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Preparedness Portfolios and Portfolio Studios

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We live in a time of great enthusiasm for the role that e-Portfolios can play in education and a time of exploration in which educators and researchers are investigating different approaches to using e-Portfolios to differentially support educational goals. In this paper, we focus on preparedness portfolios and portfolio studios as two key components of an approach to using portfolios in a specific educational context. The paper includes an identification of four commitments that contributed to the emergence of this particular approach, an explanation of the theoretical rationale associated with the approach, and a review of research data that substantiates enthusiasm for the approach. We close with comments on the potential for transferring this approach to other educational contexts.

E-Portfolios represent a flexible and powerful innovation in education. The flexibility is evident in the growing body of work that showcases e-Portfolio use across disciplines, across student populations, and for a variety of educational purposes (Cambridge, Cambridge, & Yancey, 2009; Jafari & Kaufman, 2006). The power is evident in the growing body of research that increasingly demonstrates that e-Portfolios are not only theoretically interesting, but also profoundly significant for the students and educators who use them (Cambridge, et al., 2009; Jafari & Kaufman, 2006). This body of research also raises questions about how to facilitate e-Portfolio activities to effectively leverage their potential.

In this paper, we contribute to these threads of flexibility, power, and facilitation as we describe work on preparedness portfolios and portfolio studios—two components to an approach for using e-Portfolios in engineering education. This work contributes to the notion of e-Portfolios as flexible, by showing their use in engineering education, a discipline that has not traditionally been strongly connected with work on e-Portfolios, and their use as a tool to help students connect the present to the future, hence the notion of preparedness. The work also contributes to the notion of e-Portfolios as powerful, through research linking students' e-Portfolio efforts to educationally significant issues of epistemology, identity, and meaning. Finally, the notion of portfolio studios—a structure for supporting students in their efforts to construct their e-Portfolios—contributes to the conversations on facilitation. The work we describe in this paper has been developing over the past several years (Eliot, Turns, & Xu, 2008; Kilgore, Sattler, & Turns, in press; Sattler, Kilgore, & Turns, 2010; Turns, Cuddihy, & Guan, 2010; Turns, Sattler, & Kilgore, 2010).

We anticipate that readers will take different things from this paper. For example, we feel that there is reason for people to consider adopting the entire approach, and we hope that some readers consider this. However, we envision other ways that readers can

benefit from this paper. Readers currently engaged in using e-Portfolios may find this work useful as a catalyst for thinking about and reflecting on their own work. Readers who are considering becoming involved in some type of e-Portfolio initiative may begin to develop expectations appropriate to their own situations.

In the next section, we discuss the specific commitments that have guided this work. The two subsequent sections are devoted to discussing the two components of our approach—preparedness portfolios and portfolio studios—and the ways in which these components function within the particular situation in which we are working.

Commitments

The work presented in this paper and the decisions represented within the work are specific to the situation in which we have been operating and to the commitments associated with this situation. Specifically, our work involves a commitment to undergraduate engineering education, a commitment to putting learning before assessment, and an emphasis on student generation of e-Portfolio content rather than the development of technologies that support e-Portfolio creation. In addition, the efforts associated with this work have, to date, involved a commitment to research over full-scale implementation.

A Commitment to Undergraduate Engineering Education

Nationally and internationally, work with e-Portfolios has cut across a wide variety of academic levels including K-12, undergraduate, and graduate, as well as academic disciplines including English and Nursing (Jafari & Kaufman, 2006). It stands to reason that e-Portfolio activities situated in specific disciplines and with specific student populations would, in order to be successful, start to align with characteristics of the

discipline and/or the student population being emphasized. For example, since reflective activity plays a different role in the production of knowledge in the soft versus hard disciplines (Kreber & Castleden, 2009), e-Portfolio approaches enacted in different disciplinary contexts would likely need to accommodate these differences. Also, the ways in which students understand the nature of knowledge (i.e., issues of epistemological development), and specifically how sophisticated students are in terms of their understanding of the nature of knowledge (see Felder & Brent, 2004), would likely interact with how students make sense of and succeed with e-Portfolio tasks. Since such understanding is loosely correlated with academic level, we might thus anticipate that e-Portfolio activities would, over time, be different at different academic levels.

As we stated, this work is situated in undergraduate engineering education—a form of education that is not only undergraduate but also professional. Thus, students are developing intellectually and concurrently being brought into a profession. Engineering curricula are known for being "heavy" from a coursework perspective (see Atman et al., 2010), at a time when many students are still undergoing significant intellectual development. While this heavy coursework creates challenges in introducing additional activities such as e-Portfolios, the role of experiential learning in engineering and the interest in innovation in engineering education both create opportunities for using e-Portfolios (see Sheppard, Sullivan, Colby, Macatangay, & Shulman, 2008). The approach to using e-Portfolios presented in this paper aligns with a desire to support engineering students and align with engineering curricula.

A Commitment to Promoting Learning

While learning and assessment are both linked tightly with e-Portfolio work, many e-Portfolio implementations emphasize assessment. For example, e-Portfolios have been used as tools for assessing student work for a particular course or an entire program. Such emphases are often related to accountability pressures.

The emphasis in this work has been on learning. Moreover, we conceive of learning broadly (see Davis, 2004). In fact, much of this work is associated with broad overarching questions concerning the kinds of learning that can be engendered with e-Portfolio activities and whether e-Portfolio efforts can contribute to some of the ambitious learning goals that educators and higher education institutions have for students (e.g., large-scale integration of their knowledge, metacognitive awareness, self-authorship). Since this work is not committed to supporting specific forms of assessment, we can explore having students draw on experiences widely, make very personal choices in their e-Portfolios, create e-Portfolios that do not address the same content, and take risks in making their e-Portfolios. The resulting e-Portfolios can certainly support some type of assessment, but that is not the goal of this work.

An Emphasis on Content

The issue of technology is a strong theme in the work related to e-Portfolios. In fact, the first section of the Handbook of Research on e-Portfolios (including twenty two chapters) is devoted to issues of "Portfolio Thinking and Technology." Moreover, the effort at the University of Washington to build an e-Portfolio tool specific to the university (see Lewis & Fournier, 2009) and the Minnesota statewide exploration of an e-Portfolio system (Cambridge, 2008) underscore the emphasis on technology associated with work on e-Portfolios. When the goal is a large-scale deployment, then such an emphasis on technology, particularly an emphasis on creating robust, reliable, efficient, and supportive technology, makes sense. One challenge, however, is that technology is not neutral, and efforts to construct systems that organize and scaffold an activity typically embed assumptions about that activity. Also, once a technology becomes complicated, it takes effort to learn the technology itself—something that can interfere with the potential benefits of e-Portfolio activities.

In this work, we have been emphasizing e-Portfolio content and de-emphasizing technology. In particular, we help students develop content for their e-Portfolios that they publish on the internet via simple website authoring tools. Moreover, as we describe below, the specific nature of the content and ways in which we discuss the content with students is tied to the emphasis on learning.

A Commitment to Research

Given the national and international enthusiasm for e-Portfolios, many e-Portfolio projects involve large-scale deployments. Yet, once a deployment occurs, it can be hard to find the time and resources to conduct research even if that research could create insights that would help the entire effort operate more effectively.

In this work, we have been fortunate to be able to emphasize research without immediate pressure to scale up; however, the commitment to engineering education has meant that we always keep an eye toward ultimate deployments. The opportunity to focus on research has been possible because of funding from the National Science Foundation and an endowment. In terms of conducting the research, we have focused *less* on

proving that a specific approach works and *more* on understanding what could be possible with e-Portfolios and how e-Portfolios could contribute to significant educational outcomes. Most of this research has focused on asking students about their experiences with e-Portfolio construction, including the nature of their thinking and learning as well as the difficulties they encounter (similar to the work of Brown, 2002; Cambridge, 2008).

Understanding these commitments to engineering, learning, content, and research is important for understanding the approach presented in this paper (i.e., why preparedness portfolios and why portfolio studios) and also for interpreting the research results that we have gathered. The details of the approach and how it relates to the four commitments is the focus of the next two sections of this paper.

Preparedness Portfolios

In this work, students are invited to construct engineering preparedness portfolios, which are explained to them as arguments about the ways in which they are prepared to engage in engineering activity. Students are also told that their e-Portfolios should include the following elements: (1) a professional statement in which they make claims about the ways in which they are prepared for engineering, (2) artifacts—products and by-products of their experiences—that provide evidence for those claims, and (3) annotations of the artifacts that provide context for the artifacts and explain how the artifacts support one or more of the claims made. The overall organization of these elements is depicted schematically in Figure 1 and as implemented in Figure 2.

Engineering preparedness portfolios can differ in terms of their scope. In much of our work with this type of e-Portfolio, we have asked students to create life-wide engineering preparedness portfolios—e-Portfolios in which the artifacts are drawn from a lifetime of experiences including extra-curricular, personal, work, and other experiences, in addition to educational experiences. We have also worked with students to develop experience-based engineering preparedness portfolios in which they draw evidence for their preparedness claims from specific experiences such as a class or an undergraduate research activity.

In the remainder of this section, we provide rationale for characterizing the e-Portfolio as an argument, for asking students to construct an argument about preparedness, and for having them construct their argument using the professional statement and annotated artifacts as elements. In presenting this rationale, we draw on the four commitments introduced earlier: engineering, learning, content, and research. We then close this section by describing three studies that

illustrate the potential educational significance of this approach.

Why Focus on Arguments?

In talking with students about the content and function of e-Portfolios, we use the language of argumentation—specifically, the idea that an e-Portfolio involves claims that are substantiated by evidence. Many types of e-Portfolios can be understood as arguments; for example, an assessment portfolio is an argument about what one knows, and a learning portfolio is an argument about what one has learned. The language of argumentation provides a specific and coherent vocabulary for talking about the e-Portfolio activity, a language that seems to be comfortable for engineering students.

There are several intersections between the commitment to learning and this emphasis on argumentation. For example, the language of argumentation is linked to epistemological development: higher levels of epistemological development involve deciding what to accept as knowledge based on the strength of evidence associated with potential knowledge claims (Hofer & Pintrich, 1997). Thus, having students engage in arguments about their knowledge/learning provides them with opportunities to practice discussing their knowledge and think explicitly about what they know. On a different thread, although we are very much interested in learning and reflection, the language of argumentation means that we rarely use the term reflection, and this practice has been purposeful. In our experience, the notion of reflection encounters resistance among engineering students; and, thus, rather than ask for reflection directly, we are seeking to understand the ways in which asking students to create arguments induces their reflection.

We are specifically interested in the link between e-Portfolios as argumentation and theoretical ideas about situations in which writing is knowledge transforming. As Bryson, Bereiter, Scardamalia, and Joram (1991) summarize:

> Writing involves solving two general kinds of problems—content problems, which are problems of the writer's own knowledge and beliefs, and rhetorical problems, which are problems having to do with achieving the goals of the compositions... problems arising in the 'rhetorical space' are often translated into problems requiring solution in the 'content space.' New decisions arrived at in the content space create new problems in the rhetorical space, and so on in a dialectical fashion. The result will often be that by the end of the composing process, both the writer's ideas and the nature of the written product have evolved in unexpected ways. Hence the experience of writing as discovery. (p. 71)

Figure 1
Portfolio Architecture
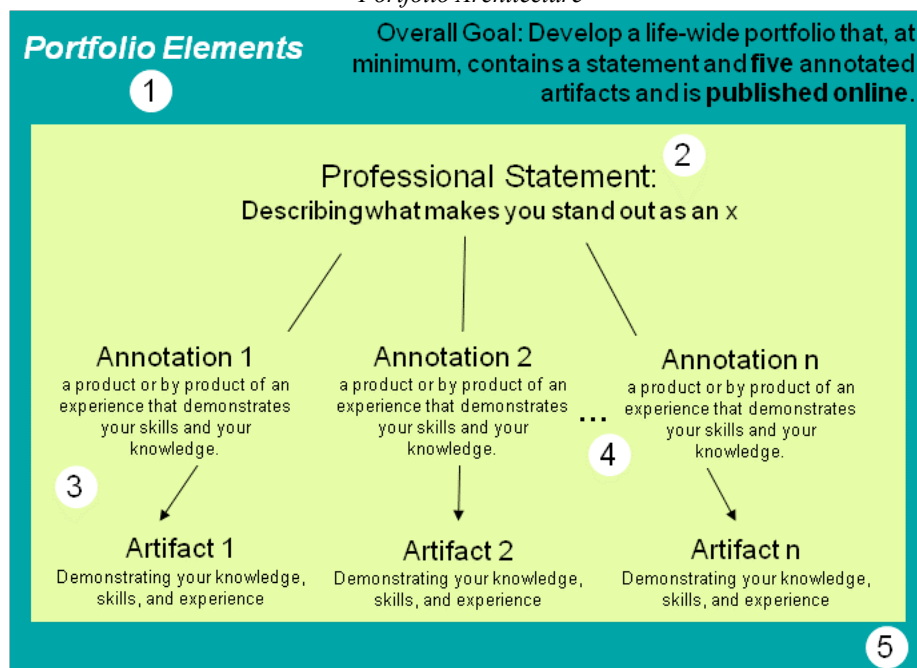
Figure 2
Portfolio Example
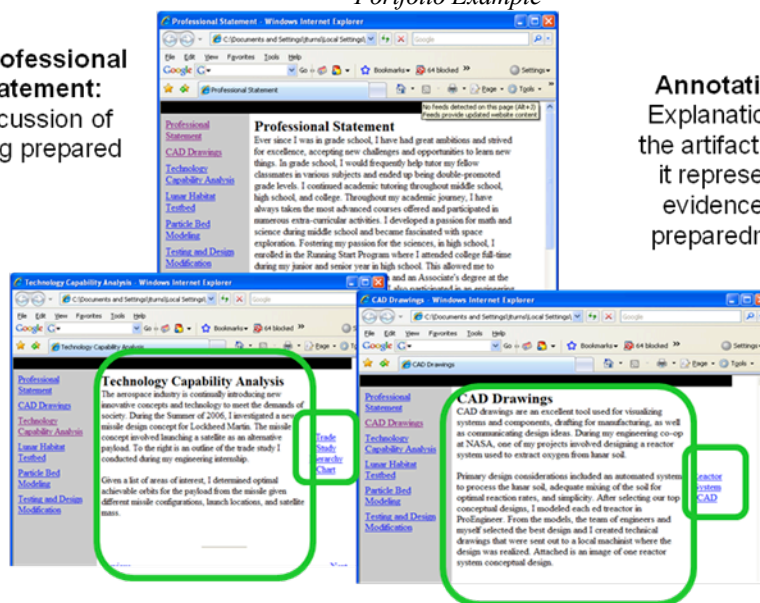
In the case of e-Portfolios, *rhetorical* problems for students could include the following: How do I explain my claims about my knowledge or learning to my audience? Which evidence is best for this audience? It is hard to imagine such rhetorical problems not giving rise to a host of challenging *content* problems, such as the following: What claims can I make? What do I know or did I learn? What does it look like to make a claim about my knowledge? What evidence do I have? Clearly, solving such problems would result in important knowledge. But, what would entice students to engage in solving such problems, and what specific

content problems could e-Portfolio construction induce? In the next section, we introduce the concept of preparedness as a way to address these issues.

Why Focus on Arguments About Preparedness?

In this work, students are asked to make arguments about their preparedness for future activity, as opposed to arguments about what they have learned or what they know. The decision to emphasize preparedness is tightly linked to the commitment to engineering in that a key goal of engineering education is to prepare students to function as engineers upon graduation. On a practical level, it is not uncommon for engineering educators to ask students *if* they are prepared (e.g., in graduation surveys); a logical next step is to ask students to explain their judgments by describing the ways in which they are prepared.

Preparedness is interestingly ambiguous with respect to audience. In this work, we invite students to think about their audience—who they would like to convince with their arguments. The attempt here is to help students transcend the school context that they are in and go beyond thinking of the educator as their implied audience. By bringing the issue of audience into the open, we also have a chance to talk about the types of claims that would interest a specific audience and the types of evidence that the audience would find appropriate and engaging. By emphasizing preparedness and having students think toward future audiences, we invite students to connect their past experiences with their future goals and, in this way, to work on establishing a continuity of experience (Dewey, 1938).

Having students make arguments about their preparedness can raise specific content problems for them because of the questions they may encounter (i.e., questions that may arise during their work). Their experience of grappling with such questions can provide an opportunity for transformative writing. While we have traditionally let these types of questions emerge for students, we do validate them when they emerge. These questions and the associated learning opportunities are highlighted.

- *How exactly did my experiences prepare me to be an engineer? Which experiences count as evidence of my preparation?* If students engage in such questions, they are engaging in reflection on their experiences. By engaging in such reflection on past experiences, students may be completing the Kolb learning cycle for past events (Kolb, 1983) and achieving Dewey's notion of a truly educative experience (Dewey, 1938).

- *In what ways **am** I prepared to be the kind of engineer that my audience expects me to be? In what ways am I **not** prepared to be the type of engineer society needs? What else do I need to do in order to strengthen my preparation?* By engaging with such questions, students are addressing issues of metacognitive awareness, which can then contribute to calibrating confidence and self-efficacy and pave the way for self-directed learning. Finding that one would like to (but cannot) make particular claims about preparedness could create an impetus for students to pursue future learning. At the same time, finding that one actually *can* make claims about preparedness that had not been considered before (i.e., discovering or at least re-remembering what one knows) can lead to increased confidence and self-efficacy.

- *What exactly does it mean to be prepared for engineering? What are different ways for one to be prepared for engineering? Who decides that someone is prepared?* These questions represent the potential of the preparedness argument task to help students engage in critical reflection—reflection that engages with one's assumptions about the world and issues of power (Brookfield, 1995). In framing the task to students, we provide little guidance on what it means to "be prepared for engineering." As a result, this is something that they have to grapple with in order to complete the e-Portfolio. While students may find their existing understanding of the issue sufficient, it is possible for them to start to question their existing understanding, particularly since the answer may depend on who they identify as the audience of their e-Portfolio. As such, the task can provide opportunities for students to critically reflect on issues such as how preparation for engineering might vary depending on the context into which one is going and who ultimately decides what it means to be prepared for engineering. Kegan (1994) would suggest that by engaging in this type of thinking, students have the potential to move from the realm of the socialized mind to the realm of the self-authoring mind—a move he argues is critical for effectively functioning in the modern world.

- *Who am I and how does engineering fit with that? What else am I? What do I want to be and how does that mesh with my argument about myself as an engineer? What kind of engineer do I want to be?* These questions represent the potential of the task to provide

students with opportunities to explore significant issues related to identity. Viewed from within engineering, the task of arguing about one's preparedness for engineering can be seen as a request for an "institution" (e.g., a company, an established person in the field) to authorize one as an engineer (Gee, 2000-2001) and as a narrative about oneself as an engineer (Sfard & Prusak, 2005). However, the questions represented in this last set go beyond the "me as engineer" view. Because the nature of what it means to be prepared is left in the students' hands and the students are encouraged to draw their evidence of their preparedness from across their lives, the students have an opportunity to start to integrate their multiple selves together and engage in self-authorship (Baxter Magolda, 2008; Kegan, 1994).

While it may seem optimistic that the preparedness portfolio task could lead students to engage in such profound questions, theories of adult learning help to illustrate why this is possible. Imagine that the students want very much to be able to answer the questions above, but they find they are unable to do so. The students, at that point, could be experiencing what Mezirow terms a *disorienting dilemma* (Mezirow, 2000) and what Jarvis conceptualizes as *disjuncture* (Jarvis, 2006). These theories provide a way of understanding how mature learners experience profound shifts in their thinking, and they may be quite useful in explaining some student experiences with e-Portfolio activities. For example, some students become disoriented when they realize they have never thought about the questions raised by the preparedness portfolio tasks. Key to supporting students through these challenging issues, however, is ensuring that they do not get overwhelmed. This brings us to the third feature of the work—focusing on professional statements and annotated artifacts.

Why Focus on Professional Statements and Annotated Artifacts?

We ask students to make their preparedness arguments in the professional statements and annotated artifacts that serve as the central building blocks of the e-Portfolio. We also ask the students to create e-Portfolios by assembling these pieces as a website. By having students do these activities, we strike a balance between two important goals: supporting students in their creation of the preparedness argument and not undermining any of the potential learning opportunities that we have identified as associated with the tasks (see above).

Asking someone to create an argument is, indeed, quite an open task. Students could create such an argument in a single document; and, in fact, a cover letter can be seen as one manifestation of a preparedness argument. In the context of a preparedness portfolio, the argumentation ideas of claims and evidence translate relatively directly into the professional statement as the place where claims are made and the annotated artifacts as the place where evidence is presented and explained. With these elements as building blocks, we can support students by offering suggested word counts and a few examples to get them started. We also highlight to students that these general guidelines leave them in control of *what* to put in their e-Portfolios.

To translate these ideas into e-Portfolios, we help work with students to publish their portfolio elements using simple web authoring tools. For example, our university provides a simple website tool to all students and staff, and Google Sites™ provides a similar tool to the public. In mapping the portfolio building blocks to the website, the professional statement typically becomes the home page and the annotated artifacts become additional pages.

What do Students Say? Research Data

Because the ideas presented above represent a theory about what *could* happen with preparedness portfolios, we have been engaging in research to validate these theoretical ideas. Our various research studies have been exploring the extent to which such theoretical ideas about what *could* happen with e-Portfolios actually *does* happen for students, and what it looks like when it does. Here we highlight three such studies.

In one of the earlier studies (Turns, Cuddihy, et al., 2010), we interviewed thirteen students from a mechanical engineering class (n=35) where the students had been asked to create engineering preparedness portfolios that focused on how their experiences in the class had prepared them for their futures in engineering. In the interviews, we sought to understand how the students had experienced the preparedness portfolio assignment itself, specifically in terms of the type of thinking and knowing that it required, the nature of the effort associated with it, and the students' perceptions concerning its value. The theme *epistemically different* emerged to capture student comments about the types of thinking and knowing associated with working on the assignment. The students reported thinking about how topics in the class could be integrated with each other and with topics from other classes (a type of knowing we termed *integrated knowing*), what they personally thought was important (a type of knowing we termed *subjective knowing*), and how to explain

their knowledge to others and to themselves (a type of knowing we termed *externalized knowing*). We labeled the theme *epistemically different* in order to capture student comments that the ways of thinking and knowing that were involved in the assignment were unlike what they experience in "normal school." Such findings speak in general to the potential for this type of activity to lead to the range of learning opportunities suggested by the questions discussed above. Of interest, the student comments also suggested they found the activity to be *manageably effortful* (i.e., not trivial but definitely do-able) and *unexpectedly valuable* (i.e., they had not expected to appreciate the assignment but found themselves appreciating it once it was finished).

More recently we ran a study in which thirty-six students created "life-wide" engineering preparedness portfolios (Eliot & Turns, in press). Students were encouraged to use not just experiences from formal education, but also experiences from life in order to populate their e-Portfolios. In this study, we collected data from students via short surveys at intermediate points in the process and an extensive post questionnaire. We subsequently analyzed the data to explore the extent to which and ways in which students reported engaging in identity thinking while working on their e-Portfolios. In this context, identity thinking can be understood as thinking associated with understanding, or even crafting, one's identity. A qualitative analysis of students' questionnaire responses revealed activities related to framing their skills and experience according to others' expectations (external frame of reference) and their own expectations (internal frame of reference) of engineering professional practice. Quantitatively, the analysis revealed that identity work was prevalent (i.e., mentioned by most of the students), and that internal frame of reference comments outnumbered external frame of reference comments by two to one. These findings definitely speak to the potential for preparedness portfolios to induce students to grapple with issues of identity as mentioned above.

In one of the most recent studies we interviewed 11 students who created "life-wide" engineering preparedness portfolios, and subsequently analyzed the interviews as well as the actual e-Portfolios in order to better understand the ways in which students reflected on their experiences and thought about experience more generally (Kilgore, et al., accepted). It is useful to note that although we did not interview students directly about their experiences or perceptions of them, the reflective nature of the e-Portfolio work made such comments about reflection likely. As we discuss in the paper, we found (mostly from analysis of the e-Portfolios themselves) that the kinds of experiences that students reflected on were rich and varied, suggesting a broad sense of what kinds of experiences *count* toward

preparing to become an engineer. Despite the variety of experiences and different ways that students talked about them, several common themes emerged. Students described the following phenomena: growing realization of value, growing awareness of engineering preparation, growing awareness of needing experience, recognition of continuity, and reasons for discontinuity. In general, the analysis supported the idea that, through the process of selecting and examining individual experiences, students' understandings of the general notion of *experience* changed, shifting from a compartmentalized, exclusionary view of experience to the examination of the "continuity" of experience that John Dewey wrote about and that we mentioned above. Moreover, we believe these realizations helped the students become better prepared for lifelong learning.

Studies such as these three support the claims made earlier in this section about the potential for the preparedness portfolio activity to be an educationally significant activity. In particular, these studies have demonstrated the possible *outcomes* that students experience when creating preparedness portfolios. As part of this work, we are also interested in how to structure student e-Portfolio activities in order to maximize the likelihood that such outcomes will occur. To explore this issue, we turn now to the ways in which we support students through the e-Portfolio process.

Supporting Students: The Emergence of Portfolio Studios

In the three studies described above, we experimented with the quantity and type of support provided to students. In the first study, in which e-Portfolios were an assignment in a specific class, students received support through two in-class brainstorming sessions and a simple grading rubric that clarified what was required to get credit for the assignment. In contrast, students in the second study participated in a four-session "e-Portfolio program." Students were supported through sessions devoted to helping them understand and brainstorm content for portfolio elements, and helping them give and receive comments on drafts of specific portfolio elements (e.g., peer review of initial drafts of the portfolio statements). Students in the third study participated in a five-session "portfolio studio." As in the second study, students in the third study were supported in understanding and brainstorming content and in giving and receiving comments. However, in a new fifth session, students were further supported with an opportunity to practice presenting their e-Portfolios. Based on observations of the studio sessions and feedback from students during these sessions, we have come to believe that the studio format as implemented in the third study has significant potential to help us

realize the educational value of e-Portfolios. We address this idea in the next section.

Portfolio Studios

In this work, the portfolio studio is a five-session experience designed to help students work through the activities involved in constructing a preparedness portfolio. The studio setting provides a collaborative, supportive, and student-driven environment. In this approach, peer review, community membership, camaraderie, and accountability are significant components. In each session, students are given the opportunity to help one another as they work through their thinking and experiment with different ideas. Questions raised by students are directed back to the group to discuss. An important characteristic of the portfolio studio environment is the absence of emphasis on "right" or "wrong" solutions or choices.

Over the past decade, we have refined the design of the studio with respect to length and timing of the studio sessions and the specific activities used in each session. Each studio session has the same general structure: the facilitator provides an agenda of session activities, revisits the previous sessions to create continuity, provides a snapshot of student feedback from previous sessions, facilitates session activities, and presents students with a wrap-up and description of work to be prepared for the next session.

The activities of the studio are organized around the key features of the preparedness portfolio as defined earlier. Figure 1 illustrates this structure by indicating the emphasis of each of the five sessions in relation to the portfolio elements (the sessions are indicated by numbers in the circles in the diagram).

- Session 1: Students are introduced to the notion of an e-Portfolio as an argument about one's preparedness for a future activity, invited to brainstorm the benefits of creating and having such an e-Portfolio, introduced to the specific terminology used for this e-Portfolio activity (i.e., professional statement, artifacts, and annotations), and prepared for writing the first draft of their professional statement, which they are told to bring to the second session.
- Session 2: Students share their experiences creating the professional statement, brainstorm ideas about effective peer review, use these ideas while reviewing each others' statements, and prepare for the upcoming task of finding and annotating one artifact.
- Session 3: Students and the facilitator review the current state of each student's e-Portfolio to highlight points of interest and concern,

students peer review each other's artifact/annotation drafts and prepare for the upcoming task of more fully populating the e-Portfolio.
- Session 4: Students think out loud while interacting with a peer's e-Portfolio to give the e-Portfolio authors a chance to see how someone might experience their e-Portfolio, provide peer review/feedback to each other on one selected element, and prepare for the final task of presenting their final, fully populated and revised e-Portfolios to their peers and the facilitator. The final presentation is a two- to three-minute *elevator pitch* that is framed as the response to a situation in which a prospective employer, or alternative audience of their choosing, requests that the student "walk them through" their e-Portfolio.
- Session 5: Students deliver their presentations, provide feedback on their peers' presentations, and revisit the overall experience.

To capture students' reactions to e-Portfolios "in the moment," students complete feedback forms where they share their ideas about rewarding, frustrating, and surprising aspects of working on the e-Portfolios. Students complete these forms at the beginning and the end of the two-hour studio sessions. At the beginning of the sessions, they reflect on their experiences working on their e-Portfolios since the last session; at the end of the sessions, they reflect on their experiences participating in the session. Student responses on these session feedback forms allow facilitators to gauge and understand students' personal progress and experience. In addition, responding on the forms provides students with an opportunity to slow down and reflect on the process of constructing the e-Portfolio. Between sessions, results on these feedback forms are aggregated and insights shared with students during the following session. In this way, students learn how others are experiencing the portfolio studio activities, which can validate or reinforce their own experiences.

In the next three sections, we provide rationale for three features of this approach—the number of sessions, the emphasis on student progress on their e-Portfolios, and the emphasis on bringing students reactions to the activities into the conversations. In discussing the rationale, we draw not only on cognitive perspectives on learning, but also on issues of motivation and social construction and emergence of knowledge.

Why Five Sessions?

Over time, five has emerged as the number of sessions we believe to be particularly advantageous for a studio series. This number of sessions represents a

balance of two competing factors: (1) having enough session time with the students to adequately leverage the important learning opportunities inherent in the e-Portfolio experience; and (2) respecting the crowded nature of engineering curricula and the demands on students' time. The focus on content over technology has contributed to the ability to provide an effective learning experience in just five sessions because we do not have to allocate much contact time with students to issues of technology. The research focus requires that we are open to new ideas and continue to question existing ideas: Are studio sessions really needed? What additional value to they provide?

Why the Emphasis on Student Progress on Their e-Portfolios?

The portfolio studio experience revolves around the student portfolio elements, and specifically around student work on these portfolio elements. The studio experience includes many opportunities for students to give and receive feedback. Three sessions center on peer review: peer review of the professional statement, of an initial artifact annotation, and of an element of the author's choosing. One session includes a check-in activity focused on students' progress on their e-Portfolio. Another session involves a think-aloud activity in which students listen in as someone else walks through their e-Portfolio. And the final session includes feedback on students' e-Portfolio presentations. Again the commitment to content over technology means that we have more time for this focus on sharing and peer review.

The emphasis on supporting students as they reflect and make arguments about their preparedness stems from the commitment to an engineering undergraduate population, a population that may be less familiar with reflection and argumentation than students in other disciplines. The studio sessions help sustain engagement: distributing work over five sessions throughout a quarter, and supporting students with the specific activities we have developed, helps students meet the challenges associated with the e-Portfolio tasks. In addition, features of the studio environment are likely to support student motivation by providing an inclusive environment that helps students create meaning (see Ginsberg & Wlodkowski, 2009). In terms of promoting inclusion, the studio approach is premised on respecting the contributions of each student and providing ample opportunity for each student to be heard. In terms of meaning, the studio approach promotes engagement and manages challenge. In particular, the studio approach improves motivation and sustains effort through the distribution of activities and the opportunities provided for peer interactions mentioned above. However, the interest in putting student work at the center of the preparedness portfolio experience goes beyond empathy with engineering students.

We see the circumstances where students share intermediate portfolio elements as particularly well suited to students constructing profoundly important knowledge related to engineering and to being prepared for engineering. We arrive at this conclusion by thinking about the ways in which the activity in the studio aligns with what is known about how to structure group activity in order to occasion the emergence of knowledge (Davis & Sumara, 2006).

Davis and Sumara (2006) have offered an innovative contribution to designing educational activity by bringing complexity concepts and ideas together with the general issue of creating groups that produce knowledge. Their ideas formalize common educator intuitions about what makes good educational situations; for example, providing straightforward activities that students can elaborate and then using the student-generated elaborations to move the group forward. Davis and Sumara (2006) propose that to occasion the production of knowledge in a group, an educator should strive to balance redundancy and variability (i.e., balance the extent to which students in the group are similar with the extent to which they are different), balance coherence and randomness (i.e., provide the group with common activities while also permitting random things to happen), and promote neighbor interaction (specifically interaction of emerging ideas) and local control (i.e., control of the direction of knowledge generation). Note that these concepts of redundancy, variability, coherence, randomness, neighbor interactions, and local control and their use as described here are specific to Davis and Sumara (2006).

Looking at the studio through this lens, using the language of Davis and Sumara, we can note the following. In terms of redundancy and variability, the students in the studios have all been undergraduates in engineering (redundancy), yet they are from different disciplines, have had a variety of prior experiences, and have different intended directions (examples of variability). In terms of coherence and randomness, the portfolio studio is organized around a straightforward series of tasks that provide coherence, while students' ways of realizing these tasks provide randomness. One challenge in facilitating these studio sessions is to provide enough scaffolding for the students to feel comfortable exploring the space in which they will create their e-Portfolios, without confining their exploration—a situation described by Davis and Sumara (2006) as "liberating constraints." Also following Davis and Sumara, "promoting neighbor interactions" is the basis for much of the portfolio studio sessions—students spend the bulk of each

session sharing their work-to-date with other students. As a result, students' ideas about issues such as what counts as evidence of preparedness and the extent to which they actually believe themselves to be prepared have the opportunity to interact with other students' ideas concerning the same issues. Finally, while there is coherence provided by a predefined series of tasks, the students ultimately have control over their evolving e-Portfolios.

Why Emphasize Students' Reactions to the Activities?

The studio activities leverage not only students' work on their e-Portfolios, but also their reactions to this work. As noted previously, reactions are collected with session feedback forms, which invite students to report on surprises, frustrations, and rewards resulting from e-Portfolio activities. Feedback is summarized and shared with the students in the subsequent session. In addition, the facilitator leverages student reactions through a warm-up exercise that precedes the first peer review activity (i.e., the peer review of the professional statement). In this exercise, students share their thoughts on four topics concerning their professional statements: (1) the experience of writing the statement, (2) their assessment of the current state of the statement, (3) something they like about the statement, and (4) something they would like help with. Student thoughts are aggregated and organized so that students can understand group-wide patterns on these issues as well as their own experience relative to the patterns.

The decision to emphasize student reactions is partially related to a sense of empathy with engineering students—a student population that may find such activities foreign. By helping students appreciate how their experience fits in with the experiences of other students, and, in particular, that negative experiences are not isolated, we anticipate that students will feel more motivated as a result of feeling more connected with each other. And, again, it is interesting to note that the emphasis on content over technology creates more time to focus on student reactions and sharing.

However, as with the emphasis on emerging student products, the emphasis on student reactions is not strictly related to helping engineering students or taking advantage of not having to explain technology. Rather, the emphasis is tied to the commitment to promoting deep and profound learning. The types of prompts that we use are inspired by Brookfield's (1995) ideas about critical reflection as seeking and questioning assumptions. For example, a surprise represents an instance of something violating a pre-existing expectation, or assumption. We theorize that exposing students to the aggregated collection of student responses can trigger significant reflection.

As with the argument about preparedness portfolios, we recognize that the ideas presented above represent a theory about what *could* happen in portfolio studios. In this case, we have only recently begun to explore the extent to which such theoretical ideas about what could happen in portfolio studios actually *does* happen for students, and what it looks like when it does. Below we present emerging insights gained from examining student feedback forms.

What do Students Say? Research Data

So what does such a portfolio studio experience look like through the students' eyes? In this section, we provide emerging insights from analysis of one set of feedback forms—forms filled out by students in a portfolio studio that was offered in the spring of 2010. Unlike the completed analyses summarized earlier, this analysis represents a preliminary step to be followed later by more rigorous analyses.

We have focused this preliminary analysis on all of the feedback forms collected during this particular studio, with an average of 22 forms per session. In this analysis, we coded student responses on the forms (i.e., what they found rewarding, frustrating and surprising) relative to three broad categories that emerged from the data: identity and self, building an e-Portfolio, and peer interaction.

The issues of *identity and self*, issues that we addressed in the studies mentioned earlier, are also prominent in the students' responses related to their *preparation* for studio sessions. For example, in their responses, students comment that they learned about themselves (e.g., "realizing I have certain skills I didn't think I had"), were able to reflect on their own experiences (e.g., "I have learned a lot from my college education even though I didn't realize this before"), and that looking back made them feel proud of their accomplishments (e.g., "I looked back on the things and skills I have learned and felt proud of myself"). Students also comment on having more or less evidence of being an engineer than they initially thought (e.g., "Realizing the amount of projects I have worked on over the past 5 years" and "Have much technical stuff. I want more leadership").

The session feedback forms also reveal, and thus remind us of, the variety of pragmatic issues of *building an e-Portfolio*—issues that are important but often fail to come up in end-of-session surveys. Moreover, these portfolio-specific issues show up in the responses related to both *preparing for* a session and *engaging in* a session. For example, in their responses, students comment on trying to figure out what an e-Portfolio is, grappling with potential artifacts (e.g., "deciding what has worth") and how to organize the e-Portfolio, handling technical problems, and figuring out how to

effectively express ideas via the portfolio elements of professional statement, annotations and artifacts ("figuring out a professional versus a personal statement"). Such comments remind us of the significant challenges associated with making an e-Portfolio. These challenges include deciphering what potential employers or academic institutions deem important and tailoring one's e-Portfolio by including the most appropriate artifacts and annotations. Challenges also include the need to achieve a balance between personal (perhaps to give a sense of an individual's personality) and professional expression through the writing style and content of the professional statement. The opportunity to balance personal and professional considerations allows students to choose evidence from their academic and working history, as well as from their life-wide experiences. As one student wrote, "It's okay to use non-engineering, non-technical experience in the PS [professional statement]."

