community. A critical component of the report is the discussion, in which the students have to make sense of and discuss the significance of their results. Here they would have to learn to negotiate, to disagree, to come to shared understanding, and then to express this understanding in writing. Peer mentoring emerged without any prompting by the faculty: academically stronger students helped those needing more support understand the concepts and procedures; native English speakers helped non-native speakers by becoming the language editors for group reports; those stronger in mathematics explained the calculations, and so on.

In their end-of-course reflective essays, General Chemistry I students were almost unanimous in rating the teamwork highly, even while confessing to initial trepidation at the prospect of group work. They acknowledged how much they learned from each other and showed a sophisticated recognition of the fact that the faculty member was not the only source of knowledge in the room. The excerpt below encapsulates what many students expressed in their essays.

Working together, we . . . got a chance to learn something new from each other every week. With the ideas from all the group members, we corrected our lab reports and got to learn how to write an excellent lab report. The advantages of working in

a group were that we did not have to just rush and finish the lab without learning anything. Moreover, whenever one of us was confused the other two tried to explain and answer the questions. That for me was really good because I got to learn the topics I was confused about from class from my team.

Thus, through written reflections on the team experience and process, students recognized that they had created intellectual spaces in which they learned to give and get feedback, deepening their understanding of the course material either by having to explain it to someone else or having it explained to them.

Developing “voice”: Learning to think, speak, and write like a scientist. Bearing in mind the Connected Learning seminar goal of maximizing ePortfolio’s potential as a teaching and learning tool, each week the faculty member would choose one report to be published on her public ePortfolio page as a way of providing General Chemistry I students with an external audience. At the end of the semester, students also uploaded to the ePortfolio two or three examples of their best work to serve as a learning artifact of the course. Students therefore learned to write with external audiences in mind. Once again, the reflections provided insight to both the students themselves and the faculty about the development of academic skills, both general and course-specific. They showed how students began to learn how to think and speak like a scientist/chemist, to develop that “sense of voice” specific to the scientific community: “[The course] helped me develop another important skill that I did not learn from my previous chemistry class. That is writing presentable lab reports” and “The skills that I needed [included] critical thinking—using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.”

Looking ahead: Reflection and professional development. Through the reflective writing assignment at the end of the General Chemistry I semester, the ePortfolio also served as a vehicle to help students recognize the effect of the experiences in the course and of the teamwork on their professional development.

Students acknowledged the teamwork as valuable rehearsal for what they might experience in their future professional lives:

Working in a team in the lab will be the same exact thing I will have to do in the clinic . . . At the beginning of the semester I was dreading it but in the end it helped me with some skills that I will need once I start working in a clinic.

Other students reflected on their personal growth and development that was facilitated by the interactions occurring in the teams:

I developed a lot of new skills as a result of working in a team. I learned to take risks and trust my ideas by working in a group because my ideas were appreciated and taken in a friendly manner. I learned to work with other people without any conflict and learned to accept others’ ideas.

Through their guided reflections, the General Chemistry I students began to recognize and value the process of learning and not just the product (e.g., chemistry knowledge). These reflections, archived in students’ ePortfolios and available to them long after the course is over, provide students with an opportunity to integrate their learning by transferring these new skills to new courses and new situations. See Figure 3 and Figure 4 for screenshots of students’ work in the General Chemistry I course.

Conclusion

Faculty observed that the yearlong Art of Advising and Connected Learning professional development seminars served as the catalysts for developing assignments and activities that succeeded in helping students to obtain, retain, apply, and share knowledge within intellectual communities. Furthermore, faculty recognized that although the experiences in professional development seminars provided a basis for classroom practice, effective implementation required careful refining of the assignments for seamless integration into the courses. Effective classroom implementation was facilitated by the structure of the professional development seminars in that assignments and activities were developed during the Fall semester and then implemented and reworked during the Spring semester. Faculty also concluded that in order for professional development to be truly meaningful, it should be linked to classroom practice, so that faculty learning enhances student engagement. Through the Principles of Accounting I and General Chemistry I initiatives, faculty experienced the significance of professional development in promoting transformative pedagogies, such as integrative social pedagogy, in the classroom.

Intentional, integrative social pedagogies enable learners to create their own learning or social communities, which can be an engaging environment—learners can use this for everyday activities, keeping in touch with each other, finding the latest resources, and sharing their own experiences (Tosh et al., 2006). Learners, especially in a so-called urban commuter college such as LaGuardia, need help in forming social communities and connections that can enhance learning and aid in retention and completion. Furthermore, when these social communities exist within an online platform such as ePortfolio, they allow communities of

Figure 3
General Chemistry I Course—Student Work

LA GUARDIA COMMUNITY COLLEGE

Welcome | About Me | Projects | Quotes | Resume | Links | Contact

Fundamentals of Chemistry I

SCC 201-1757
Prof. D. Miller

This is a two-semester sequence covering the basic concepts of chemistry and their historical development. The experimental nature of chemistry as well as the role of chemistry in many aspects of daily life are stressed. Among the topics studied are: SCC201: Atomic structure, chemical bonding, chemical reactivity, quantitative relationships in chemical reactions, thermochemistry, gases.

OSMOSIS
Diffusion of molecules from a place of higher concentration to a place of lower concentration until the concentration on both sides is equal.

Lab Report Template	Lab Report Title
Lab Report #1	Qualities
Lab Report #2	Final Collection
Lab Report #3	

Home | About Me | Courses & Projects | ePortfolio | Resume | Links | Contact

35-10 Thompson Avenue, Long Island City, NY 11101

Home | Insert | Page Layout | References | Mailings | Review | View

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SCC201, 1757

Prof. Miller

March 22, 2010

When I read Ruth's ePortfolio I was surprised to learn that she was in the Israeli Army and has traveled to many parts of the world. It is wonderful to find anyone who joins an army but even more wonderful when it is a strong woman. It is great that Ruth is very open-minded and has experienced different things in life that the ordinary person has not experienced. Ruth is an interesting individual who has seen and learned a lot early in life.

I found it interesting that *Jeuxy* is so passionate about learning French and studying abroad in France. It is a difficult task to learn a new language as an adult and it is even more difficult to learn a new language when studying in college. The fact that *Jeuxy* is willing to go across the world and learn new things is impressive.

Figure 4
General Chemistry I Course—Student Work

Home | Calendar | People | Courses | e-Portfolios | Subscriptions

Welcome, DIONNE | Logout | More | HELP?

ePortfolio

@LaGuardia Community College

Home | About Me | SCC201

SCC201

Reflections
Lab Reports

This semester I have had the opportunity to work with not only two, but three lab partners! Sachin, Rosali and Helen all have amazing stories that I found very interesting.

Prior to reading Helen's e-portfolio I had no idea that she immigrated from China just a few years ago. I found out that she is from Hong-Kong, a beautiful city that I hope to visit one day. I am very excited to work with someone from such a different part of the world. I found out that Helen and I both share a love for animals (her dog is adorable!) and that she is aspiring to become a veterinarian. I hope she achieves her goals because she seems to be very passionate about that line of work.

Rosali is someone who I feel that I have a lot in common with. I learned that, like me, Rosali is the first person in her family to attend college. She and I both moved to the U.S. while we were very young and were both raised by strong, single mothers. Rosali's story was very moving and inspiring. I can see that she is a hard working woman and she inspires me to continue to do well for myself and for my family.

I learned that Sachin is pursuing a career as a math teacher. I'm very lucky to be working with him this semester because math is my weakest subject! Sachin is, as he said, very friendly and dependable. He is always willing to chat after class. I can tell that he is a hard working person and wants to improve his skills in subjects.

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learners to develop and flourish beyond the physical and temporal boundaries of the classroom.

From the reflections and student interactions in both the Principles of Accounting I and General Chemistry I courses, it was evident that the sense of belonging to a community of learners and the ability to share goals, challenges, experiences, and resources with other learners can engender a sense of confidence. Of great importance was the recognition by students that they could become contributors to and not just recipients of knowledge and that the faculty was therefore not the only source of knowledge in the classroom.

Students in the targeted courses recognized the commonalities between the assignments and activities that they completed and the professional environment they aspired to, thus enhancing their learning through contextualization. In both the Principles of Accounting I and the General Chemistry I course, faculty observed that students exhibited “a quality of being present to the nature of the experience and an openness to its potential meanings” (Rodgers, 2002, p. 850) in order to find value in the information and the process of sharing, interpreting, and making meaning of it. To that end, contextualizing instruction facilitated a successful approach not only to working within the discipline, but also to helping students think across the disciplines and their experiences as they endeavored to frame a career path.

Peer mentoring activities allowed students to experience various facets of teamwork, which enhanced their understanding of the importance of teamwork within a professional environment. Students engaging in conversation with peers could confirm their knowledge or experience cognitive dissonance; either result validates and gives meaning to a student’s efforts.

From the faculty’s perspective, the goal of increasing engagement and learning through student to student connections was achieved. In the General Chemistry I course, this was evidenced not only by the reflective essays but also by a significant improvement in course performance: all groups submitted all of the required 10 laboratory reports, and the average lab grade improved from 70% to 82% when compared to prior semesters taught by the same faculty. Even though this was not stressed, students also reported feeling a greater sense of connection to the faculty based on the end of semester, college-administered student evaluation scores, which were compared to scores for the same faculty in the same course without ePortfolio. In the Principles of Accounting I course, increased engagement and learning through student-to-student connections was evident when 97.56% of survey respondents perceived a significant or very significant improvement in their knowledge about career readiness. Through this initiative, faculty learned that advisement

as integrative social pedagogy is about providing students with the opportunity to share, listen, question, and learn from personal experiences as well as the experiences of others. Rather than just being about course selection, advisement evolved to let students link academic, transfer, and career issues in their disciplines and help them make informed decisions. Thus, when advisement became a community affair, moving beyond its prescriptive boundaries to target instead the whole student, students were learning and engaged.

Finally, ePortfolio provided a robust, facile means for facilitating the implementation of an integrative social pedagogy. Through the assignments, activities, and reflections, recorded and shared in their ePortfolios, students explored in a much deeper fashion what they learned from the course, beyond the fundamentals of accounting or chemistry.

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Appendix A
Principles of Accounting I: Career Advisement Initiative—Assignments and Workshops

Assignment 1

Begin work on the About Me section of the course ePortfolio. This section should include the following:

- A paragraph about who you are.
- A professional picture of yourself.
- What are your short-term and long-term academic/professional goals? What immediate action steps can you take to accomplish these goals? Specifically, what skills do you need to further develop in order to achieve your long-term goals?

Assignment 2

In order to build a community of connected and active learners, review the About Me section of the colleague (from the other class) you were assigned to work with on this project (see Student Pairs List). Using the Comment feature, provide **constructive and useful** feedback as it relates to the following:

- What do you notice about your colleague's About Me? Did anything grab your attention?
- Did your colleague thoroughly address all of the requirements of Assignment 1? If not, what aspects of your colleague's About Me do you believe he/she could refine and strengthen?

Assignment 3

Preparation is key to obtaining employment. Part of being prepared is knowing what questions you may be asked, and being ready with responses to these questions. **Note:** Assume that you are interviewing for the position of Staff Accountant with Steinway & Sons.

For this assignment, **students in Group 1** (see the Participant Workspaces tab if you forgot your group number) **from both classes** will be the **Interviewer**. As the Interviewer, each student will perform research (and cite sources where necessary) and list 2 questions they believe that a potential interviewer may ask an interviewee. Try not to repeat questions already asked by other colleagues. **Important Note:** On the left of this ePortfolio page, you will notice that a template was set up for you to document your questions.

For this assignment, **students in Group 2** (See the Participant Workspaces tab if you forgot your group number) **from both classes** will be the **Interviewee**. As the Interviewee, each student will respond to 2 questions presented by the interviewer. Try not to answer questions already responded to by another colleague, unless your answer is very different. **Important Note:** On the left of this ePortfolio page, you will notice that a template was set up for you to document your responses.

Assignment 4

New York Times article - [Click Here](#) to Download.

Read the *New York Times* article included in the link above carefully. Insert a new module in your workspace, with the title "Turn Off the Phone (and the Tension)," and then answer the following questions relating to the article.

- In two to three sentences, discuss the objective of this article.
- Do you agree with the author that as a society we are over-communicated? Why or why not?
- How, if at all, would you alter your **social** screen time:
 - When preparing for, and participating in a job interview?
 - During working or class hours?

Workshop 1: Resume Preparation Workshop

This workshop will consist of a discussion followed by a hands-on resume preparation activity.

Required: Document two key points from this workshop that you found helpful and how you will use them in future.

Assignment 5

Insert a new module in your workspace to complete **both parts** of this assignment.

Part I: In no more than 200 words, analyze the role that Steinway & Sons has played in the history of Queens and New York City as it relates to **ANY ONE** of the following: Immigration, Business, Culture, and Labor. **Note:** The instructor will schedule a class visit to the LaGuardia and Wagner Archives—The Steinway & Sons Collection, located right here at LaGuardia Community College, Room E-238. This will provide an opportunity for all to learn about the rich and influential history of Steinway & Sons.

Part II: Download the extract ([Click Here to Download](#)) from the Form 10-K of Steinway Musical Instruments, Inc. and Subsidiaries, and complete all requirements listed below.

- Calculate the Dollar and Percentage change in Gross Profit from 2010 to 2011. In addition, identify **at least two** possible reasons for the change in Gross Profit.
Hint: $\text{Gross Profit} = \text{Net Sales} - \text{Cost of Sales}$
- Calculate the Dollar and Percentage change in Net Income from 2010 to 2011. In addition, identify **one item** that contributed significantly to this change in Net Income.
- Refer to the work done for Part II by your partner (see Assignment 2 above for your assigned partner under the Student Pairs List) and compare your answers. In the **Comments section** of your partner's workspace state whether you agree with their results or not. If you disagree, provide your partner with proposed revisions.

Workshop 2: Job Interview Preparation Workshop

This workshop will provide students with an opportunity to enhance their oral communication and interview skills.

Required: Document two key points from this workshop that you found helpful and how you will use them in future.

Assignment 6: Reflection

During an interview for the position of Staff Accountant with Steinway & Sons, the Company's Human Resources Director asked you to respond to the following:

Required: Share your responses to these items with the Company's Human Resources Director.

- Briefly tell me about yourself.
- What are your strengths and weaknesses?
- Where do you see yourself five years from today?
- List **two** things that you learned about the Company from the Principles of Accounting I: Steinway Research Project.
- List **one** thing that you found the most interesting about the work you completed for the Principles of Accounting I: Steinway Research Project.
- Do you have any questions for me?

Appendix B
Principles of Accounting I: Career Advisement Initiative—Student Survey

1. Check which applies to you. I am a:

☐ 1st Semester Student ☐ 2nd Semester Student ☐ 3rd Semester Student ☐ 4th Semester Student

2. How would you rate your knowledge about Career Readiness prior to completion of this Project?

Very Weak Weak Average Strong Very Strong

3. Do you perceive an improvement in your knowledge about Career Readiness after completion of this project?

☐ Yes ☐ No

If Yes, to what extent?

Not Significant Significant Very Significant

What areas did you notice the most improvement?

4. How would you rate the contribution of the Resume Preparation Workshop to your knowledge about Career Readiness?

Not Significant Significant Very Significant

5. How would you rate the contribution of the Interview Preparation Workshop to your knowledge about Career Readiness?

Not Significant Significant Very Significant

6. Note the part(s) of the Project you considered the most challenging. Why?

7. How would you rate your knowledge of ePortfolio prior to completion of this Project?

None Some Strong Very Strong

8. Do you perceive an improvement in your knowledge of ePortfolio after completion of this project?

☐ Yes ☐ No

If Yes, to what extent?

Not Significant Significant Very Significant

How did ePortfolio facilitate your understanding and completion of this Project?

Appendix C
Principles of Accounting I: Career Advisement Initiative—Student Survey Results

How would you rate your knowledge about Career Readiness prior to completion of this Project?	Very Weak	Weak	Average	Strong	Very Strong
	1.92%	9.62%	50.00%	30.77%	7.69%
Do you perceive an improvement in your knowledge about Career Readiness after completion of this project?	Yes	No			
	82.69%	17.31%			
If yes, to what extent?	Not Significant	Significant	Very Significant		
	2.44%	87.80%	9.76%		
How would you rate the contribution of the Resume Preparation Workshop to your knowledge about Career Readiness?	Not Significant	Significant	Very Significant		
	3.92%	58.83%	37.25%		
How would you rate the contribution of the Interview Preparation Workshop to your knowledge about Career Readiness?	Not Significant	Significant	Very Significant		
	0.00%	30.77%	69.23%		
How would you rate your knowledge of ePortfolio prior to completion of this Project?	None	Some	Strong	Very Strong	
	5.77%	36.54%	44.23%	13.46%	
Do you perceive an improvement in your knowledge of ePortfolio after completion of this project?	Yes	No			
	80.77%	19.23%			
If yes, to what extent?	Not Significant	Significant	Very Significant		
	5.13%	71.79%	23.08%		

Appendix D

General Chemistry Course—Assignments and Activities

Activity 1

In this course, you will be working as part of a three-person research team in the laboratory classes. Your team members have been assigned to you by the instructor. As a way of getting to know your team members, do the following:

- Share your ePortfolio with your team members.
- View the About Me section of the ePortfolios of your other team members.
- In the reflection section of your ePortfolio, write and post a short paragraph about something you found interesting or unexpected about each team member.

In a new document, make a table with two columns. In the first column, list the qualities that you think are important when working with a group of people toward a common goal. In the second column, list the qualities/strengths that you believe you already possess that will make you a good team member. You are not required to include this in the document, but also think about the qualities that you think you need to develop to become a better team member.

Activity 2: End of Course Reflection

Reflecting on the Course

In this course we have explored some of the fundamental principles and concepts of chemistry. We have tried to lay a foundation for further study in chemistry with the expectation that you will go on to do part II of the course and then apply this knowledge to further studies in engineering, health-related fields such as nursing and pharmacy as well as to your everyday life.

Please answer as thoughtfully and honestly as possible the following:

- Do you think you have developed more awareness of chemistry in your everyday life as a result of taking this course? If yes, in what ways?
- What topics, if any, do you think will be most relevant to your career goals? For example, if you hope to be an engineer, what topics do you think would be most relevant as you continue to further studies?
- What did you find most challenging about the course? What skills did you have to develop to meet those challenges? What skills did you have to use that you gained from other courses or from life in general?
- Having completed the course, do you think you learned a lot or a little?
- What advice would you give to someone planning to take this course next semester (apart from taking a different professor)?

Reflection on Working in a Team in the Laboratory

As stated at the beginning of the course, modern scientific research involves teams of scientists in an interdisciplinary approach. A survey of scientific research articles would show that the vast majority of papers have several authors who collaborated on a project. Each person brings their own resources, skills and expertise to the project. You were asked to work as a “research team” in the lab this semester.

Please answer the following as thoughtfully and honestly as possible:

- What was your overall experience of working in a team?
- What were the advantages and disadvantages of the team approach? What did you like most about the team? What did you find most challenging about the team?
- Which skills did you find most useful in negotiating the team process? Do you think you developed any new skills as a result of working in a team?
- How do you think working in a team in the lab compares to what you might experience when you have a full time job in your particular field?
- What advice would you give to someone planning to take this course next semester (apart from taking a different professor)?

The ePortfolio as a Living Portal: A Medium for Student Learning, Identity, and Assessment

Celeste Fowles Nguyen
Stanford University

This research examines the influence of college students' electronic portfolios (i.e., ePortfolios) on learning, identity, and assessment. The study creates a narrative of students' experiences with ePortfolios that integrates critical hermeneutic theory. Findings demonstrate the diverse experiences of research participants who used ePortfolios for advising and mentoring purposes or to present an academic identity to employers or faculty. This research presents ePortfolios as a way to engage with others about identity, to expand on prior understandings and ways of being, and to create a coherent narrative of past, present, and future. The implications may guide educators in developing ePortfolio programs that prepare students for authentic, ethical living in a global and ever-changing world.

On college campuses throughout the United States, there has been a shift towards assessing a student's education through learning artifacts and outcomes, instead of traditional measures such as grades and graduation rates (Association of American Colleges and Universities [AAC&U], 2011). The trend is prompted in part by accreditation agencies, which are requiring more comprehensive evidence of learning, and by professional organizations that encourage institutions to document learning outcomes (AAC&U, 2011). Additionally, new pedagogical approaches encourage college faculty and staff to guide students in authoring their own learning (Baxter Magolda, 2004). These influences in higher education have fueled growth in student electronic portfolios (i.e., ePortfolios). In 2010, almost half of all public and private institutions used ePortfolios in some fashion on their campuses (Green, 2010). Institutions utilize ePortfolios in a variety of ways at the student, class, and school level to assess and encourage student learning (Green, 2010). While ePortfolios vary in function and audience, they commonly take the form of a comprehensive personal website that is meant to be shared with others. In the online portfolio, students reflect on their lives, education, and goals.

The ePortfolio is presently understood as an online space for students to share and reflect upon learning artifacts and academic experiences. Traditionally, ePortfolios have been studied through scientific or developmental paradigms, where they are often viewed as a tool to measure outcomes or student progress. This paper contributes to the understanding of ePortfolios through a critical hermeneutic approach (Herda, 1999), in which the ePortfolio is one medium, among others, for learning. The approach is grounded in critical hermeneutic theory, which is oriented in terms of language, understanding, and identity. This framework highlights the role of the student in narrating his or her own life. The focus on identity in this research may add an additional dimension to discussions about culture and technology.

The interpretive approach of critical hermeneutics offers new insights into ePortfolios within an ontological tradition based on ways of being. This research, based on the philosophy of Paul Ricoeur (1984, 1992), viewed the ePortfolio as a medium in which students can learn about self and the world. New understandings expand one's horizon, bringing about new ways of living, which Hans-Georg Gadamer (1988/1975) conceptualized as a fusion of horizons. This approach to ePortfolios provides educators with enhanced ways of understanding learning, identity, and assessment in higher education.

This research moves beyond an epistemological approach based on knowledge, where the ePortfolios are viewed as an object or linear process, into the ontological world of being, where learning is about living life through a search that has meaning for oneself and others. As Ricoeur (1991) explained, life can be understood as a "story in search of a narrator" (p. 425). This interpretive context offers an expanded approach to learning that may complement existing practices to better serve institutions and students in preparing for an ever-changing world that lies beyond the college experience.

Significance of the Issue

The primary significance of this research is the shift from viewing the ePortfolio as an online tool and an individual reflective process to the construct of an ePortfolio that takes on meaning as a portal, or medium. The ePortfolio holds potential for the creative process of expressing oneself in relationship to the other and describing identity through narrative. In a more applied sense, an ePortfolio serves as a "living portal," through which students may continually re-articulate their ideas of self to others, bringing about new understandings and ethical intentions (Nguyen, 2013). Ricoeur (1992) characterized ethics as "aiming at the 'good life' with and for others in just institutions" (p. 172). This concept

emerged throughout the research and relates to students living an authentic life while pursuing their unique interests.

While there has been a shift by educators to expand notions of learning from grades to outcomes (AAC&U, 2011), the underlying paradigm remains developmental. A critical hermeneutic orientation extends beyond pre-defined learning and looks at new understandings about oneself and others. The implications may guide administrators, faculty, and staff in developing ePortfolio programs that encourage interpretive notions of student learning, in which students are active participants in creating and assessing their education among others.

Literature Review

There are three primary areas for the literature review of this research, including ePortfolio literature, critical hermeneutic theory, and anthropological theory.

ePortfolio Literature: Learning, Identity, Assessment

Prior ePortfolio literature summarizes existing research, with a focus on student learning, identity, and assessment. With the rise in ePortfolio usage in the last decade, the research has expanded in regards to traditional notions of student learning. In the literature, learning is frequently marked by the student meeting outcomes established by the institution, or by documenting progress in a program. The research that examines student-defined learning maintained a developmental focus. According to the self-authorship theory (Baxter Magolda, 2004; Boes, Baxter Magolda, & Buckley, 2010), colleges best prepare students for success in the modern world by guiding them towards defining independently their own identity and learning. The model focuses on understanding students' ways of knowing what they know. Further, reference guides explore ePortfolios as a means for the "transformation of learning systems" (Jafari & Kaufman, 2006, p. xxxiv) or for "deep learning" (Zubizarreta, 2009, p. xx). Reflective practice in the prior research often referred to a student reviewing past assignments and intellectual experiences in order to "make knowledge by articulating connections among portfolio exhibits, learning, and self" (Yancey, 2009, p. 5) or to facilitate self-knowledge through a cycle of reflection (Barrett, 2011). Other research explored ePortfolios as a framework for a student's integration of distinct learning experiences (Peet et al., 2011). Most of the literature addressed ePortfolios in the received tradition, focusing on knowledge and skills. This study will contribute to the existing literature by offering instead an ontological examination of the student learning experience with ePortfolios.

