Journal of Information Technology Education: Innovations in Practice **Volume 12, 2013**

Cite as: McWhorter, R. R., Delello, J. A., Roberts, P. B., Raisor, C. M., & Fowler, D. A. (2013). A cross-case analysis of the use of web-based eportfolios in higher education. *Journal of Information Technology Education: Innovations in Practice*, *12*, 253-286. Retrieved from http://www.jite.org/documents/Vol12/JITEv12IIPp253-286McWhorter1238.pdf

A Cross-Case Analysis of the Use of Web-Based ePortfolios in Higher Education

Rochell R. McWhorter, Julie A. Delello, Paul B. Roberts
The University of Texas at Tyler, Tyler, Texas, USA

rmcwhorter@uttyler.edu **jdelello@uttyler.edu** **proberts@uttyler.edu**

Cindy M. Raisor, Debra A. Fowler
Texas A&M University, College Station, Texas, USA

c-raisor@tamu.edu **dfowler@tamu.edu**

Executive Summary

Higher education is mandated to document student learning outcomes and ePortfolios have been offered as a panacea for assessment, evaluation, and accreditation. However, the student voice regarding the value students construct from building and utilizing web-based electronic portfolios (ePortfolios) in higher education has been sparse or non-existent in a number of disciplines. In the current study, a total of 459 undergraduate and graduate students' perceptions were collected through structured surveys, reflective journals, emails, and reflection papers. This mixed methods study reviews the historical foundations of contemporary web-based ePortfolios within a constructivist theoretical frame and presents four case studies from two universities in southwest USA from four disciplines (education, industrial technology, chemical engineering, and human resource development). A compilation of research findings from the four case studies yielded 27 categories that were later condensed through cross-case analysis resulting in five emerging themes: *career-focused*, *big picture of learning*, *social and visual learning*, *enablers of ePortfolios*, and *barriers of ePortfolios*. Each theme is discussed and illuminated by extracts of student work and supported by relevant literature. Recommendations include greater communication with students regarding expectations and requirements of the ePortfolio, providing student and faculty training on web-based ePortfolios, and forming a community of practice.

Keywords: Evaluation, ePortfolio, web-based, career, social networking, NVivo, constructivist

Introduction

Pivotal shifts in higher education are affecting administrators, faculty and students. One current change in higher education is the call by stakeholders for more accountability for student learning outcomes (Gansemer-Topf & Schuh, 2006; Jarrott & Gambrel, 2011; Lowenthal, White & Cooley, 2011), while another move involves the increased need to prepare students for their future careers in a difficult job market for gradu-

Editor: Krassie Petrova

ates (Hamilton, 2010; London & Hall, 2011). At the same time, web-based technologies are permeating our personal and professional lives (McWhorter, 2010). The millennial generation of students, as well as adult learners, is asking for anytime, anywhere access to learning, necessitating the use of web-based tools in higher education instructional environments (Prensky, 2001).

It is within these converging dynamics that the Web-based electronic portfolio (ePortfolio) has emerged as a powerful system for providing evidence of learning to multiple stakeholders for a variety of purposes (Buzzetto-More, 2010; Buzzetto-More & Alade, 2006). According to Lorenzo and Ittelson (2005) an ePortfolio is "a digitalized collection of artifacts, resources, and accomplishments that represent an individual, group, or institution" (p. 2) whereby students create a digitized showcase of their work, allowing the exchange of ideas, feedback, and reflection among viewers.

Over the last century, higher education globally has been involved in the evaluation and assessment of student, program, and institutional outcomes. According to James Cibulka, President of The National Council for Accreditation of Teacher Education (NCATE), authorized by the U.S. Department of Education noted: "The accreditation system will encourage and assist all institutions [to] … reach higher levels of achievement demanded by rigorous new student standards and a global marketplace" (NCATE, 2010, para. 6). Likewise, *Assurances of Learning* measures have been mandated for institutional accreditation since 2006 by the Association to Advance Collegiate Schools of Business International to advance ongoing curricula development and student learning outcomes (AACSB, 2012).

With higher education experiencing external pressures for increased assessment and evaluation, ePortfolios were established at a number of institutions. According to Light, Chen and Ittelson (2012), ePortfolios provide authentic evidence for accountability and institutional accreditation where "more authentic evidence of student learning is not only expected but actually mandated by the institution, the system, and often the state" (p. 72). Further, some have suggested that ePortfolios "have the potential to change higher education significantly" (Lowenthal et al., 2011, p. 61).

Siemens (2004) suggested that "ePortfolios can best be viewed as a reactionary response to fundamental shifts in learning, teaching, technology, and learner needs in a climate where learning is no longer perceived as confined to formal education" (p. 1). Providing insights into students' use of ePortfolios as a means to demonstrate learning may help colleges and universities, across disciplines, determine the steps needed to develop a framework in response to the call for greater accountability and outcomes-based accreditation.

The purpose of this study is to understand the meaning that student participants placed on ePortfolios within the higher education classroom. In the following sections, the relevant literature is reviewed, followed by the methods of the study, data collection including the presentation of four case studies, a cross-case findings and discussion, and the conclusions and implications are given.

Review of Relevant Literature

Based on the identified pivotal shifts in higher education, relevant literature for this study included: web-based tools for ePortfolio creation, assessment and accountability, career connections, and learning theories. Each of these concepts will be discussed next.

Web-Based ePortfolios

Historically, paper-based portfolios have been used as a means for artists and photographers to display their images and showcase their creativity and talents. According to Light et al. (2012), traditional portfolios "were not easily shared among geographically distributed audiences and were limited in scope" (p. ix). In contrast, today's artists and photographers transfer their portfo-

lios to the Web, digitalizing their work and showcasing their skills to the world. Stemming from the visual and performing arts, portfolios in classrooms currently serve to showcase students' accomplishments and personally selected works (Sweet & Zimmerman, 1993).

Long before portfolios were incorporated into classroom teaching, children's creations covered refrigerators, filled scrapbooks, and piled up in shoeboxes. As educational portfolios became more prevalent, notebooks and folders filled with student work started being used for the assessment of learning (Sanders, 2000). It was not until the 1980s that student portfolios shifted from the paper-based approach to an electronic platform and not until the early 1990s that this movement was documented in higher education research (Lorenzo & Ittleson, 2005). In the 21st century, ePortfolios are becoming a prevalent way to allow students to combine text, graphics, sound and video to create a powerful multimedia demonstration of their accomplishments (Abrams, 2009; Lorenzo & Ittleson, 2005; Sweat-Guy & Buzzetto-More, 2007). As Cohn and Hibbits (2004) stated ePortfolios may be "The show-and-tell of the millennium" (para. 1).

The term Web 2.0 describes a set of next-generation Internet technologies that are highly social and encourage users to interact with content in new ways (Wolcott, 2007). According to Anderson (2008), the Web "has expanded from a medium to display content created by professional designers and publishers, to one where commercial content is augmented, annotated, enhanced, and, in some cases, displaced by content created by the end users themselves" (p. 63). Web 2.0 technologies and applications foster the learning needs of a millennial generation of students enabling "cutting-edge collaborative learning environments for educational settings" (Zhang, Olfman, & Ractham, 2007, p. 210). For instance, online social media platforms (built from Web 2.0 tools) such as Facebook, Twitter, LinkedIn, Pinterest, and Instagram, allow students to share their ePortfolios with the world through embedded URLs.

Figure 1 depicts the evolution of ePortfolios over three generations beginning with the connection to desktop computer technology available in the 1990s (which made it possible for artifacts to be stored digitally for the first time), to the advent of the World Wide Web (Web) where Web 2.0 tools made it possible to create ePortfolios with rich media that could be shared with others (through the technology) and then to the utilization of sophisticated integrative technologies and devices for creating and displaying contemporary ePortfolios within the technology. These dynamic integrative spaces facilitate collaboration for sharing and commenting on artifacts (Barrett, 2007, 2011a; Delello & McWhorter, 2013; Kapp & O'Driscoll, 2010; McWhorter, 2010, 2012; Light et al., 2012).

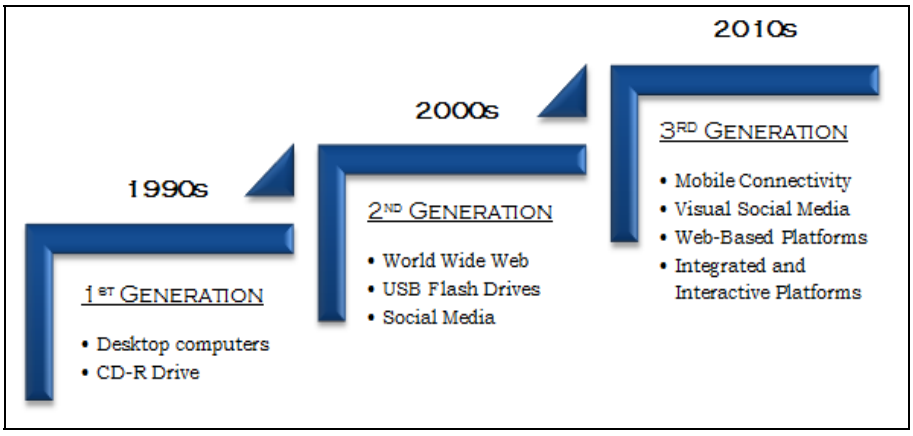

Figure 1. Evolution of Enabling Technologies for ePortfolios

Web-based ePortfolios fit well with the constructivist philosophy of education where students can create their own meaning using platforms for student-authored content and without being restricted by organizational boundaries (Cotterill, White, & Currant, 2007; Light et al., 2012). As the web-based ePortfolios are student-owned their usefulness is expanded to include lifelong and lifewide learning (Chen, 2009). Also, new web-based ePortfolio platforms such as Pathbrite (http://pathbrite.com), MyEdu (http://myedu.com), GoogleSites (http://sites.google.com) and TaskStream (http://taskstream.com) allow for students to be both content creators and curators (Delello & McWhorter, 2013) as they develop their ePortfolio and choose what items (artifacts) to include. The contents of a typical Web-based ePortfolio vary, depending on its purpose and context. For example, an ePortfolio may be used to facilitate job search and thus include materials that support particular credentials sought by an employer and valued by the industry. This type of an ePortfolio may incorporate samples of work, a list of references, a resume, contact information, statement of career goals, and other evidence to demonstrate that the ePortfolio author is qualified for the job they are seeking. Another type of an ePortfolio may showcase work connected to the assessment of a course or a program, or institutional outcomes. EPortfolios used for assessment may prompt student writers to include samples of their best work, develop reflections about the value of the items in the portfolio, and organize the portfolio around outcomes. Thus, the purpose and context of use heavily influences the contents and the design of the ePortfolio.

Assessment and Accountability

Standardized tests, as well as traditional teacher-made tests, give information about student learning, yet they do not provide a holistic picture of what a student knows, and their learning process. According to Rohlheiser and Ross (2012), teachers and administrators are now experimenting with alternatives to supplement traditional testing so that "performance assessment, portfolio collections, classroom observation, peer assessment, and self-evaluation are joining the unit test and the final exam in the repertoire of the skillful teacher" (para. 1).

Most institutions use a combination of evaluative tools and approaches including nationally standardized tests, surveys, and authentic assessment instruments such as portfolios and rubrics (Banta, Griffin, Flateby, &, Kahn, 2009, p. 4). Hart Research Associates (2009) found that 72% of the members of the Association of American Colleges and Universities (AACU) assess learning outcomes across the curriculum, and that 42% of these institutions used ePortfolios as an instrument for assessment.

According to Lowenthal et al. (2011), ePortfolios have the potential to shift the focus from the traditional checklists used in summative assessment to a more formative approach. Barrett (2005) suggested that ePortfolios place an emphasis on student reflection, collaboration and individuality; the author described ePortfolios as an assessment for learning rather than an evaluation of learning (see also Chambers & Wickers, 2007). Similarly, Pelliccione and Dixon (2008, p. 759) saw the ePortfolio was as "an effective means of gaining powerful feedback from students in terms of their ability to develop and achieve learning outcomes" that allowed students to "self-assess against outcomes and develop high order skills in critical reflection". A number of scholars are devising ways to strategically leverage the ePortfolio as formative and summative assessment instrument. For instance, Egan (2012) offered information on how both formative and summative evaluation could be garnered through proper tool selection as well as the operationalization of an online course.

In order to demonstrate that quality standards are being met by an institution or specific academic program, institutional and programmatic accreditation can be obtained. Institutional accreditation is granted by regional or national accreditors through a demonstration of institutional effectiveness, i.e., meeting standards that address the needs of society and students as established by the higher education community. For example, both institutions involved in this study are accredited

by the Southern Association of Colleges and Schools Commission on Colleges (SACS). SACS requires institutions to include student learning outcomes, assess the extent to which the outcomes are achieved, and provide evidence of improvement based on analysis of the results in educational programs (SACS, 2010).