The feedback forms are proving particularly useful in helping us confirm that, indeed, the *peer interaction* components of the sessions are significant aspects of the studios. Notably, these peer interaction comments show up prominently in the responses related to *engaging in* a session. Involving peer activity allows for participants to "see other people's work and their perspective on the portfolio" and "look at what others had problems with." Students further comment on gaining a sense of shared knowledge or experiences with their peers, the benefits of giving and receiving feedback, being helped by seeing others' thought processes, the value of seeing different styles and formats, and finally having the encouragement of those around them to work on this project. We are particularly interested in their comments about shared knowledge, "seeing that people shared my troubles," "how many people had the same problems as me," and "it was helpful to see the thought processes of others." Such comments remind us of the contribution that a group dynamic has on this part of the procedure.

Conclusion

In this paper, we have described a body of work on preparedness portfolios and portfolio studios. We have emphasized features of the situation—engineering, learning, content, and research—that gave rise to the specific approach we have described. We have also shared findings from research studies associated with this work. At present the work continues in a number of areas. For example, we are currently offering portfolio studios as one-credit seminars, exploring the educational significance of having students engage in multiple portfolio studios over time, and exploring the educational benefits of e-Portfolio construction for students in specific curricular experiences such as coop and undergraduate research.

While we recognize that the work has stemmed from a specific situation, we believe the notions of preparedness portfolios and portfolio studios can be useful in other educational contexts and to other educators. For example, while engineering educators are clearly tasked with preparing students for engineering, they are not the only educators preparing students for something. Education in general is about preparing students for activities in their future— activities such as critical and independent thinking, securing and succeeding in jobs, and participating in a democracy. Educators in other disciplines could have such goals be the subject of preparedness portfolios. Having students grapple with what it means to be prepared for each of these types of goals, as well as how their experiences have (or have not) prepared them, has great potential to help students.

The idea of a portfolio studio has similar potential to be used in other contexts. While students can and do successfully create e-Portfolios while working individually, our research suggests that the studio environment supports students through the genuinely difficult tasks associated with constructing an e-Portfolio. In a studio environment, students can learn from each other, and even push each other to higher levels of achievement. Thus, educators involved in e-Portfolio activities are encouraged to consider the idea of a portfolio studio. Such a studio environment, or even elements from the one we describe in this paper, could be added to, and could significantly amplify, e-Portfolio activities in many other contexts.

The stakes in higher education are large—costs are going up, students are being asked to prepare for an increasingly complex world, and educators are being asked to help larger and more diverse groups of students prepare for the future. E-Portfolios have a role to play in this ever more complicated educational landscape, and the significance of that role is open to our imaginations about how to put e-Portfolios into practice. We are excited about the potential of preparedness portfolios and portfolio studios to contribute to such a goal.

References

Atman, C. J., Sheppard, S. D., Turns, J., Adams, R. S., Fleming, L. N., Stevens, R., . . . Lund, D. (2010). *Enabling engineering student success: The final report for the Center for the Advancement of Engineering Education*. San Rafael, CA: Morgan & Claypool Publishers.

Baxter Magolda, M. B. (2008). Three elements of self-authorship. *Journal of College Student Development, 49*(4), 269-284.

Brookfield, S. (1995). *Becoming a critically reflective teacher*. San Francisco, CA: Jossey-Bass.

Brown, J. (2002). Know thyself: The impact of portfolio development on adult learning. *Adult Education Quarterly, 52*(3), 228-245.

Bryson, M., Bereiter, C., Scardamalia, M., & Joram, E. (1991). Going beyond the problem as given: Problem solving in expert and novice writers. In R. J. Sternberg & P. A. French (Eds.), *Complex problem solving: Principles and mechanisms* (pp. 61-84). Hillsdale, NJ: Lawrence Erlbaum Associates.

Cambridge, D. (2008). Audience, integrity, and the living document: eFolio Minnesota and lifelong and lifewide learning with ePortfolios. *Computers and Education, 51*(3), 1227-1246. doi:10.1016/j.compedu.2007.11.010

Cambridge, D., Cambridge, B., & Yancey, K. (Eds.). (2009). *Electronic portfolios 2.0: Emergent research on implementation and impact.* Sterling, VA: Stylus.

Davis, B. (2004). *Inventions of teaching: A genealogy.* Mahweh, NJ: Lawrence Erlbaum Associates.

Davis, B., & Sumara, D. (2006). *Complexity and education.* Mahweh, NJ: Lawrence Erlbaum Associates.

Dewey, J. (1938). *Experience and education.* New York, NY: Simon & Schuster.

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

Eliot, M., Turns, J., & Xu, K. (2008). *Engineering students' extrinsic and intrinsic strategies for the construction of professional identity.* Paper presented at the Research in Engineering Education Symposium, Davos, Switzerland.

Felder, R., & Brent, R. (2004). The intellectual development of science and engineering students. Part 1: Models and challenges. *Journal of Engineering Education, 93*(4), 269-277.

Gee, J. P. (2000-2001). Identity as an analytic lens for research in education. *Review of Research in Education, 25*(1), 99-125. doi:10.3102/0091732X025001099

Ginsberg, M., & Wlodkowski, R. (2009). *Diversity and motivation: Culturally responsive teaching in college.* San Francisco, CA: Jossey-Bass.

Hofer, B., & Pintrich, P. (1997). The development of epistemological theories: Beliefs about knowledge and knowing and their relation to learning. *The Review of Educational Research, 67*(1), 88-140. doi:10.2307/1170620

Jafari, A., & Kaufman, C. (Eds.). (2006). *Handbook of research on ePortfolios.* Hershey, PA: Idea Group Reference.

Jarvis, P. (2006). *Towards a comprehensive theory of human learning.* New York, NY: Routledge.

Kegan, R. (1994). *In over our heads: The mental demands of modern life.* Cambridge, MA: Harvard University Press.

Kilgore, D., Sattler, B., & Turns, J. (in press). From fragmentation to continuity: Engineering students making sense of experience through development of a professional portfolio. *Studies in Higher Education.*

Kolb, D. (1983). *Experiential learning: Experience as the source of learning and development.* Upper Saddle River, NJ: Prentice Hall.

Kreber, C., & Castleden, H. (2009). Reflection on teaching and epistemological structure: Reflective and critically reflective processes in 'pure/soft' and 'pure/hard' fields. *Higher Education, 57*(4), 509-531. doi:10.1007/s10734-008-9158-9

Lewis, T., & Fournier, J. (2009). A catalyst without a mandate. In D. Cambridge, B. Cambridge, & K. B. Yancey (Eds.), *Electronic portfolios 2.0: Emergent research on implementation and impact* (pp. 129-132). Sterling, VA: Stylus Publishing.

Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress.* San Francisco, CA: Jossey Bass.

Sattler, B., Kilgore, D., & Turns, J. (2010). *I have never spent time to think about what I have gained from my projects.* Paper presented at the Frontiers in Education, Washington, DC.

Sfard, A., & Prusak, A. (2005). Telling identities: In search of an analytic tool for investigating learning as a culturally shaped activity. *Educational Researcher, 34*(4), 14-22.

Sheppard, S. D., Sullivan, W. M., Colby, A., Macatangay, K., & Shulman, L. S. (2008). *Educating engineers: Designing for the future of the field.* New York, NY: John Wiley and Sons.

Turns, J., Cuddihy, E., & Guan, Z. (2010). I thought this was going to be a waste of time: Using portfolio construction to support reflection on project-based experiences. *Interdisciplinary Journal of Problem-Based Learning, 4*(2), 63-93.

Turns, J., Sattler, B., & Kilgore, D. (2010). *Disciplinary knowledge, identity, and navigation: The contributions of portfolio construction.* Paper presented at the International Conference of the Learning Sciences, Chicago, IL.

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Electronic Portfolios for Distance Learning:
A Case from a Nursing Clinical Course

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Clinical nursing courses can already be challenging, in the traditional context of placements and hours spent in a health care setting. These types of courses are additionally problematic when offered via distance learning, due to geographic separation of students, lack of clinical placement sites in the student's community, and lack of faculty/student personal interaction and connectedness. In this review of an online R.N. to B.S. completion clinical course in community and public health nursing, the self-directed learning (SDL) educational theory framework and a project based eportfolio format was instituted as a way to address these online learning problems. The results of implementing the eportfolio as a pedagogical practice are examined as well as considerations for improvement in the use of this instructional strategy. Additionally, student and faculty issues related to the introduction and use of the eportfolio are discussed.

Distance education courses can be challenging for faculty to implement and for students to successfully master. During the creation of the community and public health nursing clinical course component of an R.N. (Registered Nurse) to B.S. (Bachelors in Nursing) online completion program, it became apparent that the development of this type of clinical distance course would be complex. Problematic factors included the reality that students enrolled were living in a variety of cities and states; therefore, prior arrangement of specific clinical rotation sites would be difficult and impractical. Additionally, the lack of an online clinical performance evaluative tool created concern about how faculty would keep track of the students' clinical progress.

Nursing clinical courses typically involve an on-site rotation, such as at a hospital or community clinic, in which the student is paired with a R.N. preceptor who provides the student direction and supervision for a specific number of clinical hours. Most times faculty solicit and develop the student placement sites and coordinate preceptor pairing. Assigned faculty and the preceptor monitor the student for attainment of course objectives and goals. These clinical rotations also usually involve faculty providing regular meetings with students as a group to debrief and facilitate application of concepts learned to professional practice and engagement in self-reflective practice, which involves reflection upon personal performance, assumptions, and biases that affect patient care.

This particular course was being developed for students who were already registered nurses via completion of an associate degree program of nursing, and had already developed many essential nursing practice skills, but not in the public health nursing arena. This being the case, the community and public health nursing clinical course that was under development focused upon core public health nursing functions and services, which require the nurse to have expertise in assessment, investigation, education, partnership development, evaluation, and mobilization of community resources (Truglio-Londrigan & Lewenson, 2011). Since the students lived in a variety of locations, clinical experiences could not be guaranteed to be traditional in the sense of pairing the R.N. to B.S. student with a Bachelor's prepared community and public health nurse in their own communities. Some students lived in rural communities that did not have access to available nurse preceptors or conventional community and public health nursing clinical placement sites or services.

Considering these factors, the clinical course was designed as an individualized project, in which the student would assess their community, develop, implement, and evaluate a small-scale project rather than the traditional preceptor based clinical. This creation of a project based instructional experience complemented an increased desire among the discipline of nursing concerning clinical placements and community involvement and supports the growing advocacy for a collaborative partnership model of public health education in which the nursing school, students, and community partners work together to provide for a common goal, such as educational experiences or community service (Umble et al., 2005). The project based design of the course also provided a concrete opportunity for students to apply community and public health nursing concepts in their own communities via social action and problem solving on a grassroots level (Kemp, 2003).

Theoretical Framework

With these needs in mind, faculty chose the Self Directed Learning (SDL) theory as an educational framework for course development. The basic tenets of the SDL theory are centered in learner-directed instruction, facilitation of transformational learning,

and integrating social action as a key part of the learning experience. This framework corresponds with traditional adult learning concepts including providing occasions for the adult learner to direct his or her individual learning, maintaining a focus on problem-solving, preferring learning activities that provide for application of the course concepts, and being motivated internally rather than externally to participate in educational endeavors (Merriam, 2001).

Adult learning concepts and learner-directed instructional pedagogy is a paradigm shift from the traditional teacher directed instructional approach such as lecturing or one on one instruction and supervision from the nurse preceptor. This is an important component to integrate into distance course development, as distance learners often cannot avail themselves to the traditional teacher centered instructional approaches. In SDL the learners themselves direct their instruction and the role of the educator within this construct is to assist learners to plan, carry out, evaluate, and reflect upon their individual learning experiences. Thus, the educator assists the distance learner in transforming course concepts into personally and professionally meaningful experiences through activities selected and through guidance throughout the learning process (O'Shea, 2003).

The tenets of SDL theory, the role of the educator, and adult learning theoretical constructs, including problem based approaches to instruction, internal motivation, and self-directed learning abilities were considered by lead faculty to fit well with an independent and individualized project based approach to the clinical course being developed. Review of the SDL theory also indicated that some students might experience discomfort with directing their own learning (O'Shea, 2003). Since this was a potential issue with the course, an instructional design that allowed provision of a learning environment permitting student choice, work revision, and reflection on the process was required, as these instructional features offer the distance student a framework to implement learner-directed instruction (Idros, Mohamed, Esa, Samsudin, & Daud, 2010).

Specifically, in the course plan student choice was offered in student self selection of topic and theoretical basis of the project. Continuous ability to revise work was integrated into the assignments given, as the development of the project was seen as a "work in progress" until project implementation. Additionally, use of self- reflective activities, such as self-evaluation at midterm and development of an individual learning contract, was thought to be essential for integration of the concepts being introduced and development of personal meaning. In this way it was believed that the student could work toward development and

implementation of the most effective project possible whilst developing professional nursing practice skills related to course concepts and engaging in problem based learning and social action in their own communities.

Furthermore, an instructional design that provided collaborative knowledge development and a personal connection to the learning activity was sought, as these components enhance the SDL process through construction of meaning and transformation of concepts into professional practice (Garrison, 1997; Huba & Freed, 2000). Utilizing the SDL educational framework faculty reviewed possible instructional strategies and chose to implement a project based electronic portfolio (eportfolio) format that provided a structure for students to demonstrate achievement of course outcomes, facilitate engagement in transformation of course concepts into personal meaning and professional practice, and provide a platform that allowed for self-directed learning and project individualization.

ePortfolios as a technology are used in a variety of settings and disciplines, such as medical education, nursing, social work, and the arts (Lorenzo & Ittleson, 2005; Reese & Levy, 2009). These often are based on the traditional portfolio concept of a collection of artifacts that document student learning and experiences. The eportfolio also integrates current technology such as videos, podcasts, hyperlinks, and slide shows in a Web-based format. The eportfolio has been shown to be a unique way for students to collect and reflect upon their work, construct meaning, and link theory to practice (Coffey, 2005; Skiba, 2005). Additionally, the Web based version of the eportfolio allows invited classmates to view the website, or the public in general to have access to the information posted (Driessen, Muijtjens, van Tartwijk, & van der Vleuten, 2007). This availability of clinical classmate access to the eportfolio information is fundamental for a collaborative learning experience and building of the online course community. Moreover, through development of the eportfolio, via selection of artifacts and reflection upon the project experience, development of personal and professional meaning and knowledge can occur (Tegelaar, Dolmans, Wofhagen, & van der Vleuten, 2005).

Use of the eportfolio also provided faculty a formative and summative tool for online clinical course evaluation. Part of the eportfolio design was the ability for peers and faculty to post comments on each page of the eportfolio. In this way, faculty as well as classmates could view the project as it developed and provide feedback and guidance as needed for successful project implementation. As a formative evaluation tool, the eportfolio can enhance student learning through providing a format for the student to describe their learning experiences via posting documents, videos,

slideshows, and links to important materials used for project development. It also can provide evidence about what the student has accomplished, and it offers a venue for reflection of difficulties and positive achievements through the use of project updates and discussion of work posted (Gardner, 2006).

As a summative evaluation tool the eportfolio can encapsulate what the student has learned by means of their project development and implementation. It also can provide a summary of achievements at specific points in time and can be used to evaluate student performance and attainment of course objectives (Coleman, Rogers, & King, 2002). Advantages to utilizing the eportfolio format include enhancement of SDL via the ability for students to self select artifacts and participate in reflection and collaboration with peers, ease of documentation of project development and implementation through use of the eportfolio no matter where the student is geographically located, and the ability to use a variety of media to communicate competency attainment (Ahn, 2004).

Course Technology and Instructional Design

A framework was needed to implement the teaching and evaluative practice utilizing the eportfolio. Faculty performed a thorough review of the relevant online resources during the fall of 2008; the course was implemented with the inclusion of eportfolios during the spring of 2009. Considering the aspects of cost and ease of student access and site features, the PBWorks® website was chosen. The PBWorks® site offers free websites for educators to use with up to 2 GB of memory at no cost. The site allows each student to have an individual website and includes a comment tool other students can use to discuss assignments and project formation. Faculty were concerned about confidentiality of the eportfolios, but this was addressed by PBWorks®, through the ability to keep the site private, except to those invited to view the website. The PBWorks® features and products can be viewed at http://pbworks.com/.

Lead course faculty created individual student sites as the administrator. The student was also made an administrator of the site, so they had control over all aspects of the eportfolio development. Each member of the clinical course was added to the site as a reader; that is a person who can view the content of the eportfolio and make comments but cannot make changes to the eportfolio itself. In this way, SDL theory was supported as the students had autonomy on the content of their eportfolio and were also able to view peers eportfolios and give formative feedback and engage in discussion of the course content and knowledge development, allowing for revision and self-reflection.

Once the site was developed, faculty constructed a basic framework for the students that identified what should be included in the eportfolio. In the eportfolio, folders were made for each bi-weekly period of the course and each folder had one or more pages that specified the assignments required (see Appendix A). The course assignments, lectures, and reading materials were kept on Blackboard, the university's course management platform. Students were instructed to consider the course site as a "textbook." On Blackboard each bi-weekly period had a power point about topics being reviewed, a lecturette, and links to articles and websites that had helpful information for the completion of that week's assignments. Additionally, there was an assignment tab for each bi-weekly period that had specific assignments listed as well as access to document format templates that could be used by the student to assist in assignment completion.

The eportfolio was explained as the student's "notebook" of their project. When students were in the implementation and evaluation stage of their project they provided an update and reflected upon any necessary changes in the project design or implementation. The students posted their final project presentation on their eportfolio and identified three areas of behavior or knowledge they would be taking into their professional practice after course completion. All updates and reflections as well as bi-weekly work were to be viewed by classmates. The eportfolio design allowed for a comment tool and classmates were required to make comments on at least four of their peers' eportfolios each bi-weekly period. This commenting/discussion strategy was employed for the purpose of facilitating discussion and reflection, providing online course community development and social knowledge construction (see Appendix B). By having guidelines on the content and purpose of the eportfolio, SDL was supported and student motivation to take ownership of the finished product was enhanced (Driessen, van Tartwijk, Overeem, Vermunt, & van der Vleuten, 2005). Other than these few requirements the students were informed that they could add whatever content to the eportfolio they felt assisted in communicating their project, including pictures, hyperlinks, and other tools.

Challenges and Revisions

As a new approach to instruction and course delivery the clinical project based eportfolio and course had several faculty and students concerned about how the course would progress. Through one on one and group discussion with other online faculty and student representatives there appeared to be three main concerns: (1) the students and adjunct faculty having to master a new website, (2) how faculty would monitor the students' progress, and (3) how the students would initiate their projects. Initially, the lead faculty did not feel these would be significant issues as the PBWorks®

website offered online tutorials and felt viewing posted work would be sufficient to monitor the students' progress. Additionally, it was believed that since the clinical course was designed to be project based in the student's own community, identification and initiation of projects would be streamlined due to the student having personal knowledge of the community.

Unfortunately, all three of these issues were in reality significant matters that affected student progression in the course. Several students were unable to master the PBWorks® site without considerable faculty technical support. Students would post assignments and faculty would review them, but at midterm when concrete feedback was given it became apparent that some students were not adequately preparing their projects for implementation. Furthermore, most students struggled with the SDL style of self-selection of projects and venues of delivery. Based on this feedback and lead faculty reviews of the course, several changes were implemented for the following semester, including video tutorials, a project sample site, and guidelines for adjunct faculty feedback and mentoring.

A series of video tutorials on the use of the PBWorks® site were developed utilizing Wink® software that is available for no cost (http://www.debugmode.com/wink/). Faculty went through each of the PBWorks® site tools and buttons and made tutorials of the author accessing the different features of the website in relation to course requirements. Feedback from adjunct faculty facilitating the course and several students indicated these were helpful tutorials. Yet, over the following semester there were again a number of students who required significant faculty support in the mastery of the PBWorks® site. This indicated that, although the tutorials did go over specific applications of the site to the course project, many students were either unwilling or unable to view the tutorials, or if they did view them, they were unable to connect the tutorial content to active use of the website.

Many of the students also struggled with the assignments involved in assessing their communities, engaging community partners, and devising and implementing a small scale project. When the students were made aware of this requirement several students indicated they were either uncomfortable approaching people in the community or felt it was the role of the faculty member to solicit sites/placements for their projects. This issue was addressed by the development of a sample project PBWorks® site that had links to several examples of projects past students had implemented. Student permission was granted to include their content on this site and can be viewed at http://sample417projects.pbworks.com/w/page/13443166/FrontPage.

Student feedback indicated that this site was helpful and gave ideas on project development and implementation. The varied use of technology in project delivery was evident through the sample site and became a source of discussion among faculty and students about potential projects.

Furthermore, a set of guidelines was designed to assist students with community partner engagement and project initiation. The guidelines included discussion and examples of a variety of topics related to each phase of project identification and community partner engagement (see Appendix C). Adjunct faculty and students found these guidelines to be helpful as they provided a template on how to approach community partners and gave adjunct faculty a framework to address student questions about the process.

Lastly, when the course was designed the eportfolio was structured to facilitate project development and monitoring of student progress throughout the semester by the use of bi-weekly folders and assignment pages as well as assignment due dates. Yet, some adjunct faculty were uncomfortable with the eportfolio and project format of the course design, as it was new and non-traditional. When the course was implemented, the lead full-time faculty provided ongoing support via email or phone to adjunct faculty but this was found to be ineffective in ensuring that students were getting formative feedback regularly and that they were successfully participating in the course. Some adjunct faculty had difficulty themselves using the website and could not assist their students. Other adjunct faculty were unsure what to look for in the developing project and what sort of feedback to give formatively. As for summative evaluation, the concept of an eportfolio was difficult for some adjunct faculty, and even with the provision of a rubric concerning the eportfolio content; grading was shown to be cumbersome (see Appendix D). Confirming what Nairn et al. (2006) and Schaffer, Nelson, and Litt (2005) found, it was apparent through course implementation that for the eportfolio to be an effective evaluation tool, all faculty must review them consistently, provide timely formative feedback related to project development, and have a clear understanding of the final outcome expectations.

Because of these and other issues the online program developed formal adjunct faculty mentoring checklists that ensured the mentor full-time faculty was assisting in the identification of non-participating or failing students as well as providing continual support related to adjunct faculty facilitation of the course. This formal mentoring checklist has been helpful in the consistency of training of adjunct faculty and identification of potential student issues. The checklist consists of areas that include but are not limited to, orientation on course objectives and outcomes,

accessing the website and Blackboard, and review of the course vision (see Appendix E).

Discussion

Despite initial difficulties encountered, the lead course faculty member considers eportfolio use an appropriate teaching strategy in this type of clinical offering and continues to utilize this instructional strategy. Use of eportfolios provides for a rich learning experience that supports SDL and adult learning theory. The distance student via eportfolio can engage in autonomous and creative construction of his or her eportfolio while participating in the revision and reflection in the learning process. Although some students are hesitant at first to use the eportfolio, in the end several students have commented that they like the ability to individualize their eportfolio, to share it with others that they deem important, and to view the progress of their individual project as well as that of their classmates.

The eportfolio also is invaluable to clinical distance education faculty as it provides an organizing structure for formative evaluation of the project's process, development, and applicability to nursing concepts and course objectives. By having a medium in which the faculty can view assignments as they are completed, feedback can be given in real time as to the project appropriateness and development. Classmates also provide a type of formative evaluation in the discussion and reflection of the students posting of work on the eportfolio via comment tool use. This engages the class in social construction of knowledge through the pursuit of understanding others' projects, the communities and perspectives involved, and enhance the development of the online learning community.

In this course example, students were given an assignment framework consisting of the student first ideally mastering the eportfolio site and posting an introduction. Other assignments included a community assessment, project proposal, annotated bibliography, project model, and theoretical framework. These assignments were uploaded on the eportfolio as they were completed. Some students used a document format, other students utilized pictures or PowerPoint, and some typed the information directly onto the assignment page. Additionally the students began uploading video clips and adding hyperlinks to their eportfolios during project development in an effort to communicate their project and individualize their work. Once the project was completed the students often would post pictures of themselves implementing their projects as well as upload any PowerPoint slides or other handouts they had used in their project.

Ultimately, at the end of the course most students had utilized a variety of media and technologies to communicate their projects to their faculty and peers through the eportfolio. This is an important course outcome in nursing education, since the discipline of nursing has become more technologically based, the need for nursing students to become comfortable and adept at managing information and data electronically and to communicate information to others is essential (Blais, Hayes, Kozier, & Erb, 2002). The use of the eportfolio in this clinical course has the potential to support the development of these foundational 21st century nursing skills as well as meeting the learning needs of distance students and supporting identified educational theoretical frameworks.

Some online students continue to express difficulty in using the PBWorks® site, even with the addition of video tutorials and faculty support. It is uncertain the cause of this continued difficulty, but feedback from students and faculty experience indicate the difficulties arise in the student not having necessary software installed on their computers, lack of high speed internet which causes difficulty downloading and uploading large files, and a general lack of familiarity utilizing computer applications and the internet for educational and data management purposes. Additionally, some students were shown to be hesitant to ask for assistance until they were extremely frustrated with their inability to master the eportfolio and at that point are disenchanted with the use of the technology.

Currently, the program is offering an online education preparedness course with the goal of preparing potential online students to use current educational technology such as blogs, wikis, discussion boards, and the Internet. Furthermore, in the first two weeks of the course an assignment has been developed in which the student is required to access several of the most used features of the eportfolio website. The platform being utilized is also being changed to the use of the Google Sites™ application linked to the university's email system. The thought being, the student may have an easier time accessing the eportfolio and feel that it is more connected with the course site since they can use their student emails and passwords to access the technology. These instructional additions are currently under evaluation for efficacy and promotion of online student success with promising results at this time.

Oftentimes educators may not be comfortable with or knowledgeable about the educational technology available. Thus, it is essential that if this type of teaching, learning, and evaluative tool is to be implemented in an online course that a framework for formative and summative evaluation and project facilitation also be developed that communicates course outcomes and vision in a manner that students and adjunct faculty can understand and implement easily. This communication of a clear vision of the benefits of using eportfolio is

paramount if faculty buy-in is to be gained. In nursing the use of eportfolio and distance education clinical courses are relatively new instructional strategies and many faculty are hesitant to embrace a technology they are unfamiliar with. Therefore, the assignment of adjunct faculty, or faculty new to distance learning, to a faculty mentor to who is comfortable and knowledgeable about the technology and its educational use is imperative if eportfolio is to be used effectively and in a way that promotes student knowledge construction and personal reflection. It has been found in this particular course example that adjunct faculty often need an additional semester, or a full year, of formal mentoring to become comfortable with the course format and technology being utilized.

Overall, use of the eportfolio has many advantages to distance education implementation, as well supporting adult learning and SDL theory. But, from this course example it was found that to be effectively implemented the faculty and student learning curve related to its use formally needs to be addressed and integrated in the course design from the initial development.

Specific items found to be vital to address before implementing eportfolio use include the following:

- Do not assume that use of eportfolio will be instinctive for students or faculty.
- Provide a clear vision of how the use of eportfolio is of benefit to the students and the faculty to obtain buy-in.
- Provide a list of the needed technological requirements for successful use of the eportfolio to students and faculty with examples of what may go wrong (e.g., lack of high speed internet, downloading timeframes, and typical software used).
- Develop and institute a formal mentoring system for adjunct faculty who may be unfamiliar with the technology or course design and provide institutional support to lead faculty if the mentoring time period needs extended.
- Ensure there is an easily accessible system that students and adjunct faculty can contact if assistance is needed with the technology, such as a help desk or an available faculty member that can troubleshoot problems as needed.
- Take the time to develop rubrics for evaluation of the eportfolio prior to implementation and include specific definitions related to the content of the rubric (e.g., providing examples of a self-reflective posting or how the use of captions with artifacts are of benefit).
- Instructions on how to use the eportfolio and the goal of using the technology ideally should be provided via multiple instructional venues

for the benefit of all participants. For example, some participants may learn via written instructions, others with video tutorials, and others with the use of screen shots.
- Be prepared for resistance and discomfort with the use of eportfolio and the self-directed style of learning. Look ahead for potential areas of difficulty where traditional instructional strategies will not be used and provide specific instruction and support to students for their successful participation in the course (e.g., the introduction of the community partner engagement guidelines and the sample projects site).
- Do not give up on the use of the eportfolio as an instructional strategy; its many benefits outweigh potential difficulties in use, and with proper preparation can be an invaluable teaching and reflective tool. The eportfolio is low in cost to use, provides a framework for course evaluation, and allows for student creativity and personal connection to course outcomes. In addition, the skills students learn in mastering eportfolio use may translate well into the technological skills needed for professional success.

Conclusion

The opportunity for online education provides challenges to traditional curriculum design, especially in the area of clinical nursing courses. Using Internet based tools to facilitate communication and instruction only solves the most basic issues related to online learning. Preparation and foresight into potential difficulties and benefits of using available technologies are essential for ease of course implementation and student success. Establishing student responsibilities within the subject matter, while balancing their individual capabilities is required for student achievement. Other important online nursing curriculum and course development issues include linking theory to practice, facilitation of formative and summative evaluation, grading, and development of self-reflective practice. Moreover, as adjunct faculty are facilitating online nursing course offerings, a structured mentoring program is essential for course success related to use and implementation of educational technologies in online learning.

Plans for further research at this time in this course example will focus on the use of the Google Sites™ as an eportfolio platform related to ease of use and access for students and adjunct faculty. Students will also be surveyed at the end of the course to determine if they believe that the use of the eportfolio has supported the adult learning theory and

educational benefits identified in this article. Current course improvements include the introduction and use of a theoretically more student friendly eportfolio web platform and the development of evaluation rubrics for each formative phase of the project development and the assignments given. Ideally, the development and implementation of specific evaluative rubrics will assist the students and adjunct faculty in understanding the vision of the course as well as how the eportfolio can enhance their project development and technological skills. Furthermore, the online educational preparedness course will continue to be offered to students who are considering enrolling in this R.N. to B.S. completion program.

It is considered that the use of eportfolio has great potential and application in the field of nursing education. Not only is the eportfolio an instructional strategy based in adult educational learning theory, but it is also a technological venue that can be used for data storage, professional documentation, and to hone skills of communication through technology. The potential value and possibilities of the eportfolio as an ongoing platform for academic and professional achievement are great.

There are many areas of further research needed regarding the use of eportfolio in nursing education. Clinical distance course use of the eportfolio requires additional research at different nursing schools and with alternate student populations in order to evaluate the efficacy of the eportfolio as a method for documentation of clinical course outcomes, student reflection, and as a means to connect clinical concepts and knowledge to practice. Additional areas of research focus include the use of the eportfolio as a tool and instructional strategy to enhance technological skills and communication abilities needed by nurses in the 21st century and identification of the human factor considerations in eportfolio use such as training needed, accessibility, and user experience and interface.

References

Ahn, J. (2004). Electronic portfolios: Blending technology, accountability & assessment. *THE Journal, 31*(9), 12-18.

Blais, K. K., Hayes, J. S., Kozier, B., & Erb, G. (2002). *Professional nursing practice: Concepts and perspectives* (4th ed.). Upper Saddle River, NJ: Pearson Education.

Coffey, A. (2005). The clinical learning portfolio: A practice development experience in gerontological nursing. *International Journal of Older People Nursing, 14*(8b), 75-83.

Coleman, H., Rogers, G., & King, J. (2002). Using portfolios to stimulate critical thinking in social work education. *Social Work Education, 21*(5), 583-595.

Driessen, E. W., Muijtjens, A. M., van Tartwijk, J., & van der Vleuten, C. P. (2007). Web- or paper-based portfolios: Is there a difference? *Medical Education, 41*(1), 1067-1073.

Driessen, E. W., van Tartwijk, J., Overeem, K., Vermunt, J. D., & van der Vleuten, C. P. (2005). Conditions for successful reflective use of portfolios in undergraduate medical education. *Medical Education, 39*(1), 1230-1235.

Gardner, J. (Ed.). (2006). *Assessment and learning*. Thousand Oaks, CA: Sage Publications.

Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. *Adult Education Quarterly, 48*(1), 1-18. doi:10.1177/074171369704800103

Huba, M. E., & Freed, J. E. (2000). *Learner-centered assessment on college campuses: Shifting the focus from teaching to learning*. Boston, MA: Allyn & Bacon.

Idros, S. N., Mohamed, A. R., Esa, N., Samsudin, M. A., Daud, K. A. (2010). Enhancing self-directed leaning skills through e-SOLMS for Malaysian learners. *Procedia Social and Behavioral Science, 2*(1), 698-706.

Kemp, C. (2003). Community health nursing education: Where we are going and how to get there. *Nursing Education Perspectives, 24*(3), 143-150.

Lorenzo, G., & Ittelson, J. (2005). An overview of E-portfolios. *Educause Learning Initiative, 1*, 1-27.

Merriam, S. B. (2001). Andragogy and self-directed learning: Pillars of adult learning theory. *New Directions for Adult & Continuing Education, 89*(3), p. 3-14. doi:10.1002/ace.3

Nairn, S., O'Brien, E., Traynor, B., Williams, G., Chapple, M., & Johnson, S. (2006). Student nurses' knowledge, skills, and attitudes towards the use of portfolios in a school of nursing. *Journal of Clinical Nursing, 15*(1), 1509-1520.

O'Shea, E. (2003). Self-directed learning in nurse education: A review of the literature. *Journal of Advanced Nursing, 43*(1), 62-70.

Reese, M., & Levy, R. (2009). Assessing the future: E-portfolio trends, uses, and options in higher education. *Educause Research Bulletin, 29*(4), 1-12.

Schaffer, M. A., Nelson, P., & Litt, E. (2005). Using portfolios to evaluate achievement of population-based public health nursing competencies in baccalaureate nursing students. *Nursing Education Perspectives, 26*(2), 104-112.

Skiba, D. J. (2005). E-portfolios, web folio, and e-dentity: Promises and challenges. *Nursing Education Perspectives, 26*(4), 246-247.

Tigelaar. E. E., Dolmans, D. H., Wolfhagen, I. H., & van der Vleuten, C. P. (2005). Quality issues in judging portfolios: Implications for organizing teaching portfolio assessment procedures. *Studies in Higher Education, 30*(5), 595-610.

Truglio-Londrigan, M., & Lewenson, S. B. (2011). *Public health nursing: Practicing population-based care*. Boston, MA: Jones and Bartlett Publishers.