Another area of exploration in ePortfolio literature that relates to this study is student identity. Previous research includes analysis of ePortfolios in relation to cultural and academic identity. Eynon (2009) examined how ePortfolios relate to students' understanding of their personal culture and the academic culture of the institution. Other research examines student identity theoretically in light of the ePortfolio process (Cambridge, 2009, 2010). Cambridge (2009) contended that the online representation of a student in an ePortfolio includes two parts of identity, including a "networked" aspect that is flexible and changes with connections and choices, and a "symphonic" aspect that is more permanent, reflecting the enduring and whole elements of identity. Cambridge (2010) further explored the expression of identity in ePortfolios, and noted that the self "does not reach its full power until it is made clear through representation . . . by expressing who we are, we are defining ourselves, calling ourselves into being" (p. 13). For Cambridge (2010), ePortfolios encourage the expression of authentic selves.

In addition to student learning and identity, assessment is one of the most widely addressed issues in the literature relating to ePortfolios. Assessment in the prior literature refers to institutional processes for measuring learning, often for accreditation purposes, curriculum reviews, or student evaluations. Institutional assessment practices have often been researched as case studies (Lowenthal, White, & Cooley, 2011; Shada, Kelly, Cox, & Malkik, 2011). Penny Light, Chen, and Ittelson (2012) examined assessment practices through ePortfolios, with an emphasis on documenting learning. Ring and Ramirez (2012) described how ePortfolios are used for general education requirements at one university in order to "build a mechanism through which core competencies can be both demonstrated and evaluated" (p. 187).

Throughout much of the prior literature, the assumption remains that student learning should be measured through established objectives. The epistemological perspective applies external criteria to student learning, while an ontological approach extends to the internal experience of the learners and their changing ways of being with others. In this study, assessment is considered in light of critical hermeneutic theory, which underscores narrative identity and ethical action.

Critical Hermeneutic Theory

The critical hermeneutic theories that inform this study include Ricoeur's (1992) concept of narrative identity, Gadamer's (1988/1975) description of the fusion of horizons, and Ricoeur's (1984) theory of mimesis. These concepts provide open-ended insights for assessing student learning and identity. Narrative

identity, as conceptualized by Ricoeur (1992) in *Oneself as Another*, maintains that personal identity is known through a narrative of self in relation to others. Through narrative, one emplots, or creates a cohesive story, out of life events. Ricoeur (1992) posited that “it is the identity of the story that makes the identity of the character” (p. 148). Gadamer (1988/1975) conceptualized the fusion of horizons to explain how our understandings change through exposure to the unknown, often through texts, conversations, or experiences. When horizons merge, our current horizon expands to incorporate concepts that were once foreign. Gadamer (1988/1975) explained, “to acquire a horizon means that one learns to look beyond what is close at hand—not in order to look away from it, but to see it better within a larger whole and in truer proportion” (p. 272). When a fusion of horizons takes place, learning occurs. Finally, Ricoeur’s (1984) concept of mimesis informs the student experience of creating a narrative in an ePortfolio. Mimesis explains the relationship between time and narrative, which Ricoeur (1984) referred to as “the mediating role of emplotment between a stage of practical experience that precedes it and a stage that succeeds it” (p. 53). Through the three stages of mimesis, past understandings and future imaginings come together in action in the present.

Anthropological Theory

Anthropological theory—including Sapir’s (1949/1921) work on linguistics, White’s (1971/1949) notion about the primacy of technology in culture, and Geertz’s (1973) interpretive contention that culture is a text conveying symbolic meaning—also relates to this research. The critical hermeneutic orientation of this article, in particular, has a foundation in anthropology. Early anthropologists developed approaches and theories that opened discussion toward the interpretive orientation. Literature from these anthropologists also provides a background for this study on the student experience with ePortfolios. In 1921, Edward Sapir (1949/1921) posited that language shapes perception. Sapir’s student, Leslie White (1971/1949), put forth theories in a 1949 book about culture in general, suggesting that technological, or structural, systems are most important to society. Finally, Clifford Geertz (1973) shifted the conversation in anthropology towards culture as a text, in which symbolic action could be analyzed for meaning. The contributions from these early anthropologists inform an analysis of ePortfolios.

Research Questions

This study aimed to gain a deeper understanding of the ontological student experience with ePortfolios in terms of identity, learning, and assessment. In critical

hermeneutic participatory inquiry, theoretical categories guide the research (Herda, 1999). The research categories that inform this study on ePortfolios are the narrative identity, fusion of horizons, and mimesis. The research questions include:

- Through engagement with the ePortfolio, did participants come to think of their personal narrative differently in relation to and with others? How so?
- What new understandings of self and world, if any, emerged through the ePortfolio process?
- How did participants view their past, present, and future differently through creating ePortfolios?

The research questions served to direct the conversations and led to more in-depth understanding of ePortfolios and student learning.

Method

As I have previously discussed (see Nguyen, 2013), the research protocol of this study is critical hermeneutic participatory inquiry (Herda, 1999). Herda (1999) explained that participatory inquiry “allows us to recognize, challenge, and evaluate our worlds of action as well as to envision new, possible worlds” (p. 86). This interpretive framework guided my research on understanding how ePortfolios may encourage students to refigure their past and imagine new possibilities. This research topic lends itself to interpretive participatory research. Most notably, the introspective and thoughtful process of presenting oneself in an electronic portfolio requires imagination and openness about oneself and others. The aforementioned categories of narrative identity, fusion of horizons, and mimesis provide a foundation for exploring ePortfolios through an interpretive paradigm.

Participants

An intention of this study is to create a narrative of students’ experiences with ePortfolios that integrates critical hermeneutic theory. The participants for this study included selected Stanford University students who created ePortfolios. Forty students partaking in different ePortfolio programs were contacted and asked if they would like to participate. Eight students agreed to participate in the study and to speak to me about their experiences with ePortfolios. Of the eight participants, two were male and six were female. The participants included two master’s students, two juniors, and four freshmen. Their fields of study included engineering, education, biology, and political science.

The research participants engaged with ePortfolios through various programs. One student created her ePortfolio as part of an ongoing research project with an engineering faculty member. She reflected on the engineering research projects while also providing a context for her larger intellectual endeavors. She shared and discussed her ePortfolio with the faculty advisor and other members of her research team. Another participant was part of a program sponsored by the career center and the diversity/first generation office to shadow alumni mentors in their professional positions. In this program, students created ePortfolios for the alumni to review and provide feedback to the students about their career aspirations. Four of the students utilized ePortfolios through an expanded advising program within the Stanford community centers, including the Black Student Center and the Latino and Chicano Student Center. Two participants were master's students; one managed the technical elements of the expanded advising program, and the other served as a graduate mentor to freshmen. Each created an ePortfolio and also reviewed others' portfolios. Finally, an undergraduate experimenting with ePortfolios for an ePortfolio initiative program participated in this study.

Procedure

In critical hermeneutic participatory inquiry, the theoretical categories guide the data collection and analysis. The aim of this interpretive research is to gain a deeper understanding of the topic, as opposed to following traditional research methods focused on scalability or generalizations. The research protocol follows specific steps as outlined by Herda (1999), which include the following:

1. Record and transcribe conversations with participants;
2. identify significant statements and categorize them according to themes;
3. examine themes and important ideas in light of critical hermeneutic theory;
4. offer participants opportunities for continued conversation utilizing the transcribed text;
5. discuss the research topic through critical hermeneutic theory; and,
6. determine implications from the conversation text. (p. 98-99)

These steps were carried out through the theoretical categories of narrative identity, fusion of horizons, and mimesis.

A letter of invitation was sent to each person. If the student agreed, he or she was asked to share

reflections on creating an electronic portfolio during a conversation that was up to an hour long. The questions below, categorized according to the selected research theory, directed the conversation and led to new understandings about ePortfolios and student learning.

Narrative identity, as conceptualized by Ricoeur (1992), highlighted the significance of expressing our lives through stories. Emplotting life experiences through narrative leads one to new understandings about self, which changes the way in which one views others. The following questions guided my conversation with research participants in regards to narrative identity:

- Tell me a story about sharing your ePortfolios with others.
- How did the process of creating the ePortfolio influence your idea of who you are?
- Have you changed through the process of creating an ePortfolio? How so?

In addition to narrative identity, the fusion of horizons guided the research for this study. Gadamer's (1988/1975) concept of a fusion of horizons provides a hermeneutical approach to understanding learning. Ultimately, when individuals experience a fusion of horizons, they understand differently and change their way of thinking. The guiding prompts below were used to encourage a conversation about a fusion of horizons:

- Tell me a story about something that you came to view differently through creating the ePortfolio.
- What did you learn through the process of creating the ePortfolio that you did not know before?
- How has your view of your ePortfolio changed over time?

The final research category for this study is mimesis. Three stages of mimesis mediate past understandings and an imagined future in the present. By creating stories, through ePortfolios or otherwise, our lives come into full meaning, and in turn these stories can be revealed to others. To understand ePortfolios in light of mimesis, I guided the conversation with the following questions:

- How do you view your past differently after creating an ePortfolio?
- How has the ePortfolio process promoted your thinking about your future?
- Please provide an example of an action you took as a result of creating an ePortfolio.

Data Collection and Analysis

With the students' approval, I recorded the conversations and then transcribed them. Afterwards, I sent the students a thank-you letter, along with the conversation transcript for review and approval. They had the opportunity to review, edit, and delete any sections of the transcription. The final transcription fixes the conversation in a text, thereby creating distance from the conversation, and the transcribed text then becomes the basis for analysis. As Herda (1999) maintained, "research analysis discloses a possible world from the texts—the medium in which we understand ourselves" (p. 86). The results represent the final step of appropriation, where I interpret meaning through the selected critical hermeneutic theories.

Results

Through the interpretive approach of critical hermeneutic participatory inquiry, as described in the method section above, this study incorporated variations of the participants' stories while creating a larger meaning out of their narratives. The data presentation and analysis are based on the three selected critical hermeneutic theories of narrative identity, fusion of horizons, and mimesis. The following themes emerged in this interpretive data analysis: (1) the ePortfolio serves as a sharable narrative of identity, in conjunction with others; (2) new understandings of self, and different ways of evaluation, emerge in the ePortfolio; and, (3) ePortfolios create a space in the present to both refigure the past and imagine one's future.

Narrative Identity

Narrative identity provides a framework for exploring college students' changing sense of self and others in the context of ePortfolio programs. Ricoeur (1991) indicated that "life is lived and the story told" (p. 437). In other words, life is a series of events that gain meaning when configured in narrative. The ePortfolio gives students a way to create a narrative applicable to academic, professional, or personal aspects of their lives. This narrative is comprised of text, as well as images, multimedia, artifacts, and other creative expressions. With narrative identity, a person is "understood as a character in a story" (Ricoeur, 1992, p. 148). Ricoeur (1988) further posited that "narrative identity . . . can include change, mutability, within the cohesion of one lifetime. The subject then appears as both a reader and the writer of its own life" (p. 246).

In the ePortfolio, students are charged with the task of reading and writing their lives. In particular, some research participants expressed a newfound resilience

through their engagement with ePortfolio programs. One freshman involved in the ePortfolio initiative explained, "Most people just brush things off and don't think about it later. Unless you sit down and take time to do it." A junior Chemical Engineering major who participated in the Black Community Center advising program realized, after the experience of sharing and discussing his ePortfolio with an alumni mentor, that "I shouldn't wait for my insecurities to go away. But instead to form my identity on those insecurities and make it so that I don't just back down, but I use it to motivate myself." By portraying challenges and reinterpreting stories, some students saw their lives differently in relation to the lives of others.

College is a critical time for recognizing ethics in life and living responsibly with others. Ricoeur (1988) wrote, "On the ethical plane, self interpretation becomes self-esteem" (p. 169). In the ePortfolio, a student emplots various experiences into a coherent narrative, increasing their self-understanding and gaining an awareness about how to live well with others. When students narrate their stories in the ePortfolio, they are often compelled to live and act responsibly, which may be understood as authentic living. Further, Ricoeur (1992) posited that "gathering together one's life in the form of a narrative is destined to serve as a basis for the aim of a 'good life,' the cornerstone of . . . ethics" (p. 158).

For my conversation partners, ethical awareness became apparent as they established their identity in the text. In the ePortfolio, students made their stories sharable and their identity representable. Some found that the ePortfolio was a space to express affirmatively who they were. A junior who created an extensive ePortfolio for an engineering research project pointed to her ePortfolio on the computer and said, "Here's really all my life!" Ricoeur (1988) noted the connection of narrative to ethical action:

Impetus is transformed into action only through a decision whereby a person says: Here I stand! So narrative identity is not equivalent to true self-constancy except through this decisive moment, which makes ethical responsibility the highest factor in self-constancy. (p. 249)

A freshman engineering major, who created an ePortfolio for the Chicano/a Latino/a Center advising program, firmly felt that the ePortfolio "really conveys the person that you really are." Another freshman mechanical engineering major noted, "It's very clearly me." A first-year student explained the ePortfolio process as "finding your center point. Grounding yourself in who you really are and who you are with other people." These comments all point to how the ePortfolio presents an authentic identity that students

may then present to others. Ricoeur (1992) contended that this self-constancy means “faithfulness to oneself in keeping one’s word” (p. 118), or making a promise to oneself. This promise occurs in the ePortfolio as students show that “this is me; here I stand.” With that declaration, ethical intention emerges.

Ethics involves reciprocity between self and others—the ability to care for, and be cared for. One biology student, pensive at the end of her first year, highlighted her new understanding of reciprocity in the ePortfolio, through which she came to realize she can both give and receive help. She told me that during her freshman year, one of her greatest learning experiences was seeing that “you don’t have to be on your own. You can be a part of something bigger than yourself. You can both receive and give help. . . . That was a big realization. The ePortfolio extends that even more.” Reagan (2002) explained Ricoeur’s philosophy that “self esteem is the reflexive moment of the goal of the good life, while the relation between the self and the other is characterized by solicitude, which is based on the exchange of giving and receiving” (p. 18). Before college, the student viewed herself as a solo person, but changed was able to see herself as one person interconnected with others. With this recognition, she shows solicitude for others. Most often, such student realizations came about through conversations with others about the author’s online self-representation in the electronic portfolio.

The personal connections that supplemented the reflective practice of the ePortfolio provided a meaningful way for students to learn and understand in new ways. Numerous students addressed the importance of conversation to their ePortfolio experience. For four of the students, the role of ePortfolios in mentoring relationships was a topic of discussion. For example, one graduate student I spoke to, who created her own ePortfolio and served also as a mentor to freshmen advisees, told me that the ePortfolios “can facilitate deep conversations with individuals, particularly strengthening mentoring relationships.” With the ePortfolio, she could see more clearly the struggles undergraduates faced, which helped direct her mentoring conversations. For the students I spoke to, learning came about initially from creating the online profile, but then expanded significantly through conversations. In dialogue, self and others engage to create new interpretations that provide students with a deeper understanding of identity. Like narrative identity, the ePortfolio relies on a dialectical exchange between self and other, not on self alone.

The Fusion of Horizons

Understandings come about as one merges past horizons with new ones (Gadamer, 1988/1975). Gadamer (1988/1975) explained, “Understanding is the interplay

of the movement of tradition and the movement of the interpreter” (p. 293). When encountering different situations, one’s historical point of view has the chance to expand, which Gadamer referred to as a fusion of horizons. Gadamer (1988/1975) reminded us that

history does not belong to us; we belong to it. Long before we understand ourselves through the process of self-examination, we understand ourselves in a self-evident way in the family, society, and state in which we live. . . . That is why the prejudices of the individual, far more than his judgments, constitute the historical reality of his being. (p. 277)

This notion of historicity applies to the unique experience of college students. The university is an environment that brings together people from disparate backgrounds. It is a temporary home for undergraduate and graduate students who pass through in a continuous cycle, changing the college and being changed by it. A common experience that emerged in my conversations was bridging past horizons with the present college environment. For some students, the ePortfolio provides a point of reflection on this transition in life. Herda (1999) wrote, “Although we belong to history, we also can distance ourselves from it when it is in narrative form. We can read and reflect” (p. 77). Students’ engagement with ePortfolios changed their relationship to the institution and to other people.

Several of the freshmen expressed an enhanced sense of belonging at the university. For example, one freshman told me there were times he was not sure of his place in the college. In the process of making his ePortfolio, he reoriented his view of his own contributions and those of others. He explained, “You think, I don’t measure up to anyone. . . . To put it down in a narrative form, and see it in the context of where you were at the time, it helps reassure you [that you] did accomplish quite a lot of things.” A junior directly addressed the issue of belonging, telling me that he wondered, “Am I good enough? Do I belong here?” He said that his experience sharing his ePortfolio with alumni guided him to see his place at the university with more confidence. He stated that the ePortfolio “made me realize that if I’m in a class, and I’m struggling with the material, I’m not the only one struggling. Now I’m more confident raising my hand in class and asking questions.” Through the ePortfolio and the conversations that ensued, students broadened their views to see themselves differently in the world. The process of making the ePortfolio helped him realize that he should speak up in class and that he belongs at the college. He reframed his prior horizons with the new experiences in college.

Many participants indicated that the presentation of themselves in the ePortfolio gave them a different

perspective on self-assessment. Through a robust online image in the electronic portfolio, one is represented in an in-depth way. Several students addressed a shift from their prior views of evaluation as grades to a new interpretation of assessment as living authentically, or what Ricoeur (1992) referred to as ethical aim. The very nature of the ePortfolio is to construct an image of oneself online with examples of coursework and reflections of experiences. In my conversations with research participants, the fundamental quality of putting one's narrative online gave students new perspectives on how they assessed themselves. A junior mechanical engineering major, for instance, observed that engaging in things she cared about was more important than the final grades in her classes. She explained this to me in connection with the ePortfolio:

The reflection aspect I think is very important. I'm not necessarily the best student all the time. . . . Reflecting made me feel okay that maybe I'm not getting as good of grades as my friends, but I love what I'm doing, and that's enough.

This student realized that her focus was on learning rather than grades.

A junior's notion of self-evaluation expanded to incorporate pursuing his interests, putting forth his best efforts, and applying himself to doing good work in the world. He explained further that

Just expressing my profile, my bio in words, expressing it in this public forum, it's a reminder to me about why I'm here. Why I am doing this. It's not just to get an A in a class or to get in touch with people. It's doing something with my degree. I shouldn't be defined by my grades here. I should be defined by what my experience leads me to end up doing in the future.

Through the ePortfolio, he experienced a different kind of self-assessment that deemphasized grades and focused on learning. Assessment shifted to an ontological, internal guide to living authentically. By remaining open to the ePortfolio as a text and cornerstone of conversation, students expanded their personal view of assessment.

Mimesis

The ePortfolio allows for a configuration of life. It is a place to make sense of disparate elements of one's educational or personal experiences. This process lends itself to reflecting on the past and imagining the future. Ricoeur's (1984) theory of mimesis provides a context for analyzing how past, present, and future are plotted for meaning. Ricoeur (1984) referred to the

stages of mimesis as the mediation of time and narrative. Kearney (2002) further explained that mimesis "involves a circular movement from action to text and back again—passing from prefigured experience through narrative recounting back to a refigured life-world" (p. 133). The majority of my conversation participants viewed their past in new ways and expanded on the imagined future through the activity of creating an ePortfolio. These students configured their stories differently, creating new possibilities for future actions. One of the themes that emerged was the achievement of an examined life which was constructed in terms of past experiences and future possibilities. This continuity brought discordance in life to concordance in narrative, as represented in the ePortfolio itself.

Many students expressed how the ePortfolio served as a medium to tell the tale of their academic life, including the mimetic aspect of connecting past, present, and future. The freshman engineering major, who created the ePortfolio for an expanded advising program, shared that in the ePortfolio, "you can reflect on who you are, where you've been, who you want to be. Shaping that path." Another freshman, explaining that the ePortfolio made her stop and reflect, said that it served "to think about what you learned and what you did and what it meant." She explained the new insights expanded her self-understanding, which she could use to express herself more clearly in professional interviews. The ePortfolio was a place for examining the past, leading to new recognitions about the self.

Throughout the conversations, students noted an awareness of their qualities and experiences that they had not noticed before. Six of the eight students shared how they looked back at disparate parts of their life and recognized cohesion in their story. The reinterpretation of their past often led to a different action, such as new academic or personal pursuits. Several students explained how separate parts of their life became coherent as they constructed the ePortfolio. For example, one student said the ePortfolio "allowed me to verbalize this idea of myself as a mentor." Before the ePortfolio, she did not view personal qualities about herself as unique to her. Themes in her life that were previously latent came to the forefront. I asked her to tell me what it was like to discover this quality about herself. She replied:

I never really thought of it as me giving help. I've always seen it as the activity that I do. The ePortfolio got me to think about it as something that is a really big part of my life, because before I wouldn't think it is volunteer work. I assumed people do that in general. It's actually a really big part of who I am. It defines my interests and the things I like to do. The ePortfolio got me to realize that it's a big defining part of my life.

Her inclination to guide others was second nature to this student, but it was when she designed the ePortfolio that she started to see mentoring as a quality that was a distinct part of her identity.

Another student explained that she never saw how her diverse interests were connected until she crafted her profile. Discussing her ePortfolio with an advisor led her to a “mind-blowing moment” when the advisor observed that a theme of intellectual curiosity pervaded her experiences. She recounted this experience during our conversation:

She said I really see a theme of intellectual curiosity here that is clearly carrying through a lot of different things. That is something I’d never thought about before. I was writing about it, but I never thought about it as an aspect of me. I had never thought that about me, as one of my strengths being a person who is very intellectually curious. The more I looked back, the more I realized that [this theme] popped up there, and there, and there. It was nice to have a place to put this stuff down and have someone else read it and show me this is clearly a big theme in your life.

The student commented further that once she had realized the themes in her life, she could talk about herself more easily with others. She observed the mimetic quality of ePortfolios, noting that it “got me thinking about my past and my future and where I am now.” Through conversations about the content of her ePortfolio, she brought coherence to her diverse interests with the theme of intellectual curiosity.

In addition to making sense of the past, students also discussed how they viewed their future. Imagining a desired future creates the possibility for inhabiting an ideal world. Kearney (2002) explained this central concept of mimesis: “Our exposure to the new possibilities of being refigures our everyday being-in-the-world. So that when we return from the story-world to the real world, our sensibility is enriched and amplified in important respects” (p. 133). When the future is envisioned through narrative, real-world action in the present is altered in pursuit of the vision.

The student narratives integrate mimesis into how they remember their past and connect it to a desired future. This process is cyclical, as in the present they constantly reflect upon past experiences and future dreams. Ricoeur (1988) wrote that there is an “endless rectification of a previous narrative by a subsequent one, and from the chain of refigurations that results from this” (p. 248). By contemplating their histories and hopes, documenting them in the ePortfolio, and talking with others, the students’ forthcoming path became clearer as their personal notions of authentic living expand. As one student summarized, “I have

learned that when I have reflected, and once I think about things I’ve done and experiences that I’ve had, I’m much clearer about where I want to go.” For most students, imaging the future was a continuous cycle of interpretation about their lives.

Many students looked to a future beyond the university to consider how they themselves and others might live well in the world. As some students noted, the ePortfolio has the potential to provide a much-needed space for them to reflect on their own life stories. One student addressed this point directly in her reflection, showing how she took the time to consider her goals in terms of an ethical aim. She maintained:

When I was doing this for the ePortfolio, I thought it sounded nice, but I realized this is actually true. I’m not just doing this assignment. I’m actually thinking about what my goals are here. I guess everyone wants to be happy. What would make me happy would be to have a fulfilling life. To have a career where I can help other people. Where I can make a name of myself as well. And be at peace with the world. Have a fulfilling life. To get up every day and say I’m living the life I want to be living. I’m the person I want to be. There’s always room for improvement. I might get up and say, “I’m not there yet.” That could go on forever. Being in the process of improving yourself every day. Talking those small steps to being a better person in every aspect of life. It’s a big goal. It’s the final goal.