Program-level outcomes depend upon course and unit outcomes as part of the design of a course or learning experience. EPortfolios can be designed to meet course learning outcomes, which in turn are aligned with program outcomes and typically aim to address both institutional effectiveness requirements, and program accreditation requirements (Tubaishat, Lansari & Al-Rawi, 2009).

While institutional assessment focuses on both learning for a lifetime and integrative learning, reaching the assessment goals is challenging. Integrative and lifelong learning objectives are often difficult to assess because mastery requires examining the degree of learning across the curriculum and ensuring that complex and deep intellectual learning has occurred. An institutional or assessment portfolio can be a placeholder for capturing and archiving broad and deep learning experiences and for streamlining assessment efforts by organizing reflections and artifacts according to learning outcomes (Kahn, 2001); as noted in Lowenthal et al. (2011) "Much of the value of a portfolio (whether electronic or not) depends on how, when, and why students create, submit, and have their portfolios evaluated" (p. 62).

Career Connections

Universities are feeling pressure from the public to be relevant and provide a curriculum that prepares students to enter a challenging job market (Tubaishat et al., 2009). Employers expect college graduates to be prepared and have readiness for essential work tasks. The ePortfolio can be utilized to gather together collection of evidence in support of abilities and competencies (Okoro, Washington & Cordo, 2011), i.e., the ePortfolio as a learning tool can also be used to showcase job skills and readiness (Whitworth, Dearing, Hardy & Jones, 2011).

A portfolio can connect the two sides of an individual's life, becoming more personal than a resume, but more professional than a personal Web site (Cambridge, 2008). The traditional resume is not the best hiring device for representing a student's qualifications in the 21st century (Pathbrite, 2012, para. 3). A professional ePortfolio "allows students to construct professional identities and to display narratives significant to potential employers" (Graves & Epstein, 2011) and is useful for capstone classes "to assist students in integrating knowledge across [their] discipline and showcasing their learning to potential employers" (Gill & Ritzhaupt, 2013, p. 69). Further, Buzzetto-More (2010) found that the majority of students who created an ePortfolio were interested in showing it to potential employers.

EPortfolios prompt students to become more aware of what they know and how they have learned it, thus preparing them to negotiate the new contexts they will encounter in future contexts and workplaces: "When students leave the university to enter their workplace, they not only need to learn new genres of discourse but they also need to learn new ways to learn such genres" (Freedman & Adam, 2004, p. 334). Students can develop their own a professional brand – a "combination of personal attributes, values, strengths, and passions" (Guiseppi, 2010, para. 5) while creating an online presence.

Learning Theories

There are many paradigms when considering an underlying theoretical framework in regards to using ePortfolios (Barrett & Wilkerson, 2004). The Association for Learning Technology (ALT) noted that emerging technologies need to be led by learner-centered pedagogy while promoting an independent and reflective approach to learning (ALT, 2004). According to Paulson and Paul-

son (1994), the portfolio "is a learning environment in which the learner constructs meaning ... that meaning varies across individuals, over time, and with purpose" (p. 36). From a constructivist perspective an ePortfolio delivers content to users while enabling user-constructed knowledge (ALT, 2004). Therefore, learning is active and "all knowledge is unique to the individual, whether acquired from lecture and text or discovered through experience" (Swan, 2005, p. 2).

Furthermore, an ePortfolio is often used "for communication and interaction with teachers, mentors, peers, colleagues, friends, and family" (Greenberg, 2004, p. 28). Derived from the work of Vygotsky (1962), social interaction is at the heart of learning where "meaning is constructed through communication, collaborative activity, and interactions with others" (Swan, 2005, p. 5). Garrison, Anderson & Archer (2000) noted that the "construction of meaning may result from individual critical reflection but ideas are generated and knowledge constructed through the collaborative and confirmatory process of sustained dialogue within a critical community of learners" (p. 91). Therefore, both constructivism and social cognition theories are relevant to this study of ePortfolios and will be utilized to analyze and interpret the data of individually constructed ePortfolios that are shared with others in a dynamic web-based environment.

While progress is being made in identifying common learning outcomes, institutions of higher education are struggling to assess student achievement using these standards (Banta et al., 2009, p. 5). Earlier, Ayala (2006) noted that there was limited research on students' perception and opinions on the use of ePortfolios; rather, research has typically focused on the views of faculty and administrators. Thus, additional research is needed to "differentiate between student-owned [Web-Based] electronic portfolios and the [typical] assessment systems used to record evidence of students' progress toward meeting these standards" (Barrett, 2005, p. 7). The current study contributes a substantial number of student voices describing their experiences in creating and utilizing ePortfolios in the higher education classroom. It is our hope that our study provides evidence of the value of ePortfolios in this context.

Methods of the Study

The research methodology of the study is based on a multi-case study approach. Yin (2003) defined case study method as empirical inquiry that "investigates a contemporary phenomenon within its real-life context" (p. 13). According to Creswell (1998) a case study is a "bounded system" focused on issues illustrated by the case (or cases) (p. 249). This qualitative case study falls within the constructivist paradigm which, according to Lauckner, Paterson, and Krupa (2012), builds on "collectively agreed upon and diverse notions of what occurred" (p. 5). According to Stake (2006), when multiple cases are chosen, the researcher situates the case within the larger context hoping that issue-relevant meanings will emerge (cross-case). Cross-case design "promotes theoretical reflection on the findings" (Bryman & Bell, 2011, p. 63) and when chosen well, the cases can provide a diversity of contexts (Stake, 2006).

Research Design

The two institutions of higher education in the southwest United States involved in this study, and the five affiliated researchers had used ePortfolios for the purposes of accreditation and program evaluation, or as a major course assignment. As each of the four disciplines (education, industrial technology, chemical engineering, and human resource development) taught by the researchers embodied different academic backgrounds, a collaborative partnership was formed to investigate further the meaning that students placed on the use of ePortfolios in higher education. The case study, used as the primary research strategy, explores the issues and challenges of implementing ePortfolios as a tool for enhancing student learning, and supporting program or institutional accountability.

The following two research questions guided the study:

1. According to student perceptions, how were ePortfolios used across disciplines in higher education settings?

2. What are the commonalities in ePortfolio practices across disciplines?

Data Collection

A total of 459 undergraduate and postgraduate students participated in the research (Table 1). The data collected included existing documents (such as student reflection papers, student emails, student reflective journals), and student survey data. Although this research involved surveys, the goal of the study was to look at all of the documents as part of a story rather than merely for quantitative results. Permission for this study was granted through the Institutional Board Review (IRB) at both a Research I University (a national university with a full range of degree offerings including doctoral degrees and highly committed to research) and a Regional University (institution offering a full range of undergraduate programs with some master's programs but few or no doctoral programs, see U.S. News & World Report, 2013).

Table 1: Data Collected Across Four Cases

Case	Type of Institution	Number of Participants	Participant Type	Data Collected	ePortfolio Purpose
Education	Regional	310	Elementary pre-service teachers	Student surveys	Institutional ePortfolio
Industrial technology	Regional	42	Senior level industrial technology majors	Student reflection papers	Professional ePortfolio
Chemical engineering	Research I	84	Undergraduate students enrolled in a technical communication course	Student surveys	Institutional ePortfolio
Human resource development	Regional	23	PhD students	Student reflective journals and emails	Professional and Institutional ePortfolio

Data Analysis

The purpose of this study was to understand the meaning that student participants placed on ePortfolios within the higher education classroom. To this end, the team of researchers focused on the way student participants described their experiences of creating and utilizing ePortfolios in their higher education courses. To analyze the data collected in this study, an inductive analysis method, one where data is gathered by the researchers to build concepts (Merriam, 2009), was used whereby analysis required the uncovering of the meaning embedded in the data and making it explicit (Lincoln & Guba, 1985). In the current study, patterns were sought from the participants' words that encapsulated "general explanatory statements" (Potter, 1996, p. 151). The method was also interpretive: the research team attached meaning to the data that included making inferences, extrapolating lessons learned, and refining researcher understanding of the phe-

nomenon - student perceptions regarding the creation and use of ePortfolios in the higher education classroom (Hatch, 2002).

A systematic approach was used in this inductive, interpretive analysis conducted as both within-case and cross-case analysis (Stake, 2006); each of the four cases was analyzed individually and then a cross-case analysis was performed looking into commonalities and any relevant differences/outliers in the cases (exceptionalities).

After the data were collected by the researchers they were converted into digital transcripts for the purposes of the analysis. Each transcript was read by the researchers to independently gain familiarity with the data (Ruona, 2005). As suggested by Bazeley (2007), the qualitative data analysis software, NVivo 10 (QSR.org), can aid the researchers in managing the coding process, storing research memos, and facilitating the connection of concepts and commonalities across-case of the cumulative data and therefore was used in this study.

The data were initially coded in NVivo independently by two of the researchers (who had extensive experience with the constant comparative method as described by Lincoln and Guba, 1985, as well as with the use of NVivo 10) resulting in 27 preliminary codes and in reducing the data (as items with similar topics were clustered and existing data was subsequently re-coded). The specific process is described below.

In the current study, to begin the analysis process the collected data was first uploaded as a transcript into NVivo 10, then unitized or separated into "units of information" (Lincoln & Guba, 1985, p. 344) which could be a word, sentence or paragraph. The unit was highlighted, assigned to its own "node" (an NVivo term for code) and given a descriptive code name. The data coding process utilized the constant comparative method (see also Fram, 2013). More specifically, as each next piece of unitized data was examined, it was compared to the previously coded data to decide if it fit an existing code (described as "look/feel like", p. 347) or if it was different enough to warrant a new code. If the same, it was given the same code descriptor as the first. But, if different, it was assigned a new code (node).

The process continued until each transcript was coded in its entirety. Next, all codes were viewed on a report. Codes were then examined and categories constructed by grouping two or more of the codes together; then, a rule for inclusion was formally written for each category to summarize the meaning that was contained within the data for that particular category (see also Maykut & Morehouse, 2002). A total of 27 categories were assigned. Finally, a cross-case analysis was conducted revealing five emerging themes from the entirety of the data analyzed (Stake, 2006). An overview of the analysis process is shown in Figure 2.

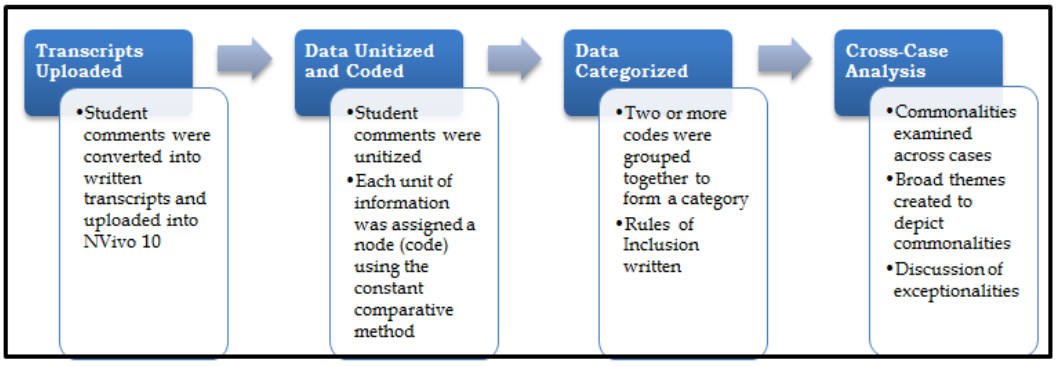

Figure 2: Process of Analyzing Student Comments with NVivo 10

Analysis of Case One involved the examination of online surveys from Qualtrics (qualtrics.com), an online survey management system allowing the researcher to create, launch, and easily analyze surveys. Specifically, transcripts were created from the open-ended survey responses while the quantitative questions utilized the platform to run reports on statistical data generated from six Likert-scale questions. The transcripts were further analyzed utilizing NVivo 10 to look at patterns in the data.

Case Two involved comments extracted from student reflection papers concerning the creation and usage of ePortfolios. In Case Three, student comments about ePortfolios were examined while Case Four involved student reflections from student journals, the ePortfolios themselves, and personal communications with the instructor in the form of emails. Each of these sets of data from Cases Two, Three, and Four were independently extracted, coded, and categorized using the NVivo 10 software platform.