Umble, K., Steffen, D., Porter, J., Miller, D., Hummer-McLaughlin, K., Lowman, A., & Zelt, S. (2005). The National Public Health Leadership Institute: Evaluation of a team-based approach to developing collaborative public health leaders. *American Journal of Public Health, 95*(4), 641-644. doi:10.2105/AJPH.2004.047993

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Appendix A
Sample ePortfolio Bi-Weekly Assignment Folders and Pages

Figure A1
Bi-Weekly ePortfolio Folders

Figure A2
Sample Assignment Pages Located in Bi-Weekly Folders
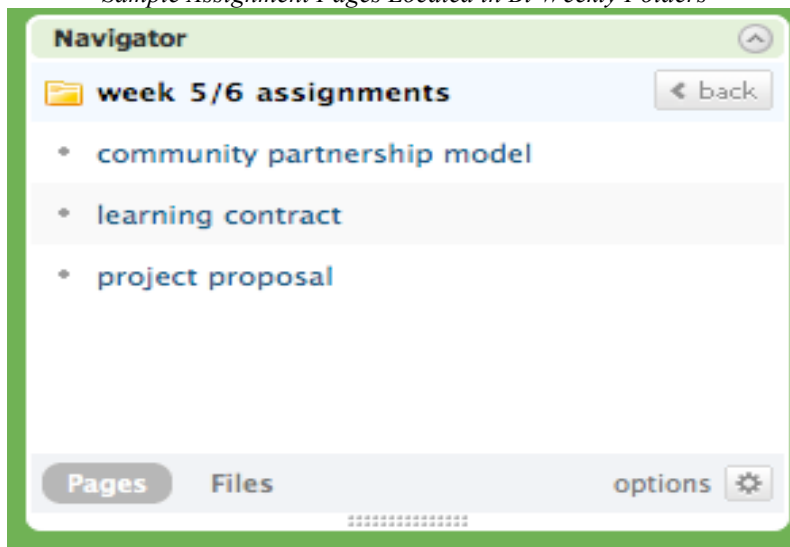
Appendix B

Sample Screen Shots of ePortfolios

Figure B1
Sample ePortfolio, Front Page of a Hand-washing Project in Nicaragua

Figure B2
Sample Final Project Blog Linked to an ePortfolio
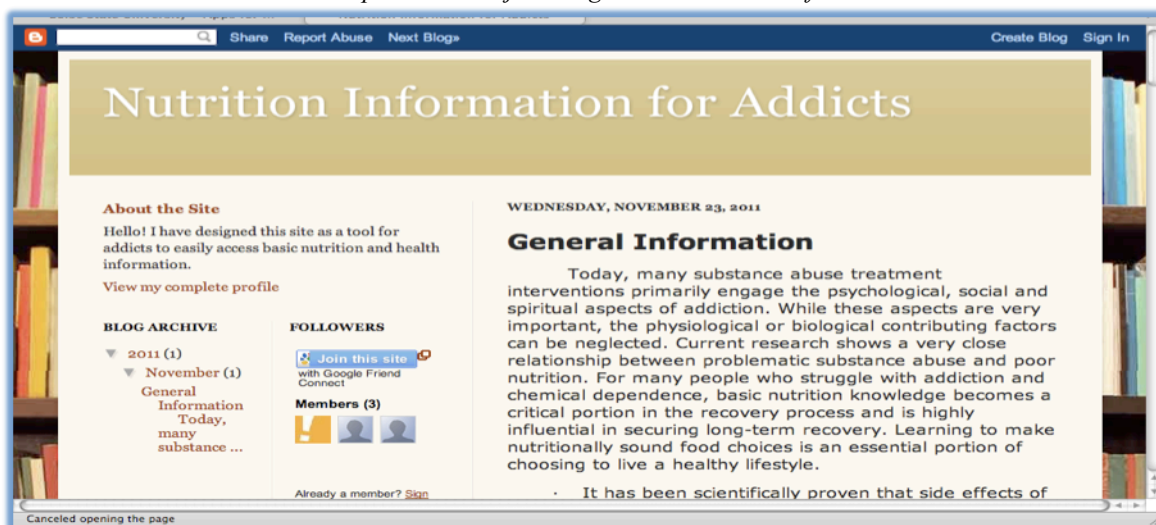
Figure B3
Sample Student Comment
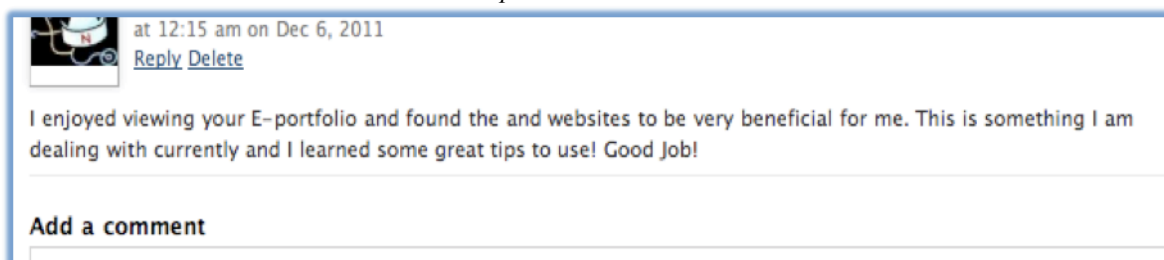
Appendix C
Community Partner Engagement Guidelines

Preparation for Community Partner Meeting	Connecting with the Community Partner	Meeting with the Community Partner
• Sketch out your project ideas and goals • Assess which community agencies may be interested in assisting with your project or have a vested interest in the project's topic	• Identify the person in charge of the agency or area you are interested in collaborating • Contact via phone or email • Follow up with a message or email if needed • Identify who you are, where you go to school, why you are doing your project, and give the community partner ideas about how you can assist their organization	• Have a timeline for project development, implementation, and evaluation available • Be professional (on time, dress appropriately, have your syllabus and faculty contact information available • Consider questions that the agency may ask you and bring prepared answers • Maintain confidentiality

Appendix D
Sample ePortfolio Rubric

Criteria	25 to 23 Points	22 to 20 points	19 to 17 points	Less than 17 points
Content Choice and Captions	All required content is included. Additional content is directly related to the purpose of the portfolio and demonstrates the meeting of course objectives. All content included is clear, organized, accurate, and effectively communicates the project. Each artifact in the portfolio is accompanied by a caption that explains the purpose of its inclusion.	All required content is included. Additional content is directly related to the purpose of the portfolio and demonstrates the meeting of course objectives. Content included is generally clear, organized, accurate, but may not effectively communicate the project. Most of the artifacts in the portfolio are accompanied by a caption that explains the purpose of its inclusion	All required content is included. Additional content may not be directly related to the purpose of the portfolio or directly related to demonstrating the meeting of course objectives. Several occurrences of the content being unorganized, inaccurate or ineffectively communicating the project are present. Several artifacts in the portfolio lack a caption that explains the purpose of its inclusion	Some required content is not included. Additional content is random and cannot be directly related to the purpose of the portfolio or demonstrating the meeting of course objectives. The portfolio is unorganized, unclear, and does not communicate effectively the project. Most of the content in the portfolio lacks a caption that explains the purpose of its inclusion
Use of Multimedia	All multimedia (graphics, links, pictures, etc.) used enhance the portfolio and are appropriate for their purpose.	Most of the multimedia (graphics, links, pictures, etc.) used enhance the portfolio and are appropriate for their purpose.	Few of the multimedia (graphics, links, pictures, etc.) used enhances the portfolio. Few are appropriate for their purpose.	The multimedia (graphics, links, pictures, etc.) used is inappropriate or distracting from the content.
Creativity	The portfolio shows creativity and original ideas throughout.	Most of the portfolio shows creativity and original ideas.	Some of the portfolio shows creativity and original ideas.	Original ideas are not evident. The portfolio does not show creativity.
Writing and Mechanics	Up to three errors in spelling or grammar present.	Four to six errors in spelling or grammar present.	More than six errors in spelling or grammar present.	Spelling and/or grammar errors are distracting to the reader or detract from the content.
Layout and Text	The portfolio is easy to read, with appropriate font size, italics, etc. Background and colors used enhance readability.	The portfolio is easy to read with appropriate font size, italics, etc. used for the most part. A few minor adjustments in layout and/or text would enhance the presentation.	The portfolio is often difficult to read. Several adjustments in layout, text, or color would enhance the readability and presentation of the portfolio.	The portfolio is difficult to read. Layout, text, and/or color and inappropriate for presentation and readability.
Total Points Possible=125				

Appendix E
Mentoring Checklist for Adjunct Faculty

Mentor faculty to review the following topics with assigned mentee:

Please check the following items as met or not met

	Met	Not Met	Comment
✓ Welcome and initial contact ✓ Support plan and strategies for the semester between mentee and mentor ✓ Course Orientation: oriented to the objectives, competencies and outcomes ✓ Class roster and drop/add deadlines/rules ✓ Course content/module schedule and rationale ✓ Teaching strategies and tips ✓ Issues with students and tips or strategies ✓ Issues with technology (both faculty and students) and helpful strategies ✓ Evaluation strategy and expectations ✓ Progress of students 3 weeks into term ✓ Progress of students at mid-term and formative evaluations ✓ End of course student summative evaluations			

Understanding Students' Experiences of e-PDP and the Factors that Shape their Attitudes

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Using an action research approach, e-PDP (electronically-supported Personal Development Planning) was embedded within an undergraduate psychology curriculum at an English university for more than two years. e-PDP was embedded in three ways: (a) information literacy micro-tasks, (b) blogs of learning activities, and (c) eportfolios submitted at the end of each academic year in which the students assessed their experiences and development across all units. This paper focuses on findings from the qualitative analysis of a sample of interviews with students. A system of five interconnected categories was identified at the center of which were the students' *attitudes* towards reflective writing and the construction of eportfolios. These attitudes were closely related to a perception of *purpose* (many different purposes, but also lack of purpose), as well as *technical aspects* (experiences of using the software), the students' willingness (or reluctance) to *disclose personal aspects* in their eportfolios, and the *guidance* received from tutors.

PDP (Personal Development Planning) was originally conceived of as a framework for higher education institutions in the United Kingdom (UK) with the aim of giving learners more control over their learning and development through reflection and planning (National Committee of Inquiry into Higher Education, 1997; Quality Assurance Agency, 2001). PDP has also been linked to employability in an attempt to provide a life-long learning dimension and highlight the practical relevance of education for the learner (e.g., Yorke, 2007). Many initiatives have taken place in the UK and other countries with varied outcomes (see Gough, Kiwan, Sutcliffe, Simpson, & Houghton, 2003). While conceptual critiques of the notion of PDP are indeed valuable (e.g., Clegg, 2004), practitioners often report of significant numbers of students and teaching staff that dismiss it as taking up precious time and having no real value (e.g., Blumhof, 2005). Finally, the switch to digital technology (Virtual Learning Environments, or VLEs, and ePortfolios) offered many exciting possibilities, but also introduced further challenges (Strivens & Ward, 2010).

For this project, PDP is understood as comprising activities carried out by the learner, but supported by tutors, of the following types: *planning* (i.e., deciding what to learn and for what purpose) such as goal-setting and producing action plans; *recording significant learning experiences* (e.g., learning logs); *reflecting* on the success of these activities (in order to better understand personal processes of learning and development); and *revising one's plan* in order to be more productive next time. These activities are supposed to enhance the development of transferable/generic skills as well as the learning of subject-related knowledge. At the University of Bedfordshire, these two important outcomes are part of the notion of learner development, but the latter also includes awareness and motivation (Atlay, Gaitán, &

Kumar, 2008; Bridges – Centre for Excellence for Teaching and Learning, 2007). e-PDP refers to the use of information technology, mostly in the form of eportfolio software, to support the PDP related activities mentioned above. PebblePad was adopted across the university based partly on the results of a pilot study conducted on the use of the Blackboard platform for producing eportfolios with students of computing and psychology (Gaitán, Manton, & Jankowska, 2007, 2008). In addition to several perceived weaknesses of the Blackboard platform, such as rigidity in its handling of images, it became apparent that it did not explicitly support a reflective style of learning.

PDP in the Psychology Department has evolved over the years. Initially, it was closely aligned to the role of personal tutors who for several years met weekly with groups of 15-20 students in the first and second years of the undergraduate degree (called in the UK Level 1 and 2; the final year is referred to as Level 3), an approach similar to that described by Savory (2007). Paper portfolios were produced at the end of the academic year and were not compulsory. Gradually, the personal tutor groups disappeared, and in 2008, following an institutionally-led curriculum review, skills-training was included throughout the curriculum, with a strong emphasis on employability (McMurray, Roberts, Robertson, & Teoh, 2011). While electronic portfolios had been offered as an option in 2007, in 2008, they were formally assessed for the first time with a weight on the grade in specific units at Levels 1 (PSY001-2 Introduction to Research Methods), 2 (PSY001-2 Social Processes & Lifespan Development) and 3 (PSY000-3 Research Dissertation). The process of relating PDP to the psychology curriculum could be described, in Atlay's terms (2006), as moving from an "additional model" (where a PDP strand runs parallel to the curriculum, but separate from it) to an "integrated"

one (where PDP activities are incorporated in individual units), but not quite having achieved full "embeddedness" (PDP informing the learning in all units in the curriculum). While some pilot studies in the UK, such as those that were part of the Individualized Support for Learning through ePortfolios (ISLE) Project (ISLE, 2007) and others (e.g., Brett, Lawton, & Purnell, 2008; Frith, 2007), provided valuable examples of embedding e-PDP: (a) they have done so in PDP-dedicated modules/units, (b) mostly at Level 1, and (c) the activities that were selected for enhancement by eportfolios do not refer directly to subject-specific learning.

In view of the above, an action research project was designed to explore the following research questions:

1. How can e-PDP be embedded in a curriculum so that it is closely linked to subject-related learning?
2. To what extent will students at Levels 1, 2 and 3 engage with e-PDP, through the use of eportfolio technology, when it is embedded in the units they are studying?
3. How does engagement with e-PDP embedded in a curriculum contribute to subject-specific learning as specified in the learning outcomes, as well as learner development as constructed by the learners themselves?

Method

Approach

Action research (Lewin, 1946; Reason & Bradbury, 2008) was adopted for this project. It is "a form of research carried out by practitioners into their own practice" (Kemmis, 2003, p. 177) with the aim of understanding these practices and the contexts in which they take place in order to make improvements. It entails designing an intervention and putting in place procedures to document the process as well as the outcomes in order to determine whether its aims were achieved and to what extent (i.e., planning). The next stage is the implementation of the intervention (i.e., action) followed by monitoring of its effects (i.e., observation). This is followed by systematic evaluation of the experience which allows the researcher to understand the extent to which the outcomes were achieved or not (i.e., reflection). The understanding gained through this sequence will enable him/her to make adjustments to the intervention that will be implemented again in the next cycle. In our project, systematic monitoring and collection of data (i.e., observation) occurred alongside the implementation; therefore, the process can be understood as comprising

three stages repeated in two cycles, each lasting one academic year (see Table 1).

To summarize, the intervention focused on the micro-tasks, blogs and eportfolios, all of which were to be strongly linked to learning subject-specific knowledge. The micro-tasks related to information literacy (i.e., use of electronic databases to search and retrieve relevant sources for an assignment), and were attached to two units at Level 1 (Psy001-1 Foundations to Psychology) and Level 2 (PSY002-2 Biological and Cognitive Psychology). These tasks included considerable reflective components. The blogs were introduced in two units: PSY003-1 Counseling and Interpersonal Psychology (Level 1) and PSY001-2 Social Processes and Lifespan Development (Level 2). While the former focused on exercises related to counseling training, the latter focused on group work over the duration of the unit. Students were required to produce eportfolios at Levels 1, 2, and 3.

Participants, Sources of Data, and Ethics

All students enrolled in a psychology undergraduate degree program were exposed to the intervention in the sense that the micro-tasks, the blogs, and the eportfolios were essential parts of the units they took, and general statistics on engagement were obtained (e.g., submissions). All students were invited to sign consent forms. A total of 112 students signed consent forms over the two years of the project. 107 consented to having their coursework analyzed, 111 agreed to their eportfolios being analyzed, and 71 to be interviewed.

However, this paper will not attempt to evaluate the success of any of these activities or the quality of the outcomes (for an evaluation of the first year of the project, see Gaitán & Robertson, [2009]). Instead, we will focus on students' experiences of e-PDP, in particular, the construction of eportfolios using PebblePad.

The source of data were 11 interviews about PDP and eportfolios carried out with five students at the end of the first year of the project – Helen, Basmah, Ali (studying at Level 1), and Kate and Ralph (Level 3) – and four further students at the end of the second year – Tracey and Sue (Level 2) and Mohammed and Sarah (Level 3). Helen and Basmah were interviewed again at the end of the second year. All names have been changed. The interviews were semi-structured in nature with the research assistant starting with the general question "Overall, what was your experience of using eportfolios like?" and then went on to explore engagement (e.g., continuous/sporadic use, enjoyment, role of reflection), technical aspects, support and training received, use of specific tools (e.g., action plans, blogs, etc.), the relation of the information literacy micro-task with the eportfolio (Levels 1 and 2), and feedback from tutors. There was no standard list of

Table 1

Activities Undertaken as Part of the Action Research Process Repeated Over Two Cycles (2008/9 and 2009/10)

Stage	Activities
A. Embedding e-PDP in the units involved (planning)	1. Identifying key learning processes in several units of the new Psychology Curriculum 2008. 2. Designing micro-tasks involving e-PDP to support key learning processes. Encouraging the use of blogs. 3. Designing guidelines for the construction of eportfolios. These portfolios were supposed to document the learner's (learning and work) experiences, her reflections and development, as well as progress on her employability. 4. Designing assessment of eportfolios: specific marking criteria for each level to match the expected learning outcomes for each level.
B. Implementation included (action and observation)	5. Implementing micro-tasks and blogs in the selected units. 6. Supporting the construction of eportfolios and their submission in the designated unit. 7. Supporting the assessment of eportfolios by staff using the marking criteria designed by the researchers.
C. Evaluation included (reflection)	8. Assessing student engagement. Attendance records and statistics of use of the VLE (Blackboard), as well as completion/submission of micro-tasks and eportfolios through PebblePad will be used as measures of engagement. 9. Assessing of learning and development in terms of the learners' academic performance, as an indicator of achievement of the learning outcomes, as well as the learners' perspective expressed in one-to-one interviews. 10. Evaluating the marking criteria for eportfolios: Researchers-Tutors record their impressions of using the marking criteria.

questions or interview schedule. The role of the interviewer was to encourage the participants to describe their experience in their own terms and as clearly as possible (probing and asking for clarification).

Particular care was given to ethical issues that could arise from the fact that the researcher was also the students' lecturer, something that is common in action research in educational settings. For instance, students could believe that, by signing a consent form, they could expect preferential treatment or higher grades in return for helping their lecturer. On the other hand, they could think that their grades could suffer if they did not volunteer. Several safeguards were put in place, such as having a research assistant collect the consent forms so that the researcher would not know the identities of the students who signed the consent forms. The research assistant anonymized data as much as possible before the researcher received them. More importantly, the research assistant conducted all the interviews after the marking of all assignments, including the eportfolios, had been completed.

Data Analysis

Although some parts of the evaluation involved numerical data (e.g., attendance, submission, and grades), most of the data were qualitative (e.g., interviews and students' reflections contained in their eportfolios). The interviews were transcribed verbatim and analyzed using a grounded theory approach (Glaser & Strauss, 1967; Pidgeon, 1996; Pidgeon & Henwood, 1997) in three stages: (1) open coding, (2) generating and managing categories systematically (i.e., axial coding), and (3) building a grounded theory around a core category. Taxonomies were generated to group codes under a key category (e.g., technical issues). Comparative analysis was used to identify opposite categories (e.g., positive/negative attitudes) or dimensions (e.g., from absence of purpose for producing an eportfolio to having a limited purpose to being a truly purposeful activity). Links between categories were identified and examined further against the data. This led to the realization that the main categories were intertwined aspects of the students' experiences of working with e-PDP that influence each other but with a distinct 'core category' (attitudes to PDP and eportfolios). This system constitutes a grounded theory, but it is proposed as a tentative (substantive) theory. The researcher and the research assistant worked jointly on the open coding stage to ensure consensus regarding all the material coded. The researchers gave particular attention to reflexivity in order to make explicit ways in which their commitments to beliefs and values, their institutional

roles, their disciplinary perspectives, and their pedagogical relations with the participants may have influenced the research and vice versa.

Results

After two years, this action research project can claim modest results: (a) micro-tasks aimed at providing training on information literacy at Levels 1 and 2 were supported through PebblePad in the first year and continued throughout the second year, but no new micro-tasks were designed; (b) a journal of counseling exercises which is part of a Level 1 unit was done as a blog in PebblePad by many students, but marked on paper and while students were encouraged to write a log of group work experiences in the Level 2 unit using the blogging facility in PebblePad, this was not a requirement; and (c) the numbers of students at all levels who submitted eportfolios at the end of the second year increased compared to the first year. Overall, 80% of all students submitted an eportfolio at the end of 2009/10, 26.3% more than in 2008/9 (see Table 2). The fact that eportfolios were made compulsory and were formally assessed for the first time in 2009/10 seems to have made an important difference. However, this paper will now focus on the 11 interviews with the students on the process of producing eportfolios rather than the products themselves.

Key Categories that Emerged through Axial Coding

Five main categories subsumed all the codes used to interpret the transcribed interviews: attitudes, purpose, disclosure, technical issues, and guidance. In order to preserve as much as possible the meaning of the categories as expressed in the interviews, quotations are included throughout this section.

Table 2
*Submissions of ePortfolios Over the
Two Years of the Project*

	Year 1 (2008-9)	Year 2 (2009-10)
Level 1	49 (50%) (n=96)	134 (75%) (n=184)
Level 2	64 (72%) (n=89)	66 (91.7%) (n=72)
Level 3	8 (11%) (n=70)	74 (86%) (n=86)
Total	121 (53.8%) N=225	274 (80.1 %) N=342

Attitudes. The first category refers to quite strong expressions of positive or negative attitudes toward PebblePad and eportfolios. Helen, interviewed in Level 1, said: "I have a very strong opinion against PebblePad," and a year later, "Yeah, they're still very strong [opinions] against it." On the other hand, Tracey (Level 2) pointed out at the start of the interview, "I'm like the biggest waver of the PebblePad flag. I love PebblePad. I love portfolios." She was quick to add, "I've always liked English and stuff and I've done quite well in my GCSE's and writing to me is like second nature." This is indeed an important clue: enjoying writing and having the ability to write.

Sue (Level 2) offers an important insight into her peers' negative attitudes and their source:

> Everyone hates it. I think I'm the only one that puts my hand up and says "It's alright, I don't mind using it," but I think the general thing is everyone hates doing it because it's time consuming and because everyone rushes to do it at the last minute.

However, in her view, this attitude comes from the fact that reflective writing competes with other urgent matters:

> [B]ecause at times (when) you are overloaded with work, the last thing you want to be doing is writing about yourself 'cos all that you feel is, I'm not going to pass, I'm not going to do this, so why am I writing about myself when I've got a big old essay to write or a massive exam to prepare for.

Finally, Sue provides some insight into how attitudes towards reflective writing and the production of an eportfolio may change:

> It might seem tedious at the start . . . So, I think it's, although at first it's like "why am I doing this?", I'm talking about myself, which no one feels comfortable doing, once you get in the swing of it and you actually realize OK, this is helping me, it becomes a lot more creative and a lot more better to use, I think.

So, it is after persevering and practicing that the task becomes enjoyable and "creative." Hence, what enabled the change was the sense of mastery ("getting into the swing of it") and the increase in self-awareness (of strengths and weaknesses) in relation to the task at hand, which led to the realization that "this is helping me."

Purpose of eportfolios. The students' views on the purpose of e-portfolios were grouped using a simple classification describing them as (a) purposeful, (b)

having some purpose, but expressing some concern, and finally (c) as lacking all purpose.

In the first category, some students understand that eportfolios can capture their development in general terms (e.g., "It is so you can see yourself grow between three years" [Basmah, Level 1]), or the acquisition of a specific skill (e.g., "I can understand that you would need to show how you can manipulate another software" [Helen, Level 2]). The former student mentioned personal growth, which can be observed throughout the three years and possibly implied that a sense of pride is derived from this, but there is no further aim. The latter refers to the possibility of verifying that students have mastered yet another piece of technology, a comment that may contain an ironic element, given the general content of her interview. However, in the second year of the project, we were surprised to find a student (Tracey) who could articulate a wide range of purposes worth examining in detail. The first purpose for her is to create a memory you can go back to: "Like not only to yourself cos you can think 'oh yeah I did enjoy that,' or 'oh yeah I remember when I done that,' you can sort of remember stuff." The second, more important, purpose is to support her learning in different ways: (a) she identifies what works and what does not work, (b) focuses on instances of poor performance and identify possible causes and (c) reflects on the results in terms of goal-setting and formulation of a strategy (e.g., the need to read in advance of lectures).

Other students are also aware of the value of monitoring their progress for goal-setting. For example Sue (Level 2):

> I definitely think . . . if you actually spend time doing it every week or every other week writing about your units and whatever, it does show you what you need to be focusing on more to get better grades and what you need to be doing less of in terms of ok . . . what to improve on.

In addition to using PebblePad tools to learn from experience, in a way that closely resembles an experiential learning cycle, Tracey used her eportfolio to *integrate knowledge* from different areas: "That's what I do, like I used criminal stuff from Social Processes and Social Processes (a Level 2 unit) in Research Methods. I just mash them all together. I just mix them all up, but I think writing about stuff does help my learning."

The third purpose for using PebblePad is to learn to reflect, and therefore, it prepares you for the future. Tracey is aware that becoming a reflective practitioner is a future career requirement: "I want to get into forensic psychology and they require a three year portfolio from what you've done at the end of unit

through your masters and stuff. So this is setting me up; it's preparing me." Sue sees the similarity with appraisals she has had to do at work, only this is more personal, and she understands that the marking of the eportfolio is more on how you reflect rather than what you achieve.

Finally, Tracey described a fourth purpose that is to *communicate with her tutors*. This is born out of a need to express what she is doing and be acknowledged for it:

> [I]t's sort of like showing to them what you're doing and then how you're doing as a student. . . . Because I feel like I do a lot as a student to push myself to get the good grades to go to the talks, writing this and that and it's sort of like had my tutors not read that that I've written in my portfolio they wouldn't know I was doing it. . . . [I]t's like a "look at what I've done, please acknowledge this," sort of thing.

At the heart of this is a sense of pride in all the things that she is doing and the effort she is putting into her studies. Tracey also aims to give feedback to tutors in order to help improve things.

Other students, however, see eportfolios as having some purpose, but this is limited. Ralph, a Level 3 student interviewed in the second year of the project, noted:

> [W]e just saw it as a requirement of some bureaucratic process rather than some useful kind of workload. . . . [It is about] engendering reflection about how you work and making people think about the task they undertake and how they could make them more efficient or effective. Then if you already do that to an extent, it's sometimes more onerous.

So, although for Ralph there might be some benefit in doing an eportfolio (planning one's learning), this is not necessary after the learning has taken place.

Kate, another student from Ralph's cohort, stated that, "I used it as very much a record of academic achievement and work and employment history and things like that. I wrote very little personal information on it." Kate's statement links to the feeling of intrusion that is referred to below.

Finally, we have statements that express *no purpose* in using PebblePad or producing an eportfolio. This is related to a perception that there are no explicit aims or criteria. For instance:

> . . . there is no, well, not that I have seen, maybe it is my fault for not looking, defined criteria for how

whatever you do put in there is valued or graded or granulated. . . . I had to define my own goals.

Additionally, some students, such as Kate, might feel that the effort required is not justified compared to what they get in return, "Because a lot of the time it's not marked, but you have to submit it to get an overall mark and it just feels like added work for nothing work really." Stronger statements include: "It's the last thing that's helped me with my academic studies" (Helen, Level 1), and, "I do think PDP's a waste of time. . . . They say you need them for job interviews and stuff, but I've never ever been asked for one" (Kate, Level 3).

Except for Ali (Level 1), and Sue and Tracey who were discussed above, the rest of the interviews analyzed did not seem to contain very elaborate notions of purpose associated with eportfolios or completely deny any sense of purpose.

Disclosure. The ease with which students like Tracey write about themselves and the problems they encounter must be considered exceptional. In contrast, several students expressed problems with the idea of reflective writing, which is essential to the broader notion of PDP. For many, reflection entails a personal element and the idea that it will be read by someone else generates discomfort: "I don't do reflection . . . I don't like writing personal things" (Kate). While students can be reassured that the readers of their reflection will only be tutors, this is still vague and anonymous (which tutor?). This is expressed clearly again by Kate: "I don't actually know who (is) going to (read them)," and Ali: "the intrusive factor actually hindered one's personal development." At one level, one can argue that students are not required to make personal disclosures and can limit themselves to learning experiences, and therefore have complete control over what they include or don't include; however, at another level, their goals, their insights and reflections on their learning process are nevertheless personal. Therefore, the issue of disclosure is indeed a very complex and deep issue that must be explored in greater depth.

Technical issues. This theme included some statements regarding advantages of the software (e.g. "PebblePad is a very good thing because our tutors can access our assets if we allow them to" [Basmah, Level 1]). Helen, at the end of the first year, said that PebblePad kept crashing and was not compatible with Windows Vista (however, this seems to have been more to do with her machine or an installation issue). A close friend with knowledge of IT had strongly criticized the software in the first year. Helen also pointed out that it was slow. However, at the same time, Helen said she "would have given [it] eight out of 10" and admitted that, apart from the crashing when she tried to upload things, "It did work whenever I needed it. Yeah, that

was not bad, the interface, that was alright, I managed to do everything, very easy, not a big deal at all." Helen stressed that everything she can do in PebblePad she can do in Word and e-mail (e.g., archiving, etc.). At the end of the second year, Helen still did not like it but did not raise any further technical issues.

The opposite experience was illustrated in Tracey's interview: She highlighted integration as an advantage:

You can keep it all in one place. Because you just log in and it's all there, you haven't got to go through files and folders and what did I name it? And stuff like that, so I think that's good.

Tracy also noted PebblePad's simplicity: "I love PebblePad; I'm like the biggest supporter of PebblePad. I think it's so good cos it's easy, it's just four little things, it's not all big and complicated." She also enjoyed personalizing her portfolio:

I like my homepage, like I changed my homepage and it's all yellow with pink stripes, it's all yellow and I've got a picture of me and my friends with Bandura and I like my homepage, it's quite cute and tidy. It's very me, you know having control over your own homepage is good.

Both Helen and Tracey are very technically able, but had totally opposite attitudes to PebblePad as software. This suggests a kind of user-software fit, but it is possible that this cannot be entirely separated from the perception of purpose of PDP and eportfolios. Sue also thought PebblePad was an easy platform to use: "An online website where you can record what you want and when you want it by, so it's basic." However, she wished PebblePad were more compatible with mobile smart phones.

Guidance. Guidance is not dealt with in detail in this paper, because students did not tend to mention it in the interviews, except to point out that they were aware of their tutors' views on PDP and eportfolios: Helen in the first year said "One of them was, very very much enthusiastic. The rest were not bothered and one specifically did not like it at all."

In the second year of the project, tutors marked the eportfolios using the marking criteria expressed in grids or rubrics that varied slightly from one level to the next. Written instructions (but not formal training) were also provided on how to enter comments on the eportfolios themselves (i.e., on specific pages and general ones). These comments constitute the most efficient form of feedback as the students can see them as soon as the team decides to release the feedback. By contrast, the traditional paper feedback grids filled in by hand cannot be returned within the academic year and have to be handed in at the start of the next academic year. Data

on the feedback provided by markers for the three levels were collected, but due to reliability issues, only the results of Level 1 eportfolios can be presented here. Nevertheless, it is illustrative.

As can be seen in Figure 1, there was considerable variability in the way the markers chose to give feedback. Of the 135 eportfolios submitted at the end of 2009-10, only three had both general comments and comments on the pages. About half had only comments on the pages (51.9%) and over a quarter (27.4%) had only a general comment. Although the best practice may be to write both types of feedback, it could be argued that detailed comments on the pages may be preferable to just a general comment. However, the content of the comments was not analyzed at this stage. In any case, the number of portfolios with no comments (18.5%) raises questions. It was initially assumed that, in all cases, a paper feedback grid would be returned at the start of the next academic year. However, at least two markers later admitted to not having used the grids. It was decided that grids could not be returned to some students and not others.

Towards a Grounded Theory

The many links between the key categories clearly indicated that the different aspects of the students' experiences of e-PDP represented by the key categories were inter-related. Most links illustrated explanations offered by the participants of why they held particular attitudes towards e-PDP, and this led to the adoption of attitudes as the core category (see Figure 2). Awareness of the importance of some of the categories explored

above for engaging students in PDP has existed for some time in the higher education sector, as illustrated in the following statement by Miller, Weyers, Cross, Walsh, and Monaghan (2009):

> The process appears to work well for the students when they appreciate its relevance to them personally, consider this type of work as integral to the curriculum, understand the benefit of reflective practice, and realise the value of career planning from an early stage to enhance their employability. It vital that students perceive that staff are committed to the ethos of PDP (p. 33).

Strivens and Ward (2010), referring specifically to eportfolios, also pointed to a diversity of purposes, the importance of guidance, the role of tutors, and the existing tension between ownership and control of the information. They echo Cambridge and Hartley (2010, as cited in Striven & Ward, 2010) who emphasized that among the "things we need to know" are the "psychological processes that support and impede the take-up of ePortfolios for both staff and students" (p. 13). Gough et al. (2003) mapped a large number of studies across 15 countries and in different settings, including higher education, but focused on outcomes rather than the students' experiences of using e-PDP. Therefore, it is hoped that the present study can make a significant contribution towards addressing this need through identifying key aspects of the students' experiences and the relationships among them. The latter are summarized below, once again remaining close to the data.

Figure 1
Types of Comments Written by Markers on Level 1 ePortfolios (2009/10)
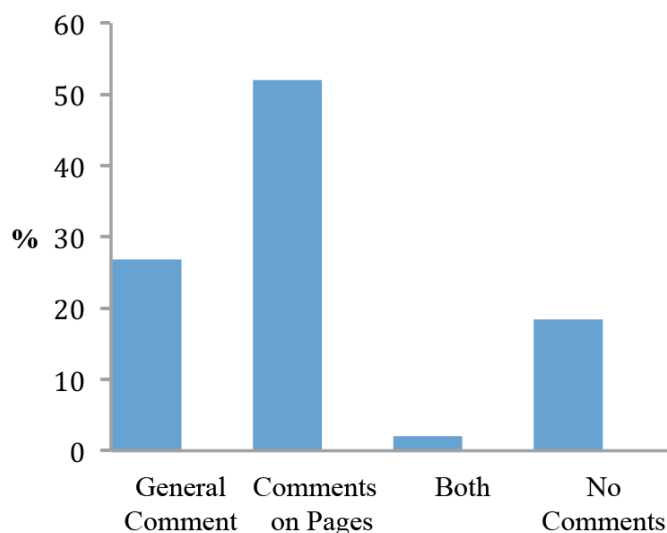
Figure 2

Main Categories Representing the Students' Experiences of Using ePortfolios
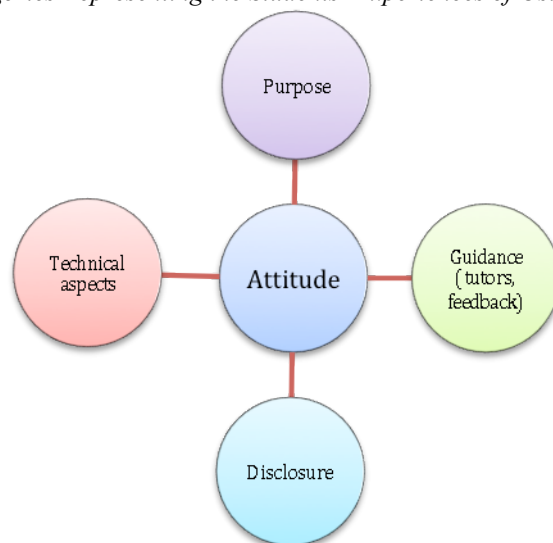
Note. Attitudes Towards e-PDP is the core category with important links to the other categories. The former are affected by the latter.

Attitudes-technical aspects. Helen's technical difficulties and frustration experienced when she started to use the software, combined with the criticisms voiced by a friend with expertise in IT, determined her strong negative attitude towards e-PDP which lasted two years, despite having produced outstanding portfolios and obtaining top grades throughout her studies. By contrast, Tracey who, as we saw, had a very positive attitude was very complimentary about the technology and its advantages.

Attitudes-disclosure. Some of the students who expressed negative attitudes referred to having to disclose their personal thoughts as a major issue (see Kate and Ali). Conversely, those who have positive attitudes, such as Tracey, may not see it that way. Tracey explained that, for her, writing about her learning was easy, and she did not mind admitting that she was having a problem:

> It's just easier for me to write it all down. Maybe other people are more private and stuff; I'm quite an open person. So writing "I had a really bad day today" doesn't make me upset; I don't feel shy to say that. Some people are too proud to say they don't understand or "I'm struggling," but I'm ok to say "I find this really difficult, can you explain it?" So I think this might have something to do with why other people don't like it.

Attitudes-guidance. The staff's views on eportfolios, reflection, and PDP were perceived by students; this was expressed explicitly by Helen. In other words, the staff's willingness to engage with the technology as well as their level of technical competence became apparent to the students. More generally, the perception of lack of clear guidance can be de-motivating. However, it is not clear how to best collect data on the staff's views in order to address them. An attempt was made to ask all teaching staff involved in marking eportfolios to write a short paragraph on the place of reflection in learning in Higher Education and another on their experience of reading and marking eportfolios. Their responses were to be sent by email directly to the research assistant and anonymized before the researchers would see them. However, of 15 members of staff, only one responded, despite two reminders. One colleague raised his concerns regarding this consultation on methodological and ethical grounds, given that the external examiners had recently expressed very positive comments at the examination board. In his opinion, staff would feel compelled to agree with these views.

Attitudes-purpose. Purpose, which included the largest number of codes and quotations, is also related to attitudes. Tracey, who had the most positive attitude to e-PDP, was able to articulate a diverse range of purposes served by e-PDP. Sue and Basmah, who also had a positive attitude, expressed clear purposes. Those who saw only a limited purpose or no purpose had negative attitudes towards e-PDP. Finally, in some cases, the recognition that e-PDP has a purpose may not be sufficient to offset the impact of another factor on the student's attitude. For example, in Ali's case, it was

the requirement to disclose: "The concept of an eportfolio is great, but asking students to submit it is counterproductive."

Conclusions

The analysis of interviews carried out at the end of the first and second years of the project revealed several important aspects of the students' experience of e-PDP which seem to be inter-related (a grounded theory). It seems that students' attitudes to e-PDP are strongly related to both their perception of a purpose for producing an eportfolio as well as technical aspects. We suspect that their attitudes are also affected by the perception of guidance (as absent, appropriate, or taken-for-granted) and the degree to which their tutors support eportfolios. However, there was less evidence of this. Understandably, students might have been reluctant to express criticisms of tutors, or may have taken guidance and support for granted and not mentioned it in the interview. The issue of *disclosure* is an important concern for some students, and it affects their attitudes towards reflective writing, which is at the center of PDP and eportfolios. Authors such as Moon (2001, as cited in Miller et al., 2009) acknowledge that "not all students may find reflection easy when it is introduced as a requirement" (p. 48). This is clearly an issue that requires further investigation since, in reality, it is impossible (and perhaps not desirable) to remove the personal aspect of PDP.

Since the role of tutors (guidance) was only explored here in relation to its impact on the students' attitudes to e-PDP, there is an urgent need to consider it in future research and implementations of e-PDP. Research-wise, it remains to be seen if a similar system of categories represents the tutor's experience of e-PDP. It has been recognized that among the list of "things we need to know" put together by Cambridge et al. (2010, as cited in Strivens et al., 2010) are "how reluctant tutors can be persuaded or encouraged" as well as the "most significant institutional barriers and enablers" (p. 13).

This paper may indeed contain more challenges than solutions. However, it becomes clear that while training and technical support to students is essential, the real driver is the clarity of purpose, institutionally and for the individuals involved (tutors and students). If reflection and ePDP become standard aspects of learning subject-specific knowledge (ePDP fully embedded in the curriculum), and at the same time eportfolios support highly personal re-presentations of the student's achievements, it is likely that more students will engage in these practices and render them meaningful in the terms described above. Perhaps, the challenges are for both staff and students just as much as for the current

academic culture, which often works against reflective learning.

References

Atlay, M. (2006). Embedding PDP practice in the curriculum. In M. Yorke (Ed.), *Personal development planning and employability, Series 2* (pp. 14-28). York, UK: Higher Education Academy.

Atlay, M., Gaitán, A., & Kumar, A. (2008). Stimulating learning – Creating CRe8. In C. Nygaard & C. Holtham (Eds.), *Understanding learning-centred higher education* (pp. 231-250). Federiksberg, DK: Copenhagen Business School.

Blumhof, J. (2005, November). *Embedding PDP in a system that doesn't really want it.* Paper presented at the Higher Education Academy Subject Centre Social Policy and Social Work's (SWAP) Workshop on Implementing Personal Development Planning: Challenges and Opportunities, London, UK.

Brett, P., Lawton, M., & Purnell, E. (2008). *Internal evaluation report.* Retrieved from University of Wolverhampton, Pathfinder Project website: www2.wlv.ac.uk/celt/Projects/UoW%20PF%20eval uation%20report%20final.doc

Bridges – Centre for Excellence for Teaching and Learning (CETL). (2007). *Briefing paper: Realistic learning.* Luton, UK: University of Bedfordshire.