This student and others expressed a narrative that reflected Ricoeur’s (1992) notion of the good life. The reflective and interactive process of the ePortfolio often leads to an awareness of ethical living. This came across in many student conversations that addressed envisioning a future that related to one’s authentic self.

As Kearney (2002) explained, “The recounted life pries open perspectives inaccessible to ordinary perception. It marks a poetic extrapolation of possible worlds that supplement and refashion our referential relations to the life-world existing prior to the act of recounting” (p. 132). In other words, a life examined through narrative leads to new ways of acting in the present. This self-understanding comes about as the students take the time to reflect and articulate new meanings as part of the ePortfolio process.

Through narrative identity, fusion of horizons, and mimesis, an ontological view of the ePortfolio as a medium for learning about self in the world emerges. The ePortfolio provides a means for sharing one’s identity with others, which is complemented by meaningful conversation. Many participants experienced new understandings about their lives, including an expanded view of self-assessment. With the ePortfolio, a

creative potential exists for students to refigure their narratives and imagine their lives differently.

Discussion

The findings and implications from my research emerged through a literature review, conversations with participants, and data analysis. Table 1 demonstrates the findings and implications by research category, with examples from student conversations. By analyzing the data through critical hermeneutic theory, I extend this narrative to create a text that may open up new opportunities for educators utilizing ePortfolios. Herda (1999) contended, “The fusion of horizons is the aim of hermeneutic research, which opens possibilities for our new understandings with concomitant actions” (p. 109). The implications may guide faculty, academic advisors, and student affairs staff in implementing ePortfolio programs and engaging with students about their ePortfolios.

Narrative Identity

Narrative identity is integral for analyzing ePortfolios in a critical hermeneutic tradition. Herda

(2010) explained Ricoeur’s concept of narrative identity as “an identity that sustains both a tension and harmony in each of our selves and in relation to each other” (p. 141). The stories that we tell reflect our sameness and also changes in our identities and relationships. I asked students to tell me about the experience of presenting their story to others through the ePortfolio, which led to my first finding.

Finding 1: The ePortfolio serves as a living portal, whereby identity is shared with others and reimagined in narrative and conversation. Through both conversation and text, the ePortfolio becomes a living portal. This concept extends Carey’s (2007) notion of a *living text*, which is based on Herda’s (1999) critical hermeneutic participatory research. The ePortfolio serves as a living text, whereby the student and the viewer continually reimagine it for new meaning. This concept of text is a broad one that incorporates all of the reflections, learning artifacts, images, and personal and academic information that is contained in a student’s ePortfolio. The online text lives through conversation: “This living text is open to appropriation because it continues to evolve and change as the text moves from the interpretation of one moment to setting the venue of continued conversation

Table 1
Data, Findings and Implications by Research Category

Research Categories	Conversation Excerpts	Findings	Implications
Narrative Identity: “It is the identity of the story that makes the identity of the character” (Ricoeur, 1992, p. 148).	“The process of presenting myself to other people, that’s what the ePortfolio is really about. It’s allowed me to reflect on who I am, and my relationship to other people.”	The ePortfolio serves as a “living portal” whereby identity is shared with others and reimagined in text, narrative, and conversation.	Integrate narrative and conversation into ePortfolio programs.
Fusion of Horizons: “To acquire a horizon means that one learns to look beyond what is close at hand – not in order to look away from it, but to see it better within a larger whole and in truer proportion.” (Gadamer, 1988, p. 272)	“Reflecting made me feel okay that maybe I’m not getting as good grades as my friends, but I love what I’m doing, and that’s enough.”	ePortfolios encourage new understandings of past traditions and current experiences, which enhances belonging and enriches assessment.	Utilize ePortfolios for new understandings of self and others, and for narrative assessment.
Mimesis: “We [follow] the destiny of a prefigured time that becomes a refigured time through the mediation of a configured time” (Ricoeur, 1984, p. 54).	“It reminds me of who I used to be and it also reminds me who I want to be.”	Students reconfigured their past in the ePortfolio, and integrated their imagined future through an ongoing process.	Encourage reflections of past, present, and future in ePortfolio programs.

of the next” (Carey, 2007, p. 28). Each time the ePortfolio serves as a medium, or portal, for new ways of seeing self and other. This experience expands through conversation, where the topic at hand is the student content in the ePortfolio.

Beyond the notion of a living text, I found that the ePortfolio functioned as a *living portal* (see Figure 1). “Living” refers to a dynamic representation that is continually reinterpreted by both the student and the viewer. “Portal” captures the idea of the ePortfolio as a medium for understanding, as opposed to a technological tool. The ePortfolio as a living portal was most meaningful to students when coupled with conversation.

ePortfolios encourage students to put a narrative of themselves online for others. In some cases, these are personal portrayals of life, including obstacles, while at other times students highlight their achievements. The reasons vary, but in any case the students present personal narratives online in a shareable format. Students showed an honest view of themselves that was rarely displayed in other venues. As a freshman mechanical engineering major explained, “I put my heart into it. . . . It gives another view into my life and

priorities.” By establishing an authentic version of their personal narrative, these students expressed a greater sense of ethical living. For example, the first year biology student shared in her ePortfolio that “I’ve come here to further develop my knowledge, establish lifelong bonds, realize my career plans, attain wisdom, and achieve these factors of life to become a better me.”

The students who spoke of ePortfolios in the most powerful way described them as meaningful expressions of self when coupled with deep conversations. Crafting the ePortfolio encourages reflection. Presenting it to others and discussing the content leads to a reconfiguration of one's narrative. This finding about the ePortfolio as a living portal for sharing identity with others suggests the following implications for practice.

Implication 1: Integrate narrative and conversation into ePortfolio programs. There are a variety of uses for ePortfolios, but the experience that resonated the most with my research participants incorporated a personal narrative and conversation with another. Conversations are integral to the meaning of an ePortfolio experience. This implies that practitioners utilize the ePortfolio not as a static text, but as a living

Figure 1
ePortfolios as Living Portals

portal. As ePortfolio programs are created, student narrative and conversation with others ought to be cornerstones of the design.

New Understandings

In the critical hermeneutic tradition, learning is conceptualized as a fusion of horizons. Linge (1977) explained Gadamer's theory that "understanding remains essentially a mediation or translation of past meaning into the present situation" (p. xii). In the context of an ePortfolio, this learning is often a new interpretation that arises through experience, text, and conversation. My questions to students addressed new understandings in the ePortfolio context. The stories they shared led to my second finding.

Finding 2: ePortfolios encourage new understandings of past traditions and current experiences, which enhances belonging and enriches assessment. New understandings come about when one encounters a situation that challenges personal pre-judgments based on one's history. In college, this encounter begins with the transition from home to a university setting, and it continues as one engages with different experiences and people. The ePortfolio encouraged reflection on this process by allowing students to recognize that they had gained a new understanding of a previously held notion. This process, in turn, often led to a greater sense of belonging at the institution. Additionally, the robust expression of self in the ePortfolio provided new ways of self-assessment, as compared to traditional measures, in the college context.

Almost all of the students observed that in the ePortfolio, past interpretations were expanded in light of their present experiences. Many students experienced an enhanced sense of belonging at the university with the ePortfolio programs. For example, one junior described gaining confidence in class from talking to alumni mentors about the content of his ePortfolio. He said, "When I look at my reflections . . . it reminds me [of how] I used to get scared and intimidated. And how that conversation has actually transformed me to be this person who is not scared to go up to the professor." Students' relationships to the institution and people within it expanded with the new understandings about self that came about in the context of the ePortfolio. This deepens engagement with the college and may have further implications for students' sense of belonging and for retention.

Creating a text and talking to others gives students new ways to assess their education. Even though I never asked students about grades, many of them suggested that grades were less important than living authentically. One freshman spoke of a shift in attitude, from focusing solely on academics to being more

balanced in his relationships with people and his studies. A graduate student observed, "The electronic portfolio has given me this opportunity to look at me as a whole person." For most students, the ePortfolio served a narrative function for evaluation, allowing an interpretive, ontological approach to assessment. This finding leads to the following implication for practice.

Implication 2: Utilize ePortfolios for new understandings and narrative assessment. ePortfolios give students new ways to think about their educational lives based on prior understandings and new experiences. Electronic portfolio practices could incorporate student reflections on their prior views and new ways of understanding, or fusions of horizons, during college. Furthermore, viewing the ePortfolio as a text with narrative may provide an alternate assessment approach based on a student's own ethics. Presenting one's portfolio online can provide a different type of evaluation that shifts from grades to narrative and is guided by the learner's goals. It may allow students to assess their lives and learning beyond traditional measures, which may better prepare them for life after college.

Mimesis

The framework of mimesis offers an approach to viewing a student's ePortfolio experience through a lens of past understandings, present experiences, and future hopes. Herda (2010) summarized the relationship of Ricoeur's mimesis to time: "in order for us to understand human existence we must use a composite framework of time, which is only possible in a narrative whose expression relies on imagination" (p. 138). Inhabiting new possibilities in life entails both reconfiguring the remembered world and imagining an ideal world. The ePortfolio creates a space for past reflections, present observations, and future imaginings. Examining life for a new awareness about self was a prevalent theme in this research. Research conversations included topics about how one viewed the past and future differently in the present through the online portfolio, which suggests the third implication of this study.

Finding 3: Students reconfigured their past in the ePortfolio, and integrated their imagined future through an ongoing process. The majority of research participants discovered qualities about themselves through the ePortfolio process that they had never realized before. College is a time when students discover new things about themselves and the world. Students who participated in this study overwhelmingly described insights about themselves through the experience of crafting an ePortfolio and engaging with others about its content. A freshman involved in the ePortfolio initiative stated, "It helped

me tie together how everything wove together, all of my experiences.” A graduate student shared a similar sentiment that with the ePortfolio, she felt that “wow, it’s so interesting how this connects to this.” The ePortfolio provides a place to reflect on the qualities of students’ past experiences and express them in new ways to others.

Fewer students directly integrated their future into their ePortfolio narrative. Refiguring the past often emerged more explicitly than expressing the future. Students engaged in a continual process of refiguring their hopes and goals to represent in their online portfolio. For example, one student observed, “My goals have been more vague than concrete. How to get there is even more vague. It’s been evolving, and changing.” The students were working towards a vision that was in the process of being shaped. A junior said that in the ePortfolio he was “finding a way to make connections between my classes and what I want to do in the future.” For many students, representing the future was an ongoing process of discovery that started with the past and led to constructing an image of what was to come. These findings about refiguring the past and configuring the future in the present through the ePortfolio suggest the final implication.

Implication 3: Encourage reflections of past, present, and future in ePortfolio programs. As higher education faculty and staff utilize ePortfolios for student learning, it is important to incorporate the remembered world, present existence, and future hopes in the design. The past is a starting place for students’ stories. Educators could encourage students to represent their present-day experiences alongside future hopes. Often, students do not have the time and space to consider their life and learning in the larger context of their personal journey. The ePortfolio may encourage the type of configuration of narrative described by Ricoeur’s mimesis, whereby past, present, and future are mediated through narrative.

Suggestions for Future Research

The place of ePortfolios in higher education is a growing reality on college campuses. This research provides an interpretive look at the experience of students crafting ePortfolios at one institution. Further research into a critical hermeneutic tradition will provide deeper understanding of some of the concepts that emerged in this research. The first suggestion is to explore the faculty or advisor’s perspective on ePortfolios for identity and conversation. Educators may benefit from a deeper understanding of the faculty or staff’s view of an ePortfolio in terms of viewing a student’s identity, and the experiences of engaging in dialogue about the student’s personal ePortfolio.

Second, ePortfolios should be investigated for belonging and assessment. Students in this research specifically addressed how they came to feel more connected with the college through participation in the ePortfolio program. This could be examined further to understand the implications for their sense of belonging and for retention. Additionally, narrative assessment practices, as designed by the student through the ePortfolio, could be studied as an alternative to widely used assessment methods, such as learning outcomes or grades. Assessment in a critical hermeneutic tradition offers a rich and complex approach to understanding a program’s influence or a student’s learning.

Finally, how students apply new understandings of their past and future should be researched. This study found that students articulated their unique qualities and histories differently after engaging with the ePortfolio. For future research, this observation can be taken a step further to explore how students translate these new understandings about self to actions in their lives. Research participants often mentioned that they articulated themselves in new ways to faculty, advisors, and employers. Investigating this topic further might provide student affairs professionals with a deeper understanding of how to better utilize ePortfolios in specific areas, such as academic advising or career planning.

Conclusion

As universities increasingly utilize ePortfolios, college students are asked more frequently than ever to create ePortfolios for academics, assessment, or advising. The purposes are as varied as the people and programs that employ ePortfolios. The online presentation is sometimes public to present an overview of one’s life, education, and professional goals. Others, shared selectively with trusted advisors, and recount learning experiences, challenges, and personal dreams. In this study, analysis shifted from prior epistemological methods based on linear processes to an ontological approach based on ways of being. Kearney (2002) contended, “Every human existence is a life in search of a narrative” (p. 129). The ePortfolio provided a space for many students to reflect upon their identity and create an online representation of their narrative. The emerging insights about self occur in relation to, and through conversation, with others. Herda (1999) observed, “The interpretation of the text is complete when the reading of it releases an event in our lives whereby we understand each other anew” (p. 128). A critical hermeneutic approach may provide new opportunities for understanding and action in higher education, where the ePortfolio serves as a living portal to create narratives and examine lives.

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ePortfolios: Promoting Special Educator Adaptive Expertise Through Reflection in a Web-Based Learning Community

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In an era of accountability, teachers must be prepared to adapt to the variability they encounter in today's classrooms. Instead of knowing only routine responses to the challenges of practice, teachers need a repertoire that is characterized by adaptive expertise. Preservice preparation can foster teacher candidates' adaptive expertise through the use of ePortfolios as web-based learning communities built upon reflection and feedback. This article reviews the literature on adaptive expertise and uses a learning-to-teach-in-community framework to explain the value of ePortfolios for supporting the development of adaptive expertise. Further, a design and evaluation plan is presented for an ePortfolio-based learning community in which special education teacher candidates practice the skills and dispositions necessary for adaptive expertise through reflection prompts that are based on real-world classroom cases and receive feedback from program faculty and practicing special educators.

Today's teachers face not only common challenges in learning to teach, but a profession filled with variability and changing instructional contexts. For special education teachers, variability is an expected part of practice due to the nature of providing individualized services for children with disabilities. However, special educators face additional challenges in their traditional pedagogical roles, as well as their new roles in collaborative teaching, that require instruction and assessment in multiple content areas, new professional partnerships (Billingsley, Griffin, Smith, Kamman, & Israel, 2009), and the demand to continually adapt instructional and assessment strategies to reflect emerging evidence-based practices (Brownell, Sindelar, Kiely, & Danielson, 2010). Considering the persistent problem of teacher attrition in special education (Billingsley, 2004; Boe & Cook, 2006) and the current educational climate, which emphasizes the importance of special education teacher quality (Council for Exceptional Children, 2012), it is imperative that aspiring special educators be prepared to adapt to the variability and challenges they inevitably will face in practice. Special educators need to be prepared with critical metacognitive and cognitive skills and dispositions that will help them persist in the field and achieve positive outcomes for their students.

To support these critical outcomes of special educator preparation, this paper offers a framework for using ePortfolios as a web-based learning community platform for engaging teacher candidates in ongoing reflection and feedback with experienced educators in order to promote candidate development of adaptive expertise. First, we review the literature on adaptive expertise, including key dispositions and metacognitive and cognitive skills, through a lens of relevance for teacher preparation. Next, we discuss the ePortfolio as a tool to support a web-based learning community for promoting teacher candidates' development of adaptive

expertise through reflection and feedback. Finally, we articulate the design and evaluation plan for an ePortfolio-based learning community in which special education teacher candidates practice the skills and dispositions for adaptive expertise through reflection prompts based on real-world classroom cases and receive feedback from program faculty and practicing special educators.

Adaptive Expertise: The Gold Standard

De Arment, Reed, and Wetzel (2013) propose adaptive expertise, the "gold standard for becoming a professional" (Hammerness, Darling-Hammond, & Bransford, 2005, p. 360), as a conceptual framework that, when established as an organizing structure in the design of teacher preparation programs, supports the development of teacher candidates in special education, as well as general education, who enter practice with the knowledge, skills, and dispositions required to work efficiently in the routine aspects of teaching and to transfer knowledge and adapt to the complexity of teaching roles and the changing dynamics of the classroom environment. Furthermore, the tenets of adaptive expertise echo the knowledge and skills domains for key 21st century competencies, as articulated by the National Research Council (Pellegrino & Hilton, 2012): cognitive (e.g., critical thinking, reasoning, innovation), intrapersonal (e.g., flexibility, initiative, appreciation for diversity, metacognition), and interpersonal (e.g., communication, collaboration, responsibility). The De Arment et al. (2013) framework parses out the previously reported two-dimensional construct (Crawford, Schlager, Toyama, Riel, & Vahey, 2005) and organizes the adaptive expertise literature around three dimensions: adaptive dispositions, metacognitive skills, and cognitive skills.

First, adaptive experts understand the world as a variable, changing context (Crawford et al., 2005). Thus, adaptive experts recognize that challenges in practice may reveal the limitations of individuals' knowledge and understanding (Crawford et al., 2005) and require them to ask questions (Schwartz, Bransford, & Sears, 2005), seek feedback, and take managed risks to respond to novel situations (Crawford & Brophy, 2006). Adaptive experts are comfortable modifying previous knowledge and assumptions based on new information (Bransford, Derry, Berliner, & Hammerness, 2005; Lin, Schwartz, & Hatano, 2005; Schwartz et al., 2005). In addition to adaptive dispositions, critical cognitive skills are required for adaptive experts. Adaptive experts are flexible and able to respond to variability in contexts of practice (National Research Council, 2000) by modifying existing or inventing new procedures (Goodnow, Peterson, & Lawrence, 2007; Hatano & Oura, 2003) to meet the current challenge using data and thoughtful consideration while also accounting for multiple perspectives (Crawford & Brophy, 2006; Crawford et al., 2005; Fisher & Peterson, 2001). Finally, metacognitive skills enable adaptive experts to self-assess both their own learning (Bell, Horton, Blashki, & Seidel, 2012; Bransford, 2004; Crawford & Brophy, 2006; Crawford et al., 2005) and the processes and outcomes of their performance in practice (Crawford et al., 2005; Lin, Schwartz, & Bransford, 2007). Further learning occurs through the analysis of the process and outcomes involved in problem solving and the selection of efficient or innovative approaches (Crawford et al., 2005; Lin et al., 2007); results inform opportunities to modify existing knowledge and procedures or to invent new procedures (Goodnow et al., 2007; Hatano & Oura, 2003).

Adaptive expertise is described as a balancing act between routine efficiency and innovation (Bransford et al., 2005). Routine experts are highly adept in the efficient performance of a particular skill set within environments with little variability (Bransford, 2004; Bransford et al., 2005; Hatano & Inagaki, 1986; Inagaki & Miyake, 2007); the specificity of their domains, however, can limit their ability to be flexible in response to a changing context of practice (Crawford & Brophy, 2006). Adaptive experts, by contrast, not only work efficiently but are able to select and justify the use of routine versus innovative approaches (Bransford et al., 2005; Schwartz et al., 2005).

Though some suggest that routine expertise must precede the development of adaptive expertise, evidence from research in medicine, business, and engineering suggests the potential for development of the two synchronously along the trajectory from novice to expert (Barnett & Koslowski, 2002; Crawford, 2007; Crawford & Brophy, 2006; Fisher & Peterson, 2001;

Martin, Petrosino, Rivale, & Diller, 2006; Varpio, Schryer, & Lingard, 2009). However, at present, evidence to support pedagogical models and strategies and assessment methods for promoting adaptive expertise in teacher educator candidates is limited (Janssen, de Hullu, & Tigelaar, 2008; Soslau, 2012). Janssen et al. (2008) analyzed teacher candidate reflections, and findings indicate reflection on positive teaching experiences promotes adaptive dispositions, such as motivation, and the cognitive and metacognitive skills required to develop innovative procedures. Bransford (2007) proposed that activities that engage learners in reflection also promote metacognitive and cognitive skills for adaptive expertise. Further, Soslau (2012) observed supervisor-student conferences following field experiences and interviewed participating students and supervisors. Results suggest that teacher educators can promote adaptive expertise by guiding students through a reflection of both the routine, as well as the unanticipated, variable, and context-specific elements of the student teaching experience. Lin et al. (2007) suggested that when learners are prompted with various "what if" scenarios as they problem solve, they can develop "smart tools" that generalize across situations and can be applied in future contexts. These investigations highlight two components of program design—reflection prompts and feedback to teacher candidates—that offer potential mediums for positively impacting the development of teacher candidates' skills and dispositions for adaptive expertise.

ePortfolios: A Web-Based Context for Learning in Community

Teacher development is neither a solitary nor a linear process; it requires, instead, the acquisition of content and pedagogical knowledge, application and challenge within varied teaching contexts, reflection and revision of assumptions, and deeper understanding of the complexity of teaching. This cyclical process is optimized by learning in community with faculty, peers, and accomplished practitioners who share their experiences and reflections to support an inquiry stance to teaching. In a community of learners or inquiry, members seek and present resources, apply theoretical frameworks to shared experiences, investigate the effectiveness of strategies, examine beliefs, and build problem solving schemas for shared dilemmas (Hammerness et al., 2005).

This model of teacher development is congruent with recent recommendations for reforming teacher preparation by the National Research Council Committee on Defining Deeper Learning and 21st Century Skills (Pellegrino & Hilton, 2012), which was charged with identifying the knowledge and skills that students need to

acquire for working in a rapidly changing world. The committee's report highlighted cognitive, intrapersonal, and interpersonal competencies that are related to positive adult outcomes. To ensure the development of these competencies in K-12 and college education, the committee recommended reform in teacher education. Building on a practice-based approach, effective teacher education emphasizes foundational knowledge in development, learning, and knowledge-based pedagogy that is linked to extensive classroom experience, with mentoring by proficient teachers (Windschitl, 2009). Within coursework, faculty can promote deeper learning in the community through case-based methods, action research projects, performance assessments, and portfolio reviews (Darling-Hammond & Hammerness, 2005). As teacher candidates, faculty, and accomplished teachers examine and discuss teaching experiences and learning outcomes, there are rich opportunities to examine practice, revise understandings, and improve teaching. Learning in community also introduces pre-service teachers to the value of teacher social networks that can provide support, promote innovation and expertise development, strengthen teacher self-efficacy, and foster student achievement (Baker-Doyle, 2011).

When guided by an organizing framework, ePortfolios can be an ideal platform not only for capturing the complexities of this non-linear teacher development, but also for promoting teachers' adaptive expertise through reflection and feedback. As noted by Lambe, McNair, and Smith (2013), ePortfolios allow learners to demonstrate a commitment to lifelong learning and document growth related to professional standards. Additionally, reflection is often the central element of ePortfolio development (Yancey, 2009). By evaluating their own learning, teacher candidates create opportunities to extend their understandings (Dalal, Hakel, Sliter, & Kirkendall, 2012) and "directly engage in the scholarship of teaching" (Pelliccione & Raison, 2009, p. 273). The Hammerness et al. (2005) learning in community framework for understanding and guiding teacher development provides a useful structure for organizing the ePortfolio as a web-based learning community that is centered around reflective practice. This framework builds on professional standards that describe targets for competent novice teachers (Interstate New Teacher Assessment and Support Consortium; Council of Chief State School Officers, 2011) and for advanced teachers (National Board for Professional Teaching Standards, 2010). Furthermore, the framework draws from the teacher development literature in order to define and connect key components of teacher learning within a learning community of educators.