Trustworthiness Criteria

Trustworthiness refers to the merit of a qualitative inquiry (Kreftling, 1991) and is the result of "rigorous scholarship" (Padgett, 1998, p. 92) that includes the use of defined procedures (Lietz, Langer & Furman, 2006). Trustworthiness in qualitative inquiry is essential because it demonstrates that findings of the study authentically reflect meanings described by the participants in the study" (Lincoln & Guba, 1985). Henning (2004) recognized that within the constructivist point of view, experts may draw different conclusions from the same dataset. To that end, the researchers utilized a number of strategies over an extended period of time to promote trustworthiness. Strategies utilized by the research team that promoted trustworthiness (Merriam, 2009) included triangulation, stakeholder checks, research memos, audit trails, and the use of a research team. Each of these trustworthiness criteria will be discussed next.

For *triangulation* (the use of multiple sources of data), various sources of data included surveys, reflective journals, emails, and reflection papers that had been collected and analyzed. *Stakeholder checks* (utilizing individuals with an investment or a stake in the research findings) involved discussions with college-level stakeholders (university administrators, faculty, and instructional specialists) who were involved in the creation of the survey and the collection of the survey responses (Thomas, 2003).

Another strategy utilized in this study was *research memos* (informal analytical writings) that were used by each of the researchers to reflect on their "hunches, interpretations, queries, and notes" (Morrow, 2005, p. 256) and were shared with the rest of the team at the various stages of data analysis. *Audit trails* (the systematic collection of records accumulated from the study) were also utilized as a strategy to enhance the trustworthiness of the study and included collecting raw data, analysis products, team meeting evidence, and process notes (Lincoln & Guba, 1985).

The *research team* approach also promoted trustworthiness. Lincoln and Guba (1985) noted that when conducting a complex qualitative study the advantages of using teams "are so overwhelming that teams ought to be used" (p. 237). In the current study, the research team (which represented multiple disciplines) shared numerous tasks such as data collection, analysis, and auditing and provided mutual support through a lengthy research process. The research team approach was very useful during the several iterations of analysis, to review the student data to identify commonalities and exceptionalities/outliers (Stake, 2006). The team took a number of opportunities to debate, discuss and share codes that emerged in their analysis; the codes signified the student participants' views of the use of ePortfolios in the classroom.

Data Collection: Four Individual Case Studies

The data for this study was collected from four disciplines: teacher education, industrial technology, chemical engineering, and human resource development. These cases are presented next.

Case 1: Pre-Service Teacher ePortfolios

The use of ePortfolios in teacher education has taken a noticeable role in measuring teacher candidates' competencies (Barrett, 2004; Ntuli, Keengwe, & Kyei-Blankson, 2009; Lin, 2008). EPortfolios, matched to state and national standards, have become a primary way to capture authentic evidence of pre-service teachers' understanding of learning and teaching (Lorenzo & Ittleson, 2005). Also, Lin (2008) explored the effectiveness and value of ePortfolios in pre-service teacher education whereby the students indicated that ePortfolios were meaningful for the synthesis of learning experiences and demonstration of growth throughout their program. Further, ePortfolios fostered a greater desire to connect with peers while motivating students to create a unique, personal product. Although previous studies have documented the use of ePortfolios for accountability and accreditation purposes, further research is needed considering perceptions of teacher candidates (Penny & Kinslow, 2006) on the "value and purpose of electronic portfolios, and whether the benefits extend to the classroom and enhance student learning" (Barrett, 2004, p. 5).

The purpose of this study was to examine the perceptions of elementary education majors enrolled in their final semester of student teaching using the ePortfolio platform TaskStream (www.taskstream.com). According to TaskStream (2012), the ePortfolio platform has the capability to assess student learning and program outcomes that prepare students for lifelong learning.

Data collection method

In the College of Education, at one regional university, a teacher preparation program was organized around the framework of the Commission on Behavioral and Social Sciences and Education National Research Council, which recommended that classroom environments were learner, knowledge, assessment, and community centered (Lamb, Geiger, Morrison, Lewis, Thomas & Wright, 2010, p.14). The education faculty worked to implement a logical and effective program adopting the ten The Interstate Teacher Assessment and Support Consortium (InTASC) principles for beginning teachers as learning outcomes for the teacher preparation program and the National Educational Technology Standards (NETS) of the International Society of Technology in Education (ISTE). Program components were also aligned with the State's Essential Knowledge and the State Board for Educator Certification standards.

As students moved through four phases (two-years) of a teacher education preparation, they were required to document evidence of their learning including classroom assignments, teaching reflections, and supportive artifacts using a *Professional Teacher ePortfolio*. The purpose of the ePortfolio platform was to: 1) meet the Teacher Education Accreditation Council (TEAC) accreditation requirements; 2) provide students a repository to store evidence of their learning based upon the InTASC model of core teaching standards; and 3) document student growth and reflection from the beginning to the end of their pre-service program. The ePortfolio consisted of four major tiers (Personal, Reflections/Evaluations, Technology, and Professional) incorporated into education courses with each course containing specific assessment performance measures, matched to both student learning outcomes and accreditation requirements (see Figure 3).

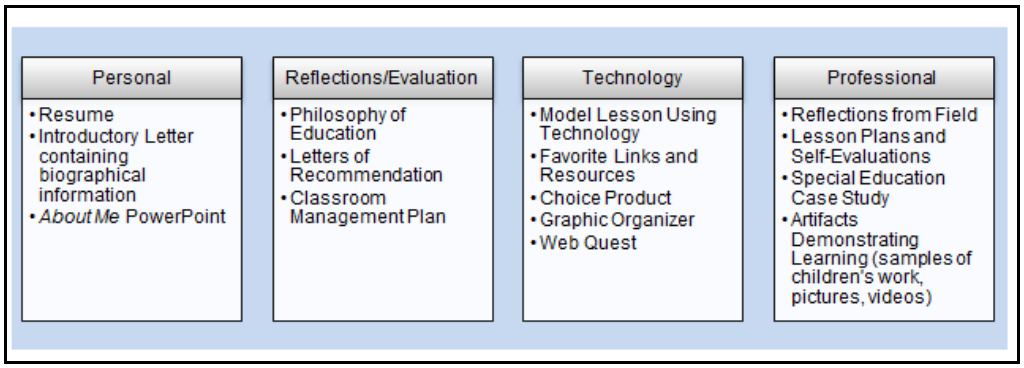

Figure 3: Requirements for the Pre-Service Teacher's ePortfolio

The comprehensive ePortfolio was evaluated as part of the teacher education course by faculty members for each course using a rubric aligned with the TEAC standards (TEAC, 2009). This allowed instructors and students to collaborate on methods of best practice and provide reflective feedback to students regarding their assignment submissions.

This study used survey data to examine the perceptions of 310 elementary education majors (pre-service teachers). The survey included six Likert-scale questions to evaluate the usability of the TaskStream system as perceived by students. The survey gave students the opportunity to provide reflective comments upon their experience using the ePortfolio as part of their educational experience. Four groups of survey data were collected for academic purposes, each semester, from the Fall of 2010 through to the Spring of 2012.

Findings and discussion

Data gathered from students surveys in this case study are shown in Table 2. The primary issue that surfaced was that of *usability* (ease of use of the technology). Over the two-year period, approximately 85% of respondents indicated that TaskStream was easy to use; however, when given the opportunity to provide additional comments regarding TaskStream, students noted concerns regarding the ease of use. A second finding was based upon *training*. All four groups reported the training videos and handouts were fairly easy to use (75%); however, open-ended responses conveyed the students needed additional training to implement ePortfolios effectively. The individual subscription cost of TaskStream purchased by each student was an issue with them. Comments provided by students reflected a negative attitude toward TaskStream stating that it was too costly and time consuming. The final set of comments reflected TaskStream connecting the classroom to their *future career*. The results were generally favorable; however, questions were raised as to whether supervisors or principals valued the ePortfolio process and product.

Table 2: TaskStream Evaluation Data (N=310)

Survey Items	Very Easy	Easy	Difficult	Very Difficult	N/A
Overall Ease of Use	25.61%	59.01%	13.08%	1.66%	0.64%
Lesson Plan Builder	35.59%	59.03%	5.35%	0.02%	0.01%
Rubric Builder	24.88%	50.90%	12.77%	1.99%	9.47%
ePortfolio Builder	23.00%	43.36%	17.07%	4.95%	11.63%
Feedback from Evaluators	32.29%	56.47%	6.55%	2.31%	2.39%
How-to-Documents/Videos	25.95%	51.25%	8.09%	1.99%	12.72%

The four major categories emerging from the analysis of the survey data were subsequently named: *Usability, Training Needs, System Issues, and Connections to Career* (Table 3).

Table 3: Emerging Categories (pre-service teacher use of ePortfolios)

Category	Selected Participant Data Excerpts
Usability	• "TaskStream was a great tool, but it needs some improvements on its spell-check and the overall presentation of the electronic portfolio" (T0035, 2012, p.3). • "The electronic portfolio is sometimes hard to navigate and figure out how to submit work" (T003, 2012, p.1). • "I enjoyed using TaskStream and I feel that it helped keep me organized, however it was difficult to load documents sometimes if they were too large. I had to break them up from time to time to get them to fit" (T0075, 2012, p.5).
Training Needs	• "TaskStream could be a great tool for students in the education program, however, the overall lack of knowledge at the university on how to use the Website and [its applicability] was disappointing" (T0021, 2012, p.2). • "The how to documents that were included on Blackboard were an excellent tool" (T0037, 2012, p.3).
System Issues	• "Love TaskStream... minus the fact that we will lose it all after our time is up" (T0015, 2012, p.1). • "DO not force students to pay for a programme that is required" (T0022, 2012, p.2). • "The whole issue of having to submit work for evaluation is a pain" (T0049, 2012, p.5).
Connection to Career	• "I don't agree with having to turn in an electronic portfolio during student teaching. Many of the principals I have spoken to say that they don't have the time to look over the portfolios" (T0032, 2012, p.3). • "TaskStream was beneficial for me to use during my teaching experience but will not benefit be later on in my teaching career" (T0044, 2012, p.4). • "I loved using TaskStream and want to continue using it for my own classroom" (T0073, 2012, p.6).

In summary, the survey data suggest that although students generally found TaskStream easy to use and a valuable repository for coursework, technology concerns existed and students recommended additional training early in their program. Concerns were raised about the TaskStream platform being worth the costs or beneficial for securing future employment. As a result of feedback, students were no longer required to create an electronic portfolio within TaskStream; however, students continued to submit assignments to instructors through email for feedback and evaluation.

It is evident from student data in this case study that creating an ePortfolio requires support and buy-in from both faculty and students. As the accreditation process across the nation continues to be paramount, ePortfolios are useful mainly for reporting purposes rather than for a focus on individual student learning. The challenge lies in collecting valid representations of authentic learning while maintaining rigorous accountability standards.

Case 2: Web-Based ePortfolios in Industrial Technology

Industrial Technology is a field of study designed to prepare technical and management professions for employment in manufacturing and distribution industries, education, and government. Further, Industrial Technologists work with senior management and engineers in the production environment to facilitate application knowledge (ATMAE.org). Industrial Technology programs are designed to prepare technical professionals for the work environment (Scott & Boyd, 2008).

The use of electronic portfolios (ePortfolios) in the STEM (Science, Technology, Engineering and Math) fields is evident in the literature. For example, Blicblau (2008) described the use of the ePortfolio for a capstone project for Engineering Education for the purpose of developing communication skills for working within an industrial environment, learning and self-evaluation. Also, Herman and Kirkup (2008) depicted the use of ePortfolios for women as a facilitator of their return to the fields of Science, Engineering and Technology describing how an ePortfolio helped women re-enter the world of work through professional development for enhancing their employability.

A recent search of common library databases (Academic Search Complete, Communication & Mass Media Complete, Computer Source, Education Research Complete, E-Journals, ERIC, Science & Technology Collection, Vocational and Career Collection), revealed no empirical studies in the academic literature in years 2005-2012 for the use of web-based portfolios in higher education within the field of Industrial Technology. Although suggested that ePortfolios could be useful by a program-level online self-study portfolio to leverage the Internet to improve the accreditation process for the National Association of Industrial Technology (NAIT) (Obermier, 2005), no literature was found on ePortfolios for student use in the field of Industrial Technology.

The purpose of the current case study is to gather empirical evidence of Industrial Technology students' perceptions of using Web-based ePortfolios for learning. The next section describes specific methods used to gather student data.

Data collection method

Data collected from Industrial Technology Majors at a regional four-year public university in the U.S. are included in this study. Data was gathered retrospectively from two semesters (Fall 2011-Spring 2012) of an Industrial Technology course designed for seniors in a capstone course. The course is a culmination of their program and gateway to the workplace. The integrated ePortfolio is constructed in a one-hour required course taken concurrently with the Capstone Experience class for Industrial Technology majors and is designed to synthesize learning across the Bachelor of Science degree in Industrial Technology and showcase relevant projects to use in the job search process.