Clegg, S. (2004). Critical reading: Progress files and the production of the autonomous learner. *Teaching in Higher Education, 9*(3), 287-298. doi:10.1080/1356251042000216615

Individualised Support for Learning through ePortfolios (ISLE). (2007). *Matrix theme: Embedding PDP into the curriculum.* Retrieved from http://isle.paisley.ac.uk/Lists/Matrix%20themes/Dis pForm.aspx?ID=4&Source=http%3A%2F%2Fisle% 2Epaisley%2Eac%2Euk%2FLists%2FMatrix%2520 themes%2FAllItems%2Easpx

Frith, L. (2007, April). *How does eportfolio software support students' engagement with learning?* Paper presented at the 4th Learning Development Higher Education Network Symposium, Bournemouth, UK.

Gaitán, A., Manton, R., & Jankowska, M. (2007). *Piloting e-portfolios at the University of Bedfordshire: Final report.* Retrieved from the University of Bedfordshire, Bridges – Centre for Excellence for Teaching and Learning website: http://www.beds.ac.uk/__data/assets/pdf_file/0014/1 2065/

Gaitán, A., Manton, R., & Jankowska, M. (2008, December). Moving forward from piloting ePortfolios: Applying the lessons learnt to wider adoption. *PDP & ePortfolio UK Newsletter, 15*.

Gaitán, A., & Robertson, A. (2009, June). *Embedding e-PDP within a psychology curriculum as a means of supporting learner development.* Paper presented at the Annual Conference of the Higher Education Academy, Manchester, UK.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research.* Chicago, IL: Aldine.

Gough, D. A., Kiwan, D., Sutcliffe, S., Simpson, D., & Houghton, N. (2003). *A systematic map and synthesis review of the effectiveness of personal development planning for improving student learning.* Retrieved from http://eppi.ioe.ac.uk/EPPIWebContent/reel/review_groups/EPPI/LTSN/LTSN_June03.pdf

Kemmis, S. (2003). Action research. In M. Hammersley (Ed.), *Educational research: Current issues* (pp. 177-190). London, UK: Paul Chapman & Open University.

Lewin, K. (1946). Action research and minority problems. *Journal of Social Issues, 2*(4), 34-46. doi:10.1111/j.1540-4560.1946.tb02295.x

McMurray, I., Roberts, P., Robertson, I., & Teoh, K. (2011). An action research project exploring the psychology curriculum and transitions to employment. *Psychology Teaching Review*, *17*(1), 50-63.

Miller, K., Weyers, J., Cross, S., Walsh, L., & Monaghan, E. (2009). *A toolkit for enhancing personal development planning strategy, policy and practice in higher education institutions*. Mansfield, UK: Quality Assurance Agengy for Higher Education Scotland.

National Committee of Inquiry into Higher Education (NCIHE). (1997). *Higher education in the learning society: Report of the national committee*. Retrieved from https://bei.leeds.ac.uk/Partners/NCIHE/

Pidgeon, N. (1996). Grounded theory: Theoretical background. In J. T. E. Richardson (Ed.), *Handbook of qualitative research methods and the social sciences* (pp. 75-85). Leicester, UK: British Psychological Society.

Pidgeon, N., & Henwood, K. (1997). Using grounded theory in psychological research. In N. Hayes (Ed.), *Doing qualitative analysis in psychology* (pp. 245-273). Leicester, UK: British Psychological Society.

Quality Assurance Agency. (2001). *Guidelines for HE progress files.* Retrieved from http://www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Guidelines-for-HE-Progress-Files.aspx

Reason, P., & Bradbury, H. (Eds.). (2008). *The Sage handbook of action research*. London, UK: Sage.

Savory, J. (2007). "I never thought how I learn, just that I learn" . . . An evaluation of the impact of embedding personal development planning (PDP) processes and the effect on independent learning. *Proceedings of the 4ᵗʰ International Education in a Changing Environment Conference, Manchester, UK, 4*, 328-338. Retrieved from http://www.ece.salford.ac.uk/proceedings/papers/34_07.pdf

Strivens, J., & Ward, R. (2010). An overview of the development of Personal Development Planning (PDP) and e-Portfolio practice in UK higher education. *Journal of Learning Development in Higher Education, Special Edition: Researching and Evaluating PDP and e-Portfolio Practice*, 1-23. Retrieved from http://www.aldinhe.ac.uk/ojs/index.php?journal=jldhe&page=issue&op=view&path[]=10&path[]=showToc

Yorke, M, (Ed.). (2007). *Personal development planning and employability.* York, UK: CRA/Higher Education Academy.

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From the Reflective ePractitioner: A Pilot Model of Teacher Preparation Employing ePortfolio

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Literacy is changing significantly alongside the prolific emergence of new technologies. The emergence of these new technologies has been so rapid that teachers may often not be as competent as their students in the use of new media or in the specific linguistic features of the growing range of text types. In this project, overseas trained teachers (OTTs) were scaffolded in their introduction to a variety of new technologies and typical text types relevant to the educational context in Australia where literacy is taught across the curriculum. As the OTTs prepared for a specific English test, which forms part of the process for gaining approval to teach in New South Wales (NSW), they were empowered by an integrated pedagogy: in the process of discovering ways to keep abreast of technology, they were simultaneously honing their language skills. The new software and text types to which these teachers were introduced made it possible for them to collate their qualifications, achievements, and reflections by creating their own professional, updatable, and portable reflective ePortfolios in English. They have since been able to use this learning to enhance their professional personas and self-esteem as they embark on a teaching career in a new country.

This paper reports on how overseas trained teachers (OTTs) were introduced to an adaptable process for creating, developing, and honing their own reflective professional ePortfolios in English. A broad-based genre approach was adopted and embedded within a sociocultural perspective on how a second language is acquired. Adapting the sociocultural theory of Vygotsky for second language learners, together with Moon's (2001) recommendations for building in reflection on learning, an interdisciplinary theoretical framework was combined with a genre approach to the teaching of writing and new technologies. This was the methodology chosen for introducing OTTs to the complexity of a range of vocationally relevant new technologies and specific text types.

The objectives were first, to empower these teachers by updating them in their use of emerging technologies, and second, to provide them with appropriate linguistic and sociopragmatic instruction and practice in using the English language. The linguistic instruction also had a dual purpose: (1) the development of well-written text types to include in their reflective ePortfolios and (2) instruction as to how to transfer learning of these text types to the more specific purpose of preparing for the Professional English Assessment for Teachers (PEAT). For these ambitious objectives to be achieved, cultivation of a reflective attitude was essential; that is, the ability to notice, make sense of, and think about what one is doing while doing it; "reflection-in-action" (Moon, 2001; Schön 1983, 1987).

OTTs in New South Wales (NSW) Australia come from culturally and linguistically diverse backgrounds. OTTs are non-native speakers of English and predominantly female migrants. Usually they are also already experienced teachers of Language,

Mathematics, Science, and other key learning areas in their first homelands. More often than not, they have migrated to an education system considerably different from the one in which they were educated and to a life in suburbs that are geographically widely dispersed.

Candidates of the PEAT generally face a long process (two years or more) when seeking to gain approval to work as teachers in NSW public schools. Most notably, they are required to achieve As in each of the four English language macro skills (Listening, Speaking, Reading, and Writing) before they can be deemed vocationally, socioculturally, and linguistically proficient. High scores of 7 – 7.5 in other English tests, such as the International English Language Testing System (IELTS), are not accepted by the NSW Department of Education (DET) as alternatives to the PEAT, even though this option does exist for other professions (Medicine, Nursing, Psychology) in NSW and also for teaching in other states of Australia. The PEAT is, in other words, an extremely challenging test (pass rate of 15% or less per administration) with vocational language requirements seemingly more stringent than presently exist to gain access to other professions or a teaching career in other educational institutions and states in Australia.

All this being taken into account, the instructors on this reflective ePortfolio project hypothesized that OTTs could develop their language skills to the level required by the PEAT if these teachers also possessed an awareness of and a familiarity with the educational environment in which they would be presenting and using their skills. This hypothesis found its source in recent second language acquisition research, which has come to a consensus regarding the influence the diverse nature of the sociocultural environment has on second language learning (Johnson, 2004; Lantolf, 2007;

Swain, Kinnear, & Steinman, 2011). The implications of Vygotsky's (1978, 1986) sociocultural theory of mind, which also emphasizes the relationships between the individual and the socially and culturally produced artifacts that transform an individual's cognitive functioning, means there is a wide range of factors impacting second language learning that require consideration.

Theoretical Framework

Owing to an endorsement of Vygotsky's emphasis on the relationships between the individual and the relevant artifacts he/she produces, this project focused on the text types OTTs would develop for inclusion in their ePortfolios in addition to those required by the PEAT. For these OTTs, relevant text types (various kinds of written pieces of work) for their ePortfolios, were expected to consist of a succinctly stated career objective, a two page curriculum vitae, at least one response to essential criteria, a generic cover letter, a detailed lesson plan, critical reflections on the ePortfolio process itself, and a critique of teaching a lesson and/or work experience. Each of these text types was distinguished by its purpose, audience, content, staging, linguistic, and pragmatic features.

Significantly, text types are not universally the same even if they bear a similar name. For example, Western institutions usually prefer quite plain and succinct curriculum vitae rather than decorative and elaborately detailed ones, although these might well be appreciated in many areas such as in parts of India. Further, the logical and linear structure expected in Western academic essays contrasts markedly with the circular structure of the cultural thought patterns characterizing many Eastern counterparts (Kaplan, 2001).

Despite the differences across cultures, text types "reflect and coordinate social ways of knowing and acting in the world and thus provide valuable means of researching how texts function in various contexts and teaching students how to act meaningfully in multiple contexts" (Bawarshi & Reiff, 2010, p. 29). The importance of being able to recognize and apply the unique structural and linguistic requirements for each of the various text types appropriately and accurately has led many educators across Australia to adopt the cyclical genre approach as a preferred pedagogy:

> Influenced in large part by the work of Michael Halliday (Halliday; Halliday and Hasan) at the University of Sydney, and applied to genre particularly in the work of J. R. Martin, Frances Christie, Bill Cope and Mary Kalantzis, Gunther Kress, Brian Paltridge, Joan Rothery, Eija Ventola, and others, [this view of linguistics] operates from

the premise that language structure is integrally related to social function and context. Language is organized the way it is within a culture because such an organization serves a social purpose within that culture (Bawarshi & Reiff, 2010, p. 29).

Various researchers have adapted this teaching-learning cycle pedagogy in many ways, and yet it can be conveniently summarized as consisting of three stages: (1) brainstorming, modeling, and joint deconstruction; (2) negotiation and collaboration to reconstruct a similar version of what has been modeled; and (3) independent construction of this text type after content research and a process of drafting and feedback.

In the first stage, students are provided with several models representative of a given text type. During this stage, teachers guide their students in deconstruction of the modeled texts; that is, they work collaboratively to identify the cultural and situational context in which such texts function, the social purposes they may serve, "how their structural elements reflect their functions, and how their language features carry out their functions" (Bawarshi & Reiff, 2010, p. 34). For example, the social purpose of an incident report could be for the school to have on file an accurate and objective record of an incident in which a student was seriously injured. The audience for such a report would be management or even a legal representative many years on. The report would need to be written in a formal register and contain details of the names of any persons involved, as well as the date and time of the incident. Various forms of the past tense would normally characterize the formal style of such a text type and students would be advantaged if their teacher were able to guide them in noticing the various structural, linguistic, and cultural features characterizing such a text type.

During the second stage, students and teacher negotiate and work collaboratively to reconstruct a version of the modeled text, so that it is similar to the original with respect to its purpose, form, and function. By the third stage of the teaching-learning cycle, students are expected to be able to construct their individual and independently written versions of the text type in question. They proceed to do so after conducting relevant research to develop content knowledge, after submitting drafts of their texts to their teacher and peers, and after a continuous process of editing, evaluating, redrafting, proofing, and, finally, publishing their texts (Cope & Kalantzis, 1993).

The cyclical or "wheel" shape of this approach exemplifies flexibility, since teachers and students can enter into the cycle at the stage most appropriate to their level. Further, the teacher and students can rotate through this cycle as different text types and/or more complex ones are attempted. In other words, the genre

approach–also conceived of as the "wheel" or teaching-learning cycle—makes the structural and linguistic features of different text types explicit and explores how these features are connected to their social functions and cultural context.

This linguistically inspired approach to teaching locates its insight in one of the main premises of genre theory; this premise examines the structural elements that combine to form predictable patterns in a text type, such as an incident report or a letter; in other words, context and social processes play a major role in the development of a text type and the language in which it is traditionally expressed. Furthermore, the premise of genre theory stresses the importance of understanding the relationship between language, knowledge, and power. This cyclical relationship requires the recognition of language as a social semiotic and literacy as social practice. In summary, the approach adopted in this project required a fundamental understanding of language as dynamic and evolving social process, which both shapes—and is shaped by—the cultural and social context in which it occurs (Halliday, 2004).

Learners were scaffolded in the development of their skills when applying this approach according to the sociocultural theory of Vygotsky (1978, 1986), which also emphasizes the relationship between the individual and his/her mental functioning. These two theoretical concepts—a genre approach combined with scaffolding—were critical in determining the structure and content of the program. The concept of scaffolding is closely related to Vygotsky's concept of a zone of proximal development (ZPD). For Vygotsky, the ZPD referred to the gap that exists between a person's actual developmental level as determined by independent problem-solving and the level of potential development as determined through problem-solving under guidance, or in collaboration. Even though Vygotsky himself never mentioned *scaffolding*, the term was employed by other sociocultural theorists who applied Vygotsky's ZPD to a variety of educational contexts. Scaffolding, therefore, refers to a process through which a teacher, or even a more competent peer, assists a student as necessary, and tapers off any aid as it becomes unnecessary, in a manner similar to that of a scaffold being removed from a building during construction.

Vygotsky's method involved observation of individuals working on a task they could not yet accomplish independently. In these situations, the learner would be provided with "material or symbolic affordances" (Swain, Kinnear, & Steinmann, 2011, p. 9) and then observed as to how effectively such tools could be incorporated into the individual's problem-solving activities. Such affordances were often in the form of dialogue with the individual learner. Also significant, with respect to the effectiveness of this method, was the nature of the task, how the individual

interacted with it, the place and time of the interaction, and the person who assisted in the development of this interaction. In other words, Vygotsky's concept of the ZPD was crucial in the theoretical framework and practical approach adopted by this project.

Assumed cultural knowledge of the NSW education system is assessed in the PEAT in which spoken and written tasks are evaluated equally according to the criteria of both accuracy and cultural appropriateness. Cultural knowledge was thus introduced gradually and when appropriate to do so. For example, the language of mitigation characterizing the way Australian teachers talk to their students when attempting to discipline them, would be addressed when studying the topic of behavior management. Further, even though the PEAT does not test students' digital literacies, this area is increasingly permeating the educational environment in which students learn; therefore, when learning about using new software such as Mahara, OTTs' awareness of related social networking applications that school students embrace, such as Facebook, would be addressed, compared, and discussed.

The essential features in this project were that the pedagogical approach used for the development of appropriate writing skills for each text type was not simply employed for sociocultural and linguistic purposes, but simultaneously adapted for the teaching of learning how to use a range of emerging technologies (Moreno & Valdez, 2007) and also on learning how to best reflect on the educative process.

The wheel, or genre, approach has become increasingly popular for teaching traditional text types such as information reports to young children, but it has also been used to assist adolescents and adults in their mastery of writing of more sophisticated and academic texts such incident reports and essays. In this reflective ePortfolio project, the wheel approach was used to teach relevant text types found in the PEAT (such as the incident report, the letter/handout, and comment), and also employed to introduce and develop proficiency with the interface and application of new technologies. For example, Learning Management Systems (LMSs), and in particular Moodle, the ePortfolio platforms of Mahara and Adobe Acrobat Pro 9, and connected classroom technology were all introduced in a manner reminiscent of the genre approach. The range of text types extended from incident reports to critical reflections. The variety of new media ranged from software to hardware. Due to the small scale of the PEAT in its present form, the dearth of relevant textbook materials prompted the discovery of a wealth of online resources, which were made available through the Learning Management System (LMS) of Moodle, with which students needed to become thoroughly acquainted in order to access many of the resources for the course.

Simultaneously, guidance and encouragement to become a "reflective practitioner" (Schön, 1983) was fully integrated in this pedagogy based on a blend of Vygotsky's sociocultural theory for second language learners with a genre approach. OTTs were, for example, initially asked to read Gunn's (2010) article "Exploring MATESOL Student 'Resistance' to Reflection" in order to clarify what "reflection" in this learning context would mean, as well as to explore how it could be practically incorporated as a part of their ePortfolio. Towards the middle of the 17 week course, when embarking on work experience, OTTs were asked to notice the differences in their host teachers' use of language when instructing versus disciplining their students or explaining a concept, when talking to their peers or to their students. With notes kept from this observation placement, OTTs were then required to compare these different uses of language not only in order to memorize relevant English collocations, but to make selected aspects of these culturally appropriate ways of communication their own. By way of further illustration, selected parts (e.g., see p. 42-43, 90-119, &167-168) of Peters (1993), which investigated the experience of reflective writing in Mathematics in a primary classroom, were provided as discussion starters and models for reflection and reflective writing in lesson planning, especially since most of the OTTs needed to include Mathematics teaching as part of their work. Models for the reflective writing pieces (on the process of creating a portfolio, lesson plans, or work experience) were provided together with an exercise from UniSA's website on reflective writing and Moon (2001). These models were deconstructed and reconstructed according to the same genre approach as applied to all other text types explored during this course.

In these varied ways, it was hoped that incorporation of a reflective component into this ePortfolio project would result in OTTs being educated to become "reflective ePractitioners," developing a fluency and flexibility that they could transfer to their future careers, to new technologies, and to the writing of text types required by the PEAT.

Institutional Context

Four of more than forty OTTs studying at Randwick TAFE NSW Sydney Institute in 2010 successfully completed a full-time course in Career Development (PEAT) in which the reflective ePortfolio project and a part-time Statement of Attainment in Preparation for PEAT were embedded. Nearly all the other enrolled OTTs were not interested in preparing for the PEAT examination in this way and chose instead to have a more test-focused form of study by enrolling in the part-time Statement of Attainment in

Preparation for PEAT. A minority chose the full-time option, with its broad-based sociocultural, technological savvy and reflective approach, rather than selecting a part-time study option devoted solely to PEAT preparation via test analysis and exemplar practice. A minority elected to study full-time in order to have the opportunity to be supported in developing their careers whilst preparing for the twin requirement of the PEAT: accuracy and appropriacy. They consciously opted for a course of study encompassing more than test preparation: they signed up to a program in which they would develop their career prospects by preparing for the PEAT via a process of learning to use emerging technologies as teachers and by creating their own reflective ePortfolios. This minority of OTTs (compared with the majority who were only studying part-time and solely concerned with test preparation), agreed to attempt their PEAT examination preparation via a new pilot course and a demanding approach, which was not totally test-focused. Technology and reflection are not commonly associated with the PEAT, but these four OTTs were willing to explore and persist with the goal of preparing for their examination via a project that did not, initially, appear to assist with examination preparation.

The project required each of these participants to commit to completing tasks, which, on the surface, appeared to be only tangentially connected to preparation for the PEAT itself. These OTTs were expected to become proficient in their use of new technologies, artifacts, and reflective text types, which do not form part of the PEAT. The PEAT is a traditional pen and paper based test, requiring OTTs to handwrite vocationally specific text types. Nevertheless, the OTTs enrolled in this pilot course were expected to develop and transfer their literacy skills through completing written assignments for text types not specifically related to test exemplar text types. An additional option for those OTTs who chose to study full-time was work experience, mainly in the form of classroom observation with an occasional option for lesson delivery; this field-based option allowed the OTTs to experience first-hand the sociocultural context of education in NSW.

The purpose of these far-reaching requirements for the full-time students was based on the principle that familiarity with the sociocultural context of the school and new media with their relatively novel text types (email, chats, and forums to name only a few) that had become part of general education in NSW would transfer positively to the learner's ability to prepare for the test itself. Further, it was hypothesized the educative process (Bolton, 2010; Dewey, 1933) of reflection and reflective writing practice would encourage a deep approach to learning (Marton, Hounsell, & Entwistle, 1997) and, therefore, result in a wide range of positive

outcomes, one of which would be becoming a reflective ePractitioner.

This select group of OTTs became part of a reflective ePortfolio project aligned to four compulsory units concerned with project development, career evaluation, sustainability, and emerging technologies in a nationally accredited Certificate IV Course in Career Development. The Languages Department at Randwick TAFE NSW Sydney Institute and the Australian Flexible Learning Framework jointly funded this venture.

Pedagogy

Each teaching stage, whether concerned with introducing a new technology or text type, was adapted according to the teaching-learning cycle mentioned earlier and as such initially involved building the field by brainstorming and then modeling. These two parts to stage one were followed by a third; that is, teacher-student deconstruction. As with the three basic stages of the teaching-learning cycle for teaching different written text types, joint reconstruction and collaboration, and finally, individual application, (after research, conferencing, adaptation, redrafting, editing, and proofing) followed when introducing each new technology or artifact. In this way the pedagogical approach employed in this project for scaffolding learners in skill development (whether for creation of text types or familiarity with the use of a new technology) followed that of the curriculum genre or teaching-learning cycle (the wheel), as originally recommended by Martin and Rothery as early as the 1980s (in Cope & Kalantzis, 1993).

Scaffolding implies a teaching strategy where instruction begins at a level in which students are able to achieve and then provides the correct amount of support so that students are enabled to progress on to a higher level of understanding and/or competence. This staged approach was developed to assist learners in their discovery of the specific language of written texts and in their development of writing and digital skills appropriate for each type of text and each new technology while simultaneously creating culturally produced artifacts capable of transforming cognitive functioning. For example, when learners explored how best to develop their curriculum vitae, they were explicitly introduced to the purpose, content, structure, sequencing, and language features of this text type, and then they were shown how these differed when writing generic cover letters. Similarly, when learners were introduced to the range of resources available to them on their Learning Management System, Moodle, they were introduced via a hands-on approach to its purpose, the range of content it contained, its organization, and its navigation. Further, Moodle was later explicitly

compared to the related but distinctive ePortfolio platform Mahara, whose purpose, content, and navigation is considerably different. Third, as mentioned earlier, when students were introduced to the concept of reflective writing, they were given models, which they would explore and analyze regarding their purpose, their linguistic style, as well as their dialogic and reflective elements before attempting the next step of creating their own versions.

When using a traditional genre approach, the purpose, audience, staging, content, as well as linguistic and pragmatic features are first brainstormed and modeled. Learners are provided with annotated models of relevant text types and the distinctive features of these with which they need to be familiar. When the models are deconstructed, their features are identified and imitated in small groups or pairs. It is only after all of these several stages have been completed that learners are obliged to adapt and transfer their learning to create similar texts independently.

In order to transfer this approach to the realm of teaching how to use new technologies, it was principally the interface that was annotated and explored. First the teacher modeled and provided annotated visual representations of the key parts, structure, content type and functions of a new software or platform. Only after this modeling stage would each learner have hands-on time to explore the space. The joint reconstruction stage, which has traditionally been applied to texts as a whole, was attempted in the case of these emerging technologies, for much more minor aspects, or mini-genres. As an example, when creating a View in the ePortfolio platform of Mahara, it was necessary first to define what a View was; that is, a specific configuration of the artifacts a person chose to combine in one virtual space. For instance, one person might have several Views: one View could display his/her professional documents, another View might only relate to his/her personal music interests. In order to display a range of artifacts within one View, however, several skills are involved: an ability to create the View, name it, and then populate it with a range of files (perhaps embedded media, images and/or blogs and RSS feeds). Discrete aspects of this total View function, each one possibly needing to be modeled, imitated, and then practiced, varied from the function of creating a folder to uploading a file or embedding media. Nevertheless, only when each micro-step could be repeated individually, sequenced appropriately, and applied independently and accurately were learners considered ready to combine all steps and, in such instances, create a View (see Appendix A). In this way, Vygotsky's ZPD was applied to the teaching of creating artifacts for the ePortfolio via a process of scaffolding each learner every step of the way. It must be emphasized even one whole View is only one part of

navigating and utilizing the vastness of the Mahara ePortfolio platform.

Saving edited and rewritten text types as Microsoft Word files, and afterwards being able to upload these Word documents to Mahara, meant that learners would create backup documents. At this stage, learners could choose whether to include these files in their Views, keep these files private, or share them, making them public. In this manner the relationships between the classroom, or computer room, and the outside world could be made explicit. Further, the built-in time for reflection and reflective writing helped OTTs become aware of the various and different sociocultural influences impacting their teaching and, subsequently, their professional identities. Reflective writing provided a space for explicitly detailing their learning and exploring how they might apply, vary, and/or share it.

If learners chose to make their documents public, they were encouraged to create a copy of their editable and portable Word files, as well as save these copies as attractive professional and secure PDF (Adobe 9) files. It was principally these files that were chosen for the final ePortfolio. Resaving documents as secure and professional-looking PDF files introduced yet another stage in the literacy/technology teaching-learning cycle for OTTs in this project. Nevertheless, it was a step these OTTs were obliged to take in order to complete their project for the course and in so doing, they collected a range of files on which to draw for the purpose of promoting themselves when the time came to look for a teaching position.

Since the overall aim of the reflective ePortfolio project required OTTs to create their own ePortfolios by following a structured and staged process for both traditional and reflective text types as well as by using of a range of technologies, the broad-based genre approach was extended to apply to the use of a variety of software and platforms.

Two main models were selected as the focus:

1. ePortfolios as represented by the Australian Flexible Learning Framework (the organization that partly funded this initiative) at: http://www.flexiblelearning.net.au/content/e-portfolios-4 and, in particular, Allison Miller's ePortfolio using Mahara at: http://mahara.e-skills.com.au/user/view.php?id=24
2. The Marine Biology course portfolio available from Adobe at: http://www.adobe.com/education/instruction/teach/acrobat-curriculum_old.html

Facilitating learners' evaluation of both platforms, and their ePortfolio examples, was an important final stage. The stage necessarily entailed consideration of language, culture, and technology. As Paas (2010) emphasizes, "If individuals are to learn effectively in a learning environment, their cognitive architecture, the learning environment, and interactions between both must be understood, accommodated and aligned" (slide 3). The cultural practice of critical thinking was, therefore, introduced as a precursor to several descriptors for reflective writing.

Reflection, which was a distinguishing feature of this ePortfolio practitioner project, was not undertaken merely at a descriptive level, nor solely at the end of the project, but encouraged and engaged in as part of the "staged goal-oriented learning process" (Martin, 2009, p. 10) based on deconstructing and recreating models of various text types. The teaching-learning cycle was ongoing. Each time a learner was able to master a new skill in using technology or after each significant artifact (curriculum vitae or cover letter) for the ePortfolio was completed and proofed, the learner was encouraged to write down his/her reflections on the process. The higher cognitive levels of reflection, descriptive, dialogic and critical (Smith & Hatton, 1993), were then introduced also by providing models of each type of reflective writing. These reflective text types, which need to be mastered as well, both challenged and extended the learners' thinking. Through this exposure to multiple text types, learners were not only provided with opportunities to hone their written skills in English, but also with the imperative to make connections between the sociocultural aspects of reflection, language, technology, context, and power.

The higher cognitive levels of descriptive, dialogic, and critical reflection (Smith & Hatton, 1993) were discussed and deconstructed. Learners were encouraged to aspire to write in a critical reflective manner and also to submit several drafts for each reflective written piece. OTTs were further guided by a list of relevant questions they could ask of themselves, such as ones relating to objectives (Did the students understand what they did in the lesson?); activities and materials (What different kinds of activities and materials could have been used?); students (Which parts of the lesson did they seem to participate in most enthusiastically and which least?); classroom management (Was I aware of how well the students were understanding and making progress?); and personal teaching style (How do I show my respect for the students and for the subject?).

Learners would write their reflections about their own lessons or lesson plans, work experience, or the ePortfolio process, either in a Word file or in an online discussion forum, focusing on how useful or challenging a new technology might be or on their perceived value of certain parts or even the whole course itself:

Sharing our reflections as teachers is a great idea and I believe it opens the gate and gives us

opportunities not only to share but also receive some new ideas . . . I believe with the help of the reflective ePortfolio, I could improve my skills, improve my delivery of a syllabus, share my reflections and be no stranger in a digital environment.

The teacher would then feedback and comment on the writing of each reflection, as well as on the files that were to be included in the ePortfolio. Following individual conferencing and written formative feedback, learners were expected to rewrite their texts, address the comments raised, and finally, aim for their writings to be completely free of errors. This last error-free requirement was essential as NSW DET expects an extremely high degree of accuracy from its teachers, OTTs included, in all subjects. Teachers in NSW are expected to be able to identify and correct their students' errors across the curriculum, as well as facilitate their own students in the development of skills in editing and self-correction. English language and literacy were of ongoing and critical concern in this project where the learners, OTTs, became reflective ePractitioners.

The twin aims of critical reflection and error free writing meant that, based on the models discussed and deconstructed in class and in small groups, OTTs had to draft, revise, rewrite, proof, and resubmit their own materials as model files that would become the content for their reflective ePortfolios. The three required written text types of the PEAT were practiced explicitly in sessions for the part-time PEAT Preparation Course and also indirectly via creation of related files for the ePortfolios. The three written PEAT text types are an incident report, a letter/handout, and a comment, which test formal, semi-informal, and informal writing, respectively. Curriculum vitae, cover letters, and reflections provided corresponding text types where these different levels of formality could be practiced, errors corrected, so the lessons thereby learnt could be transferred. The content for the ePortfolios included files for these traditional vocational items and lesson plans, which incorporated appropriate use of digital learning objects, reflections, and recorded lesson observations via work experience and/or via the connected classroom setup.

By following this staged and goal-oriented process, learners were able to improve their written English language skills in a diverse range of text types while simultaneously collating a set of personal and proofread files suitable for inclusion in their reflective ePortfolios. They were, meanwhile, also practicing uploading, arranging, reformatting their files, and gradually taking charge of their own learning and making it their own, while becoming proficient in the use of emerging technologies, such as the Mahara platform, and then Adobe Pro 9 Extended.

Results and Discussion

Learners were supported in the relatively lengthy process of preparing for the PEAT not only by specific exam and exemplar practice, but also by the knowledge that their learning would be recorded in a form over which they were in charge and that was accessible, flexible, and portable.

Despite agreeing on the choice of the relatively expensive Adobe platform for the final stage of this process (that is, the publication of their reflective ePortfolios), it was still of paramount concern for alumni of this project to enjoy free access to their ePortfolios for life. Mahara was valued as the platform that could provide this access in the long term, but it was the professional appearance of PDF files in the Adobe ePortfolio platform for which the OTTs expressed a preference. As a consequence, Mahara became the repository of word-processed files that could be edited and accessed after the course finished, whereas Adobe was the final publishing platform for the students' work during the project. OTTs would, however, only be able to edit the ePortfolio in this format if they themselves hired or purchased the relevant Adobe Acrobat Pro 9 software at a later date; Mahara provided the necessary, interim flexibility and backup as a repository for the original and editable Word files.

Of the four OTTs who successfully completed this project, one proceeded to attend a DET Interview where he presented his reflective ePortfolio in its Adobe Acrobat 9 format. This OTT was subsequently granted an exemption from needing to sit the PEAT. Another OTT was awarded a postgraduate scholarship to complete her Ph.D. in the ecology of a heritage language. A third and fourth OTT reenrolled in Randwick Languages' part-time PEAT preparation course, and the third of these is preparing by studying exclusively online. Online she accesses a newly developed Adobe Pro 9 ePortfolio of PEAT Writing materials (see Appendix B). The fourth OTT, who is now preparing to sit the PEAT again, completed her work experience by teaching a lesson on Graphs to the group of Grade 4 students she had observed for five school days at Auburn West Public Primary School from a distance, using connected classroom technology.

Enrollments and completions in this full-time Career Development ePortfolio option have increased significantly in Semesters 1 & 2, 2011. Comments such as the following characterized the forum discussion on Mahara and have been, no doubt, instrumental in encouraging new OTTs to choose a broad-based option

for preparing for their teaching careers in their new country:

> Emerging technologies have opened a new window for language teaching, language students and teachers, as they facilitate and even accelerate target language awareness and acquisition.

References

Bawarshi, A., & Reiff, M. (2010). *Genre: An introduction to history, theory, research, and pedagogy*. West Lafayette, IN: Parlor Press.

Bolton, G. (2010). *Reflective practice: Writing and professional development.* Great Britain: MPG Books Group.

Cope, B., & Kalantzis, M., (Eds.). (1993). *The powers of literacy: A genre approach to teaching writing.* London, England: Falmer Press.

Dewey, J. (1933). *How we think.* Boston, MA: D C Heath & Co.

Halliday, M. A. K., & Matthiessen, C. M. I. M. (2004). *An introduction to functional grammar* (3d ed.). London, England: Arnold.

Gunn, C. L. (2010). Exploring MATESOL student 'resistance' to reflection. *Language Teaching Research, 2010*(4), 208-223. doi:10.1177/1362168810363940

Johnson, M. (2004). *A philosophy of second language acquisition*. New Haven and London: Yale University Press.

Kaplan, R. (2001). Cultural thought patterns in inter-cultural education. In T. Silva & P. K. Matsuda (Eds.), *Landmark essays on ESL writing* (pp. 11-25). Mahwah, NJ: Lawrence Erlbaum Associates.

Lantolf, J. P. (2007). Sociocultural source of thinking and its relevance for second language acquisition. *Bilingualism: Language and Cognition*, *10*, 31-33.

Martin J. (2009). Genre and language learning: A social semiotic perspective. *Linguistics and Education, 20*(1), 10-21. doi:10.1016/j.linged.2009.01.003

Marton, F., Hounsell, D. & Entwistle, N. (1997). *The experience of learning*. Edinburgh, Scotland: Scottish Academic Press.

Moon, J. (2001). PDP working paper 4 reflection in higher education learning. *Higher Education,* 1-79. LTSN Generic Centre.

Moreno, R., & Valdez, A. (2007). Immediate and delayed effects of using a classroom case exemplar in teacher education: The role of presentation format. *Journal of Educational Psychology, 99*(1), 194-206.

Paas, F. (2010). *Evolutionary educational psychology: How a new view of cognition can advance research in educational and cognitive psychology* [PowerPoint slides]. Rotterdam, The Netherlands: Erasmus University & the University of Wollongong.

Peters, J. (1993). *An investigation of the construction and experience of reflective writing in mathematics in a primary classroom* (Master's thesis). Available from the National Library of Australia. (Work ID 65374).

Schön, D. (1983). *The reflective practitioner: How professionals think in action*. New York, NY: Basic Books.

Schön, D. (1987). *Educating the reflective practitioner*. San Francisco, CA: Jossey-Bass.

Smith, D., & Hatton, N. (1993). Reflection in teacher education: A study in progress. *Education Research and Perspectives*, *20*(1), 13-23.

Swain, M., Kinnear, P., & Steinmann, L., (2011). *Sociocultural theory in second language education*. Bristol, England: Multilingual Matters.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. London, England: Harvard University Press.

Vygotsky, L. S. (1986). The genetic roots of thought and speech. In A. Kozulin (Trans. & Ed.), *Thought and language* (pp. 68-95). Cambridge, MA: MIT Press.

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Appendix A
A View of the Reflective ePortfolio Project

Back | Edit   Profile of Project by Reflective e-portfolios   mahara
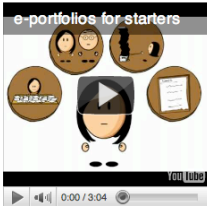
Profile of Project

Follow our journey

Resistance to Reflection?

Language_...8-23.pdf
206KB | Monday, 23 August 2010 | Details

AFLF Case Study

AFLF Case...lios.pdf
441.1KB | Wednesday, 13 October 2010 | Details

E-portfolios for starters

e-portfolios for starters

0:00 / 3:04

Sample Reflective E-portfolio in Adobe

SampleRef...ioTS.pdf
7MB | Monday, 20 September 2010 | Details

Learners' Guide

Learners'...ve E.pdf
688.1KB | Sunday, 28 November 2010 | Details

The journey

Entry One - The journey begins:

On 28th and 29th April, Jane Lock (our Facilitator) and I attended the informative induction program for the 2010 Australian Flexible Framework Projects and ours, which falls into the category of Empowering Learners.

We stayed for two days so that we could learn more about how to submit our Project Implementation Plan (due on May 7th in draft form) and about eportfolios in general from Allison Miller.

Hoping to share the project implementation plan draft with you soon!

In the meantime, we look forward to our first training session on Mahara delivered by Stephan Ridgway in A321 on Friday morning 28th May between 10am and 1pm.

Entry Two - training in Mahara:

As scehduled, on Friday 28th May, Stephan Ridgway gave our project team their first training session on *Mahara* and eportfolios. All project team members attended as well as interested teachers from other Languages staff, Melanie Doriean from the Framework and Susan Haddock from Enmore TAFE NSW.

The general consensus was that the session was very interesting and that having someone personally show you how to do things makes getting acquainted with new technology much easier.

Entry Three - IWBs, connected classrooms and netbooks:

We have been lucky during the last two weeks in that we have successfully connected to Auburn West Primary school via our connected classroom setup in AG17.

One of our TESOL students, Anastasia Avgoustis, is a primary school teacher at Auburn West and she has been using Smart Boards (the deluxe version of an Interactive Whiteboard or IWB) for sometime with her classes there. Our OTTs were able to witness her engaging and excellent class on the Solar System and then Time with Year 4.

Afterwards, Anastasia demonstrated how she uses an IWB in Randwick TAFE's setup in AG17. We now hope that our OTTs will soon be presenting demonstration lessons in this way too, even though the methodology will need to be adapted to suit our Panaboard IWB hardware and compatible software.

Of course, ways to process and then add Reflections will also need to be discussed and workshopped.

Another useful addition to our project has been the set of 5 Netbooks available for our OTTs from Randwick TAFE Library. OTTs have been

Forum Topic One: our virtual group for reflection

I hope that each of us can become virtual friends for each other and thus, form a reflective and professional teacher practitioner group. I also hope our group will enjoy privacy for our postings, expect it to be a secure space and am sure we will avoid any infringements of copyright.

I would like us to be able to share our reflections as teachers who are learning to apply our varied discipline-specific literacy skills to a digital environment that has the capability of assisting and transforming delivery.

Any comments?