As explained by Hammerness et al. (2005), the learning-to-teach in-community framework begins with a central vision that presents images embodying the standards of high quality teaching practice and allows

teacher candidates to consider the goals of teaching and the process for ensuring that students reach those goals. Within an ePortfolio, the vision makes salient the goals of the teacher preparation program and sets the tone for capturing teacher candidate growth as teacher candidates reflect upon and question the disconnects between their previously held understandings about teaching and the images represented by the vision (Light, Chen, & Ittelson, 2012). Carried throughout the preparation program, reflective, vision-based ePortfolios help to build the coherence across teacher preparation necessary for enhancing teacher learning (Darling-Hammond & Hammerness, 2005).

Reflection continues throughout each component of teacher learning that is represented in the framework. Teacher candidates must develop deep understanding of what it means to teach, not only in terms of content and pedagogical knowledge, but also through intimate understanding of students and the social contexts of learning and knowledge transfer (Hammerness et al., 2005). Conceptual and practical tools, such as learning theories and instructional strategies, help teacher candidates enact their understandings. Further, these tools help teacher candidates establish their own developing set of teaching practices (Hammerness et al., 2005). Practices include teacher candidates' various approaches to instruction, such as engaging students in cooperative learning groups, developing unit plans, and designing formative assessments that drive feedback and further learning. ePortfolios allow teacher candidates to maintain an ongoing reflective commentary related to their learning processes across these components and thus develop a discursive narrative of their individual development over time (Ehiyazaryan-White, 2012; Pitts & Ruggirello, 2012).

The ongoing reflective commentary engendered by the ePortfolio is a key element of the critical dispositions teacher candidates must develop toward their roles as teachers within the learning in community framework. Central to these dispositions are an "inquiry stance" that focuses on reflection and an openness to learning and further developing one's teaching practice, as well as the persistence to ensure the learning and success of students (Hammerness et al., 2005). These dispositions mirror important tenets of adaptive expertise, such as asking questions (Schwartz et al., 2005), modifying knowledge and assumptions based on new information (Bransford et al., 2005; Lin et al., 2005; Schwartz et al., 2005) and engaging in problem solving that results in the selection of routine or innovative responses to the challenges of teaching practice (Crawford et al., 2005; Lin et al., 2007). Table 1 illustrates connections between learning in community components and aspects of ePortfolio design.

Central to the framework is an overall understanding that learning to teach occurs within the

Table 1
Relevance of Learning to Teach in Community Framework for ePortfolio Development

Web-based ePortfolio learning communities		
	Learning in community components	ePortfolio connections
Vision	Preparation program's images of what makes high quality teaching	Preparation program goals are clear across ePortfolio development with evidence of candidate reflection aligned to a central vision throughout
Understanding	Knowing what it means to teach	Stimulation of and space for ongoing reflective commentary across each component based on engagement with others within the web-based learning community that illustrates teacher candidate development across time
Tools	Conceptual and practical theories and strategies teachers use to act on their understandings of teaching practice	
Practices	Approaches to instruction	
Dispositions	Teacher candidates' understandings of their roles as a teachers with focus on being reflective and dedicated to student learning	

Note. Learning in community components adapted from Hammerness et al. (2005)

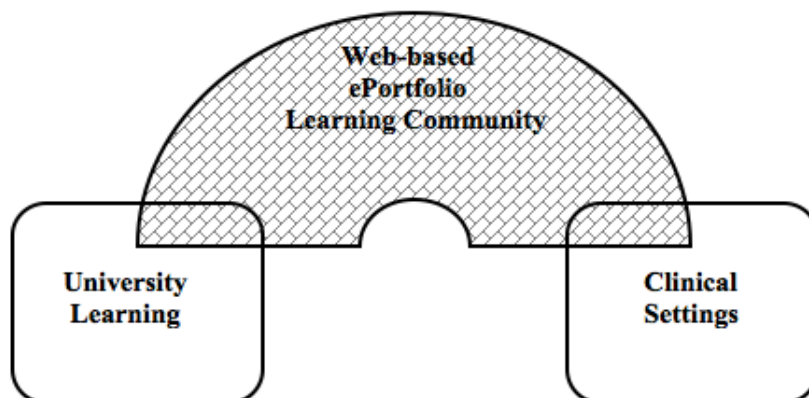
context of communities such as those developed among teacher candidate peer groups, teacher candidates and program faculty and/or school-based educators, and other combinations of teaching professionals. Learning communities can develop and change across various phases of the preparation program, and teacher educators can help orchestrate how learning communities encourage teacher candidates to embrace the program's vision of quality teaching and to develop the tools, understandings, practices, and dispositions necessary for effective teaching practice. Being learner-centered, ePortfolios establish an optimal learning-community environment for reflection because of their ability to stimulate dialogue that promotes the development of new ideas, learning, and thinking (Ehiyazaryan-White, 2012; Ring & Ramirez, 2012). Experienced teachers and program faculty can prompt candidate reflection and encourage the perspective-taking and desire for feedback characteristic of adaptive expertise (De Arment et al., 2013). Through purposeful design, teacher education faculty can establish ePortfolios as virtual learning communities that span the various contexts of teacher education and help establish program coherence (Darling-Hammond & Hammerness, 2005); ePortfolios can thus represent an essential bridge between teacher learning in university settings and teacher learning in school and clinical settings (see Figure 1; Hammerness et al., 2005).

ePortfolios: An Effective Medium for Ongoing Reflection and Feedback

Literature on the effectiveness of ePortfolios for promoting and assessing reflection informs the purposeful design of ePortfolios as web-based

learning communities for promoting adaptive expertise. Wetzel and Strudler (2006) sought the perspectives of teacher education students on the costs and benefits of using ePortfolios. Through semi-structured interviews, students and recent graduates ($n = 48$) described how they used reflection within their ePortfolios by connecting standards to theory and relating personal reactions to their own teaching activities (Wetzel & Strudler, 2006). Overall, students saw opportunities to reflect as a benefit of ePortfolio use. Further, these participants confirmed the value of ePortfolios for reflection, particularly in relation to their own teaching practices and to their understanding of what they might do differently next time (Wetzel & Strudler, 2006). Students surveyed ($n = 224$) by Parker, Ndoeye, and Ritzhaupt (2012) echoed this positive sentiment, noting that ePortfolios promoted better understanding of their work and indicated areas in which they could improve their teaching effectiveness. Students, even those with the least experience with technologies and who gave negative feedback about ePortfolios and reflection, found their learning increased because they had to engage in frequent self-analysis (Parkes & Kajder, 2010). Lambe et al. (2013) examined threaded-discussion archives to gain insight into preservice teachers' perspectives on ePortfolio development. Students in their study ($n = 22$) noted clear emphasis on critical reflection through their ePortfolios over descriptions or summaries of events and artifacts (Lambe et al., 2013). Preservice teachers ($n = 8$) interviewed by Yao, Aldrich, Foster, and Pecina (2009) also noted value in the ePortfolio for developing their skills of reflection, but felt that specific reflection

Figure 1
Connecting Teacher Candidate Learning Between Higher Education and Clinical Settings



Note. The web-based ePortfolio learning community serves as a bridge between teacher candidate learning within the university setting and real world practice within clinical settings.

templates limited their free expression. In addition, these participants found that reflective tasks based solely on theory rather than teaching experiences did not allow for in-depth reflection (Yao et al., 2009). Teacher education faculty also expressed value in the ePortfolio as a tool for promoting student reflection (Yao et al., 2009). Strudler and Wetzel (2008) conducted semi-structured interviews with 64 faculty and administrators within six teacher education programs across the US to understand their perspectives on the use of ePortfolios within their programs. Respondents from all six sites cited the importance of reflection and learning that occurred through ePortfolios (Strudler & Wetzel, 2008). The significance that students and faculty attribute to ePortfolio-based reflection is critical for ensuring the buy-in and commitment of all participants within the web-based learning community. Illustrating the importance of bridging clinical and course-based learning, reflection that promotes learning and development and is tied to teaching experiences appears to be of particular value.

Research also points to the importance of scaffolding student reflection by providing specific prompts, feedback from faculty and peers, and detailed information on expectations and associated levels of reflective practice (Ehiyazaryan-White, 2012; Parkes & Kajder, 2010; Ring & Ramirez, 2012). Jenson (2011) analyzed her instructional approaches to promoting freshmen writing students' ($n = 137$) reflection and implemented instructional changes to encourage students to think more deeply about their learning. First, using surveys, Jenson (2011) gathered information on students' strategies for achieving their writing goals. Next, she put forth a conscious effort to make the purpose of each course activity clear to students through guiding questions and class discussion (Jenson,

2011). Finally, Jenson (2011) increased the course ePortfolio-based reflection requirement, asking students to post reflections for each paper throughout the semester, rather than a single reflection at the end of the course. Through qualitative analysis of students' final reflections across eight years of ePortfolio use, Jenson (2011) found that students wrote longer reflections that moved from simply naming and describing artifacts to discussing learning outcomes and self-regulating writing strategies. Students also increasingly related learning to other coursework and life beyond college in their reflections (Jenson, 2011). These findings suggest thoughtful instructional practices that scaffold student thinking can have a positive impact on depth and quality of student reflection.

A common theme across ePortfolio literature is the importance of feedback for promoting students' meaningful reflection through ePortfolios. As Ring and Ramirez (2012) noted: "The most effective and successful ePortfolio programs provide formative feedback throughout the ePortfolio development period, encouraging reflection and subsequent revision and refinement of the evidence" (p. 89). Through action research with seven master's degree students in education, Ehiyazaryan-White (2012) identified the importance of students being able to share and provide peer feedback on their successes, failures, and uncertainties through ePortfolio-based reflection. Faculty in teacher education programs, where reflection is extensive, cited emphasis on student participation "in a cycle of response and improvement" (Strudler & Wetzel, 2008, p. 138). Rather than reflecting on a single occasion in relation to an artifact or experience, engaging teacher candidates within a learning community that prompts further reflection encourages greater reflective depth. At institutions that did not

place heavy emphasis on reflection, students demonstrated surface level reflections involving description and some affective response. Unprompted, teacher candidates did not revise these reflections further, and thus did not engage in more extensive and thoughtful self-assessment (Strudler & Wetzel, 2008). This finding underscores the importance of targeted engagement among teacher candidates, program faculty, and practicing teachers within a learning community environment for the development of the ongoing reflective practice characteristic of adaptive expertise.

In addition to regular feedback and dialogic engagement with others, explicit expectations are important for promoting ePortfolio-based reflection. Faculty can communicate expectations clearly through thoughtfully developed reflection assessment rubrics. Parkes and Kajder (2010) developed a rubric to evaluate teacher candidates' reflection on practice and critical reflection of growth. Using their rubric, faculty award points across three levels—basic, competent, and distinguished—and students use stated criteria for each level to guide their reflective work. Use of rubrics such as this one helps students understand what reflection is and provides guidance rather than a prescriptive formula for developing reflective responses (Parkes & Kadjér, 2010). Pelliccione and Raison (2009) also noted the improvement of first-year teacher education students' reflections in terms of depth and cohesion when they responded to a structured reflection guide.

Other rubric-based research targets the documentation of teacher candidates' growth in reflection through the ePortfolio platform. Pitts and Ruggirello (2012) studied the reflective practices of secondary science teachers ($n = 9$), specifically how they used baseline and post-baseline evidence to demonstrate growth within their ePortfolios. To analyze ePortfolio entries, the researchers used a scoring rubric with three levels of performance (1 = *under-developed*, 2 = *good*, and 3 = *excellent*) based on essential components of reflection: baseline and post-baseline evidence selected, application of a conceptual framework, and articulation of growth (Pitts & Ruggirello, 2012). With the support of a clearly articulated rubric and accompanying reading and writing guidelines, the students with the strongest entries were able to explain a conceptual framework and provide a clear rationale that connected the baseline and post-baseline evidence of their growth.

Research acknowledges the tension that exists between providing simultaneous structure and flexibility to support students' reflective practices through ePortfolios (Pitts & Ruggirello, 2012). However, by focusing reflection on the candidate's clinical and course-based experiences (Jenson, 2011; Wetzel & Strudler, 2006; Yao et al., 2009) and by providing explicit expectations through rubrics (Parkes

& Kadjér, 2010; Pelliccione & Raison, 2009; Pitts & Ruggirello, 2012; Wetzel & Strudler, 2006) and ongoing feedback (Ring & Ramirez, 2012; Strudler & Wetzel, 2008), teacher education faculty can enhance the depth and quality of candidate reflection. In turn, enhanced skills in reflection suggest development of critical metacognitive skills for adaptive expertise.

Developing an ePortfolio-Based Learning Community

In this section, we describe our ePortfolio design based on the adaptive expertise and reflection literature, our accomplishments to date, and our plans for further implementation and evaluation. While this ePortfolio model was developed to meet the preparation needs of special educators through collaboration with experienced teachers, the design process and the implementation and evaluation model could be applied to other teacher preparation programs.

Design Process

Our ePortfolio development team, including faculty and doctoral students from three special education preparation programs, the director of assessment, and the director of technology, started the design process two years ago to create an ePortfolio model based on professional standards (Council for Exceptional Children, 2008), with opportunities for faculty-teacher candidate review of artifacts and reflections. Although each of the three programs required teacher candidates to assemble portfolios of artifacts and graded rubrics during their programs of study, teacher candidates commented on the tedious process of organizing these portfolios. In addition, faculty were concerned about the repetitive and generic nature of candidates' reflections. To ensure a sound conceptual basis and a feasible web-based design, team members reviewed the literature on teacher development and ePortfolios.

To clarify the conceptual and professional-standards framework for the ePortfolio, the team also examined the programs' clinical evaluation, which guides and documents teacher candidates' performance within their final clinical experiences. Across five teaching standards on the Clinical Evaluation Continuum, target performance is described as "building on reflection, changing to improve, adjust, expand, and connect," descriptors that are consistent with adaptive expertise constructs. Faculty acknowledged the need to scaffold this level of reflection throughout teacher candidates' programs of study and established the promotion of meaningful reflection as a central goal in examining the curriculum and designing the ePortfolio process.

Following the review of various platforms for ePortfolios (Watwood, Nugent, & Deihl, 2009), we selected WordPress as the blogging tool based on its flexible format and the potential for promoting deeper learning outcomes through feedback and reflection (Palloff & Pratt, 2007). In addition, the university provides WordPress technical support for students and faculty. Once the department created an ePortfolio template and training resources, the basic ePortfolio was piloted with teacher candidates.

Reflection Prompt Development

To apply the conceptual model of adaptive expertise and the learning in community framework, the ePortfolio team considered the important role of effective teachers who supervise teacher candidates within their classrooms, model adaptive expertise, and scaffold teacher candidates' reflection and growth. With their first-hand knowledge of the everyday challenges of practice, the exemplary teachers' perspectives about teacher candidates' challenges were critical to informing our development of reflection prompts for the ePortfolio model. Through a grant from the university's Center for Teaching Excellence, our team implemented the next phase of ePortfolio model development with exemplary special educators, who were teaching in local schools and community programs. Faculty identified seven program graduates

regarded as accomplished educators who represented the diversity of roles and educational settings that our special education teacher candidates need to understand. Specifically, these educators' roles included early interventionist, early childhood special educators, special educators, and school psychologist, with three to 18 years' experience. Their educational environments ranged from homes and community preschools to public schools and private day settings, with a range of inclusive and self-contained models of service delivery. All of these educators had experience as formal or informal mentors and supervisory professionals.

Guided by ePortfolio team members, these educators reviewed literature about adaptive expertise and reflection as the first step in the initial alignment activity to associate adaptive expertise indicators (De Arment et al., 2013) with target performance outcomes on the Clinical Evaluation Continuum rubric and specific ePortfolio artifacts (performance assessments conducted throughout the program of study). To build a shared vision for adaptive expertise in teaching, these educators were asked to identify one of the portfolio artifacts of particular relevance to their practice and the challenges of learning to teach. Prompted by these artifacts (identified in Table 2), educators discussed their own teaching, describing their challenges and problem solving approaches. Later, ePortfolio team members used a specific protocol based on adaptive

Table 2
Alignment Activity

ePortfolio Artifact	Clinical Continuum Target Exemplar	Adaptive Expertise Indicators
Individualized Education Plan	Reflects on learning goals, linking clearly to intervention, and setting high expectations.	Using causal and hypothesis-based reasoning; selecting routine or adaptive approaches based on data and hypotheses.
Individualized Family Service Plan	Encourages family/caregiver involvement as a team member in planning, delivering, and evaluating services.	Seeking and analyzing feedback from others; accounting for multiple perspectives.
Functional Behavioral Assessment	Monitor child's behavior throughout day, selecting strategies that prevent or lessen disruptive behavior.	Being motivated to problem solve; monitoring results and performance and modifying existing procedural skills.
Cultural Diversity Research Project	Actively seeks out other perspectives; appreciates their point of view; may adjust own view upon reflection.	Willing to ask questions; willing to replace prior assumptions and understandings; accounting for multiple perspectives.
Learning Environment Analysis	Reflects on time management effectiveness, adjusts routines, adopts new plans to maximize child engagement, coaches others in embedded interventions.	Inventing new procedures and balancing efficient and innovative approaches; using data and hypotheses to drive problem solving.
Tutoring in Reading Notebook	Uses varied materials to build on student's prior knowledge, interests, needs; reflects and makes changes based on research and students' needs.	Having the inclination to learn rather than simply apply knowledge; responding to variability in the classroom.

Note. Adaptive Expertise Indicators adapted from De Arment et al. (2013).

expertise to prompt reflection on their teaching practice (see Appendix). These discussions were audio recorded for further analysis based on adaptive expertise constructs.

Next Implementation Steps

Analyses of educators' reflections will be used to characterize specific teaching practices and tools within the adaptive expertise framework. Following ePortfolio team discussions about these analyses, accomplished educators, doctoral students, and faculty will develop specific reflection prompts to scaffold teacher candidates' use of specific cognitive and metacognitive skills and of adaptive dispositions across the selected ePortfolio artifacts. These prompts will be designed to support candidates' deeper understanding of teaching and to foster habits of collaboration and problem solving that will sustain their development as teachers. In addition, faculty will update existing associated rubrics for these artifacts to incorporate the specific adaptive expertise indicators aligned with the program standards and clinical continuum.

Faculty will identify seven teacher candidates to partner with the accomplished special educators in the prompt development process. Through face-to-face discussions, teachers will prompt candidates' reflection about the specific artifacts. These discussions will be audio-recorded and analyzed based on adaptive expertise constructs. Teacher and candidates' experiences in the face-to-face discussions will inform revisions to reflection prompts before they are implemented in the ePortfolio platform.

Transitioning from face-to-face dialogue to web-based discussions, teacher candidates will complete each course assignment as they progress through their programs of study. Once they load their artifacts into their ePortfolios, experienced special educators and program faculty will engage with teacher candidates using the ePortfolio platform to prompt and probe teacher candidates to extend their thinking about the assignment in order to develop adaptive skills and dispositions in relation to real world practice. Performance on the updated rubrics will be assessed for evidence of adaptive expertise tenets in teacher candidates' responses to the reflection prompts.

Model Evaluation Plan

Candidate assessment data and evaluation data, together, will be used to determine the effectiveness of the ePortfolio-based learning community for prompting reflection to promote adaptive expertise. The content of special education teacher candidate reflection prompts, feedback from faculty and accomplished special educators, and rubric performance will provide

evidence of candidates' use of the skills and dispositions for adaptive expertise. Participants (i.e., teacher candidates, accomplished special educators, doctoral students, and faculty) will provide feedback through surveys and focus groups on the content of the reflection prompts, the ePortfolio format for reflection and feedback, and the experience of engaging in a professional learning community. Based on analysis of the assessment and evaluation data, the ePortfolio team will revise the reflection prompts, the feedback process, and the structure of the ePortfolio and web-based learning community. Subsequent investigations will include validity studies to analyze the reflection prompts to generalize this process in supporting the development of adaptive expertise in clinical experiences and subsequent job performance.

Conclusion

This paper offers a framework for using ePortfolios to build a web-based learning community that promotes special educator development, emphasizing deeper learning through reflection and the development of adaptive expertise. Collaborative work, ongoing communication, reflection prompts, and feedback are enhanced by online tools that support the learning-to-teach-in-community model for teacher development (Hammerness et al., 2005). Within the web-based learning community, special education teacher candidates practice the skills and dispositions for adaptive expertise through ongoing reflection based on real-world classroom cases and feedback from special education practitioners and faculty.

This ePortfolio model creates opportunities to: (1) engage teacher candidates in unique learning community-based experiences with faculty and proficient teachers in the P-12 education community, (2) improve pedagogy to enhance teacher candidates' preparation and development of adaptive expertise, and (3) contribute to the scholarship of teaching and technology. Specifically, prompting reflection in alignment with national standards and adaptive expertise concepts can be embedded sequentially throughout the teacher candidate's program, promote critical engagement with content and pedagogical knowledge, and provide an interactive community platform for faculty and advanced professionals' mentorship and shared vision about teacher development. For teacher candidates, reflection prompts from proficient special educators provide an opportunity to investigate real-world decision-making scenarios that often arise in P-12 special education classrooms; thus, they will be able to extend and apply knowledge and skills to classroom challenges for more adaptive and effective teaching. Findings from assessment and evaluation data from the

implementation of the ePortfolio-based learning community model have potential implications for promoting quality reflection, designing web-based learning communities, and structuring the ePortfolio as a platform for web-based learning communities.

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Appendix
Discussion of Teaching Experience Related to ePortfolio Component Protocol

- In general, in what ways do you see this [particular assignment] relating to your work as a special educator practitioner?
- Can you talk with us a little bit more by walking us through a specific example of this [assignment] in your practice?
- How did you develop your approach? Where did you learn about it?
- How did the variability across your students influence your plans? What options did you consider?
- How well prepared did you feel?
- Did you encounter anything unexpected?
- Did you change your plans? Why? In what ways?
- What made this effective? How did you know?
 - a. If team related: Did you get feedback from colleagues or family members?
 - b. What role did data play in understanding effectiveness?
- What are your best resources for solving problems in teaching?
 - a. Did you consult with colleagues or others? If yes, can you describe?

Based on what you've been describing about this particular assignment, in what ways can you prompt a teacher candidate to do this kind of thinking – to think more deeply, more broadly, more creatively? Teacher candidates develop their assignments around one finite example, how can we get them thinking about the complexity of real world practice?

Developing Codebooks as a New Tool to Analyze Students' ePortfolios

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This paper describes a three-step method for the construction of codebooks meant for analyzing ePortfolio content. The first step produces a prototype based on qualitative analysis of very different ePortfolios from the same course. During the second step, the initial version of the codebook is tested on a larger sample and subsequently revised. Finally, during the third phase the codebook is applied to analyze ePortfolios' contents and to chart trends of usage. We tested the codebook on the ePortfolios of 16 students attending a university blended course. This codebook and the method for building it enabled us to follow the ePortfolios' evolution over the course, to observe students' individual differences, to understand and guide students' self-assessment, and to customize teachers' and/or tutors' interventions. Our method produces a tailored codebook for the examination of ePortfolio contents.

The Need for the Analysis of ePortfolio Content

The relevance of portfolios has been discussed extensively in the field of education, and portfolios have been used in "the broader areas of education and training, including work-based learning and the school" (Attwell, 2007, p. 40). The reference to an organized collection of documents produced by students is a recurrent, if not universal, feature of definitions of *portfolio* in the literature (Batson, 2002; Falls, 2001). Nevertheless, different types of portfolios are designed to reach diverse educational goals, such as supporting professional skills and documenting, evaluating, or presenting personal works. With the advent of new technologies, the portfolio evolved into *ePortfolio*, finding new areas of enrichment and novel contexts of implementation. Although there are some conflicting findings about the comparison of web-based and electronic portfolios' usage (van Wesel & Prop, 2008), ePortfolios can transform portfolios from a thing to a process, to a content-management system for collecting, reflecting on, and sharing learning outcomes (Fitch, Reed, Peet, & Tolman, 2008). Much research conducted on the use of ePortfolios in education is aimed at analyzing how students perceive them (Bolliger, & Shepherd, 2010; Ritzhaupt, Singh, Seyferth, & Dedrick, 2008) or how they are used for assessment (Mason, Pegler, & Weller, 2004; Pelliccione & Dixon, 2008).