An integrated *Social Web-Based ePortfolio System* constructed in the course included the students' use of: 1) a LinkedIn social networking profile (LinkedIn.com) coupled (through an embedded URL) with, 2) a web-based repository of the students' choice such as Google Sites, Academia.edu, SlideShare.net, or similar web-based program for showcasing learning artifacts from their course of study with personal reflections on the project. This system allowed for social networking with classmates, instructors, staff at the university, leaders in the community and experts in the field by connecting individually or within professional group and also for commenting and describing their artifacts (See Figure 3).

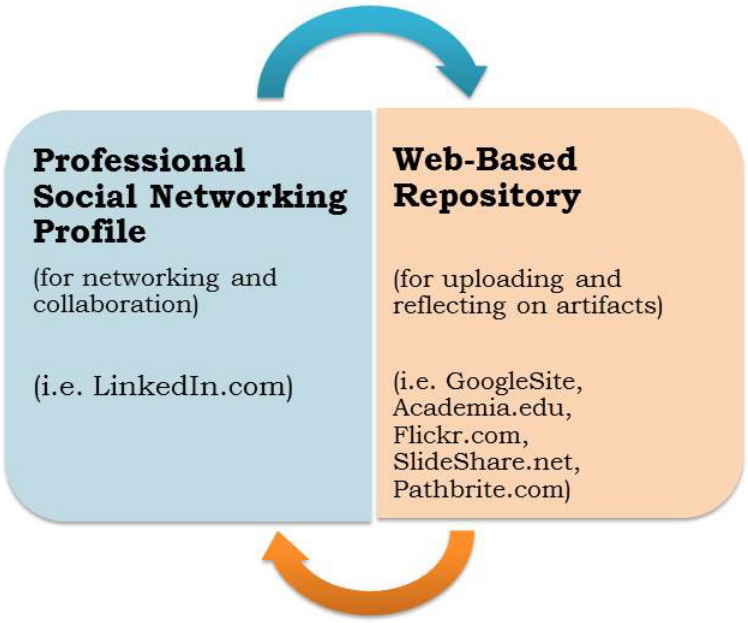

Figure 4: Integrated Social Web-Based ePortfolio System

Forty-two reflection papers were examined and comments about the process of the construction of their ePortfolio system were extracted and will be presented next.

Findings and discussion

Reflection papers from forty-two Industrial Technology students from three sections of the Capstone Experience/ePortfolio course were examined and reflections specific to the creation of their ePortfolio were extracted, coded, and categorized using the NVivo 10 qualitative analysis software program (see (QSR.com). Selected excerpts from student reflection papers are highlighted in Table 4.

The five categories that emerged from this case study are: *Academic Honesty* (the notion that students must give credit where credit is due, in writing and online), *Career Focused* (i.e., an ePortfolio is useful for illuminating professional expertise and experience and utilizing the ePortfolio as a tool for employment), and *Web-based ePortfolios for Professional Networking and Collaboration* (social web-based ePortfolio system) allows for connecting with others in a professional way. The remaining two themes are: *ePortfolio Builds Personal Brand* (establishing a professional online presence allowing for the publishing of original work in cyberspace), and *Satisfaction from Creating an ePortfolio* (student feels pride or gains enjoyment from creating an ePortfolio).

Overall, the data reflect that the Capstone students were motivated by a socially networked Web-based ePortfolio system, allowing for connecting to classmates, instructors and the community of present and future employers and also showcasing their projects to share with others. Many students reported utilizing Facebook for their personal networking needs but had not realized that a professional online presence was important until they completed their ePortfolio and subsequently reflected about their learning and its usefulness as a professional.

Table 4: Emerging Categories from Industrial Technology ePortfolios

Themes	Selected Participant Extracts
Academic Honesty	• "It is very easy for anyone to put anything on a Website and call it their own" (ITP052, 2012, p. 9)
Career-Focused	• "Creating a LinkedIn.com account along with the Academia.edu account helped me to realize that businesses can see me as a professional, rather than a profile on a social media Website" (ITP026, 2011, p. 11). • "The Capstone class and the ePortfolio were a great way to update our current resume and profiling skills by utilizing LinkedIn" (ITP030, 2011, p. 4).
Web-based ePortfolios for Professional Networking and Collaboration	• "Using LinkedIn, I was able to connect with different students from my major and even the university already in the professional sector, and could then pass along my resume or alert me to potential job interviews" (ITP027, 2011, p. 5). • "The most beneficial part of the entire course was the introduction to LinkedIn.com. I never realized this network existed…I found several people that I knew…even friends from my military service. This is really a fantastic find, especially since the field of work that I am experienced in is very small" (ITP029, 2011, p. 8).
ePortfolio Builds Personal Brand	• "Learning how to make an online profile in LinkedIn to show future employers, and then to network with other students was very helpful to get my name out in the world" (ITP027, 2011, p. 5) • "In the professional world, your digital presence can be used positively…a well-managed social media account, continuously monitored…can make the best of technology and add strength to your professional image" (ITP033, 2011, p. 10). • "I like having my best school projects on display for the world to see on my Google Site. Someone could possibly be impressed to see the effort I put forth in m projects" (ITP003, 2011, p. 12).
Satisfaction from Creating an ePortfolio	• "I created a wonderful ePortfolio I am proud of" (ITP001, 2011, p. 9). • "Another aspect of the class I found interesting, if not fun, was the creation of my LinkedIn account and Google Site" (ITP003, 2001, p. 7).

Case 3: Technical Communication in Chemical Engineering

Electronic reflective portfolios are utilized as a means of assessing learning across the curriculum and are used to assess writing competencies essential to both course and program-level outcomes. Program-level outcomes for engineering students from the Accreditation Board for Engineering and Technology (ABET) include problem-solving, critical thinking, and strategic planning as well as the ability to communicate effectively in various professional contexts. The ePortfolio serves as an ideal instrument in a technical communication course for reflecting and writing about program-level (ABET) outcomes, reinforcing the outcomes while honing essential professional writing skills. Reflective ePortfolios facilitate: 1) student understanding of concepts across the curriculum; and 2) assessment of course, program, and institutional learning outcomes, particularly those met through high-impact learning experiences (capstone courses, internships, service learning, etc.), experiences in which traditional assessment methods may not adequately represent or reinforce what a student has learned (AACU, 2011; Peet, 2010).

Students in an engineering communication course must be able to practice essentials of technical communication (style, genre, organization, development, design, and convention), while addressing different rhetorical contexts (different audiences and purposes that influence the message and its delivery). Reflective ePortfolios prompt students to become more aware of what they know and how they learned it, thus preparing them to negotiate the new contexts they will encounter in future academic contexts and workplaces.

In addition, research supports that integrative learning portfolios help students develop a positive professional identity. Developing this professional identity is facilitated through an ePortfolio through prompts eliciting reflection about how students see themselves as professional communicators and the likely continued use of the ePortfolio beyond the classroom. The ePortfolio developmental process "helps to bridge external expectations and events to internal evaluations … helping students see connections between courses and helping them to learn about the professional context" (Eliot & Turns, 2011, pp. 635-636).

The purpose of this case study was to determine if a web-based reflective integrative learning portfolio could be designed to address course and program-level outcomes and to determine students' perceptions about how well the ePortfolio helped them meet these outcomes.

Data collection method

Eighty-four students, ranging in age from 19 to 23, enrolled in an undergraduate technical communication course within a Department of Chemical Engineering at a Research I university used a reflective portfolio, the ChemE-folio, requiring students to write extensively about their knowledge and experience. Students had the option of selecting the presentation media, online or print, for producing their portfolios; if electronic, they selected ePortfolio software of their choice (i.e. Google Sites, Weebly, iWeb).

Most students chose the Google Sites ePortfolio platform (Sites.Google.com) for their ChemE-folios. Students used a template (organized by outcomes, both institutional and program) to facilitate the creation of an ePortfolio while permitting them the freedom to design the final product as they desired. Students chose to make their ePortfolios either public or private. The specific objectives for the assignment applied critical thinking and writing, as prompts required students to reflect in depth on their knowledge and experience and communicate their discoveries through reflective writing (moving from tacit to explicit understanding of their learning experiences).

Evaluation of assignment outcomes required determining how well the ePortfolio demonstrated significant writing competencies: well-developed short essays, supported by clear, substantial, relevant evidence, communicated through coherent paragraphs and a professional writing style. Though the ePortfolios created in this course were not used to determine how well program-level outcomes were met, the reflective questions students answered came directly from the program-level outcomes. Assessment of these ePortfolios, then, focused on how well the students demonstrated strong writing competencies, the primary goal of the course.

Post surveys were used to assess students' experience with particular technologies. The structured post-surveys are utilized in this case study to illustrate student perceptions of the use of an ePortfolio. Post-surveys were collected during Fall 2011 and Spring 2012 semesters.

Findings and discussion

Seven main categories derived from the seven structured questions in the post surveys of student participants were examined. The data reflects that students saw value in their ePortfolio beyond immediate use of an assessment of their writing and organizational skills in a course. However, many confessed they did not know if they will utilize it when job searching, but most students

valued what they learned about themselves through the process of directed reflection. They also demonstrated an understanding how these skills could transfer to broader contexts.

The challenges of the ChemE-folio included the students' not grasping how to apply technology options for controlling privacy: "I don't like having my personal information/my information online, viewable to public" was one of the comments of the "unlikely" surveys ("unlikely to use the ePorfolio in the future"). Also, many felt the creation of an ePortfolio was time-consuming if not used across other courses. Selected excerpts from the survey are presented in Table 5. These excerpts came from the structured student post surveys.

Table 5: Emerging Categories from Undergraduate Chemical Engineering ePortfolios

Themes Derived from Structured Survey Questions	Selected Student Extracts
Belief that reflecting (i.e. writing about knowledge, skills, and experiences) in the ChemE-folio has enhanced learning with your degree program	• "Reflecting has enhanced my learning in the degree programme by understanding what the university is trying to achieve/what they are held accountable for" (CEP001, 2011, p. 1) • "Yes, I honestly never look at the ABET outcomes but looking and reflecting on them helped me understand why professors do some of the things they do for our classes. Also helped reiterate why employers ask certain questions" (CEP061, 2012, p. 1)
Way(s) that Google Sites was or was not helpful for creating ChemE-folio	• "It [template] helped me focus more on my content, design, and formatting rather than having to spend too much time on actually building a site from scratch—i.e., dealing with hyperlinks" (CEP0014, 2011, p. 1)
Time student spent creating ChemE-folio	• "3 days (6 hours a day)" (CEP002, 2011, p. 1) • "About twenty hours" (CEP081, 2012, p. 1)
Likelihood of continued use of ChemE-folio in the future (for grad school, career advancement, or simply tracking of accomplishments)	• (Likely) "In order to continue to use it, I must be proactive at updating. Also, I want to get feedback from professionals in the workforce whether they like it or would use it to investigate me" (CEP022, 2011, p. 1) • (Very likely) "I would like to use this page as a professional site once I begin my career. By tracking my accomplishments as they happen, I believe highlighting them later will be easier" (CEP078, 2012, p. 1).
Ways the pre-made template helped to create ChemE-folio	• It helped me focus more on my content, design, and formatting rather than having to spend too much time on actually building a site from scratch—i.e., dealing with hyperlinks (CEP067, 2012, p. 1)
What liked most about creating your ChemE-folio	• "I like that it consolidates all of my experiences and shows them off as desirable traits or skills" (CEP049, 2011, p. 1) • "It will set me apart in the eyes of recruiters" (CEP048, 2011, p. 1) • "At the end of the day, I have a Website of my own" (CEP069, 2012, p. 1)
Liked the least about creating ChemE-folio	• "Being forced to write it although in hindsight I am glad for it" (CEP011, 2011, p. 1). • "The freedom was challenging" (CEP049, 2012, p. 1). • I wish I would have put for time into it—but going to continue to edit it!" (CEP038, 2011, p. 1).

Case 4: Web-Based ePortfolios in Human Resource Development

Human Resource Development (HRD) is a process for unleashing human expertise through organization development and personnel training and development for the purpose of improving performance (Swanson, 2009). According to Roberts (2011), most HRD programs primarily reside in Colleges of Education, with a few in Colleges of Business and the remainder in a variety of colleges ranging from Agriculture, Communications or Technology. These findings are consistent with those of Li, Nimon and Allen (2008) and with those of Kuchinke (2002).

The literature examining the use of ePortfolios in HRD is very limited. McWhorter and Bennett (2012) compiled a literature review examining the role of ePortfolios in facilitating the transition from higher education to the workforce. Also, Bennett, McWhorter and Sankey (2012) examined the use of ePortfolios as a tool in graduate medical education programs.