1. Sharing our reflections as teachers is a great idea and I believe it opens the gate and gives us opportunities not only to share but also receive some new ideas.

In this modern world, technology has become an integral part of the curriculum. As a Mathematics teacher, it has always been challenging for me to incorporate technology in the syllabi appropriately. For example, while teaching "Solving Linear Equations", I usually explain the steps in detail using the white board. But I feel that if I use an interactive smart board I could show the steps more attractively, clearly and hopefully engage the students more actively.

A concern for me however, is the appropriate time to use the technology. Is it at the beginning, in the middle or at the end? For example, I was teaching about types of triangles to a year7 class. I explained all the types and properties of triangles and then showed the visual images accompanied by a recorded explanation. But unfortunately, students found the video boring as they felt it was too repetitious.

I believe with the help of the reflective eport-folio, I could improve my skills, improve my delivery of a syllabus, share my reflections and be no stranger in a digital environment.

To be top notch in literacy skills is not an easy job, but with all the assistance of an eportfolio group it can be achieved.

2. I showed a website (http://www.boardofstudies.nsw.edu.au/) Board of Studies, NSW (2003) in class using the interactive whiteboard. This site contains essential educational resources for Australian teachers and students. We studied the Stage 6 Extension Chinese language online. This web page contains the updated HSC Syllabus for the Chinese Language and also contains some documents related to the subject, such as specimen

CLI website news

CLI website news

DER-NSW
CLI is supporting the rollout of laptops to teachers and students in NSW Department of Education and Training Schools.

Mobile learning
CLI has partnered with the Royal Botanic Gardens, Sydney and Telstra to trial the use of GPS location-based technology to enhance learning for Stage 3 and 4 public school students

WeCreate
Encouraging students to use technology as a tool for learning through challenges and awards that students love to engage with.

Mystery Matters
Bathurst or Bust is the latest online history mystery game for stages 3 and 4 students where they play the role of a convict sent to Sydney.

Guidelines for resource developers
Guidelines and specifications to help NSW DET staff to develop accessible learning resources.
Last updated on 01 June 2011, 6:15 AM

Jane & Judie

Framework Induction Day

J&J@induction day 28/04/2010

Project Implementation Plan

Project_i...plan.pdf
488.8KB | Monday, 23 August 2010 | Details

Appendix B
The new Online PEAT Writing course using the Adobe ePortfolio software

SYDNEY INSTITUTE
TAFE
Randwick College

Online Writing Preparation Course for the Professional English Assessment for Teachers (PEAT)
Parts One, Two and Three: *Report, Letter/Handout* **and** *Comment* **genres**
created by Languages, Randwick TAFE NSW, Sydney Institute

This online writing preparation course has been created to give you the opportunity to develop your written skills, in preparation for the Professional English Assessment for Teachers (PEAT) Writing test.

The PEAT Writing test is comprised of three questions that require you to write the following:

* Report

* Letter/Handout

* Comment

PORTFOLIO CONTENTS

1. PEAT Writing Preparation Online - Procedure
2. Unit Guide for NSWTESL408A
3. FOLDERS containing Assessment Criteria, Models & Practice Activities for the Report, Letter/Handout and Comment.

GET STARTED

☐ Don't show Welcome Page again

PEAT Writing Preparation
Online – Procedure.pdf

Unit Guide for

Report

Using the e-Portfolio to Document and Evaluate Growth in Reflective Practice: The Development and Application of a Conceptual Framework

Wesley Pitts
Lehman College, CUNY

Rachel Ruggirello
Washington University in St. Louis

This case study focused on the electronic portfolio (e-portfolio) as a portrait of teacher growth in an in-service chemistry education graduate program. The e-portfolio provided a multimedia space for systematic documentation of teacher professional growth within the domain of reflective practice. In this study, the outcome and illustration of authentic growth was theorized and evaluated using a system of quality criteria (ontological, educative, catalytic, and tactical). Findings showed that successful e-portfolio entries illustrating reflective practice were created when teacher participants explicitly showed how they experienced growth (increased professional competency) over time through well-coordinated sets of baseline- and post-baseline evidence. The conceptual framework introduced in this article responds to calls for robust models to analyze growth through reflective practice in the development of e-portfolio pedagogy.

Web-based or electronic portfolios (e-portfolios, ePortfolios, efolios, digital portfolios, etc.) are a relatively new, but quickly expanding, component of teacher education programs (Strudler & Wetzel, 2005). Since electronic portfolios (e-portfolios) have typically been used in teacher education as a means to: (1) demonstrate compelling evidence of growth and competency (Abrami & Barret, 2005; Smith & Tillema, 2003), (2) focus teacher thinking, and (3) serve as a medium for translating theory into practice (Hauge, 2006), the expectation is that e-portfolios help to connect professional growth to the process of learning to teach. The definitions of e-portfolios are numerous and range from a compilation of best practices or a "credential portfolio" (e.g., Snyder, Lippincott, & Bower, 1998), to a fluid product meant to demonstrate progress as well as achievement, sometimes referred to as a "learning portfolio" (Collins, 1992; Barrett, 2005). For example, Challis (2005) defines an e-portfolio using five criteria: (1) selective and structured collections of information; (2) gathered for specific purposes and showing/evidence; (3) stored digitally and managed by appropriate software; (4) developed by using appropriate multimedia and customarily within a web environment; and (5) retrieved from a website, or delivered by CD-ROM or DVD. These characteristics enable e-portfolio authors to incorporate more dynamic graphical displays, videos, and weblinks and prepare teachers to communicate in a world where technology is ubiquitous (Sanders, 2000). What is important in characterizing an e-portfolio is that it represents a purposeful collection of authentic and diverse evidence drawn from a larger archive representing learning over time (Barrett, 2005; National Learning Infrastructure Initiative, 2003).

Despite the benefits of e-portfolio use, a number of challenging issues arise from the use of e-portfolios. One current issue is the problem of defining purposeful reflection and authentic growth as well as appropriately guiding portfolio development while still encouraging authorial ownership. The issue of growth poses a particular set of problems. Bannink (2009) tackles the question of how to capture growth in a study that uses a combined written and video portfolio to show fruitful reflection. She attests that in order to show evidence of growth across time and multiple teaching events, the document must show change, and therefore must include two or more events, such as baseline and post-baseline evidence. Parkes and Kadjer (2010) suggest that rubrics might elicit and capture students' growth in reflective practice. They provide a reflective practice rubric to evaluate English and music education students' critical reflection on growth. However, while much of the existing literature describes e-portfolios as a means for documenting growth and development over time, it rarely discusses the ways in which students are encouraged to articulate growth nor does it provide a conceptual framework for evaluating growth within a particular domain (Barrett, 2005; Challis, 2005; Scholes et al., 2004).

In addition, portfolio literature highlights the tensions between structured templates, perceived as rigid by teachers, and more flexible constructions that allow for creativity and self-expression (Barrett, 2005; Borko, Liston, & Whitcomb, 2007; Zeichner & Wray, 2001). e-Portfolio templates in teacher education programs range from those that are highly structured (e.g., foliotek) to those that are loosely defined by a rubric where students independently organize and construct the format of their own entries using a website design program (e.g., Google Sites). Conforming to structured templates can give rise to e-portfolio entries that reflect lack of purpose, limited integration of knowledge, and weak connections between evidence and actual practice involving growth as learners and in learning to teach. Alternatively, providing structured templates helps teachers apply conceptual frameworks and illustrate emergent themes

related to competency areas, such as use of pedagogical knowledge in designing instruction and assessment.

The purpose of this study is to introduce a conceptual framework for constructing authentic reflections for science teacher preparation programs that use e-portfolios as high stakes exit projects. We sought to develop a framework that could both support and assess authentic growth in the domain of reflective practice as illustrated by the e-portfolio in a science teacher education program. We use this framework to investigate the ways in which the structure of e-portfolio entries and the guidelines for creating the entries influence the ways that teachers illustrate reflective practice and their professional growth. The following research questions guided our study:

1. How does the structure of the e-portfolio influence how secondary science teachers illustrate evidence to reflect on their teaching and learning how to teach chemistry within an in-service teacher preparation program?
2. How is the comparison between networks of baseline and post-baseline evidence used to illustrate authentic growth within the domain of reflective practice?

Overview

We first present conceptual perspectives that discuss e-portfolios as a discursive space and briefly explore the traditions of reflective practice. We then introduce a conceptual framework in the context of the study. In this study the unit of analysis is the e-portfolio entry. The conceptual framework was used to analyze and evaluate e-portfolio entries in two phases. In the first phase reflective practice entries were analyzed using three major structural categories and a system of four quality criteria. In the second phase two representative cases, strong and weak e-portfolio entries were selected to illustrate how the four quality criteria were used to analyze evidence of growth. In both cases, our analysis included how selection of baseline and post-baseline evidence were coordinated. Direct quotations from e-portfolio entries were used to corroborate our findings.

Conceptual Perspectives

e-Portfolio as a Discursive Space

Viewed conceptually, e-portfolios are multimedia spaces that afford users the capacity to analyze and illustrate growth within the discourse and standards of a community. Within this discursive space the network of evidence used to illustrate growth and change is interlinked via the capacity to simultaneously illustrate and conceptualize practice over time. In this manner, the scope of growth is illustrated by the sources of evidence presented and interpreted by both the e-portfolio author and readers. Britzman (2003) notes that as with teaching, learning to teach requires a discursive space that joins the given and the possible with the conditions of coherence and contradictions within the process of practice. In accordance with this idea, a central feature of creating e-portfolios is realized through how professional growth (or increase in authentic competency) is theorized within past, present, and future practice and connected relationships (Yancy, 2009). The opportunities to experience growth are temporally and socially constituted structures embedded in the construction of e-portfolios. These structures bring together a convergent pathway where productive illustration and interpretation of professional growth can emerge in the context of an e-portfolio model.

At the same time, e-portfolios provide science teachers with opportunities to extend and develop evidence about new ways of thinking about teaching and learning how to teach science across and within domains of growth. These domains of potential growth are usually constituted by rubric items, such as *Understanding of Science Education Theory and Literature* and *Use of New Pedagogical Knowledge in Designing Instruction* (see Appendix A). These rubric items often serve as templates to guide and structure the creation of individual e-portfolio entries. Teacher education programs may also implement highly structured templates for e-portfolios attached to a conceptual framework, which students must follow to configure and submit their e-portfolio entries (Gibson & Barrett, 2003). Typically e-portfolio templates call for teachers to upload content material as evidence to address a particular rubric category and at the end of the entry students write a reflection about their experiences and the material presented (Parkes & Kajder, 2010; Plaisir, Hachey & Theilheimer, 2011). In this procedural disconnect e-portfolio authors must reestablish a logical connection by synthesizing and interpreting evidence through reflective practice. While we agree that the presentation and configuration of evidence along with contextual reflection(s) are important to the compilation of e-portfolio entries, we argue that each e-portfolio entry be viewed holistically as a reflection. This approach challenges conventional configurations of e-portfolio entries and acknowledges the importance of the simultaneous production (and illustration) of evidence for reflective practice. This approach also advocates that an e-portfolio entry should be viewed holistically and used as a unit of analysis for assessing growth through reflective practice.

Reflective Practice

Reflective practice is considered an important goal in teacher preparation programs (e.g., Rodgers, 2002). Reflective practice in teacher education is generally characterized as the ways in which teachers critically interrogate their teaching and learning how to teach and, as an outcome of this interrogation, consider how they might refine and improve their practice (Lyons, 1998). There are a variety of perspectives on how to identify, document, and analyze this activity. Fendler (2003) uses a genealogical lens to trace the different traditions that have coalesced to influence meanings and referents of reflective practice in teacher education. While appropriate approaches to reflective practice include assumptions that reflectivity should provide warrants and evidence for beliefs (Dewey, 1933) and a means to gain professional knowledge (Schön, 1983), theoretical referents for reflective practice continue to exist as a way for teachers to gain professional knowledge and the capacity to assert a deeper conceptual layer of analysis gained from their experiences. van Manen (1990), drawing on Freirean (1970) critical pedagogy, conceptualized reflective practice as a way of thinking about coming to decisions involving alternative courses of action linked to social justice. Consequently, differences in perspective and professional practice establish the context and experiential basis for interpretation necessary for purposeful reflective practice. However, some of the ideas used to characterize reflective practice arise from the interplay of interpreting knowledge derived from experience and the uptake and expression of that knowledge that promotes professional renewal within a community of practice. For example, a science teacher who experiences success over time with how to skillfully differentiate instruction for students in the same class but at different reading levels may, as a result of reflecting on this experience, find a renewed professional commitment to the success of inclusion science courses. Admittedly, the crisis of re/representing the immediate and long-term interpretations to demonstrate the growth (increased competency and renewal) that this teacher may have experienced within the domain of reflective practice is a formidable task.

While some teacher educators offer models to describe the process of reflective practice (see Korthagen & Kessels's [1999] five cyclical phases of reflection, and Rodgers's [2002] four cyclical phases of reflection), we agree with Fendler (2003) that the schematic stewardship of reflection is not so neat. In fact, most models conceptualizing phases of reflective practice do so by outlining desired learning outcomes with what is thought to be the forms of (meta-)cognitive processes and associated practices produced in each phase. Most models, however, acknowledge that one can move iteratively back and forth among each phase. For example, Rodgers's (2002) reflective cycle consists of four phases described by outcomes associated with patterns of learning (presence-in-experience; description of experience; experimentation; analysis of experience). These interconnected phases are not hierarchical but provide a way to think holistically about reflective practice. Perhaps what is most holistically important about the strongest forms of reflective practice is the widening and deepening of the purposeful and empirical quality of the activity.

For example, once teachers decide to (and are guided to) build on salient professional experiences through reflective practice, they are more likely to make their trajectory of ideas about teaching and learning visible and available for collaboration and revision. Accordingly, Davis (2006) and other researchers (Zeichner & Liston, 1996) have characterized reflection as productive and unproductive, or as strong or weak. The factor that is instrumental in distinguishing between these types of reflections is that strong reflection is supported by evidence for claims that allows teachers to generate alternatives to their decisions or question their assumptions (Davis, 2006; Farrell, 2007; Richards & Lockhart, 1994). Ash and Clayton (2009) emphasize that strong (critical) reflection is a purposeful "evidenced-based examination of the sources of and gaps in knowledge and practice, with the intent to improve both" (p. 28).

In this research, e-portfolios provide a discursive space for reflecting on teaching and learning. We conceptualize purposeful reflective practice in e-portfolios as comprised of three critical factors: (1) selection and presentation of baseline and post-baseline evidence; (2) application of a conceptual framework; and (3) articulation of growth. These requisite components grow out of Dewey's (1933) work and align closely with Rodgers' (2002) four phases of reflection. For us, reflection is comprised of identifying and describing an experience through selection of evidence, analyzing it using a conceptual framework, and uncovering assumptions and conveying future action by articulating growth. These central characteristics of reflection are included in the e-portfolio, interactively and iteratively. In this way, e-portfolio entries are viewed as gross reflections, such that the entry's evidence, conceptual framework, and articulation of growth represent the outcome of reflective practice. Since general criticisms of reflective practice suggest what is illustrated as reflections is often unstructured, lacks serious academic work, and is comprised of a series of statements summarizing informal thoughts about participation in professional activity (Ash & Clayton, 2009; Farrell, 2007), it is important to examine the ways in which selection of baseline and post-baseline evidence impacts

the illustration of growth through reflective practice.

As mentioned above, a key aspect of our conceptual framework concerns how growth within the domain of reflective practice is depicted in the e-portfolio. A focus on qualifying growth adds to the e-portfolio literature because, while it is cited as a desired outcome of reflective practice (Davis, 2006; Rodgers, 2002) and construction of e-portfolios (Abrami & Barrett, 2005), standards for characterizing and evaluating growth are underdeveloped. We address this issue in the next section by introducing and by drawing on examples from the context of this study.

Contextual and Theoretical Frameworks

Context of Study

This e-portfolio study took place within the context of a masters degree granting Math Science Partnership (MSP) program funded by the National Science Foundation (NSF) at a major urban northeastern university. The MSP is a collaborative initiative between the university's chemistry department and its school of education and provides in-service secondary science teachers with content knowledge, science education theory, and model instructional strategies in order to encourage participants to improve teaching and learning chemistry in their schools. The program was organized for participants to complete within 26 months across three full-time summer sessions and two academic year sessions consisting of ten courses: eight dedicated to chemistry content knowledge and two focused on the theory and practice of teaching and learning chemistry. A cohort model was used to guide participants through the program where members of the same cohort enrolled in two courses per session. Successful completion of the program required participants to complete all coursework with a cumulative grade point average of 3.0 or greater, pass a final comprehensive chemistry content exam, write a thesis within a chemistry discipline, and pass the e-portfolio exit project requirement.

Structure of the e-Portfolio Exit Project

The e-portfolio was a high stakes assessment that was added as a degree requirement to the program in 2005. Teacher participants were required to use the e-portfolio to demonstrate their growth as a result of having participated in the program. It was required that participants use appropriate baseline and corresponding post-baseline evidence to explain and depict growth within all e-portfolio rubric item entries (e.g., what the evidence was, why it was chosen and how it illustrates growth). To this end, the assignments given in this teacher preparation program facilitated teacher reflection on significant educational priorities and practices, especially action research projects, journal writing, autobiography/ethnography accounts, chemistry content projects, video and/or conversational analysis, cogenerative dialogues (see Tobin & Roth, 2006), leadership projects, microteaching, or the publishing of work to share with professional communities.

The e-portfolio project was designed with general guidelines outlined in a rubric (Appendix A) that was accompanied by the *Guidelines for Writers and Readers (GWR)* (Appendix B) document. The rubric outlining the program's expectations for the e-portfolio specified that the e-portfolio must contain evidence that illustrates the author's growth within each rubric item (domain of competency). The rubric consisted of eleven items concerning the content of the e-portfolio and four additional rubric items that addressed the technical merit and aesthetics. The first eleven items required students to show growth related to both chemistry content and associated pedagogical knowledge. Each rubric item was evaluated by two raters (potentially three if the first two raters disagreed) and was scored on a "pass," "needs revision," or "fail" basis. Program participants were required to pass all rubric items in order to receive an overall passing score for their e-portfolio project. The GWR was developed after it was determined that the rubric did not effectively direct program participants to create documents that satisfied the program evaluators. This document elaborated on each rubric item and explicitly stated what was required (e.g., the number of artifacts corresponding to baseline and post-baseline evidence) in order to pass a particular area of the rubric. While this measure limits the freedom of participants, it was deemed necessary for normative assessment purposes. On the other hand, program participants were still free to choose any other pieces of evidence that they regarded as meaningful, as long as it pertained to the rubric items in an appreciable way. The GWR was implemented with the intent of creating a delicate balance such that the e-portfolio was both appropriately scaffolded and allowed enough freedom to encourage teacher ownership. In order to explore what participants articulated as evidence for growth within the domain of reflective practice, we chose to focus on the e-portfolio rubric item *Reflective Practice*.

Conception of Growth

One of the primary purposes of constructing science teacher e-portfolios is to show authentic professional growth associated with practices and outcomes over time (Abrami & Barret, 2005). This was also a central purpose of implementing e-portfolio in the MSP program. Employing authentic growth as an

analytic category entails exploring and recognizing purposeful attempts to interpret transformative experiences associated with teaching science. It is important to recognize that the activity of growth in learning (or improving) how to teach science is framed by particular social, cultural, and historical contexts (Tobin & Roth, 2006; Stetsenko, 2008). In this manner, authentic growth is multi-dimensional and is always embedded in the processes of being, becoming, and belonging to the professional field of science education. What has been seen in this multi-dimensional context of growth are emergent themes and interrelated voices that make apparent the continuous endeavor of teaching to learn and learning to teach. Many program participants express discovering "blind spots" in their patterns of classroom interactions after conducting their classroom action research. For example, one participant expressed not realizing how often he did not give enough time for students to answer questions during review periods. As such, self-reported descriptions and assertions of authentic growth are confronted by the continuum between long-term and short-term patterns attached to the human experience of learning how to teach science. Farrell (2008) suggests that, "reflective practice takes place along a continuum" and "as a result it may be unreasonable to expect all teachers to engage in reflection at every moment and stage of their teaching" (p. 4). From our current perspective, the educative value gained from reflective practice is not a static constituent of what has been experienced and observed. Rather, reflective practice facilitates different lenses to explore and explain the capacity to grow (and assert growth) in and across professional stages and levels of competencies. For science teachers an important aspect of this capacity is to communicate understanding of teaching and learning to teach science in meaningful and purposeful ways (Collins, 1992).

Figure 1 provides a conceptual framework for authentic growth through reflective practice. Networks of baseline and post-baseline evidence are formed in the framework when they have been experienced over time and are deliberatively analyzed using a consistent conceptual framework. The vertical bidirectional arrows between baseline and post-baseline evidence symbolize the necessity to constantly contemplate how each type of selected evidence is comparatively illustrated, generating new and more nuanced reflective insights that illustrate growth.   The horizontal bidirectional arrow represents the iterative and generative nature of reflective practice (Rodgers, 2002). The framework incorporates four interrelated quality criteria (ontological, educative, catalytic and tactical) to evaluate the illustration of reflective practice. The four quality criteria are introduced to provide generative pathways to theorize and make sense of experiences within the context and complexities of successful

teaching and learning of science and learning how to teach science. These quality criteria are adopted from Guba and Lincoln (1989) originally used as part of a system of criteria to judge experiences and outcomes associated with qualitative research. Since then, Tobin and Roth (2006) and Bayne (2009) have adopted this set of quality criteria to understand and judge the extent to which research participants and other stakeholders attend to ongoing, meaningful changes in their perspective due to participation in science education ethnographic research.

Articulated by Bayne (2009), ontological quality criterion encompasses the extent to which an individual's personal constructions are improved, matured, expanded and elaborated as a result of participating in sites and experiences that are intended to improve how to teach science. Just as science teachers shift roles and positions from pre-service teachers to in-service teachers, so too do their ways of *being in and with* others change as they continue to gain new understandings related to teaching and learning science. Ontological criterion not only encompasses the new construction of the teachers' way of being, but also the construction of others as they participate in teaching and learning science. For example, the manner in which science teachers construct their identities in the classroom and the identities of their students are often an emergent theme as teachers reflect on their pedagogical strategies. Educative criterion involves the understandings that value positions and findings have in being significant to teaching and learning and learning to teach. This also includes the extent to which individual participants' understanding of and appreciation for the construction of others in their community of practice are enhanced. In the context of e-portfolios in this program, the ontological and educative criteria refer to the learning of all stakeholders during the process of reflective practice. The catalytic criterion is the extent to which action is stimulated and facilitated among stakeholders as a result of participating in experiences that improve how to teach science. For example, the catalytic criterion is exhibited when science teachers use action research to confront complexities of teaching science while simultaneously encouraging those involved in their study to engage in action to change the circumstances in the classroom or school. This criterion requires that science teachers act on what is known and learned to improve the utility and institutional structures and circumstances for teaching and learning and learning to teach. The tactical quality criterion is evidenced when, as a result of participation of stakeholders in the process, help is provided in meaningful and expansive ways to those who cannot readily access the resources to help themselves. This means that teachers consider the structures of their classrooms and classroom research and ensure that all students benefit from their

Figure 1
Framework for Illustrating and Evaluating Growth Through Reflective Practice
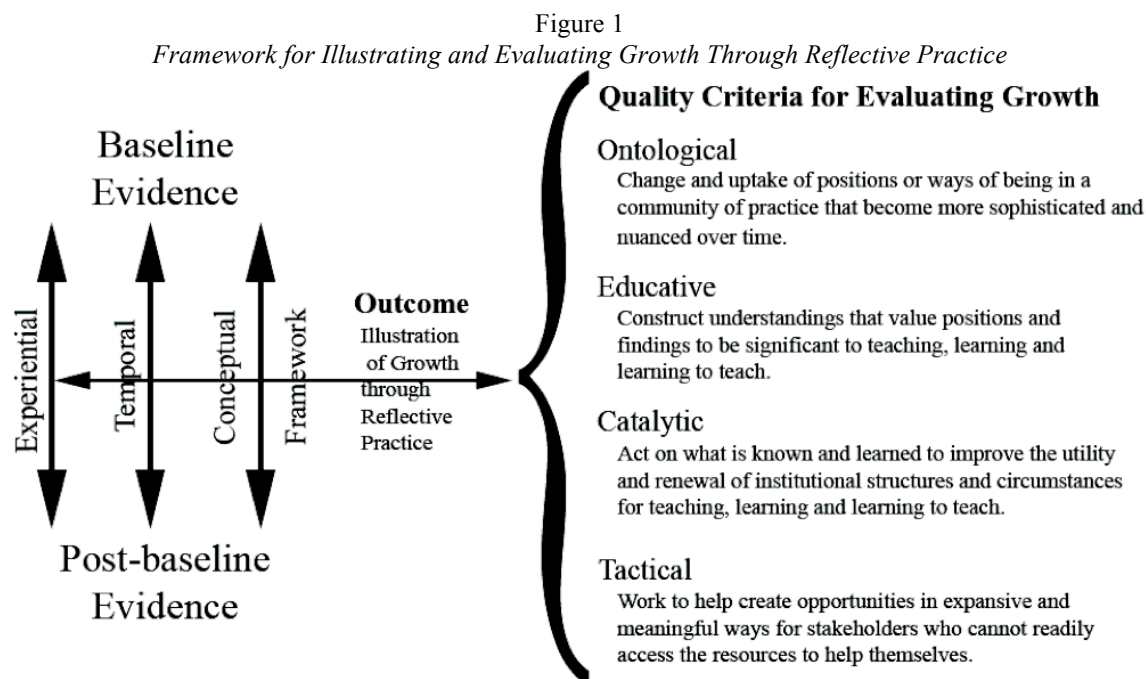
reflective practice.   Taken together, this system of quality criteria shapes and defines a generative understanding of authentic growth in the production of practices and outcomes (including reflective practice) of learning how to teach science.

Using Interpretive Frames to Depict Baseline and Post-Baseline Evidence

We turn now to discuss the conceptual framework for producing baseline and post-baseline evidence within the structure of e-portfolios. In this study, we are specifically concerned with the types of evidence selected and the impact of evidence on the nature and quality of illustrating reflective practice in the e-portfolio. Consistent with what we have argued above is the need to illustrate and coordinate interpretive perspectives across forms of evidence to examine different approaches to authentic growth within the domain of reflective practice. In this process we are guided by the quality criteria to interpret diverse possibilities for depicting growth. We consider data as evidence when used in an iterative and generative process to illustrate coherent and contradictory patterns of growth in reflective practice. Accordingly, the discursive spaces afforded by the creation of e-portfolios are springboards for emergent themes connecting and coordinating networks of baseline- and post-baseline evidence. In this manner, interpretive frameworks used to characterize authentic growth can simultaneously constitute and structure how reflective practice is depicted within and across network(s) of evidence. What is important about the application of a coordinated interpretive framework is that it addresses (1) the changes in professional practice and (2) the creation of evidence that implicates authentic growth in knowledge and competency within the domain of reflective practice. In other words, depiction of growth in teaching and learning to teach science must be synthesized across baseline- and post-baseline evidence (Roth, van Eijck, Reis, & Hsu, 2008). In this process, networks of baseline and post-baseline evidence emerge conceptually linked in e-portfolio entries, not only by documenting practice and experience, but also by a set of consistent interpretive frameworks used to theorize artifacts (including practice and experience) and produce evidence from them.

Research Methodology

Participants

This study focuses on the completed e-portfolio project produced by all participants of cohort eight, comprised of nine in-service secondary science teachers. These e-portfolios were selected for this study because this was the first cohort to experience the e-portfolio as a program component from their initial entry into the program. Throughout the program participants were able to build on their e-portfolio and

were coached to ensure the use of both baseline and post-baseline evidence for each e-portfolio entry. The teacher participants represent a diverse range of teachers. Of the nine teachers there were three male and six female teachers, aged 25 to 49, teaching in urban, suburban and rural, public and private schools. Years of teaching experience ranged from one to nine years. Additionally, four of the teacher-participants entered the teaching profession in a traditional manner while five others came to teaching through an alternate route program.

Rubric Item: Reflective Practice

This rubric item requires that program participants demonstrate "a disposition toward inquiry on teaching, and an ability to apply educational theory to do research on teaching and learning in his or her own classroom." In order to fulfill the requirement for this area, students were required to conduct classroom research. This rubric area was further clarified through the GWR. The GWR suggests that reflective practice be conceived of as classroom research related to teaching and learning chemistry. The intent of this rubric area was for participants to conduct and come to understand the importance of continuing to conduct classroom research. In order to show competence in this area, teacher-participants were required to present a minimum of one set of corresponding baseline and post-baseline pieces of evidence that illustrated growth in reflective practice. The GWR suggested that teacher-participants demonstrate growth through comparison of post-baseline evidence from their classroom research project and baseline evidence from their paper portfolio submitted prior to entering the program or other past lessons. The GWR also indicated that teacher-participants were required to summarize these projects in their reflection and provide additional discussion about dispositions toward continuing to inquire into their own teaching.

Study Design

We use the case study as our empirical inquiry approach to investigate the use of e-portfolios within the context of a teacher education program using a variety of evidence – documents, artifacts, and observations (Yin, 2009). Using the e-portfolio entry as the unit of analysis, we looked for continuities, consistencies and patterns of meaning, as well as contradictions. The goal was to capture the process of reflective practice and change over time based on teacher participants' experiences in the science education program and the requirements embedded

within the e-portfolio exit project.

Data Collection

We accessed each participant's completed e-portfolio online and archived each teacher's reflective practice entry, including external links, embedded audio-visual information and linked-to documents. Teacher-participants completed their e-portfolios in October of 2008 and we accessed and archived the entries used for the analysis in April of 2009.

Data Analysis

Data analysis was completed in two phases. In phase 1, we quantitatively scored the e-portfolio entries based on the essential components of reflection using a rubric, which was different from the more subjective rubric used by the program evaluators but specific to our theoretical framework (Table 1). We then employed purposeful sampling to select information-rich cases for in-depth study (Patton, 1990). To select the cases, we used the e-portfolio scores and selected extreme-cases in order to highlight the strongest and weakest examples of reflective practice (Patton, 1990). The entries of two teachers were selected as cases for qualitative analysis of reflective practice. In phase 2, we compare these cases to examine the variable outcomes of growth in reflective practice as portrayed by the e-portfolio.

Phase 1: Evaluating Purposeful Reflection

In order to characterize the nature of the reflection and provide a context for more in-depth examination of specific e-portfolio entries, we scored each of the e-portfolio entries on the three dimensions we identified earlier as essential components of purposeful reflection: selection and presentation of baseline and post-baseline evidence (E), application of a conceptual framework (CF) and articulation of growth (G). The rubric we developed (Table 1) was used to score the entries of all eight teacher-participants. For the category of evidence (E), we looked for artifacts that truly represented pre-program data, were clearly articulated and connected to the rubric area and were robust, such that they provided a window into teachers' reflective practice before and after participation in the program. When we evaluated e-portfolios based on the category of application of conceptual framework (CF) we analyzed the e-portfolio entries for a consistent conceptual framework for baseline and post-baseline evidence that was sufficiently tied to literature. For both the criteria of evidence and the conceptual framework we considered Challis' (2005) "A checklist for a mature ePortfolio" (Salient Differences section, Table 1) to develop the

Table 1
Researcher Rubric for Scoring Reflective Practice e-Portfolio Entry

	Under-developed (1)	Good (2)	Excellent (3)
Evidence	Not carefully selected or not relevant to the rubric area. Missing either baseline or post-baseline evidence.	At least one piece of evidence is relevant and carefully selected. Does not highlight or excerpt the salient pieces.	Both baseline and post-baseline evidence is relevant, carefully selected, makes a useful contribution and is processed to highlight appropriate excerpts
Conceptual Framework	Not adequately explained or appropriately selected. Not applied to the evidence presented.	Not consistently applied – may be applied to only one piece of evidence or use different frameworks.	Embedded, thoroughly and accurately explained and consistently applied across baseline and post-baseline evidence
Growth	Not explicitly discussed, but implied. Reveals present but not future action. May reflect only a small portion of quality criteria.	Discussed, but oversimplified discussion. Does not illustrate all components of the quality criteria.	Illustrates self-awareness and growth – focused on future action. Quality evaluation based on the presence of quality criteria.

three levels of achievement. Based on the list of characteristics of purposeful selection of evidence and reflection we created descriptions for under-developed, good, and excellent e-portfolio entries in these categories. Finally, for the category of growth (G) we looked for the explicit discussion of growth and clear articulation of how the program promoted this change over time. Specifically, we identified whether teachers' entries addressed the quality criteria (Table 1) and how they used evidence to speak to the ways in which their dispositions as science educators changed. We articulated the achievement levels for the category of growth based on our framework and the presence or absence of the quality criteria as referents of authentic growth.

To score the e-portfolios, the researchers scored the entries independently according to the rubric, isolated specific excerpts from the entries and provided narrative to support their decisions. The scores were then discussed until they were able to come to consensus around the relative scores (3 to 9) of the teacher's e-portfolio entries based on the scores given in each category. For the category of growth, we first evaluated each teacher's entry to determine the presence (P) or absence (NP) of each of the quality criterion. The results of this analysis can be found in Table 2. Based on this analysis and the ways in which the entry articulated self-awareness and growth, we arrived at scores from a low of one, representing the minimal illustration of quality criteria, and a high of three, necessitating the presence of all of the quality criteria in the teacher's entry. The e-portfolio entries ranged from total scores from a low of three to a high of nine, representing the diverse products that emerged within the same program structures and e-portfolio

requirements (Table 2). This suggests that despite the similar requirements set forth by the structure of the rubric and GWR, the nature of the reflection varied across participant entries. In addition to the e-portfolio scores, we looked at the quality of artifacts and students' overall performance in their coursework in the program as another indicator of student progress (Table 2), to consider the use of e-portfolios as an alternative assessment mechanism.

While many people advocate for authentic assessments, the issues of predictive validity and reliability across assessments still exist (Darling-Hammond & Snyder, 2000). e-Portfolios are a step away from teaching itself and a step away from coursework in the teacher education program. Since no single measure of teaching is adequate (Darling-Hammond & Snyder, 2000), looking across assessments for coherence or contradictions provides an additional layer of analysis of growth in learning how to teach science. In Table 2, grades derived from more traditional assessments are highlighted to make a comparison between how the different assessment approaches evaluate various aspects of a teacher's practice, including pedagogical decisions, mastery of content knowledge, and catalytic leadership projects. In the case of cohort eight, we noticed that teachers with the highest e-portfolio scores tended to have higher overall grade point averages and teachers with the lowest e-portfolio scores tended to have lower overall grade point averages. This suggests that e-portfolios require similar skills to traditional coursework. For example, teachers who have more sophisticated critical thinking and analytical skills and are more experienced with reflective writing may select more robust artifacts as evidence and portray more

Table 2
Summary of e-Portfolio Reflective Practice Scores and Traditional Assessment Data for Cohort 8

Teacher Participant	E	CF	Quality Criteria for Assessing Growth				G	Total Score	Post-Baseline Evidence	Grade on Selected Evidence	Overall GPA
			Ont	Edu	Cat	Tac					
Dorian	1	1	NP	P	NP	NP	1	3	Action research project	3.3	3.20
Amy	1	1	NP	P	NP	NP	1	3	POGIL	4.0	3.33
Steven	2	2	NP	P	NP	NP	1	5	Action research project	4.0	3.47
Benjamin	1	2	P	P	NP	NP	2	5	Action research project	4.0	3.97
Polly	2	1	P	P	P	NP	2	5	Action research project	4.0	3.77
Leonard	2	2	P	P	P	NP	2	6	Action research project	3.0	3.13
Dina	2	2	P	P	P	P	3	7	CSSE blog response	4.0	3.33
Grayden	3	2	P	P	P	P	3	8	Action research project	4.0	3.97
Michele	3	3	P	P	P	P	3	9	Action research project	3.0	3.90

Note. E – Evidence, G – Growth**,** CF – Conceptual Framework**,** NP: Not Present**,** Ont – Ontological, P: Present**,** Edu – Educative, Total Score: 3 (under-developed) to 9 (excellent)**,** Cat – Catalytic**,** Tac – Tactical

progress due to traditional academic prowess. However, some differences were noted. In the middle range of e-portfolio scores we find teacher-participants with both higher and lower grade point averages. Also, when considering the grade on selected evidence we also noticed that the grade on selected evidence does not always correspond to the e-portfolio score. For instance, the teacher whose e-portfolio entry received the highest score received the lowest grade on the coursework. These contradictions suggest that e-portfolios add an additional layer of assessment providing new information about the teachers and how they have transformed in their teaching and learning to teach science.

Phase 2: Using the Quality Criteria to Analyze Growth, Strong, and Weak Reflections

From the analysis in phase 1, we found a diverse sample of reflection and reflexivity as the teacher-participants highlighted the action research, conversational analysis, cogenerative dialogues, professional workshops and writings, and application of new pedagogies in their classrooms that demonstrated growth. We used this initial scoring scheme to select specific entries to further explore the extremes of reflective practice afforded by the e-portfolio. Specifically, we highlight and compare the articulation of growth against the standards of the four quality criteria, by examining educative, ontological,

catalytic and tactical nature of the teachers' practice made visible through their entries. We selected Dorian's and Michele's e-portfolio entries to present and examine the disparate ways that growth within the domain of reflective practice was illustrated. These two entries represent what we considered as strong (Michele) and weak (Dorian) reflective practice e-portfolio entries (see Table 3). In particular, we examined how continuities, consistencies and contradictions of growth were illustrated and conceptualized across corresponding forms of baseline and post-baseline evidence.