Some research has also analyzed the process of interpreting and scoring ePortfolios by teachers (Schutz & Moss, 2004). Such research has shown how teachers create a "reasonable story" from the contents of ePortfolios and grade them according to such a story. However, the literature lacks a systematic identification of the emergence of core themes in ePortfolios. Indeed, the research by Schutz and Moss (2004) provided an insightful account of teachers' interpretation of ePortfolios' contents, but does not investigate directly the actual contents of the ePortfolios, which is a

complementary methodology for understanding what the story contained in each ePortfolio is about. In particular, readers' strategies may not guarantee an awareness of the least noted themes within the ePortfolios.

The literature on assessment also provides good evidence for the value of rubrics (i.e., matrices containing assessment criteria and benchmarks of performance) in diverse settings (Hafner & Hafner, 2003; Lasater, 2007; Roblyer & Wiencke, 2003; Saddler & Andrade, 2004). Rubrics may also be used for evaluating students (and educational activities) through a rubric-based ePortfolio assessment, especially considering self-regulation, critical skills, and active participation. However, the use of rubrics is not exempt from issues related to the validity of assessment (Moskal & Leydens, 2000). Mabry (1999) claimed that rubrics may raise validity problems similar to those raised by test-based assessment. The author argued convincingly that rubric-based assessment generally prescribes what counts as satisfactory performance before a performance is realized, even when it is not easy to predict what the students would execute (Mabry, 1999). Therefore, any performance that differs from the predicted standard is discouraged (Mabry, 1999). One possible (partial) solution to this problem is to monitor periodically the range of contents/performances collected in the ePortfolios and to tune the rubric criteria and benchmarks to the observed context. In this article, we describe the construction of a codebook as a useful tool for monitoring the core themes of the ePortfolios created by students. Particular attention is paid to the students' metacognitive process; this is a crucial aspect in the implementation of an ePortfolio as a tool for reflection about the learning process. Indeed, using ePortfolios for reflection is a very effective strategy in education (Kabicher, Kriglstein, Figl, & Motschnig-Pitrik, 2008). Even though the resulting final codebook that we present in this paper is tailored to

the specific course we observed, the method we propose to construct can be considered as a model for developing a customized codebook in any context where portfolios is considered as an important part of the learning experience.

The ePortfolio and its Contents

Through the analysis of ePortfolios, it is possible to track the progress and evolution of the learning processes (Barrett, 2001). We consider ePortfolios to be organized collections of artifacts, produced either individually or collectively using various formats (e.g., video, graphics, or text). In students' hands, ePortfolios can be reflexive tools for self-assessment, self-regulation, critical skills, and active participation (Jenson, 2011). We agree that ePortfolios are valuable tools for making students "active in formative assessment rather than passive receivers of graded results" (Pelliccione & Dixon, 2008, p. 752). In this sense, ePortfolios may encourage assessment for learning rather than assessment of learning (Stiggins, 2002).

The use of ePortfolios promotes so-called "folio thinking," a term coined by Helen Chen (2004) to indicate the mental habit of building connections among experiences, skills, and artifacts and of making these connections visible to readers, but especially to the students authoring the ePortfolios. Students occupy a central position because by creating ePortfolios they are actually encouraged to take responsibility for their own learning (Paulson, Paulson, & Meyer, 1991). The personal and informal communication that may be embedded in the ePortfolios can support motivation and can act as further leverage for learning. At the same time, the teacher can monitor, direct, and guide the learning process, since the ePortfolio also gives information about the areas to be improved.

ePortfolios can be structured around three distinct, yet interrelated themes: the first one is dedicated to reflection, the second one to documentation, and the third one to collaboration/mentoring (Zubizarreta, 2004). Accordingly, the contents of ePortfolios may regard: (1) the philosophy of learning or narrative reflection upon the processes in progress, (2) the products of learning (e.g., course descriptions, curriculum, tutoring), (3) the evidence of learning (e.g., research articles, critical essays), (4) the assessment of learning (e.g., feedback, scores from tests), (5) the importance of learning (e.g., practical applications, personal growth, emotional value of learning), (6) learning objectives (e.g., improvement plans, goals), and (7) appendices (e.g., selected documentation of didactic materials). However, research seems to focus on the use of ePortfolios for assessment without dealing directly with their contents, so that few empirical

studies investigate systematically the contents of ePortfolios. For example, Chang, Tseng, Chou, and Chen (2011) examined the reliability and validity of peer assessment for web-based portfolios, discussing the limits of peer assessment and the need to develop peer assessment skills. Mason et al. (2004) discussed the use of ePortfolios for assessment tools application. Considering that ePortfolios and learning objects involve the same fundamental technology and rely on the same capabilities for selection and re-use, ePortfolios are here proposed as the final assessment of a course designed around learning objects. Buzzetto-More (2010) tested the efficacy of ePortfolios and investigated students' perceptions of ePortfolios as a tool for enhancing the understanding of learning goals and reflection on their own knowledge and skills.

Although these studies are interesting, none of them deals directly with the contents of ePortfolios. The few studies extant that analyze the content of portfolios are designed to gain "insight into students' rhetorical approaches to portfolio composition; their decisions related to selection of content, and the organization and design of their portfolio" (D'Angelo, 2009, p. 1) or to obtain feedback about how students use ePortfolios (Kabicher et al., 2008). The specificity of our contribution is to identify and classify the issues emerging from students' ePortfolios while they are under development, considering both the temporal dimension and students' individual differences. We describe, therefore, the process of building a codebook that may be used to identify themes emerging from content analysis of ePortfolios. Such analysis will provide an overview of students' reflections contained in their ePortfolios.

A Blended University Course: The Context of this Study

The course analyzed in this paper was delivered in a blended learning mode (BL), in which computer-mediated learning and teaching in presence were integrated and combined (Bersin, 2004). In addition, the course used different teaching methods, diverse modes of study (e.g., individual, dyads, small group, and plenary activities), and a variety of tasks and artifacts (e.g., see Ligorio & Cucchiara, 2011; Ligorio, Loperfido, Sansone, & Spadaro, 2010).

The course was divided into five modules covering the following contents: online educational models, learning objects, online identity, new trends, and a final module dedicated to the collaborative construction of a grid of indicators meant to analyze online courses. Each of the modules, lasting a week, was introduced by the teacher's lecture, followed by a discussion via web-forum that was coordinated by an e-tutor. The lectures were usually scheduled as follows: (a) discussion of

the topic covered during the previous module (during the first meeting the teacher presented an overview of the organization of the course), (b) introduction of a new topic for the next module, (c) discussion of the progress of on-line activities (during the first meeting the teacher introduced the functions of the e-learning platform), and (d) assignments for the following module.

The platform used, Synergeia (<http://bscl.fit.fraunhofer.de>), was designed to support online collaborative learning (e.g., Ligorio & Veermans, 2005). This platform allows both synchronous (chat) and asynchronous (web forum) communication and contains tools for the construction of concept maps (i.e., Map Tool), a shared calendar, and spaces for uploading and sharing files. In Synergeia, each module was represented by a folder containing the readings selected by the teacher (e.g., digital documents, slides, links to websites), and several areas for discussion via web-forums where students could discuss the materials and topics in the modules.

Considering the relevance of working in groups for obtaining collaborative learning (Dillenbourg, 1999), the participants were divided into two groups that were formed randomly, each consisting of eight students. The groups were asked first to discuss online the educational materials and then to build collaboratively a concept map that summarized the contents of the module and a document describing their collaborative learning process. Each student was required to be active in the group and to take responsibility for achieving common goals, interpreting a role designed in reference to the tasks (e.g., leader responsible for the cognitive map, tutor of the group discussion) that had been assigned by the teacher. At the third module, in order to promote socialization among all participants, the groups were re-combined, and two new groups, again consisting of eight students each, were formed.

The Structure of the ePortfolio

Throughout the course, students were required to create and manage a personal ePortfolio that adhered to the following structure and contained:

- A folder named The Best of Me in which, at the end of each module, students uploaded a selection of the artifacts produced throughout the module, either individually or collaboratively. Such an artifact might be a post in a discussion that the student considered to be particularly relevant, a written review of the material read, a contribution to a map, or other significant elements that represented the best of their participation in the module. This

was a limited selection of not more than four artifacts per module. In addition, each artifact had to be accompanied by a comment that explained why it had been selected. The Best of Me folder was the core of our ePortfolios.

- A folder titled Personal Space, through which students could present themselves to their teachers, tutors, and peers through links, images, video, and text (e.g., self-descriptions, expectations, free thoughts, links to personal blogs or Facebook profiles). Students could expand and enrich this space as they liked throughout the entire course.
- A self-evaluation form, to be updated at the end of each module, with information about the role the student served during the module (e.g., responsible for the map, tutor of the group discussion) and his or her self-assessment regarding the individual and collaborative tasks completed (see Appendix A);
- A folder called Balance of the Modules containing one web-forum for each module covered during the course. These web-forums contain discussion statements, impressions, and ideas about the various activities and about the ePortfolio itself. The Balance of the First Module asked about how students approached the course. In the second module, students were asked to reflect on their self-assessment—in particular, on the relationship between participation/learning, about the role they played during the course, and about collaboration within the group during the first module. In the third module, the task was to reflect on specific activities the students had performed, such as discussions around the readings, the construction of the cognitive map, and the description of the process of collaboration. In the fourth module, the assignment asked students to reflect on the role-play and on the re-composition of groups. The balance of the fifth module was included in the forum for the final discussion, described below.
- Finally, a forum called Big Balance featured a global and final reflection on the course. Here the task was to discuss freely the Course of Psychology of E-Learning, and each student was asked to describe her or his final impressions.

To build the codebook, we analyzed the notes posted in all of these sections. Each student entered a different number of notes; some students, furthermore, carefully developed all of the sections, while others left some sections empty.

Objectives

The objective of this paper is to describe the development of a procedure for building a tailored codebook to analyze ePortfolios built in an e-learning or blended course. In general, codebooks can be used to enhance teachers' awareness of the issues reflected on by students and to obtain feedback on students' experiences and perceptions. Codebooks can also constitute a working tool for the development/improvement of a rubric for the ePortfolios' assessment, while overcoming the validity issues that may be associated with the rubric's usage, as discussed by Mabry (1999). Through the codebook, it is possible to obtain an overview of the range of themes that students actually select; this allows the codebook to become a tool able to guide the construction of the rubric. Finally, codebooks are good tools for research on ePortfolios, facilitating analysis of the contents that students include in them. In this paper, we refer mainly to this latter option by describing the creation, development, and use of codebooks as tools in the researcher's hands. We consider the method used to create a codebook as the main outcome of this study. The codebook should be regarded as a tool for inquiry about ePortfolios' content and, more specifically, for:

- analyzing the distribution of themes and categories across the different sections of ePortfolios,
- observing the evolution of the themes over time in order to have a diachronic vision of the ePortfolios,
- facilitating the review and analysis of ePortfolios in following iterations of the same course, and
- triggering the construction of codebooks in similar e-learning and/or blended courses.

The content of ePortfolios built during the university course described above is the object of our analysis.

Method

The method we propose is based on an inductive approach inspired by grounded theory and content analysis. We consider such approaches useful for an exploratory analysis of the type of data we collected. Glaser and Strauss (1967) proposed grounded theory as a set of procedures for the inductive development of theoretical propositions of an increasing level of abstraction, starting from the analysis of data. In this framework, theory is developed from the data through an iterative process of defining, modifying, and redefining the categories of analysis of the empirical data (Glaser & Strauss, 1967). The term *grounded*

emphasizes the idea of a theory generated through an interactive process, in which the theory is developed from data (Glaser & Strauss, 1967). Data analysis is carried out through a coding process that seeks to find the conceptual category that best expresses the meaning of a piece of data (Glaser & Strauss, 1967). Systematically comparing the different conceptual categories, one is able to abstract a more general meaning. This process should not be done linearly, but circularly (Glaser & Strauss, 1967). The coding of the data leads to the formulation of new hypotheses that may differ from the initial ones; the circularity is considered to be a strong point of the grounded theory approach, as it forces the researcher into a continuous process of interpretation and reflection on every step (Glaser & Strauss, 1967).

Content analysis is a methodology for the objective, systematic, and quantitative analysis of the content of communication (Ghiglione & Blanchet, 1991; Hsieh & Shannon, 2005). This research method is based on the subjective interpretation of the content of text data through a systematic classification process of coding and identifying themes or patterns (Hsieh & Shannon, 2005). A widely adopted operating procedure for content analysis breaks down communicative units into simple elements (called units of classification) that are then categorized (Hsieh & Shannon, 2005). The choice of categories is crucial and difficult, since meanings are directly dependent on the context, while coding is de-contextualizing and is implemented through a recording of data to obtain a codebook (Hsieh & Shannon, 2005). A codebook usually consists of categories of analysis that can be established *a priori* based on theoretical references, or *a posteriori* when extrapolated from the data using a grounded theory approach, as in our case. Specifically, we went through the process of coding, which means that we searched for a word or a short sentence to which it was possible to assign a summative, salient, essence-capturing, and/or evocative attribute (Saldana, 2009). By systematically comparing the different conceptual codes that had been assigned, it was possible to abstract from the data more general categories or themes. This process was done through a circular route.

Participants

In this section, we describe briefly the students participating in our study. The participants were 16 students (12 female, four male) attending a specialist course for future Work and Organizational Psychologists. The mean student age was 25. The course was held at the University of Bari, and it was labeled Psychology of E-Learning. The students all came from the region where the city of Bari is located, in the South of Italy. This is a public university; the

students therefore came mostly from the middle social-class. The faculty of Psychology at the University of Bari has a good reputation, and the program generally attracts motivated students who are willing to invest time and energy in their education. In this course, the students already knew each other because they had attended the first segment of the university path (three years) that was mandated before they could enter the specialized level. To enroll in the class, they had to have passed an admissions test. The blended mode for delivering the course was optional, offered as an alternative to the traditional mode. Those students that, for any reason, did not want to join the course in the blended mode could attend lectures and have a final colloquium with the teachers without doing any activity online. In fact, this is the usual way of passing courses in Italy.

Description of the Process: Analyzing ePortfolios

The process of creating the codebook was divided into three steps: (a) an exploratory phase for obtaining a rough version of the codebook, (b) a phase during which the initial version of the codebook was tested on a larger sample of students from the same course and modified according to the results, and (c) the final phase in which the codebook was used to analyze the ePortfolios' contents and to chart trends in their usage.

First step: Building the prototype of the codebook. The first step was designing an outline of the desired codebook by qualitatively analyzing a small sample of ePortfolios. To accomplish this first phase, three different actions were performed. First of all, we selected and analyzed the two most diverse ePortfolios of the course. These ePortfolios were selected according to the following criteria:

- gender difference (male and female);
- different levels of computer skills and competence declared by the students at the beginning of the course in the self-assessment questionnaire, a five-point Likert scale ranging from 1 (*low competence*, defined as infrequent use of the computer in everyday life) to 5 (*high competence*, defined as very frequent use of the computer in everyday life); and,
- different levels of participation in the course, calculated from the number of notes posted in each ePortfolio.

Two students were selected as cases for testing our method. To protect their anonymity, we will call them Max and Lara. They posted a total of 20 notes: Max authored eight sets of notes, and Lara authored 12.

The second action consisted of segmenting the notes into units for analysis. Each unit corresponded to

phrases having a recognizable meaning that was different from the preceding and from following phrases.

The third action was meant to define themes and categories. To accomplish this aim, we used a qualitative approach inspired by grounded theory and content analysis. This method allowed us to identify five main themes that emerged from the first two selected ePortfolios: Technology, Participation, Competences, Assessment, and Self. Each theme was composed of at least one, and up to three, categories. For example, the theme Self was composed of two categories: *individual characteristics*, or references made to personal characteristics and their implications for the activities performed during the course; and *emotional aspects*, referring to moods and expectations. The categories described how the theme was actually perceived by the students. Appendix B describes in detail the themes and categories that emerged from this first step.

A small percentage of sentences (5%) were excluded from the coding process because they were considered to be irrelevant or ambiguous. Therefore, 36 total segments were used as the corpus of data for this first phase of the codebook construction. Two researchers, after sharing the objectives of the research, assigned codes to the corpus of data and independently developed an initial set of themes. Afterwards, they discussed the codes and themes to obtain a shared coding scheme. The controversial cases (about 18%) were also coded by a third researcher and discussed until 100% agreement was reached.

Second step: Testing and modifying the first version. After identifying themes and categories, we tested the version of the codebook obtained at the end of the first phase on the remaining 14 ePortfolios produced during the course. The corpus of data used in this phase consisted of 117 notes, divided into 353 segments. In this phase, the analysis was performed by the same two judges who initially had worked independently. In this first step they reached an agreement of 75.71%. After discussing the controversial cases with a third researcher, an agreement of 98.3% was obtained. The few notes on which agreement was not reached were erased from the data set, since the researchers agreed that they were not relevant for this analysis. During this step, a few categories were revised as follows:

- The category Modality of Work was redefined to include considerations about the success or the problematic aspects of the entire course.
- The category Emotional Aspects was extended to incorporate references to expectations for the future.
- A new category called Phatic was introduced, which we then included in the participation

theme. This category refers to expressions intended to open a dialogue with other students or the teacher by asking, for instance, for feedback or inviting others to express opinions (e.g., “What do you think?”).

- The theme of Sociality was extended to include aspects of pro-sociality, which is defined as an attempt to meet the needs of others (e.g., “this allows the others to better understand our point of view”).

Appendix C shows the codebook in its final version, with the five themes and all the categories, accompanied by examples.

Third step: Application of the codebook. Finally, we used this version of the codebook to investigate the structure of the ePortfolio and its contents, the distribution of the themes across the different sections, and the evolution of the contents over time, in order to achieve a diachronic understanding of the students’ self-evaluation. In the following paragraphs, we recount briefly our findings.

Results

The most frequent theme we found in our data was Assessment, which comprised 36% of the total frequency, confirming that ePortfolios play a role connected to self-evaluation and self-assessment. Participation (29%) was the second most frequent theme, followed by Self (16%), Competence (11%), and finally Technologies (8%). We expected this latter theme to be more dominant in students’ reflections, because of both the contents of the course and the required online activities, but surprisingly it was discussed only briefly at the beginning of the course. Probably students quickly became used to technology, so that it became an invisible part of the course. Other research proves that there is no significant difference between online and offline portfolios (Lunt, 2009). It is the activity of maintaining a portfolio, regardless of its format, and the formative feedback received that permit students to improve their performance in terms of self-assessment and reflection.

According to Figure 1, Self-Assessment appeared with the greatest frequency (18%). This result is not surprising, considering that this category contains student reflections, which probably were perceived to be the core aspect of the ePortfolio.

Figure 1 also shows that the second most frequent category was Individual Activities (13%), which remains an important aspect of the course, whereas “Group activities” had a relatively low frequency (4%). However, we noticed that often the contents categorized as Individual Activities referred to activities that were meant to support the groups. For instance, students

often talked about role-taking, which was technically an individual activity but in fact was intended to support group activities, discussions, and the collaborative construction of products (Brown & Campione, 1990; Hare, 1994; Slavin, 1999). In general, students considered the role-taking to be very relevant, acting as a hinge between the individuals and the group. In the light of this result, during the planning of the following edition of the course, the teacher valued role-playing as a scaffold to improve students’ participation.

The category Modality of Work had a frequency of 12%. The Modality of Work category referred in particular to the introduction of the blended mode of course delivery, which implied for these students a set of novelties, such as different time management, the alternation between online and offline contexts, and the need to develop new learning strategies. We found this result very interesting for teachers, who might want to invite students to discuss explicitly their learning strategies.

The Emotional Aspects (9%) appeared to work as a glue linking personal expectations, pressure for performance, and personal interests. The remaining categories showed a fairly low rate of less than 7%.

The Themes in Different Sections

The various sections of the ePortfolio (e.g., personal space, web forum, Big Balance, self-evaluation form) differed from one another in terms of requests and aims; therefore, we expected to find among them different distributions of core themes. Indeed, some themes proved to be central in some sections and rare in others (see Figure 2).

This analysis allowed us to see what functions each section covered within the ePortfolios. Our results show that:

- In the web-forum, notes about Participation (31%) and Assessment (27%) prevailed.
- In the Big Balance used at the end of the course, the most frequent themes were the same as those in the web-forum, but in an inverse ratio: the most prevalent theme was Assessment (37%), followed by Participation (26%). The theme Competence reached here its highest percentage in comparison to other sections (19%), probably as a general recognition of the competencies acquired thorough the entire course.
- The self-evaluation form, completed at the end of each module, contained a large percentage of Assessment (52%) and contained rather numerous references to Participation (33%). Both social and individual learning were recognized by the students as important

Figure 1
Percentage of Distribution of the Categories

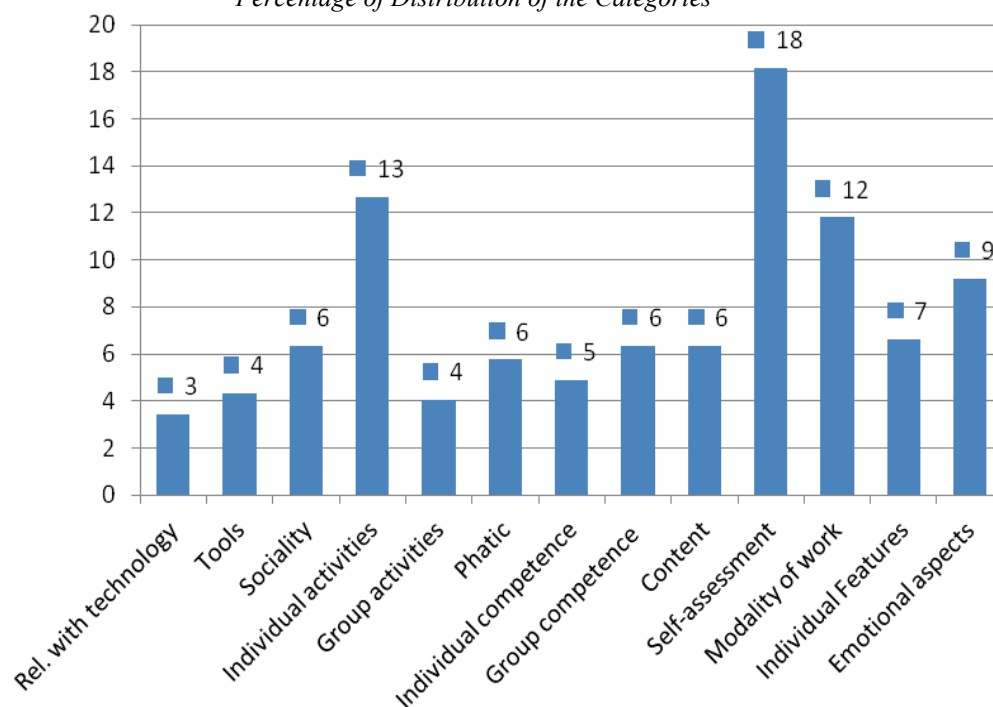
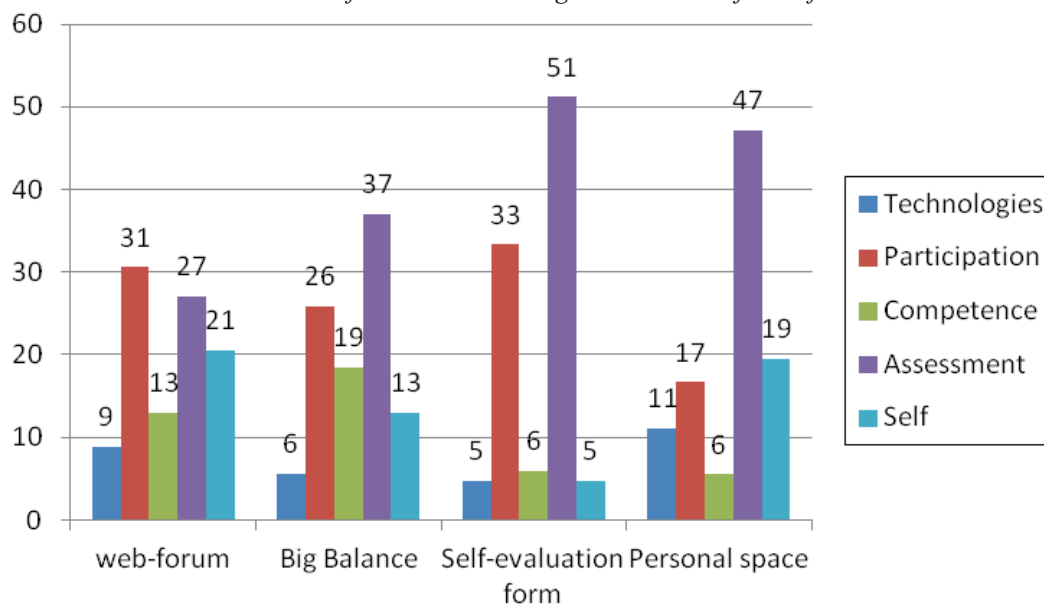


Figure 2
Distribution of the Themes Through the Sections of ePortfolios



aspects of this learning experience. Participation and assessment were also perceived by students as connected aspects of the self-evaluation. On the contrary, the dimension Self reached only 5% of the frequency, indicating that it was not so obvious for these students to express personal issues or emotional experiences.