Due to the dearth of empirical studies regarding the use of ePortfolios in the field of HRD, the purpose of the current case study is to gather empirical evidence around the use of web-based ePortfolios in HRD for gathering students' perceptions of using ePortfolios for learning. Specific methods used to gather data are presented next.

Data collection method

Data collected from twenty-three PhD students in a HRD program within one cohort at a regional university in the U.S. are included in this study. The majority of these students (91%) had completed at least twenty-four hours of their doctoral program when the ePortfolio was created. The data were collected approximately half way through their course work in the program. The web-based ePortfolios were developed as a part of the requirements of two courses. Data were collected in the summer of 2012. The students were given a grading rubric for the ePortfolios listing required items such as Introduction, Short Biography, Vita, Major Projects, Research Interests, Professional Organizations, Awards, Publications/Presentations, and a Verification Statement of the accuracy of the information. Student reflections on the construction of web-based ePortfolios were collected retrospectively from reflective journal entries, the ePortfolios themselves, and personal communications in the form of emails.

Findings and discussion

Nine categories emerged from the student reflection data. Each is highlighted in Table 6 with selected student extracts. A brief discussion follows thereafter.

The nine categories that emerged were overall not surprising given the nature of ePortfolios. However, the most satisfying finding for the instructors of the course were two categories that emerged from the study: and *Self-Reflection* (looking back on what they had accomplished in their prior year of doctoral study) and *ePortfolio offers a "Big Picture" of Learning* (ePortfolio creation facilitates the visualization of future needs in the last year of their doctoral program and also their future career) because those categories encompassed the impetus for the project from its onset.

Table 6: Emerging Categories from Human Resource Development ePortfolios

Categories	Selected Student Extracts
Usability of Task-Stream	• "I really, really like TaskStream…the output looks very professional. I especially like the fact that we can also publish the ePortfolio as a PDF" (HRDP09, 2012, p. 21). • "For a class exercise it makes sense to lock us into the structure they provide, but from my perspective, it seems too rigid (HRDP002, 2012, p. 12).
Repository for Now and Future	• "Thanks for making this available to us [I am] building a great repository for future reflection" (HRD001, 2012, p. 8). • "As with planning one's long term research agenda, I believe it will be both critical and helpful to keep the continued development of my ePortfolio in the back of my mind as I select my project work in future classes" (HRDP012, 2012, p. 11).
Time Factor	• I would say that I have at least 20 hours into researching and building this project. It is my hope that it is a superior product" (HRDP007, 2012, p. 19).
Self-Reflection	• "I have learned a lot about myself and my study and work habits"(HRDP012, 2012, p. 11). • "The process of compiling the content for the portfolio provided some interesting insight" (HRDP012, 2012, p. 11).
Faculty Aids for Creating ePortfolio	• "The rubric and the link to [Instructor's] ePortfolio also was very helpful in illustrating what is expected from an ePortfolio" (HRDP011, 2012, p. 16).
ePortfolio offers a "Big Picture" of Learning	• "Developing an ePortfolio also helped me visualize what type of information I will need to present in the future when applying for a position, or communicate with other scholars about research interests" (HRDP010, 2012, p. 15)
Career Development/ Personal Branding	• "As I looked back at the EPortfolio assignment, I realized that the assignment could be applied professionally. I tried to build the EPortfolio to be a hybrid of Academic and Professional EPortfolio" (HRDP021, 2012, p. 1). • I wonder if the portfolio will eventually replace CV all together due to its capacity to contain large amount of information. (HRDP021, 2012, p. 1).
ePortfolio for Non-Traditional Student	• "One concern that I have about my portfolio, is that my professional information is a bit lacking since I have been out of the workforce as a full-time mother. (HRDP010, 2012, p. 9).
Creating ePortfolio is Satisfying	• "Overall, I found the process of creating my ePortfolio to be a satisfying one. I feel unexpectedly comfortable with the end product and am pleasantly surprised by the quality of the "story" I was able to share after just a single, albeit rich, year of doctoral study" (HRDP009, 2012, p. 17).

Cross-Case Findings and Discussion

This study was guided by two research questions (RQs). Regarding RQ# 1, *How were ePortfolios used across disciplines in higher education settings*?, we have presented four case studies from four separate disciplines in higher education (Education, Industrial Technology, Chemical Engineering, and Human Resource Development) that have described how ePortfolios were adopted and utilized within the discipline for each case under examination. Although ePortfolios were implemented in different contexts, taken as a whole, these four cases illuminate the potential for

ePortfolios as a powerful learning tool. According to JISC (2008), ePortfolio-based learning is a complex process made up of planning, synthesizing, sharing, discussing, reflecting, giving, receiving, and responding to feedback where "the process of learning can be as important as the end product" (p. 6).

Table 7: Combined Categories across Four Disciplines

No.	Name of Category	Number of Disciplines
1	Academic honesty	1
2	Continued use of ePortfolio beyond course	3
3	Cost of ePortfolio	1
4	Dislike/skepticism of online (web-based) sites	1
5	ePortfolio – visual appeal	2
6	ePortfolio – collaboration	2
7	ePortfolio – future career	4
8	ePortfolio – learning	3
9	ePortfolio – helps students to visualize skills needed for future learning/careers	2
10	ePortfolio – helps for the non-traditional student	1
11	ePortfolio – not used in real-life	1
12	ePortfolio – not useful in job hunting	1
13	Reflection is important "big picture" of learning facilitated by ePortfolio	4
14	Request for more feedback from instructors	2
15	ePortfolio –tells the "story" of academic journey	2
16	ePortfolio –usability	4
17	ePortfolio –construction is time-consuming	4
18	ePortfolio –useful for job searching	2
19	ePortfolio –academic usefulness: organizing classwork/repository of artifacts	3
20	ePortfolio –quality issues	2
21	Help/Support from ePortfolio vendor	2
22	Instructor learning aids (i.e. template, rubric, written instructions, video) useful for building ePortfolio	4
23	ePortfolio –allow for publishing work to the Internet	2
24	ePortfolio –enjoyment/satisfaction from completing	4
25	ePortfolio –create social media awareness/literacy	2
26	More faculty training needed for ePortfolio use	1
27	ePortfolio –create virtual presence (personal branding)	2

To answer Research Question 2: *What commonalities emerged among students using ePortfolios across disciplines,* it was necessary to combine the data and analyses from the four cases and look across the cases for shared attributes. By its very nature, a multi-case qualitative inquiry generates a large amount of data (Lincoln & Guba, 1985); therefore, the research team utilized the qualitative analysis software program NVivo 10 (QSR.com) for combining the data from four individual cases for further cross-case analysis to search for commonalities (see Miles, Huberman & Saldana, 2014).

Once the data in each of the four case studies were combined, the resulting 27 categories (see Table 7) were further refined by the research team into five broad themes that the research team

agreed conceptually encapsulated the others. The following five themes emerged: *career-focused*, *"big picture" of learning*, *social and visual learning*, *enablers to web-based ePortfolios*, *and barriers to web-based ePortfolios* as depicted in Figure 5. Each theme will be discussed further utilizing selected student excerpts buttressed by ePortfolio literature. According to Stake (2006), excerpts that are shared in the research report should be selected on the basis of the expected utility of the participant excerpt to develop the themes found in the data. The student extracts reported in this paper were chosen on that basis.

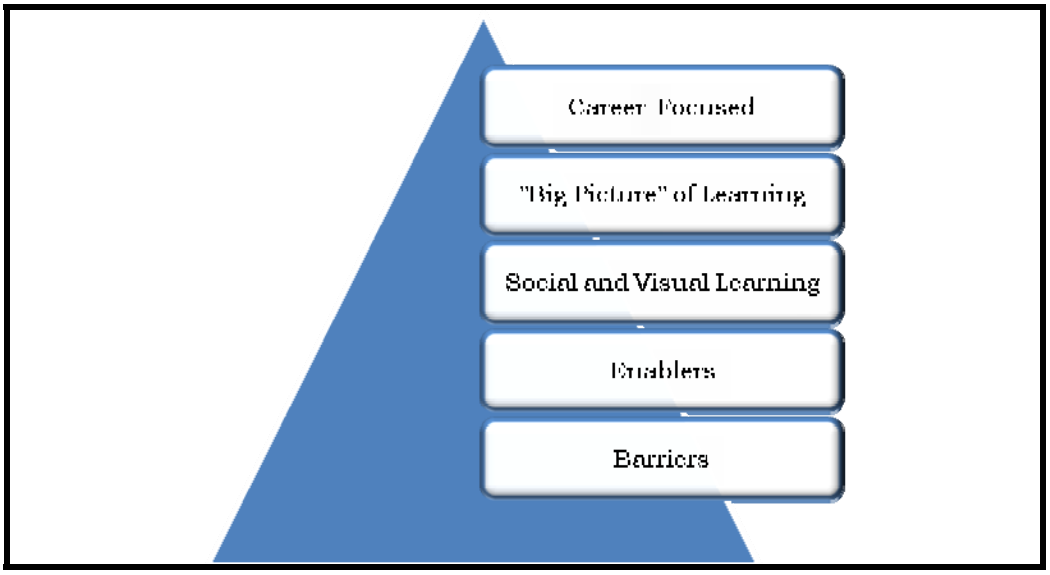

Figure 5: Emerging Themes across Four Cases of Web-Based ePortfolios

Career-focused

Across the cases, the student data revealed that students (both undergraduate and graduate) saw their ePortfolio as a gateway to their professional endeavors. The process of documenting student knowledge and skills gained in their academic program led the them to look ahead and guage the usefulness of their product. One student in chemical engineering remarked: "The points presented in the folio are common in interviews. The folio is a great refresher before an interview and a great presentation during" (CEP069, 2012, p. 1). An Industrial Technology student said: "In the ePortfolio I have posted assignments, my resume, and some demographic information that will allow potential employers to get to know me a little better" (ITP002, 2011, p. 8). A pre-service teacher noted: "I believe that this will help me obtain a job" (T0060, 2011, p. 5) and in a HRD journal, a student composed the following reflection:

> As I looked back at the ePortfolio assignment, I realized that the assignment could be applied professionally. I tried to build the ePortfolio to be a hybrid of academic and professional ePortfolio. I realized that the possibilities are limitless. I wonder if the ePortfolio will eventually replace [the] CV all together due to its capacity to contain large amount of information" (HRD012, 2012, p. 20)

This career connection is also echoed in the literature; for instance, the ePortfolio building process was found to encourage students to think about their professional knowledge, skills and abilities (Buzzetto-More, 2010). To meet the needs of learners in the 21st century, "Higher Education institutions must utilize educational ePortfolios as a collection point for all of the learner's information… as well as a point for connecting learning to work" (Smith, 2010, p. 2).

"Big Picture" of Learning

Several students in the study found creating their ePortfolio prompted them to take a broader gaze at their learning experiences. In the four disciplines, students were challenged by the reflections requiring them to see the "big picture" of their disciplines and career choices but appreciated the value of doing so. For instance, a student in HRD remarked: "I also realized how important it would be to consider how each piece of my work so far in the HRD doctoral program would fit into the "bigger picture" of my ultimate academic objectives" (HRD012, 2012, p. 11). Another said: "Overall, I found the process of creating my ePortfolio to be a satisfying one. I feel unexpectedly comfortable with the end product and am pleasantly surprised by the quality of the "story" I was able to share after just a single, albeit rich, year of doctoral study" (HRD009, 2012, p. 17). Also, a student in Chemical Engineering noted that: "The reflective writing was a good way to analyze my past" (CEP058, 2012, p. 3). And, an Industrial Technology student wrote: "my ePortfolio allowed me time to look back over all that I had learned in my program to see how far I had come" (ITP009, 2012, p.7).

Reflective feedback from instructors and peers help students to develop a sense of meaning in the "big picture" of learning. According to Jones (2011), "Students developing ePortfolios construct meaning from their learning experiences and develop a cohesive instrument for presenting the constructed meaning to others" (p. 80). However, students in the education department were disappointed in the reflective feedback they received from their instructors as brought to light in the following excerpt "I was annoyed by evaluators that would only put *meet/does not meet* requirements and not tell/show us how we actually did so we could grow and improve" (T0079, 2011, p. 6).

The "big picture" of learning resonates in the literature as ePortfolios have been identified as a tool providing "a comprehensive picture of learners' achievement and growth, enlarging the view of learning outcomes, involving students in the assessment process, motivating independent learning, communicating learning outcomes to faculty and parents, and creating an intersection for instruction and assessment" (Okoro et al., 2011, p. 348).