Michele's Reflection Practice Entry (Strong Reflection)

Michele's e-portfolio reflective practice entry focused on her experiences with using education literature to conduct what she came to consider as salient action research in her classroom to improve teaching and learning chemistry. A key resource to understanding Michele's growth within the domain of reflective practice is found in the way she inculcates a conceptual framework that allowed her to present, connect and analyze networks of baseline and post-baseline evidence. She incorporates and links one piece of baseline and two pieces of post-baseline evidence with a conceptual framework that encompasses two central themes: (1) improved formulation of research questions that induce changes in teaching practice and (2) increased use of

Table 3
Summary of Michele's (strong) and Dorian's (weak) Reflective Practice e-Portfolio Entries

Teacher - Participant	Evidence (E)			Growth (G)	
	Baseline (B)	Post-Baseline (PB)	Time Between Evidence	Theoretical Frame Applied to B and PB	Teacher's Voice OR Excerpt from e-portfolio entry
Michele (Strong Reflection)	Excerpts from self reflection on video taped baseline lesson	Research question on research proposal draft Summary of the outcomes of research	1-2 years	Action research Constructivism Qualitative and quantitative research methods	"My growth in my ability to formulate questions worthy of research is shown by the refinement of my research question as I continued to work on my research proposal in Edu536. As I encountered the literature (for the first time!) I began to understand and to integrate a constructivist framework that gave me the vocabulary and insight to observe my teaching and discern what I needed to change. "My growth in my ability to perform classroom research has much to do with my increased awareness of assessing the effectiveness of pedagogical practice. As I became more aware of my need to evaluate change I had implemented, became more comfortable with the use of both quantitative and qualitative methods of assessment
Dorian (weak reflection)	Discussion board with research project proposal on implementing POGIL	Action research paper, survey questions, interview questions	~1 year	Traditional versus inquiry methods of teaching	"What I learned from my research was NOT to make POGILs the only pedagogy in my classroom throughout the year. It should go hand-in-hand with the traditional way of teaching.

quantitative and qualitative methods in assessing the impact of pedagogical changes. In the first theme, Michele asserts her interest in analyzing how she used education literature to formulate salient research questions within a constructivist framework for her action research project. Michele indicates that, "As I searched the literature (for the first time!) I began to understand and to integrate a constructivist framework that gave me the vocabulary and insight to observe my teaching and discern what I needed to change." While Michele seems to be aware that an important outcome of classroom action research is to gain knowledge that can potentially improve practice, her overarching goal in this particular e-portfolio entry is to conceptualize and depict her growth within the domain of reflective practice. In a complementary fashion, the second theme brings a lens to interpret Michele's experience to become increasingly aware of the need to integrate quantitative and qualitative methodologies in assessing the effectiveness of her pedagogical strategies. As such, both themes afford a space for reflective practice where understanding of new and productive ways of thinking about professional participation are linked to classroom action research that inform learning how to teach chemistry.

As mentioned earlier a key assumption of reflective practice is that teachers' attempts to gain professional knowledge and the capacity to assert that a deeper conceptual layer of analysis acquired from their teaching experiences are educative. That is, there is educative value attached to learning how to teach when the process is transformative and informs perspective, meaning and orientation obtained from cumulative teaching experiences. This concept was found to be well defined in Michele's e-portfolio entry. Michele's baseline evidence consisted of data from three excerpts from a reflective evaluation of a lesson she conducted prior to entering the MSP program. It was required that all program applicants conduct and submit a reflective evaluation of one of their chemistry lessons. Using her conceptual framework, Michele selected and analyzed excerpts from her reflective evaluation and asserts that at the time she conducted the lesson she:

. . . was still hesitant and uncomfortable with changing my instruction…and did not understand its assessment of student understanding and the efficacy of my own teaching value, nor have much experience with the variety of qualitative and

quantitative research methods I could use to get a more comprehensive perspective of what was happening in my classroom.

Michele expressed that the overarching goal of her classroom action research was to find a more effective way to teach her students how to integrate and apply familiar math concepts to understand and solve chemistry related word problems. As such, her first piece of post-baseline evidence originated from her action research project assigned in the first education course in the program. Post-baseline evidence from Michele's action research project illustrated how her thinking changed as she attached educative value to publications found during her literature research and review. Michelle's analysis of education literature informed how she updated her action research questions across several months (Jan 2008- April 2008). Michele identified five key scholarly publications that informed the way in which she re-formulated her research questions. She chronicles and connects (1) how each iteration of her research question(s) catalyzed her thinking and (2) how each iteration was informed by one or more of the five key publications she identified. For example, in the second iteration she posed five research questions. The first question addresses the replication of algorithmic and conceptual understanding outcomes Nakhleh (1993) identified in his work with college chemistry students. Michele indicated,

> I was encouraged to do exploratory research of the algorithmic-conceptual disconnect Nakhleh had observed in college classes in my own *high school* classroom. I asked the question because I was somewhat interested, but the questions I was asking seemed mildly pedantic-not a driving force in my own classroom.

The other four questions in the second iteration focused on investigating a variety of related topics- from student attitude and motivation to the use of calculators in reinforcing mathematical concepts. Michele identified that investigating these groups of research questions would display academic learning but would "not be a driving force in improving my own classroom." In the fourth iteration where she finalized her research question she was able to use the following question to help narrow her focus: "Does the creation and use of manipulatives depicting the particulate nature of matter decrease the disparity between performance on algorithmic and conceptual problems?" This question was informed by an earlier Nakhleh (1992) article and one by Johnstone (1993). Michele described that these two articles were of interest because:

> Through my reading of Nakhleh (1992) and Johnstone (1993), I realized I wanted to do something

very specific in my classroom to improve conceptual understanding. In particular, I wanted to attack the problem of student's inability to understand the **p**articulate **k**inetic **n**ature of **m**atter (PKNM). Eventually, in my classroom, I not only integrated the use of manipulatives, but also a broad range of tools targeting students' understanding of PKNM, from animations and applets representing the submicroscopic aspect of nature to questions asking students to draw representations. Finally, I had arrived at a question that was of particular value to me in my classroom, of importance to a larger community, and focused enough to be meaningfully researched.

Through Michele's reading of education literature she established teacher ownership of the centrality of the research process – asking good and salient questions to inform her pedagogical practice. As discussed in the next paragraph, Michele also used education literature and quantitative analysis to help catalyze and link her understanding of student performance to her teaching practice.

An important orientation in the quality criteria outlined above to evaluate growth within the domain of reflective practice is for in-service teachers to express shifts in ontological terms that merit productive and transformative changes to science teaching and learning. In other words, it is important not only to express shifts in participative thinking but also shifts in accordance with professional participation. Accordingly, participative thinking needs to be applied to current practice and to catalyze new possibilities in ways that engage students, and when possible other stakeholders in different teaching strategies (i.e., catalytic criterion). For example, Michele's second piece of post-baseline evidence illustrates how she used statistical methods to investigate her research question. She used a chemistry final exam administered to two separate cohorts of her students to analyze the effectiveness of integrating more submicroscopic representations of matter into her teaching. Submicroscopic representations were implemented using multimedia applets and manipulatives to represent the particulate nature of matter. She used these types of representation extensively with the 2009 cohort and compared their results to the 2008 cohort where previously little integration was infused. Comparisons were conducted using questions that gauged algorithmic (calculation-heavy) understanding and conceptual understanding of gasses, chemical equations, limiting reagents and empirical formulas. From the results, Michele noted that:

> It is evident from the data that, contrary to what I expected, my students showed significantly less

conceptual understanding of gases, even as they improved their algorithmic ability to solve problems related to gas laws. There was no significant difference in any of the other question area. Since NO ONE got just the conceptual question correct, my conjecture, in looking over the actual answers chosen, is that I may have taught my lesson in a way that encouraged students in learning or retaining a misconception – they often thought that when gases are cooled, the gas not only slows down, but condenses, even at temperatures above the gas boiling point . . . I think I may have actually improved my teaching of gases in general, but made the unfortunate mistake of not accounting for a common misconception that could arise once students started visualizing and qualitatively associating particulate motion, physical state, and the effect of temperature.

For Michele, reflective practice brought opportunities to catalyze change, albeit with mixed results. It also provided her with a sense of professional renewal that incorporated productive opportunities to contemplate and enact tactical vision of teaching and learning with others. Michele used participative thinking to contemplate future action when she hypothesized that, "the use of this web-based support software (which is easily integrated into pre-existing materials to make them interactive) will improve class participation, accountability, and student enjoyment of my courses." Reflective practice is a process that requires coming to know the past, present, and what can be envisioned in the future with rearranged views about teaching and learning science. Her conceptual framework helped to organize future action as she, "hope(s) to gain a more thorough assessment in the future by making use of qualitative surveys and evaluations in concert with quantitative analysis."

Dorian's Reflective Practice Entry (Weak Reflection)

Dorian, like Michele, focused his e-portfolio entry on his research project, as the rubric area recommended that teacher-participants demonstrate the ability to apply educational theory to do research on teaching and learning in the classroom. Dorian organized his e-portfolio entry into three discrete sections, (1) *What, Why, How*, (2) *Baseline Reflection*, and (3) *Growth Reflection*. In *What, Why, How*, Dorian explains how he was introduced to Process-Oriented Guided Inquiry Learning (POGIL) (Moog et al., 2008) the first summer of the program in organic chemistry. This pedagogical strategy is used in the content and pedagogy courses throughout the program and teacher-participants are encouraged to try this in their own classrooms. In

Baseline Reflection and *Growth Reflection*, Dorian presents and summarizes his baseline and post-baseline evidence, respectively. He then brings it all together through a concluding section where he summarizes what he learned from reading educational literature and from conducting classroom research.

Dorian's baseline reflection indicates that he decided to do research in his own classroom when he was having difficulty successfully implementing POGIL activities. He states, "At the beginning of the second year into the program I started constructing my own POGILs and was not completely successful in implementing the method in my classroom. This initiated the attempt to start research in my own classroom." Despite his commitment to action research, the e-portfolio entry does not provide a conceptual framework to connect and analyze the networks of baseline and post-baseline evidence he presents. Instead, chosen research methods are presented with little to no support from established educational research.

In the section entitled *Growth Reflection*, Dorian includes a survey and interview questions used to conduct interviews with individual students. The interviews and surveys were intended to gauge student affect, including "how students feel about each of the pedagogies" and "feelings towards NOT making POGIL the only pedagogy in my classroom." While the questions are provided as evidence, there is no theoretical framework with which to analyze the data obtained, resulting in lack of synthesis across baseline and post-baseline evidence. His lack of a consistent interpretive framework makes it difficult to assess growth and evaluate his participation in teaching science. Dorian's e-portfolio entry lacks coherence in his expression of growth within the domain of reflective practice. Even in his hyperlinked research paper, the interview questions and survey are provided, but there are no results, analysis or findings (i.e., no transcript of conducted interviews, no statistical analysis of survey data, no achievement indicators), making it impossible to attach educative value to his research.

Overall, Dorian focuses not on a changing disposition toward inquiry in his own classroom, but rather how his thinking about using POGILs in the classroom was shaped by his classroom research project. Although he attempts to provide a coherent picture of how his classroom research shaped his practice, his conclusions and the conceptual framework from his literature review are disconnected, and the presentation of evidence and what he learned from his research are inconsistent. The e-portfolio reflection seems to suffer from confirmation bias. In other words, rather than collecting evidence on all sides of the approach in question and evaluating it as cogently as he can (Nickerson, 1998), Dorian instead builds a case by

selectively gathering (i.e. providing a survey to find out how students feel about *NOT* using POGIL as the only strategy) or giving undue weight to his position. Hence, despite the research Dorian cites, he implements research methods that support his initial disposition toward using POGILs in the classroom and neglects to gather (or present) evidence that would tell against it. For example, Dorian provides references that question the traditional method of teaching (Hanson & Wolfskill, 2000; Pintrich, 2003) and states,

> According to the research-based generalization, I should be aware that after traditional teaching there will be: (1) Lack in the connection among concepts, formal representation, and real world (2) Lack in overcoming certain conceptual difficulties and that may not help to increase the understanding of the basics of these concepts, because some students will not grasp the concept by telling them. (3) Lack in the growth in the reasoning ability.

However, despite the research cited from education literature and without presenting research findings from his classroom, he still concludes that

> . . . what I learned from my research was NOT to make POGILS the only pedagogy used in my classroom throughout the year. It should go hand-in-hand with the traditional way of teaching. . . . It is not right to abandon the traditional teaching approaches. Traditional methods of teaching can be adapted, modified, and improved.

His e-portfolio entry provides the past and present of his teaching, but does not contemplate future improvements in teaching and professional practice. There is an incomplete picture of his interpretation of professional growth and what is present suggests that this experience did not catalyze change in his classroom or create an ontological shift in the way he approached the teaching and learning of chemistry. Instead, his reflective practice led him to support his baseline thinking, without supplying convincing evidence to support that conclusion. Importantly, his reflective practice did not seem to contribute to tactical changes in the way he approached the teaching and learning of chemistry or how he will use the knowledge gained through inquiry to change future actions.

Outcomes

At the beginning of this article we asked: *How does the structure of the e-portfolio influence how secondary science teachers depict evidence to reflect on their teaching and learning how to teach chemistry within an in-service teacher preparation program?* The e-

portfolio entries of teacher participants were guided by the same rubric and Guidelines for Writers and Readers (GWR). An affordance of this structure is that all entries provided evidence to demonstrate temporal and experiential change over the course of the program and were not limited to a specific template or formatted software. In accordance with the characteristics of strong reflection (Davis, 2006), requiring *both* baseline and post-baseline evidence pushed all teachers toward more purposeful reflection. In addition, the ability to choose the format of the entry gave teachers some level of ownership of and self-expression within their e-portfolios (Borko, Liston, & Whitcomb, 2007). However, the structure was constraining in that teacher participants tended to select the baseline and post-baseline evidence that were recommended by the GWR (see Table 2). Of the nine e-portfolio entries examined, all but two teacher participants selected their action research project as evidence of growth, which corresponded to the evidence recommended by the GWR. When e-portfolios were evaluated based on the rubric, the teachers who demonstrated authentic growth based on the quality criteria also had a strong conceptual framework and clear rationale for the evidence selected, Therefore, while growth framed and organized the entry the nature and quality of the reflections differed significantly. In cases of strong and purposeful reflection of authentic growth, teachers tended to begin by outlining the conceptual framework they would weave throughout the rest of their entry and apply in their action research and analysis of growth. In contrast to these entries stood those entries that described disconnected experiences as baseline and post-baseline evidence without using a conceptual framework to link both corresponding forms into an interpretive and connective whole. Accordingly, in methodological and practical terms we regarded the structure of the entire e-portfolio entry as a complex whole illustrating both reflective practice and reflection simultaneously. A lack of integration with a conceptual framework across the networks of evidence and absence of an articulation of authentic growth leads to weak reflection and reflective practice based on the application of our interpretive framework.

At the beginning of this article we also asked: *How is the comparison between networks of baseline and post-baseline evidence used to illustrate authentic growth within the domain of reflective practice?* We conceptualized and utilized four interrelated quality criteria to analyze e-portfolio entries that attempted to illustrate growth within the domain of reflective practice. Authentic growth was evaluated against the standards of the quality criteria. Applying this framework supported an in-depth analysis of both Michele's and Dorian's reflective practice, and more specifically their growth, as illustrated in their e-

portfolio entries. A major outcome of this work is seen in the use of corresponding baseline and post-baseline evidence to illustrate and corroborate growth in reflective practice.   In this context corroboration means how opportunities are joined to create a believable whole against the standards of the quality criteria, particularly on what fits from what is already known. For example, Michele (strong reflection) introduces a conceptual framework that allowed her to present, connect, and analyze networks of baseline and post-baseline evidence in a way that guided her analysis and illustration of authentic growth within reflective practice. Michele's reflection of her own teaching of chemistry led to an educative experience that truly catalyzed change in both her teaching practices and her disposition towards future inquiry and action research with other stakeholders. This represented a form of catalytic exchange and development of reflective practice that emerged simultaneously from individual and collective activity of stakeholders in a community of professional practice. That is, experiencing, enacting and illustrating reflective practice, and associated schemas, can produce new forms of knowledge about how learning to teach science is experienced and understood. In this sense science teachers can experience ontological criterion by learning and sharing their world and disposition to learn how to teach science in new ways.

As already emphasized, in illustrating what otherwise can seem disconnected, it is important to connect networks across a coherent conceptual framework to illustrate reflective practice. What gets left out and what is not connected is often as important as what gets included and interpreted (Parkes & Kajder, 2010). In this study we considered an important objective of authoring an e-portfolio: to convincingly engage formal evaluators and readers as interpretive witnesses to reflective practice. Unfortunately, Dorian's entry (weak reflection) does not provide a conceptual framework and for this reason, his evidence remains disconnected and the reader is unable to determine the conceptual framework that Dorian utilizes to render a pattern of analysis of his growth within reflective practice. Dorian's entry corroborated the claim that an action research project had been conceived of and conducted. However, his disposition towards using POGILs in the classroom remained unchanged. In addition, his illustration of reflective practice did not indicate organizing for future action. In Dorian's case, he had strong working knowledge of the POGIL technique through working with it in the program, but needed to make better distinctions between his specific action research project focused on integrating POGILs and a more general approach to inquiry into his own teaching.

Limitations of this Study

This study analyzed nine e-portfolio entries, each created by science teachers in the participating cohort. Entries were created using electronic text, figures and graphs to illustrate the outcome of reflective practice. The e-portfolio entry was used as the unit of analysis. There are limitations to this analytical context. One limitation is that the sample size was small. This cautions generalization to broader contexts.   It is important to note that the intent of this study was to introduce a conceptual framework for illustrating and evaluating the outcome of growth in the domain of reflective practice and to show how the framework could be applied in the context of a science teacher education program using e-portfolio. More studies on the effectiveness of this framework need to be conducted, possibly correlating survey or interview data from teachers.   This would afford a deeper understanding of the ways in which science teachers conceived of using e-portfolios to illustrate their professional growth in the context of this framework.

Additionally, although we noted differences in the nature of reflective practice afforded by the e-portfolio, we were working under the assumption that in-service teachers entered the graduate program as proficient writers. Participants in the program were also required to submit drafts of their e-portfolio to receive feedback and requests for edits. We do acknowledge, however, that there could be significant variation in language ability in writing about reflective practice among participants. Research indicates that graduate students are still novices when it comes to using writing as a tool for self-growth and learning (Parkes & Kajder, 2010). Therefore, it is also worthy to note that strong reflections, certainly partially, are the product of students who may be more skilled as writers (Jenson, 2011). Since e-portfolios are a step away from the process of reflection this written electronic medium might privilege a candidate's ability to select and write about artifacts of teaching disproportionately to the candidate's growth in reflective practice. It could be that growth, in this framework, is a mixture of growth and language ability. An instrument to measure language ability was not administered to participants, thus limiting our ability to control for language ability in our analysis. As the pedagogy of e-portfolio improves within teacher education, as well as other professions, there is a need to address the important role of language ability within the process of accessing and evaluating reflective practice illustrated in the e-portfolio.

Conclusions and Implications

Two key purposes of reflective practice in teacher education are to interrogate forms of participation and

participative thinking and subsequently learn from them by exploring new possibilities for improvement. In this study, we described a conceptual framework to assess and evaluate e-portfolio entries created by in-service science teachers to illustrate growth within the domain of reflective practice. Our conception of reflection as holistically represented in an e-portfolio entry, using the quality criteria as a means for qualifying authentic growth, can improve the design and evaluation of other e-portfolios in teacher education. At the core of the matter is depicting a unified representation through the process of deciding what is important to include and exclude along with what works to corroborate a standard of authentic growth within the domain of reflective practice. Consistent with the literature (e.g., Borko et al., 2007), clear tensions emerged between the rigidity constraining participant reflection for evaluation and the flexibility necessary for true self-assessment of growth. In some cases, teachers completed categories in order to "pass," as indicated by a tendency to choose evidence suggested by the guidelines, because portfolios were high-stake assessments. Programs must therefore consider how much structure to provide, when to provide descriptive feedback, and when and if evaluative feedback is required to meet the desired goals of the e-portfolio.

Although the framework used in this study was developed in the context of a graduate science education program, we feel that the conclusions and implications are relevant for a wider audience. Keeping in mind that there is more to reflective practice that can be depicted in e-portfolio, we advocate that teacher education programs using e-portfolios encourage the explicit use of baseline and post-baseline evidence. This is particularly important if the intention is to demonstrate evidence-based growth with in the domain of critical reflective practice (Ash & Clayton, 2009). Also, programs must be explicit about what it means to demonstrate growth and provide appropriate guidelines to evaluate the outcome of growth.

Our framework for evaluating growth (within the domain of reflective practice) using a system of four quality criteria (see Figure 1) adds to the literature by establishing standards for articulation and evaluation of professional growth within science teacher education. Each criterion, however, can be shaped in relation to the other to address specific foundational dispositions particular to growth in a community of practice. For example, engineers can develop more nuanced ways of approaching design plans (ontological criteria) as they come to value new design theories (educative criterion) and advocate for their widespread adoption in manufacturing codes (catalytic criterion) and education and industry standards (tactical criterion). In doing so these quality criteria can potentially guide the evaluation of reflective practice for engineering professionals and students. The key idea in the use of the quality criteria is the acknowledgment that reflective practice is deepened when individuals construct more nuanced ways of understanding how concepts and material, as well as human and institutional resources are used to meet goals within a community of practice.

If e-portfolios are being assessed, it is important to consider what type of evaluative instrument to use. Ascribing evaluation to reflective inquiry is complex, challenging, and potentially contentious (Ghaye, 2010). Programs must consider whether to create a program-specific rubric and determine how specific to make it. Additionally, with The National Council for Accreditation of Teacher Education (NCATE) program accreditation requirements at nearly all educational institutions, programs must consider whether it is appropriate or necessary to link the rubric to NCATE standards (Strudler & Wetzel, 2005). Finally, the timeline and method for assessment of e-portfolios is critical. If e-portfolios are to truly be created within a community of practice, specific structures must be in place to enable feedback and improvement along the way. In so far as e-portfolios serve as an alternative assessment method (Darling-Hammond & Snyder, 2000), programs should consider whether reading the written statements provided by teachers is enough, or whether an accompanying "oral defense" of sorts would be appropriate for providing a clearer picture of teacher growth.

e-Portfolios have the potential to be catalytic within programs for pre- and in-service teachers. We hope that by making explicit how incorporating corresponding baseline and post-baseline evidence helps to develop a framework for growth, we might inspire important considerations for new reforms linked to e-portfolio development aligned with current professional teaching standards. Accordingly, additional research on how science teachers connect growth in practice, theoretical understandings, and inquiry within the domain of reflective practice is needed. Demonstrating growth over time in a static electronic document is difficult. Science teacher education programs, and teacher education programs in general, must coach teachers to select exemplars and scaffold the process of reflection and articulation of growth. This may also mean helping students become better reflective writers and creators of reflective media salient to their career trajectories (Parkes & Kajder, 2010). In our research, teachers tended to select the suggested piece of evidence suggested by the rubric. The program GWR (see Appendix B) that was added to further guide the science teachers as they completed their e-portfolios seemed to constrain the teachers in this study. The science teachers tended to select evidence that aligned with suggestions in the GWR. We suggest that instead of providing e-portfolio guidelines

that highly suggest evidence to present, programs integrate the idea of what Rodgers (2002) calls being "present-in-experience" and help teachers "learn to see." In doing so programs can help teachers to both improve their reflectivity and responsiveness to pedagogy by choosing and iteratively linking salient professional practice (including baseline and post-baseline exemplars) for evidence of growth through reflective practice (Lyons, 1998). As the possibilities and utility of the e-portfolio continue to emerge and mature as a multimedia medium that affords illustration of reflective practice and authentic growth, science teacher education programs must continue to explore the value and validity of the e-portfolio as a meaningful discursive space for professional renewal and continued development.

References

Abrami, P. C., & Barrett, H. C. (2005). Directions for research and development on electronic portfolios. *Canadian Journal of Learning and Technology, 31*(3).

Ash, S. L., & Clayton, P. H. (2009). Generating, deepening, and documenting learning: The power of critical reflection in applied learning. *Journal of Applied Learning in Higher Education*, *1*, 25-48.

Bannink, A. (2009). How to capture growth? – Video narratives as an instrument for assessment in teacher education. *Teaching and Teacher Education*, *25*, 244-250.

Barrett, H. C. (2005). White paper: Researching electronic portfolios and learner engagement. Retrieved from www.electronicportfolios.com/reflect/whitepaper.pdf.

Bayne, G. (2009). Cogenerative dialogues: The creation of interstitial culture in the New York metropolis. In W. M. Roth & K. Tobin (Eds.), *World of science education: North America* (pp. 513-527). Rotterdam, The Netherlands: Sense Publications.

Borko, H., Liston, D., & Whitcomb, J. A. (2007). Genres of empirical research in teacher education. *Journal of Teacher Education, 58*(1), 3-11.

Britzman, D. P. (2003). *Practice makes practice: A critical study of learning to teach.* New York, NY: State University of New York Press.

Challis, D. (2005). Towards the mature ePortfolio: Some implications for higher education. *Canadian Journal of Learning and Technology, 31*(3).

Collins, A. (1992). Portfolios for science education: Issues in purpose, structure, authenticity. *Science Education, 76*(4), 451-63.

Darling-Hammond, L. & Snyder, J. (2000). Authentic assessment of teaching in context. *Teaching and Teacher Education*, *16*(5-6), 523-545.

Davis, E. A. (2006). Characterizing productive reflection among preservice elementary teachers: Seeing what matters. *Teaching and Teacher Education, 22*(3), 281-301.

Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process.* Boston, MA: D. C. Heath.

Farrell, T. S. C. (2008). *Reflective practice in the professional development of teachers of adult English language learners*. Washington, DC: Center for Applied Linguistics. Retrieved from http://www.cal.org/caelanetwork/pd_resources/CAELABrief-ReflectivePractice.pdf

Farrell, T. S. C. (2007). *Reflective language teaching: From research to practice*. London, England: Continuum.

Fendler, L. (2003). Teacher reflection in a hall of mirrors: Historical influence and political reverberations. *Educational Researcher*, *32*(3), 16-25.

Freire, P. (1970). *The pedagogy of the oppressed*. New York, NY: Seabury.

Ghaye, T. (2010). A reflective inquiry as participatory and appreciative action and reflection. In N. Lyons (Ed.), *Handbook of reflection and reflective inquiry: Mapping a way of knowing for professional reflective inquiry* (pp. 555-572). New York, NY: Springer.

Gibson, D., & Barrett, H. (2003). Directions in electronic portfolio development. *Contemporary Issues in Technology and Teacher Education, 24*(4), 559-576.

Guba, E., & Lincoln, Y. S. (1989). *Fourth generation evaluation.* Thousand Oaks, CA: Sage Publications.

Hanson, D., & Wolfskill, T. (2000). Process workshops: A new model for instruction. *Journal of Chemical Education, 77*(1), 120-129.

Hauge, T. E. (2006). Portfolios and ICT as means of professional learning in teacher education. *Studies in Educational Evaluation*, *32*, 23-26.

Jenson, J. D. (2011). Promoting self-regulation and critical reflection through writing students' use of electronic portfolio. *International Journal of ePortfolio, 1*(1), 49-60.

Johnstone, A. H. (1993). The development of chemistry teaching: A changing response to changing demand. *Journal of Chemical Education, 70*(9), 701-705.

Korthagen, F. A., & Kessels, J. P. (1999). Linking theory and practice: Changing the pedagogy of teacher education. *Educational researcher*, *28*(4), 4-17.

Lyons, N. (1998). Portfolios and their consequences: Developing as a reflective practitioner. In N. Lyons (Ed.), *With portfolio in hand: Validating the new teacher professionalism* (pp. 247-264). New York,

NY: Teachers College Press.

Moog, R. S., Creegan, F. J., Hanson, D. M., Spencer, J. N., Straumanis, A. R., Bunce, D. M., & Wolfskill, T. (2008). POGIL: Process-oriented guided inquiry learning. In N. J. Pienta, M. M. Cooper, & T. J. Greenbowe (Eds.), *Chemists' guide to effective teaching* (pp. 90-107). Upper Saddle River, NJ: Pearson Prentice Hall.

Nakhleh, M. B. (1992). Why some students don't learn chemistry: Chemical misconception. *Journal of Chemical Education, 69*(3), 191-196.

Nakhleh, M. B. (1993). Are our students conceptual thinkers of algorithmic problem solvers? *Journal of Chemical Education*, *70*(1), 52-55.

National Learning Infrastructure Initiative. (2003). *The digital repository comes of age: How NLII members are turning learning objects into knowledge agents*. NLII Annual Review, The New Academy. Retrieved from http://www.educause.edu/nlii/annual_review/2003/thedigitalrepository.asp.

Nickerson, R. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology*, *2*(2), 175-220.

Parkes, K. A., & Kajder, S. (2010). Eliciting and assessing reflective practice: A case study in Web 2.0 technologies. *International Journal of Teaching and Learning in Higher Education, 22*(2), 218-228.

Patton, M. Q. (1990). *Qualitative research & evaluation methods*. Thousand Oaks, CA: Sage Publications, Inc.

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology, 95*(4), 667-678. doi:10.1037/0022-0663.95.4.667

Plaisir, J. Y., Hachey, A. C., & Theilheimer, R. (2011). Their portfolios, our role: Examining a community college teacher education digital portfolio program from the students' perspective. *Journal of Early Childhood Teacher Education, 32*(2), 159-175.

Richards, J., & Lockhart, C. (1994). *Reflective teaching in second language classrooms*. New York, NY: Cambridge University Press.

Rodgers, C. (2002). Defining reflection: Another look at John Dewey. *Teachers College Record*, *104*(4), 842-866.

Roth, W. M., van Eijck, M., Reis, G., & Hsu, P. L. (2008). *Authentic science revisited in praise of diversity, heterogeneity, hybridity*. Rotterdam, The Netherlands: Sense Publishers.

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

Scholes, J., Webb, C., Gray, M., Endacott, R., Miller, C., Jasper, M., & McMullan, M. (2004). Making portfolios work in practice. *Journal of Advanced Nursing*, *46*(6), 595-603. doi:10.1111/j.1365-2648.2004.03050.x

Schön, D. (1983). *The reflective practitioner: How professionals think in action*. New York, NY: Basic Books.

Smith, K., & Tillema, H. (2003). Clarifying different types of portfolio use. *Assessment and Evaluation in Higher Education, 28*(6), 625-648.

Strudler, N., & Wetzel, K. (2005). The diffusion of electronic portfolios in teacher education: Issues of initiation and implementation. *Journal of Research on Technology in Education*, *37*(4)*,* 411-433.

Snyder, J., Lippincott, A., & Bower, D. (1998). The inherent tensions in the multiple uses of portfolios in teacher education. *Teacher Education Quarterly, 25*(1), 45-60.

Stetsenko, A. (2008). From relational ontology to transformative activist stance on development and learning: Expanding Vygotsky's (CHAT) project. *Cultural Studies of Science Education, 3*(2), 471-491.

Tobin, K., & Roth, W. M. (2006). *Teaching to learn: A view from the field*. Rotterdam, The Netherlands: Sense Publication.

van Manen, M. (1990) *Researching lived experience: Human science for action sensitive pedagogy*. New York, NY: State University of New York Press.

Yancy, K. B. (2009). Reflection and electronic portfolios: Inventing the self and reinventing the university. In D. Cambridge, B. Cambridge, & K. Yancey (Eds.), *Electronic portfolios 2.0* (pp. 5-16). Sterling, VA: Stylus Publishing, LLC.

Yin, R. K. (2009). *Case study research: Design and methods*. Thousand Oaks, CA: Sage Inc.

Zeichner, K. M., & Liston, D. P. (1996). *Reflective teaching: An introduction*. New York, NY: Routledge.

Zeichner, K., & Wray, S. (2001). The teaching portfolio in US teacher education programs: What we know and what we need to know. *Teaching and Teacher Education*, *17*(5), 613-621.

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Appendix A
Program Rubric for Evaluating Teacher-Participants' e-Portfolios

An e-portfolio must contain:
1. Pieces of **evidence** that illustrate the author's growth in each of the areas covered by the rubric items below.
   o Evidence can include coursework, student work, correspondence, etc.
   o You should include evidence from one or more Penn STI courses and/or your teaching practice for each rubric area, as appropriate.
2. A **reflective statement** or critical analysis for *each* piece or grouping of evidence. Reflections must explain:
   o **What** the piece of evidence is (to an outside reader)
   o **Why** you chose it (what it illustrates about you)
   o **How** it illustrates your **growth** in one or more specified areas of the rubric

For each rubric item:
"Exceeds Expectations" indicates that your e-portfolio shows evidence of very significant growth and/or your reflections show a very sophisticated understanding of your growth process.
"Passing" indicates that you have proven sufficient growth in the rubric area through reflecting on evidence.
"Needs Revision" indicates that your e-portfolio gives little or no evidence of and/or reflection on your growth or understanding in a particular area. Specific suggestions for changes or additions needed to receive a passing score will be provided by your reviewer.

Achievement in Science and Education:

Comprehension of Science/Chemistry Content Enduring Understandings – The participant has grown to have a stronger comprehension of science content as described in the program and course Enduring Understandings.	**Exceeds Expectations**
	Passing
	Needs Revision

Use of Accurate Scientific Language – The participant has grown in his/her ability to accurately use scientific language.	**Exceeds Expectations**
	Passing
	Needs Revision

Synthesis of Scientific Concepts Across Science/Chemistry Courses – The participant has demonstrated a synthesis of key program ideas across the program content.	**Exceeds Expectations**
	Passing
	Needs Revision

Application of Scientific Concepts – The participant has grown in the ability to apply concepts and scientific principles to practical problems and/or real-world situations.	**Exceeds Expectations**
	Passing
	Needs Revision

Use of New Science/Chemistry Content Knowledge in Designing Instruction – The participant has demonstrated the application of new scientific knowledge in the design of teaching materials, lesson plans, and/or assessments used in his or her own classroom.	**Exceeds Expectations**
	Passing
	Needs Revision

Understanding of Science Education Theory & Literature – The participant has grown to have a stronger understanding of important education literature and theory.	**Exceeds Expectations**
	Passing
	Needs Revision

Reflective Practice – The participant demonstrates a disposition toward inquiry on teaching, and an ability to apply educational theory to do research on teaching and learning in his or her own classroom.	**Exceeds Expectations**
	Passing
	Needs Revision

Use of New Pedagogical Knowledge in Designing Instruction – The participant has demonstrated the application of improved knowledge of educational theory in the design of teaching materials or lessons used in his or her own classroom.	**Exceeds Expectations**
	Passing
	Needs Revision

Use of New Pedagogical Knowledge in Designing Assessment – The participant has demonstrated the application of improved knowledge of educational theory in the design of assessments used in his or her own classroom.	**Exceeds Expectations**
	Passing
	Needs Revision

Leadership – The participant has grown as a leader in science education.	**Exceeds Expectations**
	Passing
	Needs Revision
Integration of Available and Appropriate Technology into Classroom Practice – The participant has become more skilled and sophisticated in his or her use of appropriate technology in classroom practice.	**Exceeds Expectations**
	Passing
	Needs Revision

Technical Merit of the E-Portfolio:

Organization – The site is well organized and pages are clearly labeled with author, subject and date.	**Exceeds Expectations**
	Passing
	Needs Revision
Clarity of navigation – Site navigation makes it easy to find items of interest. Evidence pieces are limited to relevant sections of large documents, or relevant sections are clearly identified visually.	**Exceeds Expectations**
	Passing
	Needs Revision
Functionality – There are very few malfunctioning buttons, links, or images. HTML pages are used when possible, and other documents are in a universal format (PDF, JPEG, etc.).	**Exceeds Expectations**
	Passing
	Needs Revision

Visual presentation – Color and font are chosen so that text is easy to read, and any visual effects used enhance the presentation, rather than distracting the reader.	**Exceeds Expectations**
	Passing
	Needs Revision

Appendix B
Guidelines for Writers and Readers

General:
- **Evidence is to be specific to the rubric area and not a full thesis/capstone or other large document, but rather specific pieces from such documents.**
- **Evidence is to be imbedded into the reflection document or linked from the reflection document so that it opens in a browser window such as PDFs in IE or Safari**
- **All reflections are to be webpages not PDFs or other file formats.**

Comprehension of Content Enduring Understandings –
The participant has grown to have a stronger comprehension of science content as described in the program and course Enduring Understandings.
> *The intent of this rubric area is for the participant to demonstrate their new and/or increased understanding of fundamental science concepts studied in program courses, not small facts.*

Passing:
1) A minimum of 3 content EUs (MISE – across both physical and non-physical science disciplines; MCE across content from several courses; BOTH – over the full span of the program)
2) Evidence: baseline and later for each EU
3) Reflection discusses the specific concepts and acknowledges courses in which it was studied, as well as discussion of participant's own growth.
4) Content must be accurate!
5) Growth is demonstrated through the baseline vs. later evidence and is explained in the reflection.

Use of Accurate Scientific Language –
The participant has grown in his/her ability to accurately use scientific language.
> *The intent of this rubric area is for the participant to demonstrate their ability to use accurate scientific language to explain fundamental scientific concepts, rather than to demonstrate their increased vocabulary.*

Passing:
1) A minimum of 2 sets of baseline and later evidence of improved use of scientific language in explaining concepts.
2) Reflection discusses specific language to be seen by reader in evidence as well as discussion of participant's own growth.
3) Content and language must be accurate!
4) Growth is demonstrated through the baseline vs. later evidence and is explained in the reflection.

Synthesis of Scientific Concepts Across Courses –
The participant has demonstrated a synthesis of key program ideas across the program content.
> *The intent of this rubric area is for the participant to select broad concepts such as energy, the use of models, the importance of bonding, scale, systems, time, scientific method, etc., not small scientific facts, and to be able to synthesize content learning around this idea. Note – no growth must be demonstrated.*

Passing:
1) At least 1 broad concept (MISE – across both physical and non-physical science disciplines; MCE – across several courses; BOTH --over the full span of the program)
2) The reflection may be where the synthesis is presented if no assignment/evidence is appropriate. In this case, the evidence would be assignments/documents from courses where content was learned.
3) If evidence is provided as the synthesis, then the reflection discusses the concepts as they relate to appropriate courses over which participant's evidence is now demonstrating synthesis of the conceptual understanding.