- The personal space was focused on Assessment (47%), while Participation seemed to be less relevant (17%); here the focus was on self-reflection. This result was unexpected, given that the personal space was designed to focus more on self-presentation and sharing of emotions.

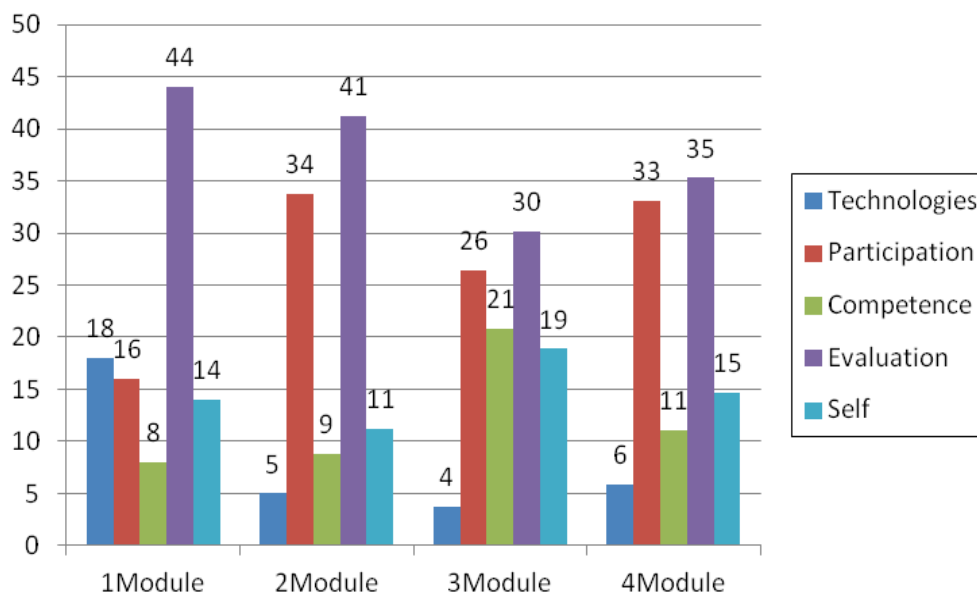
Evolution of Themes Through the Course

One of the characteristics of an ePortfolio is its temporal evolution. In this course, the flow of time was marked by the portfolio's modular structure. In order to investigate the variation over time, the forums called Statement and Evaluation and the self-evaluation forms, both active at the end of each module, were compared. The Big Balance, which was aggregated to the fourth module, coincidentally was completed at the course's conclusion. The personal space was not considered, as it was a personal activity and was not structured in modules. Figure 3 shows the distribution of the themes in relation to time, comparing the sections completed at the end of each module.

Figure 3 shows that the theme Technology had a higher frequency at the beginning of the course (18%) but became less relevant in subsequent modules. Our interpretation of this trend is that students reflected on the use of technology at the beginning of the process of instrumental genesis, which required students to appropriate technological tools and integrate them into their practices (Ritella & Hakkarainen, 2012); however, afterwards technology generally became an invisible background for other activities (Engeström, 1987). It is interesting to note that in modules 1 and 2, Evaluation exceeded 40% of frequency but dropped to 30%-35% in subsequent modules. In contrast, Participation was low in the first module (16%), but reached 34% in the second module and remained between 26% and 33% in subsequent modules, probably because, after the initial modules, students introduced the narrative of their learning and their participation as part of their reflection. This aspect seems in line with the folio thinking idea (Chen, 2004), suggesting that the ePortfolio triggered the construction of a narrative in which experiences (in terms of participation) and skills (of which students became aware through the evaluation) were linked.

The theme of Competence reached its peak in the third module (21%), as did the theme of the Self (19%). It is worthwhile to recall that for the third module, groups were remixed; this probably gave students the opportunity to strengthen in a new group the competencies acquired in the previous group, and, consequently, their attention to their competencies was reinforced.

Figure 3
Frequencies of Theme in Each Module



The analysis of the temporal evolution of ePortfolios allows the researcher, as well as the teacher and/or tutor, to understand the trajectory along which an ePortfolio is evolving. This information can be used to regulate the activity of maintaining the ePortfolio, as well as for understanding where and when there is a need for intervention or adjustments.

Individual Style

The codebook can be used to sort out the themes used by each student and, consequently, to reflect about individual learning paths. For example, considering the two initial ePortfolios examined, the majority of notes from Max (who was accustomed to using technology) fell into the emotional aspects category (42%), with references to moods and expectations. Lara (unfamiliar with the use of technology) had a greater focus on content (24%), with many references to the educational materials she read during the course. Future research might use the codebook to investigate more thoroughly the personal style that emerges from students' ePortfolios.

Discussion

The three-step process of building a codebook that we developed has been applied to analyzing the core themes referred to by students when they completed the various sections of an ePortfolio in a blended university

course. In particular, we analyzed differences across the ePortfolios' sections, both throughout the course and in individual students' ePortfolios. Such analysis permits monitoring the sections of the ePortfolios at different moments of the course. The process of building a codebook is summarized in Table 1, along with some suggestions about how it can be used in other courses.

As indicated in Table 1, the application of the codebook to other contexts must be tailored to fit different curricula and assessment goals. Furthermore, it is useful to consider that the codebook, as we used it, did not contain all possible aspects analyzable in ePortfolios. In our case, some aspects were neglected because they were not relevant within the structure of the course (e.g., level of team interaction, relevance to learning objectives, media effectiveness). In particular, the reflection in our ePortfolios remained mostly individual, whereas the assessment of group and collective activity was implemented in other parts of the course, in connection with the group activities.

In general, we can conclude that although we recognize that the literature does not clearly point to the need for a codebook, we believe this tool enables a full examination of ePortfolio contents, since any aspect considered when planning and developing the ePortfolios can be taken into account. Such a tool can be considered as a new lens for understanding what content students use when creating and maintaining ePortfolios and how this content changes over time and across the ePortfolios' sections.

Table 1
The Process of Building a Personalized Codebook: Three Steps

Steps	Aims	Application	How it can be applied in other courses
1: Building a prototype	Creating a first draft of the codebook	Selecting and analyzing two very different ePortfolios	With a larger sample, more than two different ePortfolios could be selected
2: Testing the initial version of the codebook on a larger sample and modifying it according to the results	Verifying the solidity of the categories and finalizing the codebook	Analyzing all the students' ePortfolios, changing labels and the content of categories and adding new categories when needed	Adapting the categories to the aims of the course and to the activities composing the ePortfolios (e.g., task, skills, level of group versus individual performances, creativity).
3: Using the codebook to analyze ePortfolios' contents	Using the codebook to assess the content of the various sections of the ePortfolios and its evolution	Analyzing the distribution of the frequencies at different times and into the various spaces of ePortfolios, analyzing individual codebooks	Statistical analysis of all the ePortfolios obtained, comparing different sections, different times, individual performances, group performances, media effectiveness, and etc.

Although the codebook has many advantages, applying it in a course is a rather difficult and long process; involvement by at least two experts is advisable. By experts we mean researchers, tutors, or even teachers who have a clear understanding of the structure of the ePortfolio and its general function within the course. Furthermore, knowledge about content analysis and grounded theory is required. Time is needed to establish the themes and categories, to cover the three steps we have outlined, and to discuss and negotiate the results.

Nevertheless, we are convinced that this tool can support a good understanding of how students perceive and use the ePortfolios. Additional, more extensive applications of the codebook (e.g., looking at personal profiles) may guide students' self-assessment as part of the learning process and customize teachers' and tutors' intervention in an appropriate manner. At the same time, considering the set of ePortfolios produced in a course, a story told from different personal observation points about learning experiences in the course could emerge. Therefore, the codebook could also be used to define specific profiles of participation and to observe differences and similarities among members of the same group. Further instantiations of the codebook in other courses and contexts could improve its power and make it more solid and reliable.

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Appendix A
The Self-Evaluation Form

Student First and Last Name: _____

Instructions: This form should be updated at the end of each module. Please fill in the column corresponding to the module just completed by assessing yourself about the statement reported on the left along a scale from 0 to 4 (0 = *not at all*, 1 = *slightly*, 2 = *somewhat*, 3 = *moderately* 4 = *extremely*).

	MODULE 1: Learning and Technology	MODLE 2: Learning Object, Open source	MODULE 3: Digital Identity	MODULE 4: New trends
<i>Role-play</i> (Self-evaluation of the role played. Do not answer if you did not play any role.)				
How much do you think the role supported your participation in the activities?				
How much do you think the role helped you in learning the contents of the module?				
How much do you think the role helped you acquire learning skills?				
<i>Writing Reviews</i>				
How much do you think writing a review on the reading material helped the knowledge building of your group?				
How much do you think you learned from writing the review?				
How much do you think writing the review helped you acquire learning skills?				
<i>Web-forum discussion</i>				
How much do you think you participated in the discussion?				
How much do you think the discussion helped you in learning the content of the module?				
How much do you think the participation in the discussion helped you acquire learning skills?				
<i>Classroom activities</i>				
How much do you think classroom activities helped you in learning the content of the module?				
How much do you think classroom activities helped you acquire learning skills?				
<i>Building cognitive maps</i>				
How much do you think you contributed in building the cognitive map?				
How much do you think participating in the construction of the map helped you acquire learning skills?				

<i>Group activities</i>				
How much did you feel part of your group?				
How much did you feel part of the larger group?				
<i>Self-evaluation</i>				
How well do you think you are capable of assessing yourself?				
List the contribution you consider the most important for the module (a note of a discussion, a product, etc.).				

Appendix B
First Themes and Categories

Theme	Description	Categories
1. <i>Technology</i>	Reference to difficulties regarding the online environment and reflection on their technological skills	Relationship with technology Tools
2. <i>Participation</i>	How students reflect on the modality of participation and interaction, and how they perceive group dynamics	Sociality Individual activities Group activities
3. <i>Competence</i>	How students reflect on their skills	Individual competence Group competence
4. <i>Assessment</i>	How students evaluate themselves and the activities of the course (metacognition)	Content Self-assessment Modality of work
5. <i>Self</i>	Personal and emotional aspects emerging from participation	Individual features Emotional aspects

Appendix C
The Final Codebook

Themes	Categories	Description	Examples
1. Technologies	1.a. Relationship with technology	Reference to the relationship with the technology	"I never had any talent for technology."
	1.b. Tools	Reference to a specific tool	"I created a wiki note for discussion."
2. Participation	2.a. Sociality	Reference to the social aspects of participation such as sharing, mutual exchange, pro-social attitudes	"I felt encouraged to participate."
	2.b. Individual activities	References to individual activities.	"To me, it was very interesting to play the role of the synthesizer."
	2.c. Group activities	References to the composition, organization and group dynamics	"The identity of the group was strong."
	2.d. Phatic	Supporting discussion and asking for feedback	"Well, what about it?"
3. Competence	3.a. Individual competence	References to personal skills	"This role develops the ability to extract the key elements of a module."
	3.b. Group competence	References to skills gained while working in a group or used to carry out group work	"We developed analytic skills."
4. Assessment	4.a. Content	References to the contents of the educational materials	"It was very interesting to understand what really is the aim of e-learning."
	4.b. Self-assessment	Critical reflections on their own work	"Now that my ePortfolio is completed, I realize the progress I've made."
	4.c. Modality of work	References to the method used to perform an activity, even concerning the problematic aspects	"I have the impression that this discussion has been too short for the type of argument."
5. Self	5.a. Individual characteristics	References to personal characteristics and to the implications for the activities	"I love to be able to draw conclusions because, in general, in my life I like to stop and observe myself and what I did."
	5.b. Emotional aspects	References to moods (anxiety, fatigue, difficulty) and expectations	"This role has generated anxiety in me; it was a hard work."

Evaluating Processes and Platforms for Potential ePortfolio Use: The Role of the Middle Agent

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With the changing face of higher education comes a demand to include new technological tools. Universities need to build their capacity to respond to new technology-related challenges. The introduction of ePortfolios is a significant strategy in this response. A number of organizational change management models are used to analyze the incorporation of new technologies, such as ePortfolios, into university culture, including Kotter's Model of Change, the LASO Model, and the middle-out approach. This article offers a case study of using a middle-out approach to technology adoption in the context of change management. It argues that such an approach provides links between university faculty values and upper institutional management decision-making that results in a positive and collegial transition to introducing ePortfolios. This study used a staged methodological process, based on faculty and professional staff feedback, literature in the field, benchmarking with similar universities, and external reports of best practices to develop functional criteria customized to the institution's context, an analysis of available and appropriate ePortfolio software, and finally, recommendations to the institution's decision-makers. The distinction is made throughout the article between faculty, who are staff members with teaching and research responsibilities, and professional staff, who provide a range of support to faculty, including teaching support and technical services. Where a particular sub-group is identified, they are named in terms of their primary function. Findings reflect the importance of the individual context and available resources of the institution when assessing new technology implementation and the value of the middle-agent role in facilitating a seamless shift towards change inclusive of both "top" and "bottom" stakeholder groups.

The face of higher education is rapidly changing. External pressures to provide authentic learning experiences that support preparation for the real world of employment (Reese & Levy, 2009) require flexible teaching approaches. As professional accreditation organizations increase their demand for evidence of graduate competencies, documenting and recording learning through hard copy portfolios can become unwieldy for students to use and teachers to assess. Furthermore, students in a client-focused higher education environment expect improved services, including technology-enhanced learning (Universities and Colleges Information Systems Association, 2012) and teaching (Bhati, Rankin, & Thomas, 2009; Duncan-Howell, 2012). Students also face competing priorities between study demands and financial pressures, resulting in the need for flexible learning options. One response to these complex challenges (Scott, Coates, & Anderson, 2008) is an increased focus on e-learning and blended learning delivery options (Lai, 2011), even for universities that previously engaged students in predominantly face-to-face learning.

The introduction of ePortfolios is a significant strategy in an institutional approach to technology-enhanced learning, blended learning or e-learning. An ePortfolio is an online repository in which students store and share a variety of informal and formal learning experiences, collected over time, using written, visual, and auditory artifacts. The "processes of planning, synthesizing, sharing, discussing, reflecting, giving, receiving, and responding to feedback" (JISC &

Higher Education Academy, 2008, p. 6) are as important to the learning processes as the finished products. ePortfolios are flexible personal learning spaces owned by the individual students rather than by the institution (Hughes, 2008). In recent years, development of the use of ePortfolios in the higher education sector has advanced rapidly, with ePortfolios becoming a pedagogical and technological tool used to serve numerous purposes (Hallam et al., 2008). Examples of the institutional use of ePortfolios includes e-administration of a diverse student population, assessment of student learning (Stefani, Mason, & Pegler, 2007), and the demonstration of graduate attributes attained and future student career preparation.

Introducing a new technology, such as an ePortfolio, is disruptive to institutional processes at the macro level and has implications for learning and teaching practices at the micro level (Burnett, 2001). Without alignment to institutional and user needs, any new technological solution is likely to be problematic, making it more difficult for pedagogical innovation to take place. Without careful preparation for the new learning approach, teachers and students can revert back to tried and tested pedagogies, even if these are not as effective for learning (Westberry, McNaughton, Gaeta, & Billot, 2012) or they institute other solutions outside of the organizational infrastructure. For example, early adopters of ePortfolios can outpace both the existing organizational infrastructure and higher management buy-in (Jasinsky, 2007), potentially incorporating ePortfolios into their own courses/programs without

institutional support. Such bottom-up innovation, while providing a local and immediate solution, may not be long-lasting and can result in wider adoption problems (Uys, 2007), especially if any challenges are encountered. In another common approach, “ePortfolio champions” initiate trials of ePortfolio use within selected courses/programs that are supported by relevant faculty. Similarly, problems can occur at the end of the trial if institutional decision-makers do not agree to implement ePortfolios. In this situation, programs with an ePortfolio embedded into their curriculum from the trial have no guarantee of its longevity.

Adoption of ePortfolios at a programmatic or institutional level requires university decision-makers’ support and approval, based on consideration of the innovation and all its implications for the institution (Uys, 2007). This article offers a case study of an institutional assessment approach to the decision-making processes and potential ePortfolio platforms in an Australian regional university. The authors argue that the role of a middle agent can provide links between university faculty opinions and institutional decision-making, resulting in a positive and collegial process of introducing new technology. Based on the individual institutional context, faculty and professional staff opinions, and a review of literature and other universities’ experience, this middle team developed a systematic, evidence-based approach to criteria development, investigated suitable software options, and promoted to university decision-makers an evidence-based approach to ePortfolio adoption.

Literature Review

Approaches to Institutional Change

Each institution has its own culture, which is shaped by its context, mission, and priorities (Conole, White, & Oliver, 2007). Policy development needs to consider organizational contexts and different perspectives and should focus on human aspects rather than technological developments (Conole et al., 2007). Increasingly, technologically-based learning and teaching solutions are recognized to be part of higher education’s strategic business (JISC & Higher Education Academy, 2008). Responses therefore need to be strategic rather than based on technological affordances (Uys, 2007). Most institutions have a strategic document relating to e-learning: either a discrete e-learning strategy or principles embedded into wider learning and teaching strategies (JISC & Higher Education Academy, 2008). The alignment of e-learning or a blended learning strategy to support institutional goals and values enables explicit support from senior leadership and can result in widespread and impactful change (JISC & Higher Education Academy, 2008).

Aligned with its institutional top-level plans, the university that is the subject of this case study has a formal policy statement of its position on blended learning; a term defined as “the integration of educational technologies with face-to-face teaching to enhance the student learning experience” (University of the Sunshine Coast, 2012, para. 1). The stated aims of using this blended learning approach include increased flexibility, improved student preparation for face-to-face sessions, enhanced communication of assessment and feedback, increased learning networks, and embedded educational technologies in curriculum design (University of the Sunshine Coast, 2012). Thus far, these tools normally appear as part of the University’s Learning Management System (LMS), with Blackboard as the core platform (University of the Sunshine Coast, 2012).

Any introduction of ePortfolios into an institution will involve management of multifaceted change processes. While there are numerous change-management models available within the literature (Cummings, Phillips, Tilbrook, & Lowe, 2005), we discuss here three methods used recently by several universities to analyze the introduction of technology-initiated changes within their institutions. These models are: Kotter’s Model of Change, the LASO Model for Technological Transformation in Tertiary Education, and the middle-out approach. Kotter’s Model of Change explains change according to eight strategic steps, all of which must be present for change to be effective (Kotter, 2012). These steps are: establishing a sense of urgency, creating the guiding coalition, developing a change vision, communicating the vision for buy-in, empowering broad-based action, generating short-term wins, never letting up, and incorporating changes into the culture (Kotter, 2012). This model is a popular choice for analyzing institutional change in higher education. For example, Uys (2010) discussed one university’s use of this model to describe its institutional change-management processes during the implementation of an open source LMS, while Quinn et al. (2012) used it to evaluate the change-management principles employed in a collaborative university project. Carneiro (2010) used Kotter’s model to interpret innovation and change within higher education, highlighting the importance of the role played by organizational structure.

The Leadership, Academic, and Student Ownership and Readiness (LASO) Model for Technological Transformation in Tertiary Education argues that top-down and bottom-up processes need to be integrated in order to achieve technological transformation (Uys, 2007, 2010). This model is based on the assumption that top-down change has failed and that the concerns and needs of academic faculty and students need to be addressed through bottom up approaches that give ownership of the

technological change to those implementing the changes “on the ground” (Uys, 2007). Strategic inside-out activities that are used to bridge the gap between stakeholders reinforce both academic ownership (Uys, 2007) and the connection between “top” and “bottom.” Essentially, in a top-down approach senior university managers drive changes through policies and restructuring, while in a bottom-up approach, inspirational individual faculty members initiate change, challenging others to follow their lead (Cummings et al., 2005).

Introduction of new technologies requires organizational change produced as “the result of a team effort in which the most-appropriate and best-positioned people are involved in a process of action learning” (Scott, 2003, p. 73). This suggests that top-down and bottom-up approaches may not always be the most suitable. The analysis of change-management processes at one Australian university identified an alternative option in which middle managers, sometimes called middle agents or change intermediaries, filled the leadership gap and responded to early adopter demands in a collegial manner (Cummings et al., 2005). Middle agents have that title because they can exercise agency and have capacity and resources to introduce change. They are usually trusted by senior management and also have a good track record with practitioners working in the field. They have established information channels that allow them to liaise between top and bottom (Parag & Janda, 2010). Rouleau (2005) investigated the micro-practices of middle managers in terms of how they interpret and communicate change every day and found that they engaged in four specific practices uniquely possible for them because of their position in the organization. Middle managers’ practices, according to Rouleau (2005), translate the orientation of senior management to others, communicate the strategy differentially on the basis of socio-cultural codes, discipline the participant to receive the message positively by using particular words, gestures, and symbols, and justify the change by providing good reasons that are acceptable to the participant with whom they are communicating. Balogun (2003) described middle managers as a strategic asset in implementing change. This suggests that middle agents’ work is often subtle and focused on influencing others to take on institutionally-endorsed change. The middle-out approach is appropriate for managing change within an institution and therefore provides a suitable model for analysis of the processes and outcomes of this research.

Method and Findings

Context and Background

In late 2012, a small but rapidly growing regional university, which had reached sufficient student

enrollments to consider ePortfolio use, undertook a six-month feasibility study to determine whether university academic faculty and professional staff would consider using ePortfolios as a teaching and student learning tool. The university maintained a neutral position on the introduction of ePortfolios but was aware of sector trends and potential benefits of ePortfolio adoption. The feasibility study was funded through the ICT Governance Committee’s Strategic Asset Management Plan (SAMP). Throughout the study, the project team submitted regular reports to this group, both for funds acquittal and as an advocacy tool, reflecting the middle-out approach adopted for the project. Furthermore, research ethics approval was sought and granted. This facilitated the project team’s capacity to gather and share information about the project beyond the university.

The aims of this feasibility study were to:

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

Although some overlap occurred, these stages were undertaken in a linear fashion, building evidence from one stage to input into the decision-making of the next stage. The project team included the Director of the Learning and Teaching Center, the Project Manager, and an Information Technology (IT) Functional Analyst. No members of the project team held strong views about the adoption of an ePortfolio solution.

Faculty and Professional Staff Opinion Associated with ePortfolios

The study used a number of consultative methods to engage with academic programs and support services across the University. Potential participants were recruited through posters, word-of-mouth recommendations, networks and program presentations, and the invitation to join an e-mail interest group. An initial survey (see Appendix) was used to elicit views of ePortfolios for student use. Questions centered on perceptions of how ePortfolios might be used, enabling

factors for successful implementation, and the main barriers and problems associated with their use at the university. A limited response resulted in a second data-collection phase using discussion groups and interviews with faculty. Further responses came from the ePortfolio e-mail interest group. Project team participation in external cross-institutional forums and conferences supplemented the internal data.

The data collection phases resulted in only forty formal responses from the faculty and professional staff cohort of about 600. Although the small number of responses limits the capacity of the study to provide meaningful quantitative data, participants who responded valued the opportunity to engage with initial development of the ePortfolio implementation and requisite change processes. Having a survey instrument elicited opportunities for further conversations about ePortfolios with interested faculty. The largest number of responses came from faculty teaching in professional degree programs who were seeking tools to evidence student competencies and to meet accreditation standards, as was explained by one group participant: "Accreditation is very important. At the moment it is hardcopy and not very stringent but it will become more rigorous." A second area that gained a number of responses was employment enhancement: "As a prospective employer, I would look very favorably on this [ePortfolio] as a type of resume or application." While most of the findings were related to the technological affordances gained by using ePortfolios, participants also saw pedagogical benefits in using an ePortfolio for reflective practice, for assessment and feedback, and for evidencing graduate attributes.