Social and Visual Learning

Across two of the disciplines, ePortfolios were identified as helping students to showcase their learning through social interactions, and all four case studies utilized a web-based platform for student ePortfolios. Students had an emotional attachment to the products they created. They desired to create something they were pleased with, would want to show employers, and could keep for later use. One Industrial Technology student noted: "I have been able to make connections through LinkedIn with business people I admire. I have even had the opportunity to pick an executive's brain and ask questions on how he started his business" (ITP003, 2011, p. 8), while another student remarked: "When I started work on the ePortfolio, specifically LinkedIn, I began to see how this could be a useful tool for networking with like-minded indivuals…this became a turning point for me" (ITP008, 2011, p. 4). A second HRD student described the process of creating their ePortfolio to reflect their personality through visual means: "As I am not particularly artistic or aesthetically creative… I wanted to create a portfolio that would be both interesting and informative, but also professional looking and subtle…choosing a color scheme that reflected my personal tastes" (HRD005, 2012, p. 2).

According to Barrett (2009), research has shown that the use of ePortfolios is fast becoming an integral component of 21st century learning. EPortolios "give students the opportunity to build a positive digital identity and establish their online brand" (p. 16). Also, she noted that when students are given choices in the visual presentation and multimedia components in their eportfolios, they are more intrinsically motivated to learn. The ePortfolio becomes, as Rebbeck

described “a reflection of the student as a person undergoing continuous personal development, not just a store of evidence" (in JISC, 2008, p. 9).

Enablers of Web-Based ePortfolios

Analysis of the results revealed that there are key *enablers* associated with ePortfolio use. These enablers included online platform templates and instructor aids such as grading rubrics, ePortfolio models, templates, and reference guides. For instance, templates offered by the ePortfolio vendors enabled students in the development of their ePortfolios (Batson, 2012). Also, a template created by the instructor for use by the Chemical Engineering students facilitated development of the ePortfolio; one student in Chemical Engineering remarked: “It [template] gave me a roadmap for getting started… [yet] allowed us to decide on materials included and [the] format” (CEP059, 2012, p. 1).

A second enabler to web-based ePortfolios was instructor provided aids. For example, a student in HRD found that the instructor grading rubric and the model of a completed ePortfolio were helpful: “The rubric and the link to [Instructor’s] ePortfolio were very helpful in illustrating what is expected from an ePortfolio” (HRD011, 2012, p. 16). Another student commented on the instructor’s guides: “The how-to documents that were included on Blackboard were an excellent tool” (T0037, 2012, p. 3). This enabler is reinforced in the literature. For instance, Light et al. (2012) recommended sharing a teacher-made or teacher-located grading rubric “at the beginning of the learning experience when the learning outcomes are communicated so they understand what is expected of them … providing a scaffold for them to develop their knowledge, skills, and abilities ... helping to operationalize learning” (p. 63) for the students and instructor.

The literature around enablers of web-based revealed that students benefit from access to guides that illustrate the use of particular tools and platforms (Barrett, 2011b). Also, rubrics can be a “powerful approach to understanding artifacts within the ePortfolio and relating them to the learning activities and learning outcomes articulated to students at the beginning of the learning experience” (Light et al., 2012, pp. 61-62).

Barriers of Web-Based ePortfolios

Ditzhazy and Poolsup (2002) noted that both internal and external barriers can impact the integration of technology tools within the classroom. Rogers (2000) contended that internal barriers could be related to one’s perception towards or competency in using a technology while external sources include the necessary support, training, and tools. Rogers further noted that a lack of time and the unique culture of the institution cross both types of barriers. In this study, a number of barriers (internal and external) were found across the four cases in the creation of web-based ePortfolios. These barriers included the lack of adequate training, usability issues, time consumption, and student privacy issues.

The first challenge identified by the students was the need for information and additional *training* in the creation of an ePortfolio. Students in education remarked that more explanation from the instructor was needed: “This system needs to be explained a lot better than it was... to the students and the teachers. It was a huge headache, and it is something that [I] will never use when I become a teacher” (T0017, 2012, p.2). Another student concurred with this view, stating: “The electronic portfolio is sometimes hard to navigate and figure out how to submit work. I think more training and information needs to be given to future students” (T0033, 2012, p.3).

The second issue that emerged from the student extracts was one of *usability*. Nearly 15% of survey data from pre-service teachers reported that the ePortfolio platform was difficult to use. These difficulties encountered created resistance to the use of the eportfolio amongst some users. For example, one student stated: “Taskstream is a useful tool, although not enough is placed on

informing the students exactly what taskstream can do. If the students are unaware of the benefits, they are less likely to use it to its full potential" (T0077, 2012, p. 6). Kimball (2005) contends, "Even in systems that allow some customization, students are restricted to what the system will allow" (p. 442). For example, a HRD student remarked: "For a class exercise it makes sense to lock us into the structure they provide, but from my perspective, it seems too rigid. My perspective being that of one familiar with Web development and highly concerned with graphic design" (HRDP002, 2012, p. 12).

Across all disciplines, student after student said the ePortfolio creation process was *time consuming*. One Chemical Engineering student remarked that the ePortfolio was quite time consuming in its planning and writing stages: "More time was spent planning and writing than actually creating the site itself" (CEP031, 2011, p. 1). A HRD student said: "I would say that I have at least 20 hours into researching and building this project" (HRDP007, 2012, p. 19). "While it was easy to use", a pre-service teacher noted, "it is time consuming" (T0064, 2012, p. 5). In Industrial Technology, the time factor was also illustrated: "Creating an ePortfolio was very intimidating ... and time consuming and not sure I will use it beyond this class" (ITP010, 2011, p. 7).

Another barrier discovered in this study was one of *student privacy*: "I am not sure that all students want to create digital profiles of themselves" (ITP053, 2012, p. 7). A Chemical Engineering student echoed a similar sentiment: "I don't like having my personal information/my reference information online, viewable to public" (CEP032, 2011, p. 1).

Technical-Social barriers to successful ePortfolios include glitches and usability that reduce effectiveness (Mancuso, Chlup & McWhorter, 2010); also, issues and challenges specified in the ePortfolio literature include scalability, information overload, saturated privacy and copyright issues, faculty buy-in, and technology proficiency affecting successful ePortfolio creation (Lorenzo & Ittelson, 2005).

Limitations of the Study

It is noted that our interpretations of collected retrospective and anonymous survey data were not taken back to the participants to confirm or gather further insights (*member checking*; see Lincoln & Guba, 1985). The largest group of student data (Education) was gathered anonymously and therefore was not able to be confirmed by the students who commented. Also, of the remaining groups, many had graduated and were unable to be located to get their feedback on the data. Therefore, the assumptions made by the researchers may be inaccurate or incomplete. Also, the data ascertained from the surveys and reflections are the students' perspective and experiences and may not reflect those in other university locations, disciplines, or academic levels. In addition, this study reflects four web-based technology platforms and will not represent all web-based platforms available for creating an ePortfolio.

Conclusions and Implications for Higher Educators

This cross-case study presented four cases around the usage of ePortfolios in higher education in four disciplines from two public universities. Even though a majority of the data collected in this study was for purposes of accreditation and evaluation, it is important to examine the overall experience of the ePortfolio student users. In culmination, these four cases reflect the perceptions of 459 student users of ePortfolios in the higher education setting. As a research team, we wish to comment on our findings and provide insight into our learning from combining and analyzing our results across these four cases.

First and foremost, the data revealed the need for the universities to more clearly communicate the ePortfolio expectations and requirements to the students. Students need to understand the pur-

pose behind developing an ePortfolio. If students see value for the potential usage of their ePortfolio, they will spend time learning the tool and building the final product. For example, the majority of pre-service teachers looked at the ePortfolio as a way to complete course requirements in order to complete their evaluation rather than a tool for learning. Prior research noted that the standardization of ePortfolios (for evaluation reasons) is a potential challenge stifling creativity and innovation (Siemens, 2004). According to Barrett (2011b) the student's "choice and voice" (para. 2) is very important to increase motivation and attitudes toward creation of the ePortfolio often resulting in a better experience and product.

Secondly, regardless of the ePortfolio platform, students and faculty members need training and support. The extent to which templates, tutorials, and self-paced instruction are helpful is dependent upon the individual, discipline and the tool. Easy access to support should be available in any case – especially in the early stages. An emphasis needs to be placed on the fact that ePortfolio development is not primarily about creating a deliverable to get a job. Instead, instructors must focus on helping students to see the value of what they are learning about themselves as lifelong learners, critical thinkers, decision makers, and problem solvers.

It is recommended that ePortfolio stakeholders on a campus or within a region establish a community-centered environment such as a community of practice (Anderson, 2008). A virtual community of practice (VCoP) is normally organized around the interests of its members (Ardichvili, 2008) and could be utilized to share learning and experiences of quality ePortfolio practices in higher education in order to foster scholarship and research opportunities. For instance, the Electronic Portfolio Action & Communication group (EPAC) is a VCoP that has been involved with ePortfolios since 2002 and its virtual communication includes a list-serv and frequent Webinars (EPAC, 2013) and utilizes social media such as Twitter. A VCoP can become the vehicle for gaining formal and informal training and support around the use of ePortfolios. Through a shared discourse, key stakeholders such as peers, faculty and employers can come together to decide on quality, assessment, and evaluation whereby "student learning is social and therefore learners are building social capital in the community of practice well before they formally enter the field" (Brown, Peterson, Chida & Desrosier, 2009, p. 4). The VCOP should also be involved in the selection, implementation, and pedagogies involved with the uses of ePortfolio technologies that directly influence the success of the product created and the learning achieved (JISC, 2008).

Educators should be committed to the lifelong (longitudinal) and lifewide (breadth) facets of student learning. According to Peet et al. (2011), much of the "unconscious [tacit] knowledge, skills, and capacities embedded within a particular context or relationship can be retrieved through meta-reflection (the ability to think about the process of learning)" (p. 15); and suggested that ePortfolios are one way to surface tacit knowledge giving students a voice, a window into prior experiences, and cognizance of their learning thereby creating a pathway between academia and industry (see also Heinrich, Bhattacharya & Raydudu, 2007).

As technology becomes increasingly sophisticated (McWhorter, 2010), higher educators must be abreast of technologies that promote and document student learning. Web-based platforms differ greatly in terms of their learning curve, ownership, sharing, updating, and design options. These technologies, platforms, and deliverables must match real-world applications in order for learning to be meaningful and make sense to the learner (Morphew, 2012). Paulson and Paulson (1994) said that "The portfolio is a learning environment in which the learner constructs meaning. It assumes that meaning varies across individuals, over time, and with purpose" (p. 36).

In order to measure student learning, assessment tools (assignments and rubrics) that reinforce writing goals must be incorporated into the ePortfolio process. The assessment of an ePortfolio needs to be part of a formative process allowing for peer and instructor feedback throughout the program, not designed as summative only evaluations. Incorporating reflections within program

learning outcomes and specific experiences (i.e., internships, service-learning, etc.) gives the students a more holistic view of their academic career and helps them to understand the relevance of their learning. In turn, an ePortfolio becomes an assessment *for* learning rather than just an assessment *of* learning (Barrett, 2005).

Asking students to construct work in an authentic digital environment is important. According to Raisor and McWhorter (2012), "carefully planning how to synthesize writing assignments, workshops, discussions, and reflections within an authentic context…is essential to meeting complex communication outcomes dictated by the current global environment" (p. 3). The construction and maintenance of an ePortfolio gives the practice needed to develop professional writing skills including "flexibility, communication and judgement in digital environments" (JISC, 2012, para. 1).

A constructivist classroom "requires a paradigm shift," as well as "the willing abandonment of familiar perspectives and practices and the adoption of new ones" (Brooks & Brooks, 1993, p. 25). Throughout this study, each researcher became a reflective practitioner – one who goes back and looks into learning from the past and lets it inform their future practice. This process of self-reflection and interpretation is called metacognition which, according to Morphew (2000), is consistent with constructivist thought. For example, a researcher noted:

> I think it interesting as I examine the queries that I find that my terminology as an instructor has changed. For example, my students' reflection papers reflect the use of the concept of digital presence to virtual presence to professional branding. I think it interesting that it may very well be that my concept evolved over semesters until it is more refined in my own mind through experience with the Internet as an individual user of technology that is then adapted to my courses.

Finally, it is the combined hope of the researchers that the lessons learned from this study could support other programs in the successful implementation of ePortfolios across higher education. In the future, the researchers anticipate the application of learning obtained from this research to inform a second iteration of their study of ePortfolios involving the collection of data from an external (but crucial) stakeholder to higher education, the employer.