Application of Scientific Concepts –
The participant has grown in the ability to apply concepts and scientific principles to practical problems and/or real-world situations.
> *The intent of this rubric area is that the participant applies science content learning to real life and/or practical problems, not that the content is applied to their teaching.*

> **Passing:**
> 1) Minimum of 3 real life/practical applications of science concepts (MISE – from both physical and non-physical science disciplines; MCE – from several courses; BOTH --over the full span of the program)
> 2) Evidence may come from lessons within participant's own classroom, which could make 'baseline' and 'later' evidence easier to find.
> 3) Reflection is to specifically yet briefly discuss where content was learned, where/how application was learned, and how growth is shown through the evidence.

Use of New [Science] Content Knowledge in Designing Instruction -
The participant has demonstrated the application of new scientific knowledge in the design of teaching materials, lesson plans, and/or assessments used in his or her own classroom.
> *The intent of this rubric area is that participant has learned science content through program courses that has been and can be applied in their classroom, and is able to demonstrate the application.*

> **Passing:**
> 1) Minimum of 2 instances of participant's classroom use of their own new science content knowledge, at least one of which is to have already been implemented in their classroom.
> 2) Evidence: Baseline and later authentic[1] evidence is to be provided (e.g., part of previous authentic lesson plan [w/o new content knowledge] vs. new authentic lesson plan [with new content knowledge] in order to demonstrate growth).
> 3) Reflection is to specifically discuss the newly acquired content knowledge, from which course(s), as well as how/why/when the participant was able to apply it in participant's own classroom.

Understanding of Science Education Theory & Literature –
The participant has grown to have a stronger understanding of important education literature and theory.
> *The intent of this rubric area is that the participant has studied and been significantly affected by some aspect of science education literature or theory as a result of some program course.*

> **Passing:**
> 1) The quality of the impact will be judged as more important that the number of references.
> 2) Evidence: To be provided for where the literature was encountered, in what context, including specific citations and/or specific pieces of annotated bibliography (e.g., course assignments that included the citations), discussion boards on the particular literature/theory.
> NOTE: evidence is not required of implementation of teacher practice change (e.g., no lesson plans, assessments are required)
> 3) The specifics of the literature or theory selected by the participant should be cited and accurately summarized in the reflection, including a description of the course(s) and context in which they encountered this literature.
> 4) The specifics and comparisons of the 'baseline' and 'later' (i.e., change) of the participant's practice/philosophy that are based on this literature/theory should be explained in detail in the reflection.
> 5) Growth is demonstrated through the discussion in the reflection.

Reflective Practice (i.e., Classroom Research) –
The participant demonstrates a disposition toward inquiry on teaching, and an ability to apply educational theory to do research on teaching and learning in his or her own classroom.
> *The intent of this rubric area is that the participant has conducted, and come to understand the importance of continuing to conduct, classroom research.*

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[1] "Authentic" means "participant created" (e.g., not copied from teacher guide, text, developed by a colleague, etc.).

Passing:
1) Evidence: Later evidence will be selection(s) from participant's classroom research project(s). Baseline evidence may be from participant's Baseline Teaching Portfolio or other lessons but needs to relate to their later evidence.
2) Reflection: The selected piece(s) of participant's classroom research project(s) is (are) to be summarized in the reflection (e.g., Why participant selected the topic, brief overview of literature, summary of the project and outcome[s]). Some additional discussion should demonstrate participant's disposition toward continuing to inquire into their as well as some comparison of baseline and later to discuss their own Growth.
3) Growth is demonstrated through comparison of baseline and later evidence and discussion in reflection.

Use of New Pedagogical Knowledge in Designing Instruction –
The participant has demonstrated the application of improved knowledge of educational theory in the design of teaching materials or lessons used in his or her own classroom.
   The intent of this rubric area is that the participant will provide evidence of using their new pedagogical knowledge in their classroom practice but not including assessments.

Passing:
1) Evidence: A minimum of baseline and 2 later pieces of evidence should be provided. Baseline evidence may be from Baseline Teaching Portfolio or other 'baseline' materials, lessons, units. Later evidence is to be authentic new materials, lessons, units implementing the pedagogical knowledge in the participant's own classroom. Pieces of evidence are to be carefully selected and targeted to the new pedagogical knowledge, not large documents but specific pieces of large documents that apply here.
2) A minimum of the Baseline and 1 of the later pieces of evidence should have been used in the student's classroom, not just planned for use.
3) If the pedagogical knowledge is based on literature/theory already discussed in previous rubric area, linking to that is encouraged. If not, then citation(s), detailed summary of the research/theory basis for this new pedagogical knowledge needs to be included in a reflection here.
4) Reflection discusses participant's new pedagogical knowledge, how/where attained and how participant has used that knowledge in designing instruction (i.e., classroom materials, lessons, units). Specifics of the evidence provided and connections to the pedagogical knowledge are to be clearly described in the reflections.

Use of New Pedagogical Knowledge in Designing Assessment –
The participant has demonstrated the application of improved knowledge of educational theory in the design of assessments used in his or her own classroom.
   The intent of this rubric area is that the participant will provide evidence of using their new pedagogical knowledge in their classroom assessments.

Passing:
1) Evidence: A minimum of baseline and 2 later pieces of evidence should be provided. Baseline evidence may be from Baseline Teaching Portfolio or other 'baseline' assessments. Pieces of evidence are to be carefully selected and targeted to the new pedagogical knowledge. They should not be large unit documents but specific pieces of such large documents that apply here.
2) A minimum of the Baseline and 1 of the later pieces of evidence should have been used in the participant's classroom, not just planned for use.
3) If the pedagogical knowledge is based on literature/theory already discussed in previous rubric area, linking to that is fine. If not, then citation(s), detailed summary of the research/theory basis for this new pedagogical knowledge needs to be included in a reflection here.
4) Reflection discusses participant's new pedagogical knowledge, how/where attained and how participant has used that knowledge in designing assessments (i.e., quizzes, tests, formative, alternative, performance, etc.). Specifics of the evidence provided are to be described for the reader.

Leadership –
The participant has grown as a leader in science education.
> *The intent of this rubric area is that the participant will provide evidence of their influence and/or cooperative work with others in the school community, outside of their own classroom.*

> (We are sensitive to the variety of possibilities that can be thought of as leadership and that the teaching situations of some participants do not provide support and/or opportunities for them to demonstrate the leadership of which they are capable.)

> **Passing:**
> 1) Evidence: Baseline evidence may be from participant's application essay or other documents but Baseline evidence is to be provided.
> 2) Later evidence must be provided; hopefully, more than 1 piece of evidence (e.g., minutes of mentoring meetings, conference abstracts, emails between colleagues, etc.)
> 3) Reflection discusses specifics of participant's understanding of 'teacher as leader' and how this understanding has changed over their time in the MISE/MCE program.

Integration of Available and Appropriate Technology into Classroom Practice –
The participant has become more skilled and sophisticated in his or her use of appropriate technology in classroom practice.
> *The intent of this rubric area is that 'technology' is to be interpreted broadly, including computer software usage, webquests, probes, sensors, smartboards, lab equipment, etc. and that the emphasis is on the participant's growth in using the technology.*

> **Passing:**
> 1) Evidence: Baseline evidence may be from participant's application essay, Baseline Teaching Portfolio, or other baseline lessons but it must be provided. Evidence should not simply be a picture of students or participant using technology, but rather should also include the lesson plan or other instructional evidence that demonstrates the pedagogical relevance of the technology used.
> 2) Evidence: A minimum of 1 piece of Later evidence is to be provided except in the case of a teacher whose teaching situation offers no possibility for this. In this case, participant needs to specifically describe their teaching situation and its limitations.
> 3) Reflection discusses specifics of participant's Baseline use of 'available and appropriate technology' in their classroom, as well as their current ability to use, use of and pedagogical relevance/importance/impact of the use of the technology.

Analysis of a Rubric for Assessing Depth of Classroom Reflections

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Writing reflections is recommended for enhancing retention and transfer of learned material. The benefits of student reflections have been well documented, but the methods for collecting and assessing reflections can be difficult. This study presents the development and analysis of a new, straightforward rubric for assessing depth of student reflections. The psychometric properties of the depth ratings based on the rubric and preliminary validity evidence of the ratings are investigated. With this rubric, raters were able to assess the depth of reflections very reliably. Depth ratings were significantly related to GPA.

Retention and transfer of learned material are important—although too often merely implicit—goals of classes at the university level. Factors that enhance retention and transfer of learning are now key areas of research, and one frequently recommended method of enhancing these goals is to incorporate reflection into classroom practices (Saito & Miwa, 2007). Reflection is the ability to think critically about successes and failures, extract ideas and information from a variety of sources, and recognize when current information can be used in the future (Hopkins, 1997). Reflections and reflective ability have been linked to many positive academic outcomes including retention and transfer of learned material (Cassidy, 2006). However, there is a substantial gap between the findings from research on reflection and their application. In particular, instructors who wish to incorporate reflections into their classes may struggle to find a method that is tractable yet effective for both collecting reflections and assessing their depth. This report offers a model designed to facilitate the collection and assessment of student reflections. First, we outline how electronic portfolio (e-Portfolio) systems offer simple methods for collecting reflections in the classroom. Collecting and managing reflections from a large group of students can be logistically difficult; however, we demonstrate how e-Portfolio systems offer an approach to deal with this challenge. Second, we present a rubric that we believe will allow for peer assessments of reflection depth. Indeed, assessing the reflections of a large group of students can be a daunting task for an instructor. Here, we present a rubric and training session that can allow for reliable peer assessments of the depth of the reflections taking some of the burden off the instructor. We also present an assessment of the reliability of these depth ratings and some evidence of the validity of these assessments. Results of these analyses will demonstrate that this rubric is a useful tool for peer assessments of student reflections as collected via e-Portfolios.

As stated above, reflection is the ability to think critically about successes and failures, extract ideas and

information from a variety of sources, and recognize when current information can be used in the future (Hopkins, 1997). More simply, reflecting is engaging in meta-cognitive activities to assess one's learning. As such, reflection is seen as similar to other cognitive activities including meta-cognition (Saito & Miwa, 2007) and self-assessment (Cassidy, 2006). These three concepts share the idea of evaluating one's learning and using the evaluations to further understand and apply newly learned materials.

King and Kitchener (2004) developed a model of reflective judgment formulated around the concept of epistemic cognition—underlying assumptions about what knowledge is and how it is gained. They further demonstrate that reflective thinking develops slowly over time from adolescence to adulthood as one's thinking begins to recognize the uncertainty in knowledge. This work on reflective thinking underscores the point that reflective ability develops over time and may need formal development.

The benefits of reflection have been outlined in many studies. In particular, Saito and Miwa (2007) demonstrated that reflecting aided in retention of learned material. Furthermore, Cassidy (2006) showed that reflection was related to deeper learning. Boyle, Duffy, and Dunleavy (2003) demonstrated that deep learners are characterized by being intrinsically motivated, able to relate new materials to previously learned information, and able to critically evaluate information; deep learning is also positively related to grade point average (GPA) and average exam scores.

An interesting application of reflection in an educational setting was reviewed by Knowles, Borrie, and Telfer (2005). These researchers showed that reflection in a sport coaching program helped develop more effective coaching, noting that those coaches who are taught to reflect on both their performance as a coach and the performance of the team were able to coach more effectively. They go on to advocate for the implementation of reflection training into all elite coaching programs. Finally, reflection has been linked

to deeper thinking (Short & Rinehart, 1993). Journal entry reflections were quantitatively and qualitatively analyzed with the results showing that levels of reflection and complexity of thinking increased by the end of the year. In all, these studies demonstrate that reflecting is associated with beneficial outcomes.

A common feature in many studies of reflection is the complicated method for scoring reflections. For example, researchers tend to use highly structured methods for gathering reflections; these methods include semi-structured interviews (King & Kitchener, 2004; van Kraayenoord & Paris, 1997) or a structured diary paradigm (Short & Rinehart, 1993). Furthermore, reliable scoring of reflections using these methods typically requires highly trained coders (King & Kitchener, 2004). Although these methods are appropriate for the research on reflections in the classroom, their complexity poses substantial constraints when trying to implement and assess reflections for large numbers of students. What is needed to make it practical, then, is a relatively straightforward medium for collecting reflections and an easy method for evaluating those reflections. e-Portfolio systems provide a medium to address this first issue.

e-Portfolios

The use of student portfolios as an assessment tool has increased since the 1990s (Ewell, 2002). Furthermore, portfolios provide opportunities to collect feedback to improve curricula and student performance (Ewell, 2002). e-Portfolios offer the benefits of paper and pencil portfolios while adding the ability to highlight audio-visual artifacts, to be viewed from remote locations, and to reflect on portfolio artifacts (Cambridge, 2001). The versatility of e-Portfolios presents instructors with a powerful method for gathering assessment information for their students (Goldsmith, 2007). Moreover, because e-Portfolios are Internet based, instructors and peers can access e-Portfolios at any time allowing for assessments outside of the classroom setting. These features of e-Portfolios suggest that they offer a medium to collect and maintain a large number of student reflections.

e-Portfolios have the versatility to house both global assessments and evaluations of specific facets of student learning. In addition, e-Portfolios offer diverse opportunities for enhancing teaching and learning. Research on e-Portfolios has uncovered positive relationships between e-Portfolio usage and various academic outcomes. Knight, Hakel, and Gromko (2008) showed that e-Portfolio users had higher overall GPAs, credit hours earned, and rates of retention in college. Furthermore, they showed that GPA and credit hours earned were positively related to the number of artifacts

uploaded and number of versions of resumes uploaded. One challenge in integrating reflections into the classroom is the difficulty with collecting reflections; e-Portfolios represent one medium for collecting reflections.

Yancey (2009) demonstrated how e-Portfolio systems might be used to collect reflections from students. She further demonstrated that the structure of the e-Portfolio system might have an impact on student reflection. More specifically, Yancey reviewed the e-Portfolio systems of various universities and determined that the system design can impact whether or not students will reflect. e-Portfolios are a medium to encourage and catalog reflections that can be viewed from anywhere. Yancey further showed that students who reflected (as opposed to those who did not reflect) were more engaged and reported more benefits of learning.

Tigelaar, Dolmans, De Grave, Wolfhagen, and van der Vleuten (2006) investigated the role of creating and maintaining portfolios to stimulate teacher reflections, finding that assignments to update portfolios lead to increases in the frequency of reflecting about teaching. In particular, reflections within the portfolio were centered on teaching effectiveness and functioning. Similarly, Groom and Maunonen-Eskelinen (2006) showed that maintaining a portfolio helped student teachers engage in reflections and develop the ability to self-assess their teaching.

The studies outlined above demonstrate how portfolios can stimulate and collect reflections, and how reflecting can improve engagement and learning relative to the absence of reflection. These studies do not, however, investigate the depth of these reflections. Indeed, none of the above studies assessed the depth of these reflections, nor attempted to assess the relationship between depth and academic outcomes. Although reflecting is better than not reflecting (see Yancey, 2009), it is important to assess the depth of these reflections, ascertain whether the reflection depth is related to student outcomes, and determine whether or not instructors should look to encourage deeper reflection. Interestingly, no studies investigating the depth of student e-Portfolio reflections could be located—this study hopes to address this gap in the literature.

Reflections and e-Portfolios

Independently, research on depth of reflections and e-Portfolios has shown many benefits; however, there is little research investigating the depth of e-Portfolio reflections. One primary reason for this is likely due to the lack of a straightforward method for assessing the depth of these reflections. Here, we look to help address this gap in the literature by providing a rubric to assess

reflection depth that can be integrated into an e-Portfolio platform. With this in place, then, it is possible to expand on the research investigating the role e-Portfolios can play in developing reflective ability in students and enhancing student learning.

Even though recent work has demonstrated how e-Portfolios can be used to encourage and collect reflections (see Yancey, 2009; Rickards & Guilbault, 2009), there are still more ways to utilize e-Portfolio reflections to enhance student learning. One example is to use e-Portfolio reflections to address some principles of learning. Pashler et al. (2007) and Graesser, Halpern, and Hakel (2008) identified principles of learning to help guide research and practice in education. Reflecting on e-Portfolio artifacts can help address these principles to improve student learning. Pashler et al. (2007), for example, suggested that instructors should encourage students to connect and integrate abstract and concrete representations of concepts. Reflecting on actual e-Portfolio artifacts can assist students in connecting the concrete artifact to the abstract lessons that the instructor was trying to convey.

The principles outlined by Graesser et al. (2008; see also Graesser, 2009) can similarly be integrated using reflections. For example, "explanation effects" (Principle 17) suggest that student learning is enhanced from constructing deep coherent explanations of the material; this is similar to deep thinking—as stated above, reflective ability has been linked to deep thinking and deeper reflections can stimulate deeper thinking. As another example, "deep questioning" (Principle 18) is an activity to help students learn better by asking questions that require the students to critically evaluate what they have learned. Reflection exercises can be responses to deep questions. As a final example, reflections can help "anchor learning" (Principle 25). When material is connected to real-world problems or applications, learning is deeper; reflections that connect an artifact to practical applications can help anchor the learned materials. Instructors can use e-Portfolios to encourage reflections to address these principles of learning.

The benefit of combining reflections with e-Portfolio artifacts allows students to gain a deeper appreciation for assignments and lessons. As stated above, deeper reflection is associated with deeper learning. Along these lines, then, it is important to begin to assess the depth of e-Portfolio reflections. We present a reasonably straightforward method for evaluating the depth of these reflections to accomplish this goal to expand the research on e-Portfolio reflections.

The Current Study

The current study presents a rubric for assessing the depth of e-Portfolio reflections. As such, presented first is a description of the rubric created for assessing reflection depth; this is followed by an examination of its psychometric properties. The second part of the study will present an investigation of whether depth of reflections is related to academic outcomes. This test provides preliminary validity evidence of the depth ratings obtained by using the depth rubric. To this end, we present two research questions to be investigated in the study:

- *Research Question 1:* How reliably can reflection depth be rated?
- *Research Question 2:* Do the depth ratings obtained using the depth rubric correlate with academic outcomes?

Methods

Participants

To answer question 1, nine raters were asked to rate the depth of a series of reflections. Three of the coders were graduate students in psychology, four were undergraduate psychology students, one was a non-student research assistant, and one was a faculty member in the psychology department.

The reflections focused on an uploaded file, or artifact, copied from the Epsilen e-Portfolio system from Bowling Green State University (BGSU). Hakel and Smith (2009) provide a description of the e-Portfolio system at BGSU. A total of 1,456 reflections from 324 different e-Portfolio users were collected. There was no consistency in the uploaded reflections. Some of the reflections were from specific classes whereas others were just unprompted reflections uploaded by the user. All of the reflections, however, were unstructured and largely unguided. Because of this, the depths of these reflections are likely to be rather inconsistent.

Reflections from 219 (note: sample sizes of actual analyses varied from 219 due to missing data) students from the same university were gathered to investigate question 2. All of the students had undergraduate credits while 35 students (16%) had some graduate credits. These 35 students were undergraduate students who took graduate classes, undergraduates who continued into graduate school, or graduate students who took undergraduate courses. These students were retained in the analyses since their undergraduate outcome variables were available for the analyses. Demographically, 63% of the sample was female and 88% of the sample reported ethnicity as white. Five percent of the sample consisted of freshmen, 2.7% sophomores, 3.6% juniors, and 72.7% of the sample consisted of seniors; the remaining respondents (~16%) listed their class level as "other."

Materials and Procedures

Depth rubric and coding. Reflections were independently coded by the nine member research team using the Reflections Depth Rubric created for the study (Appendix A). The rubric consists of six ratings of depth, ranging from 0 meaning *not a reflection* (e.g., "test upload") to 5 meaning *deep reflection*. Recall from above that reflection is the ability to think critically, extract ideas, and apply current information to future uses (Hopkins, 1997). Using this definition, the rubric was developed in the view that reflections become deeper to the extent that the reflector extrapolates from the actual artifact or assignment to higher level applications and deeper thinking. That is, deeper reflections will center less on the actual uploaded artifact, and will demonstrate a critical evaluation of the learning behind the artifact, and how the principles are related to future application. For example, note this student's reflection: "This file demonstrates my skills using Excel, and how I used Excel in an M&M lesson to incorporate technology with my students." Based on the rubric developed, this reflection received an average rating of 0.81 because the student did not reflect past the actual artifact to demonstrate an understanding of the applications of the Excel file past the immediate purpose, nor did the student critically evaluate the learning that occurred while developing the artifact. Take, instead, this excerpt from a student's reflection:

> When writing the paper, I spent a great deal of time critically thinking about what I feel as a person compared to my beliefs in the professional field. The process involved me learning more about myself and integrating different aspects of my life into my professional field. . . . From this assignment, I feel that I have grown as an FLE because I have identified my own values and feelings that impact me as a professional in FLE.

The whole reflection had an average score of 4.52 since this reflection demonstrates reasoning past the immediate purpose of the artifact; indeed, this student was able to anchor the artifact to future uses. Note that this rubric defines reflections to be deeper the more the student demonstrates that he/she has critically evaluated the learning behind and development of the artifact, and to the extent that he/she understands that the artifact exists beyond the confines of the assignment and begins to evaluate what was learned or the artifact itself can inform future work—in short, deeper reflections represent deeper and more critical thinking about learning which have been shown to be positively related to academic outcomes (see above, Appendix A provides further examples of reflections of different depths).

After a short training sessions and practice codings (see Appendix B), the coders assessed a total of 1,456 reflections from 324 different e-Portfolio users. Coders were asked to make a primary depth rating, and also to make a secondary depth rating if the reflection did not fit one of the defined cut points exactly. For example, if a reflection was between a 2 and 3 in terms of depth, the coder was allowed to use the primary rating option for the most representative depth, but recorded a second rating option for the other (e.g., primary of 2, secondary of 3). Final reflection depth scores were calculated by computing a weighted average where the primary rating received a weight of 2/3 and the secondary rating received a weight of 1/3. This weighting scheme was used to give more emphasis to the coders' initial thoughts while still allowing for uncertainty.

Dependent measures. The dependent measures for research question 2 were obtained by matching university ID numbers with data from the Institutional Research office of the university. These analyses used Cumulative GPA, total credit hours earned, and ACT scores as dependent measures of academic outcomes. Using a concordance table from Doran, Lyu, Pommerich, and Houston (1997), individuals' with only SAT scores had their scores converted to ACT scores.

Results

Research Question 1

To answer question 1, a two-way random effects intraclass correlation (ICC) was computed. This ICC assumes that both the reflections and the raters are random samples of their respective populations. We make the assumption of random effects of the raters as we expect the raters for this study to represent potential evaluators of artifact reflections. Inter-rater consistency was measured as we were not interested in absolute agreement between the weighted average depth scores, but were instead interested in consistency of ranking of the reflections (i.e., across all raters, reflection 100 is deeper than reflection 102). Therefore, an ICC(2,1) was calculated for the nine judges over all the reflections (McGraw & Wong, 1996; Shrout & Fleiss, 1979).

The ICC for averaged measures based on the nine raters over the 1,456 reflections was 0.946 (F (1455, 11640) = 18.47; $p < .001$; 95% CI = 0.942 to 0.950). This value is well above the recommended ICC = 0.70 value before aggregating data (e.g., Klein & Kozlowski, 2000). Furthermore, the lower bound of the confidence interval is well above this criterion. The ICC for averaged measures was used since the average weighted depth rating of the coders is the most appropriate index of reflection depth. The ICC value for just the four undergraduate students was significantly lower than nine raters (ICC(2,1) = .90, F (1455,4365) =

Table 1
Means, Standard Deviations, and Intercorrelations of Deptartment Ratings and Academic Outcome Variables

	M	SD	1	2	3	4
1. Maximum Depth	1.61	1.15	1.00			
2. ACT	21.69	4.00	0.05	1.00		
3. GPA	3.17	0.53	0.27**	0.51**	1.00	
4. Credit Hours Earned	116.50	36.96	0.10	0.03	0.13	1.00

Note. Ns = 170 – 219; ** Correlation is significant at the 0.01 level (2-tailed).

9.96, $p < .001$, 95% CI = 0.89 – 0.91). However, this is expected given the reduced number of raters; also, the ICC value is still well above the recommended cut-off.

Here, we used the average rating of nine raters to determine the level of reliability of the ratings. However, using nine raters per reflection is wasteful if fewer raters can be used while still obtaining the desired level of reliability. An equation can be used to estimate the number of raters needed to attain a certain level of reliability or ICC value:

$$k = \frac{ICC^*(1 - rl)}{rl(1 - ICC^*)} \qquad (1)$$

Where k is the number of raters, ICC^* is the desired ICC value, and rl is the lower bound of the 95% confidence interval for the estimated ICC value. Setting $ICC^* = 0.946$, $k = 1.08$ indicating that a minimum of two raters can be used to obtain an ICC value of 0.946.

Research Question 2

Each reflection's final depth rating was an average of the nine coders' weighted depth scores. Some students uploaded more than one reflection; in fact, the number of reflections uploaded ranged from one to 44. For this analysis, only the students' maximum reflection depth was used. For those students who wrote only one reflection, this one reflection was treated as their maximum depth. Depth assessments were correlated with the dependent measures to establish the relationship between depth of reflection and academic outcomes.

Table 1 presents the correlations between the variables as well as the means and standard deviations of the measures. As the table shows, the mean of the maximum depth rating was just above 1 ($M = 1.61$, $SD = 1.15$). The mean value suggests that, even at their deepest reflection, these students are not reflecting at a very deep level. This is to be expected since these reflections were free response without any guidance. It is unlikely that students would reflect at a very deep level without some form of instruction. Indeed, King and Kitchener (2004)

demonstrated the reflective ability develops overtime, and Yancey (2009) showed that the structure of e-Portfolio system can impact reflections. Maximum reflection depth was significantly related only to GPA. Reflection depth, as judged by the rubric, was unrelated to credit hours earned and ACT scores.

Discussion

The results of this study showed that raters can be trained to rate reflection depth reliably. The simplicity of the rubric and training makes this method for assessing reflection depth a viable alternative to the more demanding approaches used in previous research (for examples see King & Kitchener, 2004; Short & Rinehart, 1993; van Kraayenoord & Paris, 1997). Furthermore, the ICC values are well above the cut-off recommended for aggregating scores, showing that ratings can be aggregated to create a final depth score of a student's reflection. As equation 1 showed, an ICC value as large as found in this study could be found with as few as two raters. In answer to question 1, therefore, this rubric in combination with a short training session can result in reliable assessments of reflection depth. This suggests that instructors can create triads of students where two students rate the third student's reflections with a strong level of rater reliability.

Research question 2 asked about preliminary validity evidence of the ratings. Although the maximum weighted depth ratings were unrelated to credit hours earned and ACT scores, initial validity is demonstrated by the moderately positive relationship between the ratings and GPA. These results make sense, however, when one considers the temporal ordering of the variables. The ACT is taken before the student begins to reflect in college. Research has shown that reflective ability becomes better and reflections become deeper with time (King & Kitchener, 2004), and even without instruction students would deepen their reflections even a little over time. Therefore, reflective ability in college would not necessarily be related to ACT scores from high school. Therefore, in response to question 2, this study has shown preliminary evidence of the validity of these ratings.

Table 2
Examples of Reflections Addressing Learning Principles

Principle Number[1]	Description of Principle[1]	Reflection Text[2]
17	**Explanation Effects**. Students benefit more from constructing deep coherent explanations.	This lab was one of my favorites! I am very interested in manipulating foods, especially in baking. Sweeteners are something I never really tampered with becuase I did not want to ruin my product, but after this lab I learned so much and have a better understanding of sugar and substitutes now. Sugar gives the beautiful browning when foods are baked which makes it look appetizing, plus, the structure of sugar cuts air into the product to give it extra rise. A full 100% substitution for sugar is not a good idea; the product is flat and does not look nearly as appetizing. This lab gave me knowledge that I can apply when I bake at home.
18	**Deep questions**. Students benefit more from asking and answering deep questions.	The learning outcome that was demonstrated in this assignment was inquiry. We were asked what were valuable assets that a scientist should have. This assignment was very useful in the fact that it required us to think about what would make a good scientist and what a good scientist would have to embody. This paper required a lot of thought and conversation between both Stephanie and I because this was very thought provoking. Some of the ideas that we had come up between the both of us had come up twice and that was when we knew that that particular trait/characteristic was important.
25	**Anchored Learning**. Learning is deeper and students are more motivated when the materials and skills are anchored in real world problems that matter to the learner.	My internet scavenger hunt will be used directly with my social studies Caribbean cultures unit. The scavenger hunt will allow for my students to learn about different countries flags (something they love to learn about) and a quick fact about each Caribbean nation selected. As a teacher, I can use this as a formal assessment of their internet, word processing, and research skills. I would like to create at least one internet scavenger hunt for each of my major teaching units.

1. From Graesser, Halpern, & Hakel (2008)
2. Note: Errors in text represent typographical errors in original reflection text made by the student.

As described above, incorporating reflections into the classroom is an important opportunity to increase depth of learning in the classroom. This study adds to this growing body of literature by presenting a new method for collecting and assessing reflections to make this incorporation more feasible. Past research has shown that students with active e-Portfolios have higher GPAs, credit hours earned, and retention rates than a matched sample of non-users (Knight et al., 2008). By incorporating the use of e-Portfolios into the classroom, the benefits to students will accrue first from keeping an updated e-Portfolio (Knight et al., 2008), but also by fostering reflections (Yancey, 2009).

e-Portfolios are a good medium to collect reflections. The benefits of reflection are likely due to the ability to critically evaluate the learned information and assist students in actively learning the information rather than relying on rote memorization. Additionally, the learning principles outlined by Graesser et al. (2008; e.g., Anchoring, Questioning) can be addressed by this technology because it offers the student a forum in which to reflect. Indeed, as Table 2 shows, even though these reflections were free recall and unguided, some of these reflections exhibit the learning principles outlined. e-Portfolios offer students the ability to catalog their work and critically evaluate that work.

This study provides a new approach for incorporating reflections into the classroom. By utilizing e-Portfolio systems and the rubric described here, instructors can make use of reflections in their classes. However, future research is needed to replicate and extend these results. Future research should look at more than just GPA as an outcome measure. Retention and transfer of learning are two variables related to knowledge, and their relationship to reflections should be studied explicitly rather than inferred from correlates (e.g., the relationship between reflection depth and GPA). Also, the reflection literature may be bolstered with an experimental investigation that randomly assigned students into either a reflection or non-reflection condition to see if the outcomes are better for those who reflected. Finally, future research can try to explicitly study the link between reflections and the principles of learning rather than inferring it. Even though many of the reflections in our sample demonstrate these learning principles (see Table 2), it is worth investigating the extent to which reflections structured around these principles improve learning. For example, one can study the role that reflection plays in being able to effectively anchor lessons to actual future application.

With this rubric and a versatile course management system like e-Portfolios, instructors can enhance student learning by incorporating reflections into their classes. Indeed, the rubric is offered as a tool that might be embedded into e-Portfolio, learning management, and course management software, a step that can benefit both students and researchers.

References

Boyle, E. A., Duffy, T., & Dunleavy, K. (2003). Learning styles and academic outcome: The validity and utility of Vermunt's inventory of learning styles in a British higher education setting. *British Journal of Educational Psychology, 73*(2), 267-290. doi:10.1348/00070990360626976

Cambridge, B. (2001). Electronic portfolios as knowledge builders. In B. Cambridge, S. Kahn, D. P. Tompkins, & K. B. Yancey (Eds.), *Electronic portfolios: Emerging practices in student, faculty, and institutional learning* (pp. 1-11). Washington, DC: American Association for Higher Education.

Cassidy, S. (2006). Learning style and student self-assessment skill. *Education + Training, 48*(2/3), 170-177. doi:10.1108/00400910610651791

Dorans, N. J., Lyu, C. F., Pommerich, M., & Houston, W. M. (1997). Concordance between ACT assessment and recentered SAT I sum scores. *College and University, 73*, 24-31.

Ewell, P. T. (2002). An emerging scholarship: A brief history of assessment. In T. W. Banta and Associates (Eds.), *Building a scholarship of assessment* (pp. 3-25). San Francisco, CA: Jossey-Bass.

Goldsmith, D. J. (2007). Enhancing learning and assessment through e-Portfolios: A collaborative effort in Connecticut. *New Directions for Student Services, 119*(31), 31-42. doi:10.1002/ss.247

Graesser, A. C. (2009). Inaugural editorial of journal of educational psychology. *Journal of Educational Psychology, 101*(2), 259-261. doi:10.1037/a0014883

Graesser, A. C., Halpern, D. F., & Hakel, M. D. (2008). *25 principles of learning.* Washington, DC: Task For on Lifelong Learning at Work and at Home. Retrieved from http://www.psyc.memphis.edu/learning/whatweknow/index.shtml.

Groom, B., & Maunonen-Eskelinen, I. (2006). The use of portfolios to develop reflective practice in teacher training: A comparative and collaborative approach between two teacher training providers in the UK and Finland. *Teaching in Higher Education, 11*(3), 291-300. doi:10.1080/13562510600680632

Hakel, M. D., & Smith, E. N. (2009). Documenting the outcomes of learning. In D. Cambridge, B. Cambridge, & K. Yancey (Eds.), *Electronic portfolios 2.0: Emergent research on implementation and impact.* Sterling, VA: Stylus.

Hopkins, D. (1997). Improving the quality of teaching and learning. *Support for Learning, 12*(4), 162-165. doi:10.1111/1467-9604.00038

King, P. M., & Kitchener, K. S. (2004). Reflective judgment: Theory and research on the development of epistemic assumptions through adulthood. *Educational Psychologist, 39*(1), 5-18. doi:10.1207/s15326985ep3901_2

Klein, K. J., & Kozlowski, S. W. J. (2000). From micro to meso: Critical steps in conceptualizing and conducting multilevel research. *Organizational Research Methods, 3*(3), 211-236. doi:10.1177/109442810033001

Knight, W. E., Hakel, M. D., & Gromko, M. (2008). The relationship between electronic portfolio participation and student success. *AIR Professional File*.

Knowles, Z., Borrie, A., & Telfer, H. (2005). Towards the reflective sports coach: Issues of context, education and application. *Ergonomics, 48*(11-14), 1711-1720. doi:10.1080/00140130500101288

Mason, R., Pegler, C., & Weller, M. (2004). e-Portfolios: An assessment tool for online courses. *British Journal of Educational Technology, 35*(6), 717-727. doi:10.1111/j.1467-8535.2004.00429.x

McGraw, K. O., & Wong, S. P. (1996). Forming inferences about some intraclass correlation coefficients. *Psychological Methods, 1*(1), 30-46. doi:10.1037/1082-989X.1.1.30

Pashler, H., Bain, P., Bottge, B., Graesser, A., Koedinger, K., McDaniel, M., & Metcalf. J. (2007). *Organizing instruction and study to improve student learning*. Washington, DC: National Center for Education Research, Institute of Educational Sciences, U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/wwc/pdf/practiceguides/20072004.pdf.

Saito, H., & Miwa, K. (2005). Construction of a learning environment supporting learners' reflection: A case of information seeking on the Web. *Computers & Education, 49*, 214-229.

Short, P. M., & Rinehart, J. S. (1993). Reflection as a means of developing expertise. *Educational Administration Quarterly, 29*(4), 501-521. doi:10.1177/0013161X93029004006

Shrout, P. E., & Fleiss, J. L. (1979) Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin, 86*(2), 420-428. doi:10.1037/0033-2909.86.2.420

Tigelaar, D. E. H., Dolmans, D. H. J. M., De Grave, W. S., Wolfhagen, I. H. A. P., van der Vleuten, C. P. M. (2006). Portfolio as a tool to stimulate teachers' reflections. *Medical Teacher, 28*(3), 277-282. doi:10.1080/01421590600607013

van Kraayenoord, C. E., & Paris, S. G. (1997). Austrian students' self-appraisal of their work samples and academic progress. *The Elementary School Journal, 97*(5), 523-537. doi:10.1086/461879

Yancey, K. B. (2009). Reflection and electronic portfolios: Inventing the self and reinventing the

university. In D. Cambridge, B. Cambridge, & K. Yancey (Eds), *Electronic portfolios 2.0: Emergent research on implementation and impact.* Sterling, VA: Stylus.

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Appendix A
Reflections Depth Rubric

The purpose of this rubric is to outline the process by which written document reflections are numerically coded. The coding scheme is done using a six point scale ranging from surface to deep. Below is the coding scheme and how to differentiate between the codes. (Please note that all spelling errors in the examples have been noted, but all quotes are in their original form).

Code of 0
• Not a reflection
• "lkj;asdkjfg ai8ujrgm;qawerg"

Code of 1
• Represents a surface reflection
• The reflection **centers around the artifact** uploaded and does not extend pass the particular artifact.
• Example 1: "I made this graph in Excel. It is my all time favorite graph. I'me sure you can see how hard I worked on it."
• Example 2: "I absolutely loved writing this paper because it forced me to dig deep into this issue and write my personal opinion, which at times, can be very strong. I think that it has some good points and is a worthwhile document."

Code of 2
• Represents a surface-moderately deep reflection
• The reflection still centers around the artifact uploaded, but starts to extend past the particular artifact to include a discussion of the class or thoughts about working on the particular artifact. It **does not extend to anything past the artifact** though; all thoughts are centered on the artifact still.
• Example 1: "I believe this paper displays my ability to research and write a thorough description of complicated processes. It also displays my understanding and mastery of the following National Science Education Standard: The earth is a system containing essentially a fixed amount of each stable chemical atom or element. Each element can exist in several different chemical reservoirs. Each element on earth can move among reservoirs in the solid earth, oceans, atmosphere, and organisms as part of biogeochemical cycles."
• Example 2: "This document taught me how to use a basic tool such as draw to create images and pictures using technology. I learned how to manipulate the mouse and object on the computer to come up with a final product that looks such as this."

Code of 3
• Represents a moderate reflection
• The reflections starts to extend past the artifact itself and starts to talk about how the creating the artifact has helped them for the **near future**. There are notions of growth in education, but not connected to the distant future.
• Example 1: "This is my Teaching Project I for MUED 240: Introductory Music Field Experience. I liked doing this project because it gave me a chance to become more skilled in using technology. Also, I was able to identify good and bad concepts in my teaching."
• Example 2: "I liked doing this because it forced me to think about what good webpages entail but I do not think that anyone else will find it that valuable because it was done by a young college student and may not be as reliable as other website checklists."