Development of Set of Functional Requirements for ePortfolio Use

Choosing the right platform for ePortfolios is also challenging because the platform needs to align with the institution's purposes (Goldsmith, 2007). Therefore, any effort towards adopting an ePortfolio should establish a set of criteria that has this alignment (Goldsmith, 2007). Data collected from faculty and professional staff, together with a literature review, provided insight into the development of functional criteria suitable to the individual context of the university. Constructivism was used as the theoretical basis for the requirements, as the aim of having students use ePortfolios was to encourage "independent, self-reliant learners who have the confidence and skill to use a range of strategies to construct their own knowledge" (Stefani et al., 2007, p. 12). Based on this theoretical foundation, pedagogical and technological functions were identified as important by the project team.

Pedagogical priorities from participants who responded to the survey questions centered on

reflection, assessment and feedback, and the gathering and collation of evidence to support claims that learning had occurred. Interest from professional programs with external accreditation and registration requirements were the most frequent, as faculty saw the ePortfolio as a vehicle to evidence and assure graduate learning outcomes to authorities with a vested interest in student achievement. These criteria were important in identifying an appropriate ePortfolio platform because, without the capacity to respond to these needs, even a platform that met all of the identified technological priorities would not be acceptable.

The technological priorities that were identified include interoperability, security, ownership, and usability. For the purposes of this article, we focus on the technological functions with the view that the criteria would ultimately guide the evaluation of a number of ePortfolio platforms that might be suitable for the university's purposes. The project team met for a brainstorming session to discuss the data collected from participants, criteria found in scholarly literature, and themes drawn from the experience of other universities, as expressed in cross-institutional ePortfolio meetings. Table 1 outlines the set of functional requirements developed from this meeting that addressed the need for a suitable ePortfolio software platform by the university's technical support staff responsible for ePortfolio implementation.

Investigation of Available Technologies

Based on the data collected and the development of pedagogical and technological criteria chosen for this institution, the next step was to link these criteria with suitable ePortfolio software. Recognizing the extensive list of ePortfolio solutions available to evaluate, the project team chose to only consider options for which there was either experience available within the University or more generally, in the higher education sector in Australia. Table 2 details the list of applications identified based on key categories developed by Himpsl and Baumgartner (2009). The list of software solutions is based on data collected from three main sources. First, formal feedback from surveys and verbal data collected from the participants of the focus groups identified solutions already used in the University or those used by participants in a previous higher education setting. The group contained both faculty and professional staff. In Table 2 the software identified from this source are classified as "Ex." The second source of potential ePortfolio software came from an investigation of software solutions currently licensed and available under the university's ICT infrastructure. In Table 2, the software identified from this source are classified as "ICT." The final source was the group of leading software applications used in the

Table 1
Set of Functional Requirements Developed for Potential ePortfolio Platform

Requirement	Details
Links to LMS (i.e., Blackboard)	<ul style="list-style-type: none"> • Grade center • Single sign-on • Add/retrieve artifacts
Interoperability	<ul style="list-style-type: none"> • Between schools/university • Export/import (universal standards) • Use after leaving the university
Sharing	<ul style="list-style-type: none"> • External • Internal • Comments/ feedback • Groups • Control access
Functionality	<ul style="list-style-type: none"> • Grade artifact • Templates • Customisable/able to personalize • Professional • Easy to use • Facilitates graduate attributes
Accessibility	<ul style="list-style-type: none"> • Compatible with screen readers
Support	<ul style="list-style-type: none"> • Supportable • Self-support
Hosting	<ul style="list-style-type: none"> • Hosted solution • Self-hosted • Self-maintain /develop • Off the shelf
Corporate Look & IT Infrastructure	<ul style="list-style-type: none"> • Customisable to achieve a corporate look • Meets current IT infrastructure and skills

Table 2
List Software Solutions Identified for Further Analysis

Software Solution	Provider	Type	Identified by
Blackboard Portfolios	Blackboard Inc.	L	ICT
Campus Pack - ePortfolio	Learning Objects	I	Ex, ICT
Mahara	eCDF New Zealand	M	Ex, Re
OneNote	Microsoft	A	Ex, ICT
PebblePad	Pebble Learning Ltd	M	Ex, Re
Wordpress	Automatic	A	Ex

Note. Key to column “type” using Himpel and Baumgartner (2009): M = ePortfolio-Management-Software products offered to institutions as ePortfolio software; L = LMS/LCMS with integrated ePortfolio functions (“learning platform” with ePortfolio elements); I = Integrated systems respectively software families (CMS with possible Portfolio functions); and, A = Other systems, respectively kinds of software.

Australian higher education sector (ACODE, 2011) highlighted as “Re” in Table 2. The list of solutions covered a representative range of the types of applications available. A high-level analysis was performed on each of the software solutions identified in the first step. Each solution was assessed at a high level and rated against the criteria. Reviews of product documentation, video demonstrations, and high-level investigation of functionality in the

software solutions formed the basis for the analysis. As Table 3 explains a positive (“+”) rating was awarded if the criteria was met at an acceptable level and a negative (“-”) rating if the criteria was not met. A “0” indicates that the criterion was not applicable. Based on a count of positive criteria, it was decided to proceed with further analysis on the Mahara (5 +’s), Blackboard Portfolios (5 +’s), and PebblePad (8 +’s) software solutions.

Table 3
List of Software Solutions Identified for Further Analysis

Software Solution	Criteria							Corporate Look & ITS Infrastructure
	Links to LMS (Blackboard)	Interoperability	Sharing	Functionality	Accessibility	Support	Hosting	
Blackboard Portfolios	+	+	-	-	-	+	+	+
Campus Pack	+	-	-	-	-	+	+	-
Mahara	-	+	+	+	-	+	+	-
OneNote	-	-	-	-	-	-	0	-
PebblePad	+	+	+	+	+	+	+	+
Wordpress	-	+	-	-	-	-	+	-

Detailed Analysis of Performance

A detailed analysis of the three most suitable software solutions, Blackboard, Mahara, and Pebble Pad, was performed by the IT Functional Analyst. The Blackboard portfolio was the simplest application to analyze, as the University uses Blackboard as its LMS. Although benefits include no additional licensing or IT infrastructure costs, plus the ability to be well integrated into the existing LMS, it very quickly became apparent that Blackboard's functionality was limited in terms of the pedagogical and technological priorities. It provided an inflexible solution, with minimal opportunity to share; to produce professional-looking artifacts was difficult and time-consuming. Ongoing investigations highlighted that Blackboard Inc. would not be developing their portfolio functionality any further and that early discussions were underway to develop links between Blackboard and established ePortfolio providers (Koch, 2012). Based on these findings no further investigation continued and Blackboard was ruled out as a possible solution.

The open source solution Mahara was simple to install and set up. It offers an intuitive solution that enables easy initial uptake by users and allows for the creation of high-quality artifacts with a good level of customization. It was a pedagogically and functionally rich solution. Mahara provided no links to the LMS (Blackboard) but did provide the opportunity (with the right expertise) to develop and customize the software to meet the needs of the university. At first glance, Mahara is a relatively inexpensive solution because open sourcing means no licensing or purchase cost. However, the university's ICT infrastructure is Microsoft-based and to self-host Mahara, a Linux-based solution, would incur considerable costs for installation, maintenance, and support. Another option considered was finding an external vendor to host, manage and support an installation of Mahara.

The final option, PebblePad, offered a pedagogically and functionally rich solution, with a visually appealing user interface. It is more difficult to learn and requires a conceptual understanding of how to collate and produce an ePortfolio. The high-quality help functionality and video tutorials assist in development of the necessary skills to begin to producing content. After the steep learning curve was overcome, PebblePad began to reveal its true potential as an ePortfolio solution. It contains the flexibility to produce templates to meet virtually all requirements. It provides an authentic personal learning space in which content truly belongs to the user, with no possibility of anyone else accessing content that has not been shared intentionally. It also provides a solid mobile device and accessibility compatible solution, which does not provide a full visual experience but offers an equivalent content-creation platform. The providers, Pebble Learning, have strong higher education connections and relate to the pedagogical needs of an ePortfolio solution that is evident in the software.

User Trial

A trial was conducted for both PebblePad and Mahara, with volunteer users from the e-mail interest group. Five users participated in trials of PebblePad and seven of Mahara; two of these users were given access to both. An initial 2-hour training session aimed to provide for the users a conceptual view of using the software. Comprehensive training was intentionally not provided so as to identify the ease with which the solution can be self-taught. The users were encouraged to begin the trial by implementing their resume and to then explore the software's functionality for their own specific uses. The trial ran for approximately four weeks.

Upon completion of the trial, a feedback session was conducted for users. Information was gathered from each user to determine their overall experience

and opinion of the software, their ability to learn and use the software easily, identify strengths, weakness, and potential concerns or risks identified with rolling out the solution. The overall feedback was positive for both solutions, but two key points were noted for consideration in the final recommendation:

- PebblePad was conceptually difficult to understand and not easy to learn, with the implication that users would require additional user training and support than with Mahara.
- Independent of the solution chosen, a concern was raised that a well-defined training and support model would be required for a successful implementation of an ePortfolio solution. It would, in most cases, be difficult for faculty to manage independently the training and support for their students.

Recommendations to Institutional Decision-Makers

Using the data from all steps in the process, the following summary of analysis of the proposed software platforms explained in Table 4 was produced and presented to the University's senior management in order to enable evidence-based decision making.

As part of the recommendation document, a high level cost comparison was also presented. The cost comparison produced a surprising result. The implementation and running cost for Mahara, as an open source option, did not produce as low a cost as had been anticipated. A vendor-hosted solution of Mahara was only marginally less costly than the commercially licensed solution of using a hosted PebblePad solution. The unit cost comparison worked out at a ratio of 7:8 (Mahara:PebblePad). The University's IT infrastructure and lack of resources to manage, support, and implement Mahara made it unrealistic to implement, and no cost was presented. The self-hosted solution of PebblePad was more expensive, at a comparison cost of 10.5. The costs were calculated based on following data:

- institutional rollout of 8,000 users;
- access to 50 mb of storage for each user; and,
- hosted costs, based on a three year hosting contract with a vendor, including a pro-rata value for all one-off implementation costs.

The self-hosted PebblePad costs were based on a four year hardware replacement cycle; Mahara self-hosted costs were not presented, as this option was deemed unfeasible in the university's current ITS infrastructure. The research and investigation of software solutions resulted in the project team recommending to the University decision-makers the implementation of

ePortfolios for student learning, and in particular the adoption of a hosted PebblePad software platform.

The results of the ePortfolio feasibility study were prepared and presented as a report directly to the Deputy Vice Chancellor and to the ICT Governance Committee, which had initially funded the project. The Director of the Learning and Teaching Center, who had the most ready access to these senior management groups and who is a member of the ICT Governance Committee, presented the reports and discussed them formally at meetings. The comprehensive data-gathering and analysis that had taken place both in terms of staff readiness for ePortfolios and the functional requirements of an ePortfolio platform provided a useful framework for discussion that led to positive endorsement of the further development of the ePortfolio project. The focus of decision-making was on the institutional advantages of introducing an ePortfolio, balanced against the possible risks and costs of doing so. Student learning outcomes and staff readiness featured predominantly in these discussions. It was felt that the choice of platform had been sufficiently investigated in terms of the criteria identified, so the recommendation for choice of platform was endorsed with little further discussion.

As a result of the endorsement, further funds were provided for the 2013 academic year for an "early adopter phase," with two programs using ePortfolios. The institution's intention is to support, within in the next couple of years, a further, staged ePortfolio implementation process that will be funded through the Strategic Asset Management Plan.

Discussion

Pedagogical and technological responses to the changing needs of universities require decision-making processes about the implementation of new tools, such as an ePortfolio. In this case study, three principles are drawn from the middle-out approach to decision-making. First, it is vital to have the right skill mix of people on the project team—those who can collaborate with stakeholders but also have the power to make initial decisions that will lead to the final recommendations to institutional decision-makers. Cummings et al. (2005) remark on the unique position of middle agents, who possess "some authority and resource to implement change" (p. 11) and "are in a unique position to mediate between the more individualized interest of teaching staff [faculty] and the broad strategic focus of senior staff" (p. 11). In this case, the Director of the Learning and Teaching Center reported directly to the Deputy Vice Chancellor, the Project Manager was well known by faculty, and the Functional Analyst had strong knowledge of product analysis, development of functional criteria, and the

Table 4
Software Solution Criteria Comparison

Criteria	Mahara	PebblePad
Corporate Look	✓	✓
Links to Blackboard	✗	✓
Facilitates the Graduate Attributes	✓	✓
Portability (LEAP2A & HTML compatible)	✓	✓
Sharing (internal, external, groups)	✓	✓
Accessibility Version (HTML only)	✗	✓
Mobile Compatible Interface	✓ (very limited)	✓
Alumni Solution	✗ (university to provide)	✓
Support Materials Provided	✗	✓
Easy-to-learn (initial)	✓	✗ (more initial training required)
Easy-to-use	✓	✓
Fully Hosted Option	✓ (independent vendor)	✓
Self-Hosted Option	✓	✓ (> 1000 users only)
• Aligned to ITS infrastructure	✗	✓
• Aligned to ITS expertise	✗	✓
Institutions Using	> 290 (currently registered)	> 120

Note. ✓ = meets criteria, ✗ = does not meet criteria.

enterprise architecture and infrastructure of the university's IT systems.

Second, the middle-out process also allowed the information collected from the earlier stages to be aligned with the institution's strategic priorities and compared to existing ICT infrastructure capabilities. Making change decisions based on an understanding of the needs of the individual context of the institution is vital to the success of this approach (Goldsmith, 2007). For example, the extensive investigation undertaken to develop a set of functional requirements for the implementation of ePortfolios led to the systematic elimination of unsuitable software platforms, and the final choice of an appropriate one, based on the needs of the institution as well as the available resources and ICT infrastructure. Other institutions may have a different set of criteria, resources, and infrastructure that result in a different outcome. Therefore, any ePortfolio or other technological software solutions need to be rigorously investigated to ensure alignment with existing ICT infrastructure before recommendations are made to the institutional decision-makers.

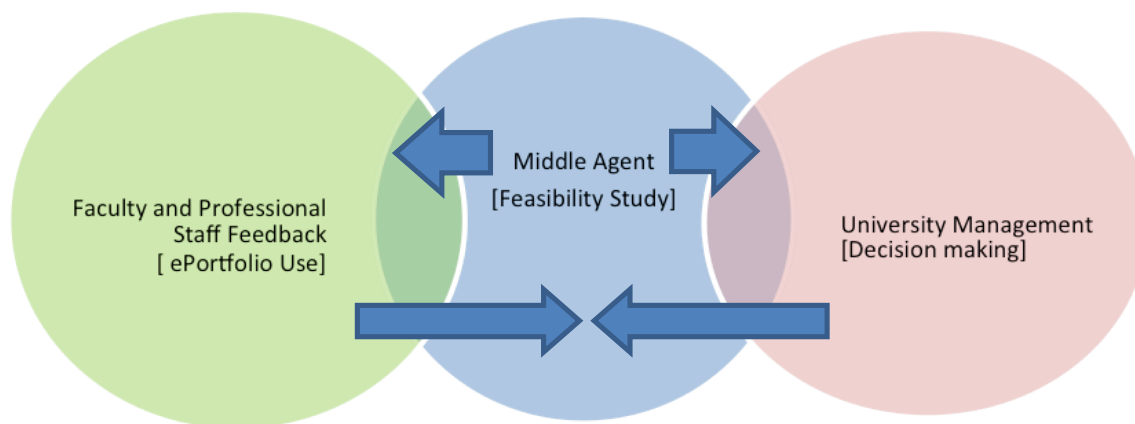
Finally, the collegial approach to data collection was valued by respondents and produced strong support for recommendations to the institutional decision-makers. Middle-out agents have the capacity to introduce change because of their unique position in the University. In this case study the staged investigative process undertaken by the project team allowed faculty and professional staff values to be heard and distilled into initial decision-making processes before engaging the senior management. Traditional institutional change

management involves top-down or top-down and corresponding bottom-up approaches that do not account for the significant role of middle agents in initiating, supporting, and advocating for change. Figure 1 depicts the "go-between" role of the middle agents engaging, on the one hand, with senior management decision-makers and on the other, with faculty and professional staff. The reciprocal relationships developed between the two groups enable a potentially smooth early introduction to new technology, such as ePortfolios.

Conclusion

The article presented a case study example of an approach to technology adoption in the context of change management. The authors argued that a middle-out approach, which provided links between university faculty and professional staff values and senior institutional management decision making, resulted in a positive and collegial transition to introducing new technology, such as ePortfolios. Based on the exploration of the opinions of faculty and professional staff about the value of ePortfolios for student use, this approach developed a systematic, evidence-based approach to criteria development, investigated suitable software options, and individualized recommendations to the university decision-makers. Findings suggest that the skills of the project team are a vital component for the success of this approach. In this case study, the middle agents adopted roles of investigation, analysis, synthesis, and preliminary decision-making before presenting their findings to the senior management

Figure 1
Cohesive Impact of the Middle Agent's Role on the Relationship between Faculty and Professional staff and University Management



decision-makers, with whom they played an advocacy role. Next, the project team needed to consider both the individual priorities and needs of the institution and also the currently available ICT infrastructure and resources. Finally, the collegiate approach to data collection was valued by participants and enabled improved recommendations for the institutional decision-makers.

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Appendix
ePortfolio Feasibility Project Survey

Questions 1-4:

Please circle the numbered option/s that best suit your responses. The questions allow some space for further comments if needed.

1. Which faculty are you from?

1. Faculty of _____
2. Faculty of _____
3. Other area of the university _____

2. What is your role at the university?

1. Staff
2. Student
3. Both staff member and student
4. Other _____

3. Have you had any previous experience with ePortfolios?

1. Teaching purposes
2. As a student
3. Personal use
4. Other _____

4. What do you see as the main ways ePortfolios could be used? (More than one option can be selected)

1. Reflective practice
2. Student learning
3. Assessment
4. Graduate career showcase
5. Accreditation
6. Continuing professional development
7. Evidence of teaching practice
8. Employment promotion
9. Performance review evidence
10. Other _____

5. Why is your selection in Q4 your preference/s for ePortfolio use? (Please comment)

Questions 6-10: *(Please comment)*

6. How would you feel about using ePortfolios as part of your teaching or learning repertoire?

7. What enabling factors do you see as necessary to successfully implement ePortfolios at the university?

8. What do you envisage as the main barriers or problems associated with the use of ePortfolios at the university?

9. Any other comments you would like to make about ePortfolios?

Thank you for your participation

ePortfolio Effectiveness: A(n Ill-Fated) Search for Empirical Support

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ePortfolio has become ubiquitous in higher education over the course of the last decade, with faculty and institutions devoting both time and monetary resources to its use. Given this trend, the purpose of this study was to investigate the landscape of ePortfolio research to determine what evidence exists for ePortfolio's impact on student outcomes. We identified four trends in the research: articles making theory-based arguments for the use of ePortfolio or providing a descriptive account of a single instance of use; articles presenting original data on users' feelings and opinions of ePortfolio; articles presenting original data on student outcomes resulting from ePortfolio use; and finally, articles focused on the technological vehicles of ePortfolio. Through our analysis of the literature it became evident that an increased focus in the research is necessary with regard to collecting and presenting original data on student outcomes and investigations of the most effective and usable platforms designed for ePortfolio.

The Emergence of ePortfolios in Education

Over the past decade, the use of ePortfolios in an educational context has flourished. From ePortfolio's paper-based origins in the realms of fine arts, music, creative writing, and architecture, the word *portfolio* was initially defined as a portable case for carrying a loose collection of papers and materials (Avraamidou & Zembal-Saul, 2002; Meeus, Questier, & Derks, 2006). Portfolios are intended to contain samples of an individual's "best work," presented as a testament to the individual's abilities (Avraamidou & Zembal-Saul, 2002). Today, an electronic portfolio, or *ePortfolio*, is defined as "a digitized collection of artifacts, including demonstrations, resources and accomplishments that represent an individual, group, organization, or institution" (Lorenzo & Ittelson, 2005, p. 2) and involves situating a portfolio within a web-based interface. The use of a web-based interface makes the portfolio process more flexible and dynamic and allows individuals to contribute to and alter their ePortfolios in a way that is immediately accessible to employers or instructors. The word *artifacts* can indicate text-based work, reflections, video demonstrations, and other multimedia elements, such as blogs and wikis that are included in the ePortfolio to both promote and demonstrate learning (Brandes & Boskic, 2008).

According to Alvarez and Moxley (2004), ePortfolios are "process, product, and tool," meaning that ePortfolios should be viewed as a mechanism for both formative and summative assessment. ePortfolios are now being widely used to showcase student growth over time and to assess learning outcomes (Lombardi, 2008). Instructors are incorporating ePortfolios in their classrooms from the primary level up through post-secondary education. Many universities are currently developing institution-wide ePortfolio programs that are intended to encompass the entirety of a student's college career. As

ePortfolios become more prevalent at multiple levels of education, it is wise to assess what we know of this pedagogical tool in order to answer the ultimate question: Does the evidence truly support the theoretical connections between ePortfolio and student outcomes? We address in this question academic learning outcomes in addition to other outcomes that may lead to increased learning. In order to answer this question, a wealth of empirical evidence, or evidence presenting original data, is necessary. It is the aim of this paper to take a quick snapshot of the ePortfolio literary landscape to determine whether this empirical evidence is being produced, or whether the research tends to focus more on arguing for the use of ePortfolios and describing their use without presenting data.

ePortfolios and Human Learning

The eventual adoption of ePortfolio in the realm of education makes theoretical sense, given what we know of human learning. Theoretical arguments for the use of ePortfolios have cited improved reflection, increased student engagement, improved learning outcomes, and increased integration of knowledge (e.g., Acosta & Liu, 2006; Doig, Illsley, McLuckie, & Parsons, 2006; Hartnell-Young, 2006; Heinrich, Bhattacharya, & Rayudu, 2007; Jenson, 2011; O'Brien, 2006; Peet et al., 2011; Riedinger, 2006; Sherman, 2006). The electronic nature of ePortfolios allows even greater flexibility and fluidity than their traditional paper-based counterpart, which opens the door for a more streamlined, iterative reflective process. Students can easily document their reflective process and witness their growth over time (Doig et al., 2006; Riedinger, 2006). Reflection can also be encouraged through a specific ePortfolio interface, which can be designed to address the reflective needs of the students according to their experience level and academic domain (Doig et al., 2006). Instructors can

use ePortfolios to shift the locus of control from teacher to student, thereby nurturing student engagement (Acosta & Liu, 2006). When students incorporate artifacts from multiple disciplines and are asked to synthesize and reflect on them, ePortfolios can become a vehicle for developing integrative knowledge skills (Peet et al., 2011). When combined, all of these factors can provide students with a method for constructing their own knowledge and skills, which is likely to lead to deeper levels of understanding and improved learning outcomes (O'Brien, 2006).

Although the theoretical foundation for ePortfolio use is strong, it is not sufficient to justify widespread use. As ePortfolio use continues to grow and valuable time and resources are being invested in this fairly new pedagogical tool, it becomes even more important that we have empirically-based evidence for its adoption. In this paper, we present an overview of the current ePortfolio research and the methodology employed within it to discuss whether the necessary evidence exists to make an informed judgment on this tool.

Methodology

ePortfolio Research Sample

Data collection. In an effort to outline the current landscape of ePortfolio research, we reviewed a sample of 118 peer-reviewed journal articles on ePortfolios. We limited our search to peer-reviewed publications (i.e., refereed journal articles). Other sources (e.g., books, book chapters, conference presentations, white papers) were excluded from this search in an attempt to restrict the sample to publications subjected to a more rigorous review process.