References

Abrams, A. (2009). *The portfolio builder 2 for PowerPoint: Templates for creating digital portfolios with PowerPoint.* Retrieved from http://www.arnieabrams.net/portfolio/Chapter1-%20PB_overview.pdf

Anderson, T. (2008). *Toward a theory of online learning*. In T. Anderson & F. Elloumi (Eds.), *Theory and Practice of Online Learning* (pp. 45-74). Retrieved from http://www.aupress.ca/books/120146/ebook/02_Anderson_2008_Anderson-Online_Learning.pdf

Ardichvili, A. (2008). Learning and knowledge sharing in virtual communities of practice: Motivators, barriers, and enablers. *Advances in Developing Human Resource, 10*(4), 541-554. doi: 10.1177/1523422308319536.

Association for Learning Technology (ALT). (2004, April 22-23). *EPortfolios and digital repositories.* ALT-SURF Seminar, Edinburgh, UK.

Association of American Colleges and Universities (AACU). (2007). *College learning for the new global century. A report for the national leadership council for liberal education & America's promise.* Retrieved from http://www.aacu.org/leap/documents/GlobalCentury_final.pdf

Association to Advance Collegiate Schools of Business International (AACSB, 2012). *Accreditation.* Retrieved from http://www.aacsb.edu/accreditation/

Ayala, J. I. (2006, November). Electronic portfolios for whom? *Educause Quarterly*, *1*, 12-13. Retrieved from http://www.educause.edu/ir/library/pdf/eqm0613.pdf

Banta, T. W., Griffin, M., Flateby, T. L., & Kahn, S. (2009). *Three promising alternatives for assessing college students' knowledge and skills*. Urbana, IL: University of Illinois and Indiana University.

Barrett, H. (2004). *Directions for ePortfolio research.* Retrieved from http://electronicportfolios.org/research.html

Barrett, H. (2005). *Researching electronic portfolios: Learning, engagement, collaboration, through technology.* Retrieved from http://electronicportfolios.org/portfolios/ConnectedNewsletter-final.pdf

Barrett, H. (2009). *Balancing the two faces of ePortfolios.* Retrieved from http://electronicportfolios.org/balance/balancingarticle2.pdf

Barrett, H. (2011a). *Evolution of electronic portfolios*. Retrieved from http://blog.helenbarrett.org/2011/04/evolution-of-electronic-portfolios.html

Barrett, H. (2011b). *Generic tools requirement for ePortfolio development*. Retrieved from http://blog.helenbarrett.org/2011/05/generic-tools-requirement-for-e.html

Barrett, H., & Wilkerson, J. (2004). *Conflicting paradigms in electronic portfolio approaches: Choosing an electronic portfolio strategy that matches your conceptual framework*. Retrieved from http://electronicportfolios.org/systems/paradigms.html

Batson, T. (2012). *12 Important trends in the ePortfolio industry for education and for learning.* Retrieved from http://campustechnology.com/Articles/2012/09/19/12-Important-Trends-in-the-ePortfolio-Industry.aspx

Bazeley, P. (2007). *Qualitative data analysis with NVivo*. Thousand Oaks, CA: Sage.

Bennett, E. E., McWhorter, R. R., & Sankey, H. (2012, February 29-March 4). *Eportfolios as Virtual HRD: A review of literature and analysis of a tool in a graduate medical education program*. Paper presented at the Academy of Human Resource Development International Conference, Denver, Colorado.

Blicblau, A. S. (2008). Interactive capstone portfolios. *International Journal of Engineering Education, 24*(6), 1078-1083.

Brooks, J. G., and Brooks, M. G. (1993). *In search of understanding: The case for constructivist classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.

Brown, G., Peterson, N., Chida, M., & Desrosier, T. (2009). Retrieved from http://campustechnology.com/articles/2009/02/04/eportfolios-and-communities-of-practice.aspx

Bryman, A., & Bell, E. (2011). *Business research methods* (3rd ed.). New York: Oxford University Press.

Buzzetto-More, N. (2010). Assessing the efficacy and effectiveness of an ePortfolio used for summative assessment. *Interdisciplinary Journal of e-Learning and learning Objects, 6*, 61-85. Retrieved from http://www.ijello.org/Volume6/IJELLOv6p061-085Buzzetto691.pdf

Buzzetto-More, N. A., & Alade, A. J. (2006). Best practices in e-Assessment. *Journal of Information Technology Education, 5*(5), 251-269. Retrieved from http://jite.org/documents/Vol5/v5p251-269Buzzetto152.pdf

Cambridge, D. (2008). Audience, integrity, and the living document: eFolio Minnesota and lifelong and lifewide learning with ePortfolios. *Computers & Education, 51*(3), 1227-1246.

Chambers, S., & Wickersham, L. (2007). The electronic portfolio journey: A year later. *Education, 127*(3), 351-360.

Chen, H. L. (2009). Using ePortfolios to support lifelong and lifewide learning. In Darren Cambridge, Barbara Cambridge, and Kathleen Yancey (Eds.), *Electronic portfolios 2.0: Emergent research on implementation and impact* (pp. 29-35). Sterling, VA: Stylus.

Cohn, E. R., & Hibbits, B. (2004). Beyond the electronic portfolio: A lifetime personal web space. *Educause Review Online*. Retrieved from http://www.educause.edu/ero/article/beyond-electronic-portfolio-lifetime-personal-web-space

Cotterill, S. J., White A., & Currant, B. (2007). *Using Web 2.0 to Support PDP*. Retrieved from http://www.eportfolios.ac.uk/?pid=177

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five designs*. Thousand Oaks, CA: Sage.

Delello, J. A., & McWhorter, R. R. (2013). *New visual social media for the higher education classroom*. An unpublished book chapter.

Ditzhazy, H. R., & Poolsup, S. S. (2002). Successful Integration of Technology into the Classroom. *Delta Kappa Gamma Bulletin*, *6*(3), 10-14.

Egan, J. P. (2012). EPortfolio formative and summative assessment: Reflections and lessons learned. *Proceedings of Informing Science & IT Education Conference (InSITE).*Retrieved from http://proceedings.informingscience.org/InSITE2012/InSITE12p417-422Egan0119.pdf

Eliot, M., and Turns, J. (2011). Constructing professional portfolios: Sense-making and professional identity development for engineering undergraduates. *Journal of Engineering Education, 100*(4), 630-654.

EPAC. (2013). *FrontPage.* Retrieved from http://epac.pbworks.com/w/page/12559687/FrontPage

Fram, S. M. (2013). The constant comparative analysis method outside of grounded theory. *The Qualitative Report, 18*. Retrieved from http://www.nova.edu/ssss/QR/QR18/fram1.pdf

Freedman, A., & Adam, C. (2004). Learning to write professionally: 'Situated learning' and the transition from university to professional discourse. In J. M. Dubinsky (Ed.), *Teaching technical communication: Critical issues for the classroom* (pp. 310-336). Boston: Bedford/St. Martin's.

Gansemer-Topf, A., & Schuh, J. (2006). Institutional selectivity and institutional expenditures: Examining organizational factors that contribute to retention and graduation. *Research in Higher Education*, *47*(6), 613-642.

Garrison, D. R., Anderson, T, & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*, 87–105.

Gill, T. G., & Ritzhaupt, A. D. (2013). Systematically evaluating the effectiveness of an information systems capstone course: Implications for practice. *Journal of Information Technology Education: Research, 12,* 69-94. Retrieved from http://www.jite.org/documents/Vol12/JITEv12ResearchP069-094GillFT63.pdf

Graves, N., & Epstein, M. (2011). Eportfolio: A Tool for constructing a narrative professional identity. *Business Communication Quarterly*, *74*(3), 342-346.

Greenberg, G. (2004, July). The digital convergence: Extending the portfolio model. *Educause Review,* 28-36. Retrieved from http://www.educause.edu/ir/library/pdf/ERM0441.pdf

Guiseppi, M. (2010). *10 Steps to an authentic, magnetic personal brand*. Executive Career Brand. Retrieved from http://executivecareerbrand.com/10-steps-to-an-authentic-magnetic-personal-brand/

Hamilton, J. (2010). *Proposed rule links federal student aid to loan repayment rates and debt-to-earnings levels for career college graduates*. U.S. Department of Education. Retrieved from http://www.ed.gov/news/press-releases/proposed-rule-links-federalstudent-aid-loan-repayment-rates-and-debt

Hart Research Associates (2009, April). *Learning and assessment: Trends in undergraduate education*: *A survey among members of the association of American colleges and universities.* Retrieved from http://www.aacu.org/membership/documents/2009MemberSurvey_Part1.pdf

Hatch, J. A. (2002). *Doing qualitative research in education settings.* Albany, NY: State University of New York Press.

Heinrich, E., Bhattacharya, M., & Rayudu, R. (2007). Preparation for lifelong learning using ePortfolios. *European Journal of Engineering Education, 32*(6), 653-663.

Henning, C. (2004). Confronting data analysis with constructivist philosophy. In K. Jajuga, A. Sokolowski, & H. Bock (Eds.), *Classification, clustering, and data analysis: Recent advances and applications* (pp. 235-244). New York: Springer-Verlag.

Herman, C., & Kirkup, G. (2008). Learners in transition: To use the eportfolio for women returners to science, engineering, and technology. *Innovations in Education and Teaching International,* 45(1), 67-76.

Jarrott, S. &, Gambrel, L. E. (2011). The bottomless file box: Electronic portfolios for learning and evaluation purposes. *International Journal of ePortfolio, 1*(1), 85-94.

JISC (2008). *Effective practice with ePortfolios: Supporting 21st century learning.* http://www.jisc.ac.uk/media/documents/publications/effectivepracticeeportfolios.pdf

JISC (2012). *Developing digital literacies: A series of national workshops on developing learners and learning organisations for the 21st century.* Retrieved from http://www.jisc.ac.uk/whatwedo/programmes/elearning/developingdigitalliteracies/diglitworkshops.aspx

Jones, V. (2011). EPortfolios and student engagement. *ASCUE Proceedings.* Retrieved from www.ascue.org/files/proceedings/2011/080-086.pdf

Kahn, S. (2001). Linking learning, improvement, and accountability: An introduction to electronic institutional portfolios. In Barbara Cambridge, Susan Kahn, Daniel Thompkins, and Kathleen Blake Yancey (Eds.), *Electronic portfolios: Emerging practices in student, faculty, and institutional learning* (pp. 135-158). Washington, DC: American Association of Higher Education.

Kapp, K. M., & O'Driscoll, T. (2010). *Learning in 3D: Adding a new dimension to enterprise learning and collaboration*. San Francisco, CA: Pfieffer.

Kimball, M. A. (2005). Database eportfolio systems: A critical appraisal. *Computers and Composition, 22*, 434-458.

Kreftling, L. (1991). Rigor in qualitative research: The assessment of trustworthiness. *The American Journal of Occupational Therapy, 45*(3), 214-222.

Kuchinke, K. P. (2002). Institutional and curricular characteristics of leading graduate HRD programs in the U.S. *Human Resource Development Quarterly, 13*(2), 127-144.

Lamb, J., Geiger, W., Morrison, K., Lewis, M., Thomas, S., & Wright, G. (2010). *TEAC Inquiry brief proposal*. University of Texas at Tyler: College of Education and Psychology.

Lauckner, H., Paterson, M., & Krupa, T. (2012). Using constructivist case study methodology to understand community development processes: Proposed methodological questions to guide the research process. *The Qualitative Report, 17,* 1-22. Retrieved from: http://www.nova.edu/ssss/QR/QR17/lauckner.pdf

Lietz C., Langer C., &Furman R. (2006). Establishing trustworthiness in qualitative research in social work: Implications from a study regarding spirituality. *Qualitative Social Work, 5*(4), 441-458.

Li, J., Nimon, K., & Allen, J. (2008). *Undergraduate HRD Programs in the United States*. In T. J. Chermack, J. Stroberg-Walker, & C. M. Graham (Eds.), *Proceedings of the Academy of Human Resource Development 2008 International Conference.* Panama City Beach, FL: AHRD.

Light, T. P., Chen, H. L., & Ittelson, J. C. (2012). *Documenting learning with eportfolios*. San Francisco, CA: Jossey-Bass.

Lin, Q. (2008). Preservice teachers' learning experiences of constructing ePortfolios online. *The Internet and Higher Education*, *11*(Special Section of the AERA Education and World Wide Web Special Interest Group (EdWeb/SIG), 194-200. doi:10.1016/j.iheduc.2008.07.002

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage.

London, M., & Hall, M. (2011). Unlocking the value of Web 2.0 technologies for training and development: The shift from instructor-controlled, adaptive learning to learner-driven, generative learning. *Human Resource Management*, *50*(6), 757-775. doi:http://dx.doi.org/10.1002/hrm.20455

Lorenzo, G., & Ittelson, J. (2005). *An overview of ePortfolios*. Boulder, CO: EDUCAUSE Learning Initiative. Retrieved from www.educause.edu/ir/library/pdf/ELI3001.pdf

Lowenthal, P., White, J. W., & Cooley, K. (2011). Remake/Remodel: Using ePortfolios and a system of gates to improve student assessment and program evaluation. *International Journal of ePortfolio, 1*(1), 61-70.