Articles for this review were located first through keyword searches (e.g., e-portfolio, ePortfolio, electronic portfolio, e-folio, folio thinking, digital portfolio), second through citations of previously located articles and well-known books, and third by locating and retrieving articles from an ePortfolio-themed journal launched in 2011. Articles representing the last two years of ePortfolio research were pulled from this journal, one of the first peer-reviewed journals dedicated to this particular topic and therefore an important inclusion in the sample. Databases such as EBSCO Host, ERIC, Google Scholar, and a university online library search tool (i.e., "Summon") aided our search. We included every peer-reviewed article located through these searches, unless full-text articles were unavailable either through our universities or general online accessibility, which was infrequent. In order to ensure that we procured as accurate a sample as possible, we abandoned database keyword searches once the results

consistently duplicated articles already obtained and contained only irrelevant resources. Our access to full-text publications via our university libraries' subscriptions is extensive, as both are Research I institutions. Thus, we believe that limiting our search in this way would portray more accurately the manner of peer-reviewed publications available to interested researchers and practitioners. Several articles located through database searches and article and book citations were unavailable, and occasionally difficult to locate even for purchase.

Finally, because the sampling process did not render as many publications by several of the more well-known ePortfolio researchers as was expected, we also searched by author using advanced options. However, this specialized search rendered only eight additional peer-reviewed publications, as many of the oft-cited sources by these authors are books, book chapters, and conference presentations. Our search process took place over two years and several iterations, and although we do not propose that our sample includes every peer-reviewed article on ePortfolio, we do argue that it illustrates what other researchers and practitioners are likely to be able to find and access in their own searches for empirical evidence of ePortfolio.

Organization of the sample. Once we located a sample of peer-reviewed ePortfolio research in the form of journal articles, we classified each article into one of the following four categories:

1. *Descriptive*: An argument for the use of ePortfolio, often citing learning theory; may present data from other findings, but does not present original data; may present an example of ePortfolios in use for a specific program or course, but these examples are descriptive and do not present data.
2. *Empirical, affective*: Presents original data, but these data address the participants' feelings and opinions about ePortfolios and do not examine their impact on student outcomes.
3. *Empirical, outcomes*: Presents original data, qualitative or quantitative, on student outcomes.
4. *Technological*: Presents data and models on the structure and usability of ePortfolio platforms, or provides description of a platform.

Both authors participated in the classification process in order to maintain reliability. When a questionable item arose, we consulted until consensus was reached. The above definitions were also revised and/or developed anew as need arose. The forth classification (i.e., technological) was developed as a new pattern in the

data formed and became consistent. Once the new classification was developed, we reviewed all former articles and reclassified as needed.

Results

Of the total number of articles located, 58 were empirical in nature (49% of the sample), meaning that original data on the use of ePortfolios in a specific context was collected and presented. Of these empirical articles, we classified 40 (69% of the empirical articles) as empirical, affective and 18 (31% of the empirical articles) as empirical, outcomes.

Fifty of the articles (42% of the sample) were descriptive in nature, or practice-oriented. These articles focused on arguing for the use of ePortfolios in education or describing a specific instance of ePortfolio use, often including suggestions for the successful development and implementation of an ePortfolio program at either the classroom or university level. We classified 10 (9% of the total sample) as technological,

which were either empirical in nature (presented data and models on ePortfolio platform structure and usability) or descriptive in nature, offering examination of a particular platform. Table 1 displays our findings regarding distribution of the descriptive and empirical articles in our sample, and Figures 1 and 2 depict the distribution by category.

Dates of publication ranged from 1996 to 2012, with the bulk of the research published in 2012 (30%), followed by 2008 (14%), and 2011 (12%). As Figure 3 suggests, an increase in ePortfolio publications is evident, with the peak occurring in 2012. Table 2 displays the distribution of articles in our sample per year, including the percent of the sample each year comprised. The majority (72%) of the articles were published during the latter five years included in the sample (i.e., between 2008 and 2012). The drastic increase in ePortfolio articles over time and especially in 2012 is, in part, explained by the launch of a peer-reviewed journal dedicated to the study of ePortfolio, the *International Journal of ePortfolio*. As it is one of the

Table 1
ePortfolio Research Distribution Based on Classification

Years	Article Type	N	% of Total Sample	% of Type (e.g., empirical)
1996-2012	Descriptive	50	42	—
	Empirical	58	49	—
	Total Empirical	58	49	—
	Affective	40	34	69
	Outcomes	18	15	31
	Technological	10	9	—
	Total	118	—	—

Figure 1
Distribution of Descriptive and Empirical Articles

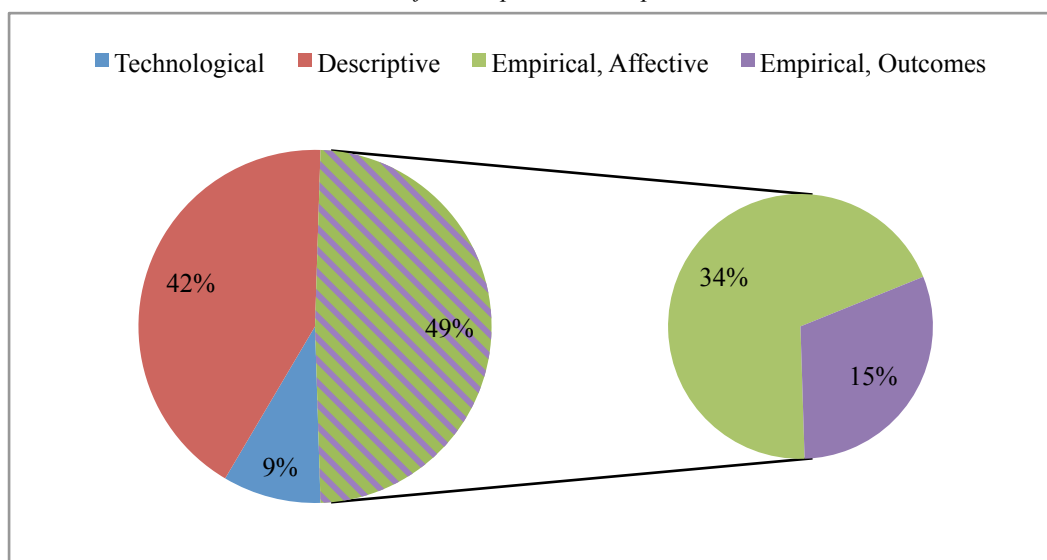


Figure 2
Distribution of Categories within the Total Sample

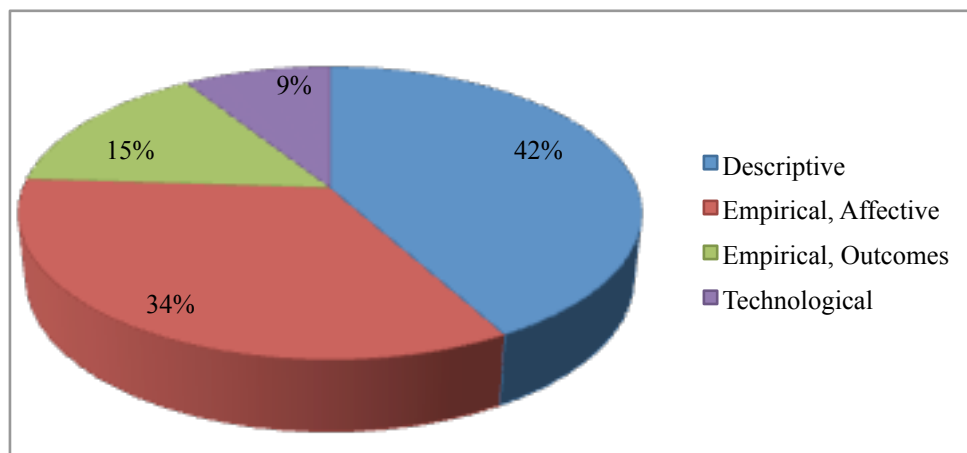
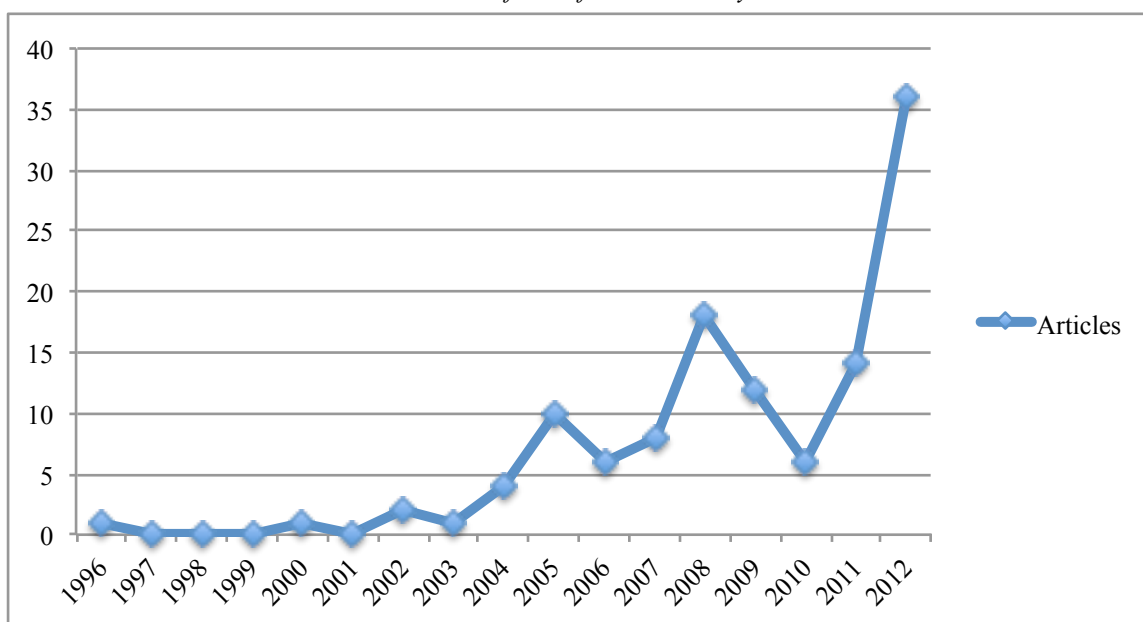


Figure 3
Distribution of ePortfolio Articles by Year



first journals of its kind, this represents rapid growth as the journal fulfilled an existing need. This growth signals an increased interest in publishing ePortfolio-related literature and, in turn, general popularity of the tool.

The Current State of ePortfolio Research

Descriptive articles. Many of the descriptive/practice articles from the sample gave detailed accounts of the experiences of individuals or institutions when implementing ePortfolio programs.

They were directed at practitioners interested in experimenting with ePortfolios and looking for specific examples of how others have undertaken such a task. These articles often highlighted the successes and pitfalls of these experiences so that readers can create a smoother transition into ePortfolio use for themselves. Also included in this category were the articles that made structural or theoretical arguments for ePortfolios. Many cited the need to develop new methods of assessment, address decreasing levels of student engagement, and help students become adaptive

Table 2
Distribution of ePortfolio Articles by Year

Year(s)	No. of Articles	% of Sample
1996	1	1
1997-1999	0	0
2000	1	1
2001	1	1
2002	2	2
2003	1	1
2004	4	3
2005	9	8
2006	6	5
2007	8	7
2008	17	14
2009	13	11
2010	6	5
2011	14	12
2012 & in press	35	30

problem-solvers. As noted previously, we classified 50 of the articles in this category. Thus, the descriptive papers were the largest category, comprising 42% of the total sample.

Empirical articles. The empirical articles we reviewed in this sample generally fell into two categories: those assessing attitudes and perceptions (40 articles), and those assessing student outcomes (18 articles).

The first category, containing empirical, affective articles, formed 69% of the empirical articles and 34% of the total sample. The majority of the articles in the first category used surveys, open-ended response items, and interviews to collect information on instructors' and students' experiences with ePortfolio. Case studies and focus groups were used less frequently. Twelve of the articles included measures of student perceptions of their own learning as a result of their experiences with ePortfolios. Together with the aforementioned descriptive papers, 76% of the sample was either non-empirical in nature or more informally assessed perceptions and feelings, as opposed to more robust findings involving student outcomes and impact on learning.

The second category, empirical articles measuring student outcomes, comprised 31% of the empirical articles and only 15% of the total sample. Outcomes-based research of ePortfolio did not appear in our sample until 2006. Although our objective during the initial search concentrated on articles measuring the impact of ePortfolio usage on participants' learning, we generalized the third category description to include student outcomes reaching beyond academic learning (e.g., motivation, reflective practice, self-regulatory strategy use) as we encountered an array of outcomes-based research. As noted above, learning theory

suggests that improved outcomes in areas such as personal reflection and academic motivation can lead to learning gains. We discuss academic learning outcomes, in addition to other student outcomes, both in combination and separately during our analysis.

Within this category, researchers investigated a variety of outcomes in the context of ePortfolio use, including students' writing ability, reflective ability, motivation, critical thinking, self-regulation, knowledge attainment and integration, and engagement. Compared to the attitudes and perceptions category, a wider range of methods were used to collect and analyze the data, such as rubrics, case studies, questionnaires, and interviews. In one study, researchers used a Likert-scale system to rate students' final written work, then used *t* tests to determine whether the ePortfolio project had improved the students' writing abilities (Acker & Halasek, 2008).

However, of the articles, few directly assessed student outcomes empirically (i.e., using a control or comparison group and reliable and valid assessment of student learning). Of the 18 empirical, outcomes articles, only nine assessed ePortfolio's effect on student learning outcomes (8% of total sample), while eight assessed ePortfolio's effect on non-academic learning outcomes (7% of total sample). It is important to note that one article (Abrami et al., 2008) included several instruments, which measured both academic and non-academic outcomes. Only two articles incorporated a comparison group, both of which also examined learning/academic outcomes (Desmet, Miller, Griffin, & Balthazor, 2008; Fiella et al., 2012). Desmet et al. (2008) examined the effect on writing quality, and Filella et al. (2012) academic performance in general. Of our sample of 118, two articles (1.7%) empirically evaluated student outcomes utilizing valid and reliable measures in addition to a comparison/control group. Table 3 displays these and additional themes related to the empirical, outcomes category.

Technological articles. Even though our initial intent was to investigate evidence of student outcomes related to ePortfolio, a fourth category became necessary as we consistently found publications that were best classified as technological papers. This category, accounting for 9% of the total sample, includes both empirical and descriptive articles that either presented data and models on the structure and usability of ePortfolio platforms or offered descriptive examination of particular platforms. Technological articles, first appearing in 2005, were a minority in our sample and represent an emerging trend in ePortfolio research. Despite aligning only indirectly with the purpose of this paper, discussions of the importance of coordinating desired student outcomes with appropriate platforms made it clear that this budding trend in the research deserved recognition.

Table 3
Themes in the Empirical, Outcomes Articles

Research Purpose	<i>n</i> *	Methods	<i>n</i> *
Assessed ePortfolio's effect on student learning outcomes using reliable and valid measures	9	Used comparison/control group	2
		Used reliable tool to assess learning (e.g., rubric)	4
		Used self-report measure and/or observation (e.g., questionnaire, Likert scale, open-ended questions, interview)	7
Assessed ePortfolio's effect on outcomes other than learning (e.g., motivation, self-regulation, reflective practice)	8	Used comparison/control group	0
		Used reliable tool to assess learning (e.g., rubric)	2
		Used self-report measure and/or observation (e.g., questionnaire, Likert scale, open-ended questions, interview)	8
Assessed outcomes unrelated to ePortfolio's effect on student outcomes.	2		

Note. * Some overlap exists when multiple methods were used in single publications.

Various ePortfolio platforms were presented, assessed, and/or explored in these articles, some original and others adapted from existing interfaces (e.g., utilizing Web 2.0 technologies [Zhang, Olfman, & Ractham, 2007] and modifying Microsoft FrontPage-developed prototype websites using Microsoft Word [Lyons, 2008]). Searches for platform issues, developing prototypes to tackle a specific need or pedagogy, integration of new or existing technologies, and usability were common threads of discussion. Of the 10 articles within this category, the following trends emerged: three presented case studies of ePortfolio platforms; four were entirely descriptive in nature, describing a particular platform or need; and three utilized subjective measures, such as observation and notes, in addition to assessments of student/user perceptions via surveys, questionnaires, and feedback sessions. A variety of disciplines were included, ranging from social work education to second language instruction to both the professional and educational spheres of medicine.

Discussion

The Next Phase of ePortfolio Research

Descriptions of individual or particular experiences with a specific pedagogical tool, in this case ePortfolio, serve an important function in the literature. Arguably, in many cases where a new technology or tool is beginning to emerge, these articles are usually the seed from which more rigorous research germinates; as these articles make ePortfolios more prevalent, other researchers undertake the more demanding task of

presenting data on ePortfolio and desired outcomes. They do not illustrate whether the theoretical underpinnings of ePortfolio use are sound. For this, a shift in the research must take place.

It is promising that such a high percentage of the located articles discussed data that was collected first-hand. This review suggests that ePortfolio research has made the shift successfully from a focus on descriptions of practice and theoretical arguments to a focus on data collection and presentation. Despite making this crucial step, however, within the realm of empirical articles, the focus remains on the attitudes and perceptions of the instructors and students using ePortfolios. This is especially problematic for several reasons. First, students do not always prefer the instructional methods that result in the greatest learning gains (Milheim, 1989; Morrison, Ross, & Baldwin, 1992; Ross, Morrison, & O'Dell, 1989; Steinberg, 1989). Even if students do not have highly positive attitudes towards ePortfolio, it is possible that they are still beneficial to the students' learning experiences. Second, many of the studies in our sample that measured students' perceptions of their own learning; this was often after using ePortfolio for the first time in a class where the instructor had recently adopted the tool (e.g., Bartlett & Sherry, 2006; Blair & Godsall, 2006; Bollinger & Shepherd, 2010; Gardner & Aleksejuniene, 2008; Wickersham & Chambers, 2006). Limited information can be gleaned from students' perceptions of their own learning; this is essentially a more roundabout way to assess students' attitudes toward ePortfolio. It is difficult to know whether those that had negative perceptions of an ePortfolio's impact on their learning felt that way because the tool itself was flawed, or

because there were flaws in its implementation. Possible implementation issues could include unclear guidelines and expectations for the ePortfolio, student difficulties adjusting to the interface, and choice of improper/poor software platforms. In fact, it has been suggested that many of the current options for software platforms are too standardized: students paste text and other artifacts into a pre-determined structure (Clark & Eynon, 2009). By taking the organization and structural decisions out of students' hands, these software platforms fail to align the pedagogical goals of ePortfolio that stress reflection, self-reflection, and engagement (Clark & Eynon, 2009). Thus, there is a clear need for increased research into the technological platforms used in ePortfolio.

Empirical evidence for the adoption of ePortfolio, grounded in learning theory, becomes increasingly important as use continues to grow. Evidence suggests that ePortfolio use at the post-secondary level has tripled since 2003, and a little more than 50% of public colleges and public and private universities make some use of ePortfolios (Clark & Eynon, 2009). The same growth is evident in our sample, in which 72% was published between 2008 and 2012 (see Figure 3 and Table 2). Another shift in the research is required: from data focused on attitudes and perceptions to investigating the link between ePortfolio and student outcomes, especially learning. Some have already begun this work: Brandes and Boskic (2008) used a qualitative analysis to explore students' reflective work and levels of learning within their ePortfolios. Others have used rubrics as a way to gain a more reliable assessment of student learning outcomes with ePortfolios (Abrami et al., 2008; Acker & Halasek, 2008; Cooper, 2008; Desmet et al., 2008; Diller & Phelps, 2008), or have examined the change in students' reflective abilities over time (Cheng & Chau, 2009; Jenson, 2011; Ring & Foti, 2006). Future studies should continue to examine students' development of reflective skills, critical thinking skills, deeper levels of learning, and student engagement in the context of ePortfolio. However, analysis of our sample suggests that more information is needed regarding ePortfolio's impact on integration of knowledge and metacognitive awareness.

One glaring issue with what we evaluated of the current literature is that there is rarely a comparison or control group; as a result, it is difficult to determine whether learning or positive growth in other realms occurred because of the ePortfolios or because of the general structure of the course. Researchers should begin to compare ePortfolio use to non-ePortfolio use within separate sections of the same course in order to parse out the specific contributions of the tool. Finally, the adoption of institution-wide ePortfolio systems that will follow students from their freshman year to

graduation provide a new opportunity for researchers: longitudinal studies that look at differences between ePortfolio and non-ePortfolio users over the course of several years could provide useful information on potential benefits once students become sufficiently acclimated to the ePortfolio process.

Limitations and Access to ePortfolio Research

Also deserving of discussion are the limitations of our sample and the barriers we encountered in accessing ePortfolio research. As stated previously, our sampling of ePortfolio peer-reviewed journal articles took place over two years and multiple iterations; however, this does not mean that our sample addresses all possible pieces on ePortfolio research. One issue we encountered while searching was accessing articles we found cited in other sources. A small number of these came from journals that were unavailable through our universities' subscriptions, and one in particular we could not even locate for purchase. Therefore, our sample is limited to those articles that we had access to through our university affiliations.

A second barrier we faced was in locating seminal sources of ePortfolio literature. We conducted specialized searches in an effort to include key figures in ePortfolio, yet these pursuits often led us away from peer-reviewed journals to sources that were outside of our methodology (and often less accessible), such as conference presentations, white papers, and book chapters. We find it important to note that many of the seminal pieces in the literature were difficult to access and did not manifest in the first few iterations of our search. These works, which have contributed substantially to the literature and shaped the collective conceptualization of ePortfolio, are unlikely to be readily accessible to others if we had difficulty locating them after extensive searching. This lack of access could have negative implications for the forward progression of ePortfolio as a pedagogical tool if key understandings of its use are unavailable to those who wish to study and employ it.

Conclusion

According to our sample, the current literature suggests that ePortfolio can plausibly make great contributions to student learning when properly implemented. However, there are still substantial gaps in the literature, and the adoption of ePortfolio continues to out-pace our knowledge of its effectiveness and appropriate use after over 10 years of research. Arguably, the field of education has a history with regard to adopting new approaches and technologies before the research has yielded more fine-grained understandings. Previous instances of

enthusiasm overstepping what is known about a concept can easily be found in education, where limited time and resources intensifies the allure of the quick fix or “silver bullet” (Watson, 2012), ultimately resulting in the wasting of precious time and resources. To avoid such undesired outcomes, it becomes even more important that ePortfolio be allowed to mature before it is packaged for broader consumption in the realm of practice.

Achieving this maturity is important, given the demonstrated potential of ePortfolios and the current educational climate. Students in all disciplines are being asked to master a set of new, demanding skills in order to be successful upon graduation. It is no longer enough for students to simply know their content; now they must also be creative, reflective, and communicative. As the K-12 system shifts toward a focus on “21st Century Skills,” the higher education system must follow. According to the Partnership for 21st Century Skills (2009), such skills include the ability to refine and evaluate one’s own creative efforts; incorporate input and feedback; view learning as a cycle, with failure being a part of that cycle; reflect critically on learning experiences; and use multiple forms of media and technology to organize, evaluate, and communicate information. Theoretical arguments and current research literature suggest that ePortfolio could serve as a useful tool for helping students master these skills in a wide range of disciplines (Acker & Halasek, 2008; Brandes & Boskic, 2008; Cheng & Chau, 2009; Cooper, 2008; Desmet et al., 2008; Diller & Phelps, 2008).

Although portfolios originated in the arts, music, and architecture, all disciplines stand to gain from the proper implementation of ePortfolio, as students are being required to provide more concrete evidence of their abilities to potential employers. Research has already begun to demonstrate the potential usefulness of ePortfolios in educational technology, general education (multi-disciplinary), writing and composition, information literacy, and foreign languages (Brandes & Boskic, 2008; Cheng & Chau, 2009; Cooper, 2008; Desmet et al., 2008; Diller & Phelps, 2008). Further research should expand our knowledge of the disciplinary appropriateness of ePortfolios, especially as colleges and universities implement system-wide ePortfolio programs for their incoming freshmen. Expansion should include a focused look at ePortfolios in the “hard science” disciplines, including engineering, physics, and mathematics, where the research is currently lacking. Here, where an ePortfolio program might arguably focus less on writing and more on innovative thought, rubrics or other qualitative measures may be useful in documenting students’ reflective and iterative thought processes in solving complex problems, in addition to quantitative measures of specific learning outcomes.

Although ePortfolio research is increasingly evident in the literature, a transition toward empirical assessment of their impact on student outcomes is needed. It is time for the research to make this crucial shift so that ePortfolios can either attain their full potential, or valuable time and resources can be allocated to a more worthy cause.

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