Mancuso, D. S., Chlup, D. T., & McWhorter, R. R. (2010). A study of adult learning in a virtual world. *Advances in Developing Human Resources, 12*(6), 681-699. doi: 10.1177/1523422310395368

Maykut, P., & Morehouse, R. (2002). *Beginning qualitative research: A philosophic and practical guide.* Bristol, PA: Taylor & Francis.

McWhorter, R. R. (2010). Exploring the emergence of virtual human resource development. *Advances in Developing Human Resources, 12*(6), 623-631. doi:10.1177/1523422310395367

McWhorter, R. R. (2012). *Scenario planning as the development of leadership capability and capacity; and virtual human resource development*. Unpublished dissertation, Texas A&M University, TX.

McWhorter, R. R., & Bennett, E. E. (2012, February 29-March 4). *Facilitating transition from higher education to the workforce: A literature review of ePortfolios as virtual human resource development.* Paper presented at the Academy of Human Resource Development International Conference, Denver, Colorado.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.

Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis: A methods sourcebook,* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Morphew, V. N. (2000). Web-based learning and instruction: A constructivist approach. In L. Lau (Ed.), *Distance learning technologies: Issues, trends and opportunities* (pp. 1-15). Hershey, PA: Idea Group Publishing. doi:10.4018/978-1-878289-80-3.ch001.

Morphew, V. N. (2012). *A constructivist approach to the national educational technology standards for teachers.* Eugene, OR: International Society for Technology in Education.

Morrow, S. L. (2005). Quality and trustworthiness in qualitative research in counseling psychology. *Journal of Counseling Psychology, 52*(2), 250-260. doi: 10.1037/0022-0167.52.2.250

National Council for Accreditation of Teacher Education (NCATE) (2010). *NCATE and TEAC form new accrediting body: The Council for the Accreditation of Educator Preparation (CAEP).* NCATE News & Press Releases. Retrieved from http://www.ncate.org/Public/Newsroom/NCATENewsPressReleases/tabid/669/EntryId/121/NCATE-and-TEAC-Form-New-Accrediting-Body-The-Council-for-the-Accreditation-of-Educator-Preparation-CAEP.aspx

Ntuli, E., Keengwe, J., & Kyei-Blankson, L. (2009). Electronic portfolios in teacher education: A case study of early childhood teacher candidates. *Early Childhood Education Journal, 37*(2), 121–126.

Obermier, T. R. (2005). Using the Internet for an accreditation self-study portfolio. *Journal of Industrial Technology, 21*(5). Retrieved from http://atmae.org/jit/Articles/obermeir010605.pdf

Okoro, E. A., Washington, M. C., & Cardon, P. W. (2011). Eportfolios in business communication courses as tools for employment. *Business Communication Quarterly, 74*(3), 347-351. doi:10.1177/1080569911414554.

Pathbrite (2012). *Is the résumé dead? Not quite yet.* Retrieved from http://www.pathbrite.com/2012/08/17/is-the-resume-dead-not-quite-yet/

Paulson, F. L., & Paulson, P. (1994). Assessing portfolios using the constructivist paradigm. In R. Fogarty (Ed.), *Student portfolios*. Palatine: IRI Skylight Training & Publishing.

Peet, M. (2010). *The integrative knowledge portfolio process*. Available from https://bu.digication.com/JamesWolff/The_Integrative_Knowledge_Portfolio_Process

Peet, M., Lonn, S., Gurin, P., Boyer, K. P., Matney, M., Marra, T., . . . & Daley, A. (2011). Fostering integrative knowledge through ePortfolios. *International Journal of ePortfolio, 1*(1), 11-31.

Pelliccione, L., & Dixon, K. (2008). ePortfolios: Beyond assessment to empowerment in the learning landscape. In *Hello! Where are you in the landscape of educational technology?* Proceedings ascilite Melbourne 2008. Retrieved from http://www.ascilite.org.au/conferences/melbourne08/procs/pelliccione.pdf

Penny, C., & Kinslow, J. (2006). Faculty perceptions of electronic portfolios in a teacher education program. *Contemporary Issues in Technology & Teacher Education, 6*, 418-435.

Potter, W. J. (1996). *An analysis of thinking and research about qualitative methods*. Mahwah, NJ: Routledge.

Prensky, M. (2001). *Digital game-based learning*. New York: McGraw-Hill.

Raisor, C., & McWhorter, R. R. (2012). *Teaching technical writing with virtual world technology*. Unpublished manuscript.

Roberts, P. B. (Ed.) (2011). *Human resource development directory of academic programs in the United States*. Tyler, TX: The University of Texas at Tyler.

Rogers, P. L. (2000). Barriers to adopting emerging technologies in education. *Journal of Educational Computing Research, 22*(4), 455-472.

Rohlheiser, C., & Ross, J. A. (2012). *Student self-evaluation: What research says and what practice shows*. Center for Development and Learning. Retrieved from http://www.cdl.org/resource-library/articles/self_eval.php

Ruona, W. E. A. (2005). Analyzing qualitative data. In R. A. Swanson & E. F. Holton (Eds.), *Research in organizations: Foundations and methods of inquiry* (pp. 223-263). San Francisco, CA: Berrett-Koehler.

Sanders, M. (2000). Web-based portfolios for technology education: A personal case study. *Journal of Technology Studies*, *26*(1), 11-18.

Scott, S., & Boyd, G. (2008). A case study of a project course developed to close competency gaps in an Industrial Technology program. *Journal of Industrial Technology, 24*(4). Retrieved from http://atmae.org/jit/Articles/scott112508.pdf

Siemens, G. (2004). ePortfolios. *elearnspace.* Retrieved from http://www.elearnspace.org/Articles/eportfolios.htm

Smith, P. (2010, August 11). *America's best colleges: Catering to the 21st century learner*. Forbes Online. Retrieved from http://www.forbes.com/2010/08/01/higher-education-college-rankings-opinions-best-colleges-10-smith.html

Southern Association of Colleges and Schools (SACS, 2010). *The principles of accreditation: Foundations for quality enhancement*. Retrieved from http://www.sacscoc.org/pdf/2010principlesofacreditation.pdf

Stake, R. (2006). *Multiple case study analysis.* New York: Guilford.

Swan, K. (2005). A constructivist model for thinking about learning online. In J. Bourne & J. C. Moore (Eds), *Elements of Quality Online Education: Engaging Communities* (pp. 13-30). Needham, MA: Sloan-C.

Swanson, R. A. (2009). *Foundations of human resource development* (2nd ed.). San Francisco: Berrett-Koehler.

Sweat-Guy, R., & Buzzetto-More, N. A. (2007, June). A comparative analysis of common ePortfolio features and available platforms. *Proceedings of the Informing Science and Information Technology in Education Conference*, Ljubljana, Slovenia, pp. 327-342. Retrieved from http://proceedings.informingscience.org/InSITE2007/IISITv4p327-342Guy255.pdf

Sweet, D., & Zimmermann, J. (1993). Student portfolios: Classroom uses. *Education Consumer Guide, 8,* 2-4, U.S. District: U.S. Department of Education.

TaskStream (2012). *Accreditation.* Retrieved from https://www.taskstream.com/pub/Accreditation.asp?ReferringPage=0

Teacher Education Accreditation Council (TEAC) (2009). *Content of the inquiry brief and inquiry brief proposal. Retrieved from* www.teac.org/wp-content/uploads/2009/03/content-IB-IBP

Thomas, D. R. (2003). A general inductive approach for qualitative data analysis. *American Journal of Evaluation, 27*(2), 237-246. doi: 10.1177/1098214005283748

Tubaishat, A., Lansari, A., & Al-Rawi, A. (2009). EPortfolio assessment system for an outcome-based Information Technology curriculum. *Journal of Information Technology in Education: Innovations in Practice, 8*(9), 42-54. Retrieved from http://www.jite.org/documents/Vol8/JITEv8IIP043-054Tubaishat710.pdf

U.S. News & World Report (2013). *Colleges.* Retrieved from http://colleges.usnews.rankingsandreviews.com/best-colleges/rankings/regional-universities

Vygotsky, L. S. (1962). *Thought and language*. Cambridge, MA: MIT Press.

Whitworth, J., Deering, T., Hardy, S., & Jones, S. (2011). Perceptions regarding the efficacy and use of professional portfolios in the employment of teachers. *International Journal of ePortfolio, 1*(1), 95-106.

Wolcott, M. (2007, May 15). *What is Web 2.0?* CBS Interactive Inc. Retrieved from http://www.cbsnews.com/8301-505125_162-51066094/what-is-web-20/

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Zhang, S. X., Olfman, L., & Ractham, P. (2007). Designing eportfolio 2.0: Integrating and coordinating web 2.0 services with eportfolio systems for enhancing users' learning. *Journal of Information Systems Education, 18*(2), 203-214.

Biographies

Rochell R. McWhorter is an Assistant Professor of Human Resource Development in the College of Business and Technology at The University of Texas at Tyler. She received her Ph.D. degree in Human Resource Development from Texas A&M University. She has over 20 years' experience in industry and K-12 education. Rochell has edited and authored a number of journal articles and scholarly resources on technology-facilitated learning in higher education. Her scholarly publications include topics such as ePortfolios as facilitators of learning and professional branding, virtual human resource development, visual social media, scenario planning for leadership development, and virtual learning environments for real-time collaboration. She has been a recipient of numerous teaching awards including the Silvius-Wolansky Outstanding Young Teacher Educator Award from the Association for Career and Technical Education. She serves on numerous committees promoting the effective use of technology in higher education and Chairs the Virtual HRD, Technology, and e-Learning Special Interest Group for the Academy of Human Resource Development.

Julie Delello is an Assistant Professor in the College of Education and Psychology at The University of Texas at Tyler. She received her PhD in Curriculum and Instruction with a specialization in science and technology from Texas A&M University. Her areas of focus include Response to Intervention, Disability Studies, Visual Media Technologies, Virtual Science Museums, Social Media Platforms, and ePortfolios for authentic learning. Julie has worked in K-12 education for over 20 years as both a teacher and as an administrator. Julie helped to design virtual science museums in conjunction with The Chinese Academy of Sciences, Computer Network Information Center in Beijing, China. In addition, Julie has won several grants and teaching awards including a National Science Foundation Grant for The East Asia and Pacific Summer Institutes, the Golden Apple Educator Award for Best Practices in Staff Development and Curriculum Initiatives, and the 2012 University of Texas at Tyler-Kappa Delta Pi Teacher of the Year award. Julie was also the invited guest speaker at the United States Department of State Eleventh Annual Joint U.S.-China Joint Science and Technology Commission Meeting on the efforts of expanding the scientific and educational ties between the U.S. and China.

Cindy Raisor is a Technical Communication instructor in the Department of Chemical Engineering at Texas A&M University. She has taught writing courses at TAMU since 1985 and has also served as an instructional writing consultant and program coordinator. She has experience with workplace writing, teacher training, program management, curriculum development, assessment, instructional web technologies, and the use of ePortfolios in advancing critical thinking, reflection, and lifelong learning. Cindy has presented at a number of international venues including the Higher Colleges of Technology at Fujairah College in the United Arab Emirates as well as Coventry University in the UK.

Paul B. Roberts is currently the Associate Dean in the College of Business and Technology and Associate Professor in the Department of Human Resource Development and Technology at The University of Texas at Tyler. He has received over $900,000 in grants and funded projects since coming to UT Tyler in 1992. He is the director for an online teacher training grant with the Texas Education Agency and coordinates ongoing professional development activities. His research focuses on Virtual HRD and the demographics of HRD programs. Paul serves as editor of the "Directory of HRD Programs in the US". He has received numerous honors and awards for teaching including recently awarded the Chancellor's Council Outstanding Teaching Award and nominated for the Regents' Outstanding Teaching Award. Paul earned his doctorate with an emphasis in computer assisted instruction and curriculum development from the Department of Human Resource Development at Texas A&M University in 1994.

Debra Fowler is the Associate Director of the Center for Teaching Excellence at Texas A&M University, College Station, Texas. Debra has served as adjunct faculty in the Department of Education Administration and Human Resource Development where she has taught the College Teaching graduate course. Her main research focus is on curriculum redesign of entire programs as well as the incorporation of integrative ePortfolios and reflection across the curriculum. She is also involved in research on the professional development of graduate students in teaching. Dr. Fowler earned a Ph.D. in Interdisciplinary Engineering with a focus on engineering education from Texas A&M University. She has several published articles in the area of scholarship of teaching and learning and is active in various professional organizations, including AAC&U, ASEE, and POD Network.