Code of 4
• Represents a moderate to deep reflection
• The reflector makes only a loose connection to the actual artifact, and starts to look at how the project has helped them for the **distant future**. The reflection is less concerned with the particular events of the reflection, but now looks at how the process was helpful and informative for other things.
• Example 1: "This lesson plan I saw in my observations and I really liked how he did this lesson. I think that it will help the students get interested in authentic german songs, as well as learning about grammar and new vocabulary."
• Example 2: "I really liked doing this in class because I feel that it is important to recognize children's acheivements and hard work with something that they are able to hang on their parent's refrigerator."

Code of 5

- Represents a deep reflection
- The artifact is hardly mentioned, but the process of creating it and the uses are the topics of the reflection. The reflector is discussing how the process is going to help him/her obtain future goals. The reflector is able to see how the individual artifact will actually be able to help **areas in their future**.
- Example 1: "With all the changes that occurred with my assistantship institution, I was expected to go above and beyond my normal duties. One such responsibility was to complete a directors report highlighting all the events and activities that student activities did. Doing this allowed me to look more critically at what types of programs this office produces. Further, I can critically analyze what methods and steps I can take to produce better events in the future."
- Example 2: "After taking EFTL 302, I have learned a great deal of information that will be VERY beneficial in my future as a teacher! Although it was very stressful at times, I learned how important it is to incorporate technology nto my classroom. I hope that the school I get hired at will have computers in my classroom and will be willing to supply me with the technology I need. I truely hope to use it as much as possible, especially to allow students to use it for their own work."

Appendix B
Reflection Depth Ratings: Training Session Information

Goals

The training for rating reflection depth was developed with two goals in mind. First, the training was meant to maximize rater consistency by allowing raters to familiarize themselves with the task, practice rating reflections as a group, and to practice rating reflections individually. Second, the training was meant to be replicable, meaning that every effort was made to document the process to facilitate future efforts in rating reflection depth. The same general training program could be adapted to rate reflections using a different medium, and can be applied to large scale training.

Throughout the training exercises, raters were exposed to a variety of example reflections. All examples used throughout this training were chosen from a pool of actual e-Portfolio reflections. Reflections were chosen either to (a) fit well within the definitions of the different depth categories, or (b) to be somewhat ambiguous as to the depth category. This was meant to facilitate discussion and allow raters to calibrate on reflections that do not necessarily fit into any definitional category.

Definitions and Examples

In both PowerPoint and handout formats, all raters were provided with definitions of each level of depth, ranging from "0" (not a reflection) to "5" (deepest level of reflection). Along with each definition, one or more example reflections were given, providing the raters with concrete examples to facilitate calibration. Raters were allowed (and expected) to refer to these definitions examples throughout all other training exercises, as well as during the actual rating task. The depth rating of these examples was previously agreed upon by the primary researchers.

Group Rating Activity

Following discussion of the definitions and the examples, a discussion exercise took place. Raters were given several example reflections, one at a time, and asked to rate these based on the definitions and the examples. The raters were to write down their ratings, and then discuss why they chose these ratings. Whenever there was disagreement, the raters were asked to discuss their differing viewpoints, and to settle on a score. This provided raters a concrete opportunity to calibrate. The trainers provided their own ratings of the exercise based on their own knowledge, which provided further discussion if there was disagreement.

Individual Rating Activity

To complete the training, each rater was given an individual rating activity. This activity presented the raters with ten reflections, each of which the raters were asked to rate on their own over a 20 minute interval. Following this, the trainers tallied up the responses, and any reflections that had more than a single disagreement were discussed. Discussion is imperative for both the group and individual exercises so that all the raters are calibrated and rate using the same frame of reference. The total training session can last between one and two hours.

Materials

PowerPoint presentations and handouts are available online at http://www.epsilen.com/ddalal under the "Showcase" tab.

Implementing ePortfolios for the Assessment of General Education Competencies

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This paper describes the Clemson ePortfolio Program initiated in 2006, where all undergraduate students are required to create an ePortfolio. Specifically, the program was designed as a mechanism through which to evaluate our recently revised general education program. In this program all undergraduates create and submit a digital portfolio as evidence of academic and experiential mastery of our general education competencies. This paper, which is the first in a series, describes the implementation process providing a detailed look at the rationale behind implementation, feedback and mentoring, assessment, and support.

The purpose of this paper, which is the first in a series, is to examine the ePortfolio Program as implemented at our University as a multi-purpose environment, one in which students learn about themselves as learners through what Schön (1983) termed reflection in action and on action and a second in which our University learns about the effectiveness of our core competencies instruction and our student's ability to demonstrate them.

The Clemson ePortfolio Program was implemented out of a need to evaluate our recently revised general education program. In this Program, all undergraduates create and submit a digital portfolio as evidence of academic and experiential mastery of our general education competencies. Its rationale is to build a mechanism through which core competencies (see Appendix B; e.g., Arts and Humanities, Cross-Cultural Awareness, Mathematical Literacy, Natural Sciences, Social Sciences, Science and Technology in Society, Critical Thinking, and Ethical Judgment) can be both demonstrated and evaluated.

It is through the development of their ePortfolios that students begin the process of self-reflection as they select appropriate work and analyze these selections, engaging in connection making and synthesis as they bring their evidence together to tell their academic story. These activities require students to engage in critical reflection of learning. This self-assessment or examination of learning is powerful and contributes to the habits of mind that we wish to embed in our students. Moreover, key factors in the development of an ePortfolio are student selection and reflection on the elements to be included, ideal activities to support the new learning outcomes-based approach to general education.

Our Program has several benefits for its stakeholders. They include:

- Encouraging students to reflect on their learning;
- Helping students to see how their coursework relates to real-world practice;
- Helping students to see the inter-connectedness of general education and upper-level courses;
- Helping students to recognize how their college experiences connect to their professional goals;
- Offering a flexible yet robust assessment system that provides a way to aggregate and disaggregate data for university, college, and departmental use;
- Offering a student-centered way for measuring learning outcomes while encouraging deep learning and student engagement;
- Allowing both faculty and students to evaluate student growth, making learning visible to both students and faculty; and
- Providing a mechanism through which students can showcase their knowledge and skills that can be used for internships, employment, or graduate school.

A logic model was created to chart the Theory of Change that the ePortfolio Program might facilitate. Figure 1 maps the flow of inputs, outputs, and outcomes of this implementation, thus acting as the blueprint for change. The Program brings together resources in the form of mentoring, peer feedback, and technological support to all stakeholders (faculty, students, and administration). This paper is divided into sections that mirror this logic model from its implementation (inputs) to its results (outcomes).

Theoretical Framework

The use of electronic portfolios in higher education has increased steadily over the past decade. Not surprisingly, these initiatives seem to be commonly focused on a single program area such as education, architecture, or writing and are put in place for a variety of purposes, usually focusing on learning, assessment,

Figure 1
Logic Model: Theory of Change
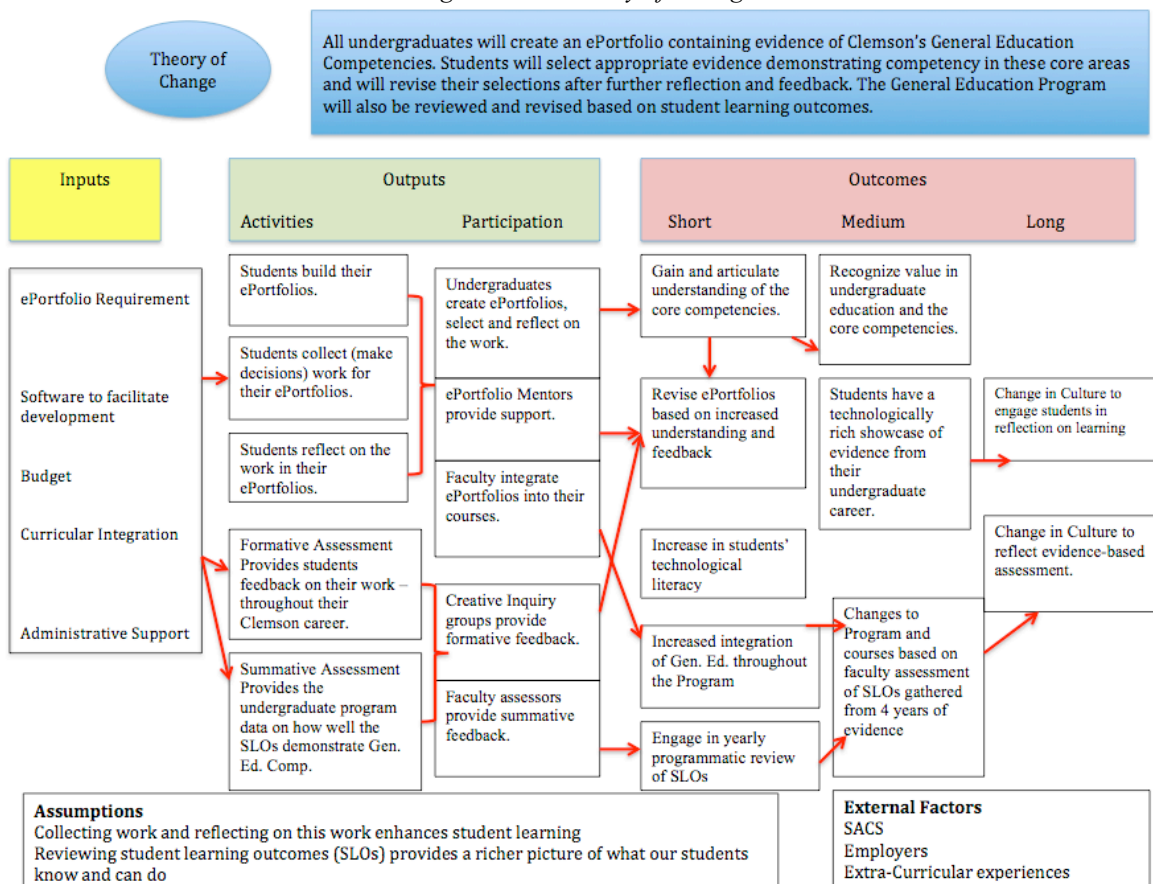
or showcasing skills and achievement (Abrami & Barrett, 2005). We believe it is imperative that these goals co-exist. That is, unless students see value in creating an ePortfolio, it will be viewed as an add-on and, as a result, will not include quality evidence that will provide an accurate assessment of student knowledge and abilities. Therefore, the purpose of our current ePortfolio Program is a combination of learning, assessment, and showcasing of student work. Students are encouraged to collect evidence, reflect on this evidence through the construction of a rationale statement justifying the relationship between the artifact and the competency, and begin to reflect on how this evidence "showcases" their professional skills. We believe that a successful ePortfolio program incorporates these various forms at strategic times throughout a student's education. In addition, student ePortfolios facilitate our task of institutional goal setting and enhance our general education curricula.

Although the primary purpose of the Portfolio Program is the assessment of general education, its development requires students to make decisions and to

think critically about what evidence is appropriate. This activity encourages students to engage in critical self-reflection and critical narrative analysis (Moss, 2003, 2008), aligning well with our goal of producing lifelong learners. Doing so shifts the focus from a standardized product to one that elicits both creative and critical thinking. It is through the selection of appropriate work and the development of their rationale statements that articulate how the evidence demonstrates the competency that students engage in this critical self-reflection. Since our ePortfolio Program focuses on assessment as a tool for learning, rather than solely as an assessment of learning, we believe that multiple goals can be achieved.

ePortfolios for Learning

Paulson, Paulson, and Meyer (1991) view the ePortfolio as a laboratory where students construct meaning from their accumulated experiences. According to them, it is a story of knowing backed by evidence. For a learning ePortfolio, students

demonstrate what they know using evidence collected from their various college experiences. This activity engages students in self-reflection as they begin to examine their own learning and development. This learning process is augmented through systematic reflection, identification of learning, and the synthesis of evidence accompanied by the identification of learning gaps (Borman & Dowling, 2006).

An ePortfolio Program that has at its core learning and approaches this goal from a student-centered perspective must have a built-in mechanism for feedback. This mechanism is difficult to implement because as Wade and Yarbrough (1996) point out, student feedback and ePortfolio review require a significant amount of time. Although researchers agree that reflection on learning is a critical element of the portfolio process, they also have pointed out that students are not good at constructing well thought-out reflective statements, concluding that scaffolding is essential for this process (Carraccio & Englander, 2004; Ring & Foti, 2006). The most effective and successful ePortfolio programs provide formative feedback throughout the ePortfolio development period, encouraging reflection and subsequent revision and refinement of the evidence. We believe it is through this formative review and students' subsequent reflection on that feedback that they begin to identify and achieve their learning goals, better understand their strengths and weaknesses, and begin to recognize the intrinsic value of their ePortfolios. This process has begun to inform our Portfolio Program and has contributed to a richer assessment of our core competencies.

ePortfolios for Assessment

The increased use of ePortfolios for assessment has changed the nature of the ePortfolio discussion, often contributing to tension in the ePortfolio community. Recently, there has been a tendency to use portfolios in accountability-driven assessment systems in many countries (e.g., England with teacher standards, the USA with state licensing of teachers and Australia with outcome-based education) to determine standards of performance or competency levels in these settings (Cochran-Smith & Fries, 2002; Darling-Hammond, 2000). The assessment portfolio is often implemented for bureaucratic use and has mandated requirements (Smith & Tillema, 2003). Many view these issues as possible contributors to the disconnect between assessment criteria and student learning, thus creating a conflict between the measurement of standards and capturing development and reflection (Smith & Tillema, 2003). According to Zeichner and Wray (2001), there is also a tension between a student-centered and an overly prescribed ePortfolio that may cause students to resent it, thus contributing to a lack of

ownership or buy-in on the part of students. To address these tensions and facilitate the student learning and analysis crucial to developing 21st Century skills, Clemson is attempting to implement an ePortfolio Program that extends beyond a department or college and is integrated throughout the undergraduate curriculum.

Inputs

Implementation

In an attempt to prepare students as lifelong learners in a rapidly changing world, our general education curriculum underwent substantial changes in the competencies of the core curriculum in 2005, expanding to include technological literacy, ethical judgment, cross cultural awareness, critical thinking/problem solving, and STS (science and technology in society). Given the new laptop requirement for undergraduates, it became evident that an effective way to evaluate student understanding of these core competencies was through the development of an ePortfolio. Key factors in the development of such a portfolio are student selection and reflection on the elements to be included, activities supporting the new learning outcomes based approach to general education. Moreover, electronic portfolios are a way to generate as well as document learning (Basken, 2008). A taskforce comprised of faculty, staff, and students was convened to explore the idea of an ePortfolio requirement, and a formal proposal outlining ePortfolio development, support, and assessment was subsequently presented to the undergraduate curriculum committee who voted to implement the program. These topics are discussed in detail in the upcoming sections.

In 2007, a director was hired to oversee and manage the Program. During her first year, she collected data from students and faculty via surveys and face-to-face conversations to gain a better understanding of the ePortfolio Program. Based on this feedback, it was clear that several issues needed to be addressed, including:

1. Overall confusion and misunderstandings regarding the ePortfolio Program;
2. Limited support available to students;
3. A lack of exemplars available upon which students could model their work;
4. A lack of motivation on the part of the students to create their ePortfolios; and
5. Uneven integration of the ePortfolio throughout the undergraduate curriculum.

These issues became the foundation upon which our support system is based and provided the impetus for

the redesign of elements of the Program. This process has become iterative as we continue to identify issues/problems related to the ePortfolio Program and correct them as they occur.

Tools Used

Working under the guidance of the Information Technology Department, the faculty taskforce developed a plan for students to use the current course management system to create their ePortfolios. We continued to use this system for the first two years of implementation at which point it was deemed insufficient to meet the needs of our Program and our students. For example, students wanted more flexibility in the design of their ePortfolios, and when surveyed, stated they would prefer to use Google, iWeb, or simply build their own pages using a web editor. Though this range of development tools presented a problem for us in terms of implementation, training, and assessment, we learned that there was no "one-size fits all" system that would provide students the flexibility they desired while providing us the ability to assess their work and collect data on this assessment. We decided at that point to use two systems, one for the ePortfolio interface (see Appendix A) and another through which students tag (connect digital evidence to a competency) their work and assessors review the work (see Appendix B).

Simultaneously, the University adopted Google Apps, meaning that all students were provided a Gmail account and had access to Google Docs. This made it easy for us to adopt GoogleSites as an ePortfolio tool. It is important to point out that while we encourage students to use GoogleSites to develop their ePortfolios, they are not required to do so. They are, however, required to use CUePort to tag their work to the competencies.

This tagging/assessment system was developed in-house and is multi-purpose. Using CUePort, students tag evidence to the general education competencies, peers review their work and provide feedback, and faculty assess the work for programmatic improvement.

Another problem we had with our original system was its lack of portability. In other words, once a student graduated they could no longer access their ePortfolios unless they downloaded a copy prior to graduation, a cumbersome process. We believe it is our responsibility to support and encourage lifelong learning in our students and that our students should have access to their ePortfolios well after graduation. Google and CUePort allow for this portability and accessibility beyond graduation. In fact, we already see evidence from Google Analytics that some students are continuing to use and revise their ePortfolios after graduation and will continue to collect data to learn the extent of students' use of ePortfolios in this context.

Faculty and Student Support

Based on concerns voiced by faculty and students in informal conversations with the Director of the ePortfolio Program during her first year, Clemson initiated the following suggestions over the next two years to enhance faculty and student support:

- Deepen student understanding and buy-in through ePortfolio student mentors, student workshops, and online support;
- Deepen faculty understanding and buy-in through ePortfolio workshops, brown bag lunches, and informal visits to student advisers;
- Provide ePortfolio exemplars that serve as best practice examples for faculty and students;
- Implement an ePortfolio campus-wide awards program;
- Continue to survey students to identify student perceived weaknesses of the program and revise the program based on these data; and
- Continue to identify the issues related to the ePortfolio system and correct problems as they occur.

We found that providing students a variety of learning opportunities "just-in-case" they will need it – though we know they will – as well as "just-in-time" opportunities provides maximum support. Some examples of "just-in-case" learning opportunities include online tutorials available through the ePortfolio website (http://www.clemson.edu/academics/programs/eportfolio/index.html), workshops, and in-class visits. The "just-in-time" opportunities include ePortfolio mentors available for face-to-face or virtual assistance and faculty-developed prompts embedded on the tagging page that pose probing questions designed to help students make appropriate choices of work. We have also made significant efforts to deepen faculty understanding and buy-in through ePortfolio workshops, brown bag lunches, and informal visits with student advisors.

In addition, we recently implemented a common freshman experience, LIB100, in which students learn how to use technology at the University, engage in diversity training, and begin their ePortfolios. In this zero credit class, students watch two video modules designed to help them create their GoogleSites page and tag a practice artifact. In this class, we also try to help them understand that keeping their work is an important part of their college experience, providing them an opportunity to step back and reflect on their Clemson experiences, though admittedly, it is believed that few actually comprehend this idea as freshmen.

Many students are resistant to the idea of an ePortfolio initially, yet we find, not surprisingly, that the sooner students begin the ePortfolio process and the more frequently they revisit their ePortfolio, the more value they recognize from it. Students begin to gain a sense of accomplishment when provided an opportunity to review and reflect on their collegiate experiences.

## Outputs

ePortfolio Assessment

Once students choose and tag their work, the assessment process begins. In our program, multiple forms of assessment were implemented based on recommendations from the ePortfolio faculty taskforce and the Clemson University Office of Assessment. According to the Southern Association of Colleges and Schools (SACS), a sound rationale must be in place to evaluate undergraduate general education (see Figure 2). To address this expectation, the ePortfolio faculty taskforce conceptualized a robust assessment plan utilizing multiple sources of feedback and artifact review including self-assessment, peer feedback (formative assessment) and faculty assessment (summative assessment). Feedback from professors and peers is an essential element of ePortfolio development. Moreover, using the ePortfolio as a catalyst for

dialogue contributes to new ideas, new learning and broader thinking. In the 21st Century, courses and grades are simply not enough!

This reasoning is supported by research which suggests that portfolio assessment provides multiple benefits for both the developer and the institution in the form of valid, holistic assessment of students higher-order cognitive skills (Dickman, Schwabe, Schmidt, & Henken, 2009), improvement of students' ability to self-assess and reflect on their work (Gilman & McDermott, 1994), and more authentic evidence (Kieffer & Morrison, 1994). As Wiggins (1994) suggests, "the use of a single grade to represent achievement, progress, and growth leads to the difficulty of grading fairly" (p. 33). The following sections address the formative and summative assessments used at Clemson.

Formative feedback. Creative Inquiry (undergraduate research) groups are utilized for the formative feedback of ePortfolio artifacts. Each competency area has a Creative Inquiry (CI) team associated with it, comprised of a faculty facilitator and up to ten students. There are two components to these CI projects: conducting research on ePortfolio related topics and scoring of artifacts. Like all CI projects, students commit to at least one year of involvement, although many have stayed with the team longer. Prior to reviewing and scoring artifacts, students must

Figure 2
Assessment Rationale
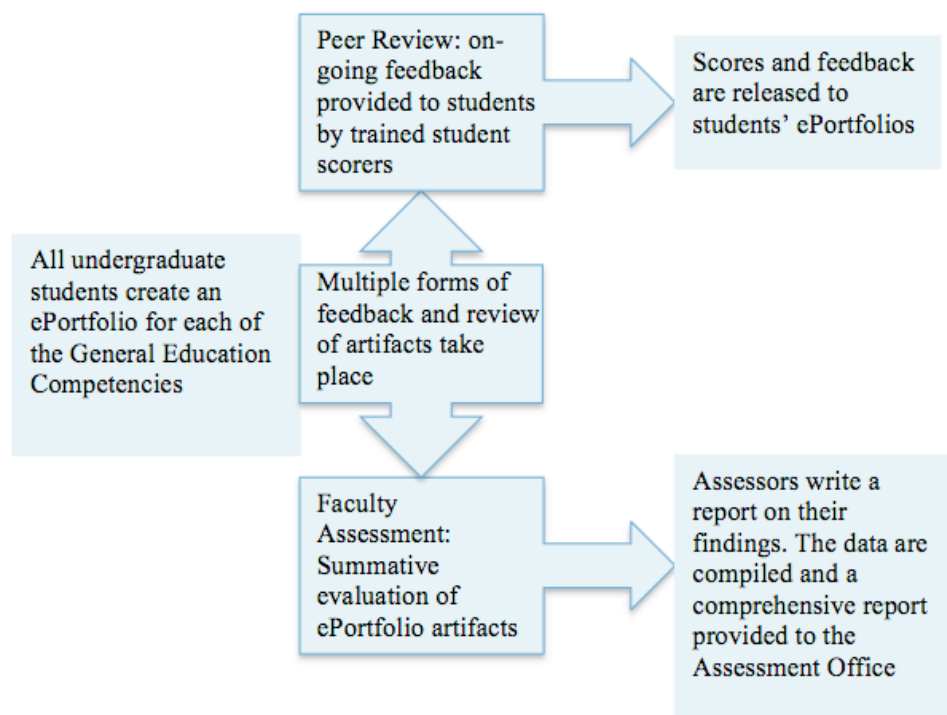
complete the Human Subjects modules through CITItraining.org (certificates of completion are retained by the faculty facilitator), participate in a training session conducted by Director of the ePortfolio Program on the technical aspects of scoring as well as more general dos and don'ts of scoring, and participate in a training and norming session conducted by their faculty mentors. Through this process, the students are trained extensively on CUePort, the tagging and assessment tool, the competency and how to review a student's communication skills.

The training approach is fairly consistent among all groups. At the beginning of the semester, the scorers meet with their faculty advisors, and everyone reviews the same artifact using a faculty-developed rubric for the particular competency. The scorers then discuss and compare their scores to achieve consensus. This process usually takes a few sessions and a great deal of conversation before reviewers' scores are consistent across artifacts. The student reviewers are only allowed to score on their own when the faculty mentor is certain they are fully trained.

Once trained, using the CUePort system, students randomly select an unscored artifact based on student year (freshman, sophomore, junior, senior, graduating senior) and competency. Using the rubric developed for each competency, the artifact is scored on 1-4 scale. In many cases, comments are also provided (comments are required for scores of 1 and 4). These are scores – not grades – that indicate how well the work has demonstrated the competency. These scores are retrieved weekly by the Director of the ePortfolio Program and reviewed for anomalies prior to release to the student's CUePort page. Anonymity is built into the system, and for the most part, students are not aware of whose artifact they are scoring.

Summative assessment. Each summer, a cadre of faculty members from various disciplines conducts a summative assessment of student ePortfolios from across campus. We invite faculty to participate based on several factors: college/department, we try to include a cross section of faculty participants from each college; student exposure, we try to include faculty that teach large general education classes (Introduction to Psychology, for example); and a commitment to general education. Each potential participant is sent a list of the eight competencies and is asked to think about which ones he/she feels best suited to assess. Once we have this information, we select our assessors. Initially, we thought the summative assessment could move off-site and be done asynchronously, but it has become clear that working together and sharing ideas and concerns are important parts of the process. We encourage participants to commit to two summers of work, enabling us to have seasoned as well as novice assessors involved and makes the training and overall

process function more smoothly. Participants are compensated for their time.

This process is intended to provide insight on the quality of student artifacts, the clarity of the competencies, and the usefulness of the scoring rubrics. Each summer, approximately 1,000 artifacts are scored, and the data are reported to faculty, administration, and the University Office of Assessment.

We approach faculty assessor training the same way we approach training peer reviewers: practice, conversation, and more practice. The first morning, all assessors are trained on using CUePort to assess artifacts, a process that takes approximately one hour. We then achieve group inter-rater reliability by selecting two or three artifacts and scoring them together. This is meant to provide assessors an opportunity to see the assessment process in action and to get in the habit of conversing about the work. Once reliability across all raters is achieved, the groups are adjourned to smaller groups where the same format and process are used to achieve reliability in the competency group.

The opportunity that faculty have to "read" students' ePortfolios enables them to gain a better understanding about what our/their students are learning throughout the undergraduate curriculum. In fact, that is already happening as faculty who participate in the summer assessment have a more favorable view of the ePortfolio and are more willing to integrate it into their classes. The summer assessment has been conducted for four years, and we have used these data to improve the general education curriculum.

Outcomes

The ePortfolio Program, while still in its early stage of implementation, has already had a significant impact on university policy, classroom practice, and technological infrastructure. The outcomes gained from the ePortfolio Program include:

- The ePortfolio is becoming an active part of the dialogue about student learning. Each summer, faculty are actively engaged in reviewing the work that students select to demonstrate the general education competencies.
- Based on the work viewed through the students' ePortfolios, substantial changes were made to the undergraduate curriculum. For example, in 2006-2007, Clemson had 22 competencies; this number was reduced to 19 in Fall 2009, and further reduced to eight in Fall 2010.
- One of the more notable changes that occurred to the competencies pertained to Written and

Oral Communication. We noticed that in some cases students seemed to only pay attention to the quality of their communication for the communication competencies. Moreover, faculty and peer reviewers often neglected to take communication into consideration when reviewing work outside of the communication competencies. This contributed to a silo effect for communication and was distressing for a University known for communication across the curriculum. With feedback from the Communication and English departments and the Pearce Center for Professional Communication, the University Curriculum Committee voted to make communication an über competency, meaning that every artifact in a student's ePortfolio is reviewed for both communication and content. This was a monumental decision and one we hope will help our students become better communicators.

- Although students were provided feedback electronically on the quality of their artifacts, preliminary data suggest that their work began to improve significantly after face-to-face conversations about the purpose of the competencies. Based on these data, workshops were created to help students "unpack the competencies."

- Faculty members have begun to rethink their syllabi and course assignments based on the work that students are including in their ePortfolios. In some cases, courses and assignments have been revised to help students better understand the competencies and how to demonstrate them effectively.

- The ePortfolio technological infrastructure was radically changed to encourage greater creativity and ownership on the part of students. For example, we moved from a closed to an open system (students select how they want to present themselves using GoogleSites or a similar development tool).

- The ePortfolio assessment system was radically changed to facilitate peer feedback and faculty assessment. CUePort was designed by the Director of the ePortfolio Program and a professor in computer science and has been used successfully for three years.

- Multiple entities across campus have become collaborators with the ePortfolio Program. For example, the library has become a center for ePortfolio technology checkout; the Class of 1941 Studio for Student Communication has become the "hub" of ePortfolio training; and the Michelin Career Center has begun to

survey businesses regarding the contents of an ePortfolio used in the job search process.

- To raise awareness and reward students, the Program has implemented a campus-wide ePortfolio awards program (10 awards given Spring 2010). These awards help provide ePortfolio exemplars that serve as best practice examples for faculty and students.

- Various student groups have taken ownership of the program. For example, the Transfer Student Council developed a brochure and organized a "blitz" students attend for help on developing their ePortfolios. Various other student groups (sororities, Women in Science and Engineering, etc.) have initiated student workshops and ePortfolio work sessions.

Challenges

To continue our path to success, we must address a few issues that continue to plague the Program: buy-in, clarity of purpose, motivation, and use of technology. One of the challenges of a university-wide program such as that envisioned by the faculty taskforce is how to satisfy the needs of the various stakeholders (students, faculty, and administration). Ideally, the portfolio should become a mechanism through which students see continuous self-growth. This would support the findings of portfolio researchers, namely that as students connect their work to standards, they begin to better understand the standards and see value and relevance in their work (Campbell, Cignetti, Melenyzer, Nettles, & Wyman, 2001; Ring & Foti, 2003).

One of the challenges we faced during the implementation period is getting students as well as faculty to accept the ePortfolio as a holistic way in which students document their learning, understanding, and growth throughout their college experience. Hartman and Calandra (2004) suggested that one of the factors that contributes to the burden students feel portfolio development places on them is the disconnect between their ePortfolios and the assignments in their classes. This finding is supported by data collected from our assessments that suggest some general education classes do not provide opportunities to generate quality artifacts. Moreover, the perception that professors do not value the Program contributes to the lack of value that students see in the ePortfolio activity. Because of this disconnect, in many cases, it seemed as though students were simply "dumping" work into their ePortfolio in an effort to "get it out of the way."

Similarly, a concern voiced by faculty is "what do we need to sacrifice in our curriculum for the ePortfolio?" With proper integration, the answer to this

question is "nothing." Stone (1998) explored the importance of providing guidance and support when implementing teaching portfolios and the efficacy of introducing them early in the professional education program. Stone found that 75% of the group who received support near the beginning of their first student teaching experience believed that portfolios accurately communicated and documented learning and accomplishments while 48% of the participants, who began portfolio construction with their final student teaching assignment, agreed that portfolios were worthwhile. Stone (1998) concluded that students need to be introduced to the process early, that the introduction must be carefully planned, and that students needed to be taught how to select and reflect on their learning. A portfolio is much more than just a collection of student work: it gains value from the thoughtfulness and deliberateness of the selection. In order for the ePortfolio to become a learning environment, students must be encouraged to engage in continuous self-assessment and reflection. That is, the ePortfolio must not be thought of as an add-on; rather, it must be revisited and revised often throughout a student's academic career.

We also found that a lack of clear purpose was a barrier to the success of our program. While the reason for implementation was the assessment of general education, its purpose was not clear. Students thought it was for employment purposes, an idea we in fact used to "sell" them by suggesting their ePortfolios will help them get jobs once they graduate; however, students rightly complain that employers are not interested in Clemson's general education competencies. The reality is that we have an ePortfolio requirement to assess our general education program, and we need to sell it to students by having them see the benefit of creating one. We are still working hard to make clear its purpose to all stakeholders, a problem that is proving difficult to overcome.

Finally, shining a light on what our students don't know is not always popular among both students and faculty. We point out that the ePortfolio is a lens through which we gain a richer picture of our students' understanding of the general education competencies. With this understanding, we are empowered to make the necessary improvements to the undergraduate curriculum.

Conclusion

As we continue to develop long-term implementation plans, the critical lesson learned is that we cannot approach things from one perspective if we are going to be respectful of the university community. In order to achieve this result, we need to encourage students and faculty to think of ePortfolios as a catalyst

for reflection or a context for discussion and to facilitate it whenever possible. Ideally, this occurs not at the end of the process but throughout the student's Clemson career. Understanding the importance of this dialogue is critical to the success of the initiative. With time, we hope the University community will see ePortfolios as a forum through which expertise may be developed during the undergraduate years, providing the "value-added" experiences found only in the university setting. Assessment based on ePortfolios then becomes a moving picture, a video stream of achievement, rather than a periodic snapshot (Heritage, 2007).

References
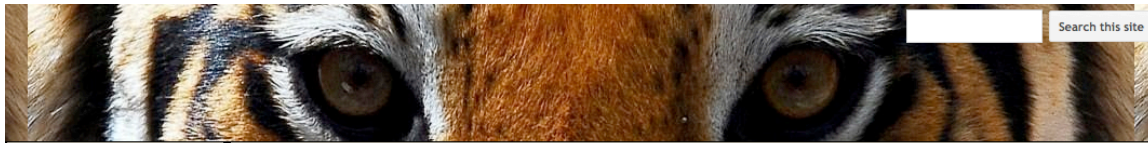
Abrami, P. C., & Barrett, H. (2005). Directions for research and development on electronic portfolios. *Canadian Journal of Learning and Technology, 31*(3).

Basken, P. (2008, April 18). Electronic portfolios may answer calls for more accountability. *The Chronicle, 54*(32), A30. Retrieved from www.chronicle.com/weekly/v54/i32/32a03001.htm

Borman, G. D., & Dowling, N. M. (2006). The longitudinal achievement effects of multi-year summer school: Evidence from the Teach Baltimore randomized field trial. *Educational Evaluation and Policy Analysis, 28*(1), 25-48. doi:10.3102/01623737028001025

Campbell, D. M., Cignetti, P. B., Melenyzer, B. J., Nettles, D. H., & Wyman, R. M. Jr. (1997). *How to develop a professional portfolio: A manual for teachers*. Boston, MA: Allyn and Bacon.

Carraccio, C., & Englander, R. (2004). Evaluating competence using a portfolio: A literature review and web-based application to the ACGME competencies. *Teaching and Learning in Medicine, 16*(4), 381-387. doi:10.1207/s15328015tlm1604_13

Cochran-Smith, M., & Fries, M. K. (2002). The discourse of reform in teacher education: Extending the dialogue. *Educational Researcher, 31*(6), 26-28. doi:10.3102/0013189X031006026

Darling, L. F. (2001). Portfolio as practice: The narratives of emerging teachers. *Teaching and Teacher Education, 17*(1), 107-121. doi:10.1016/S0742-051X(00)00041-X

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives, 8*(1), 23-36.

Dickman, A., Schwabe, A., Schmidt, J., & Henken, R. (2009). *Preparing the future workforce: Science, technology, engineering and math (STEM) policy in K-12 education*. Milwaukee, WI: Public Policy Forum.

Gilman, D. A., & McDermott, M. (1994). Portfolio collections: An alternative to testing. *Contemporary Education, 65*, 73-76.

Hartmann, C., & Calandra, B. (2004). Teacher e-portfolio communities: Diffusion of design knowledge as a catalyst for teacher learning. In R. Ferdig, C. Crawford, R. Carlsen, N. Davis, J. Price, R. Weber, & D. A. Willis (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2004* (pp. 110-117). Chesapeake, VA: AACE.

Heritage, M. (2007). Formative assessment: What do teachers need to know and do? *Phi Delta Kappan, 89*(2), 140-145.

Kieffer, R. D., & Morrison, L. (1994). Changing portfolio process: One journey toward authentic assessment. *Language Arts, 71*(6), 411-418.

Moss, G. (2003). Critical self-reflective narrative of portfolio assessment in teacher preparation. *Scholar-Practitioner Quarterly, 2*(1), 45-60.

Moss, G. (2008). Developing a critical lens among preservice teachers while working within mandated performance-based assessment systems. *Teacher Education and Practice, 21*(2), 146-159.

Paulson, F. L., Paulson, P. R., & Meyer, C. (1991). What makes a portfolio a portfolio? *Educational Leadership*, *48*(5), 60-63.

Ring, G. L., & Foti, S. L. (2003). Addressing standards at the program level with electronic portfolios. *TechTrends, 47*(2), 28-32. doi:10.1007/BF02763422

Ring, G, L., & Foti, S. L. (2006). Using eportfolios to facilitate professional development among preservice teachers. In A. Jafari & C. Kaufman (Eds.), *ePortfolio new paradigms in learning assessment and career opportunities* (pp. 127-161). New York, NY: Columbia University Press.

Schön, D. (1983). *The reflective practitioner: How professionals think in action*. New York, NY: Basic Books.

Smith, K., & Tillema, H. (2003). Clarifying different types of portfolio use. *Assessment & Evaluation in Higher Education, 28*(6), 625-648. doi:10.1080/0260293032000130252

Stone, B. A. (1998). Problems, pitfalls, and benefits of portfolios. *Teacher Education Quarterly, 25*(1), 105-114.

Wade, R. C., & Yarbrough, D. B. (1996). Portfolios: A tool for reflective thinking in teacher education? *Teaching and Teacher Education, 12*(1), 63-79. doi:10.1016/0742-051X(95)00022-C

Wiggins, G. (1994). Toward better report cards. *Educational Leadership*, *52*(2), 28-37.

Zeichner, K., & Wray, S. (2001). The teaching portfolio in US teacher education programs: What we know and what we need to know. *Teaching and Teacher Education, 17*(5), 613-621. doi:10.1016/S0742-051X(01)00017-8

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Appendix A
A student's opening page of her ePortfolio created in GoogleSites

Appendix B
View of the competencies and menus in CUePort

General Education Competencies

List of Gen Ed Competencies

Arts and Humanities

AH1: Demonstrate an understanding of the arts and humanities in historical and cultural contexts.

Critical Thinking

CT1: Demonstrate the ability to critically analyze the quality and utility of knowledge gained throughout the undergraduate experience and apply this knowledge to a wide range of problems.

Cross-Cultural Awareness

CC1: Demonstrate the ability to critically compare and contrast world cultures in historical and/or contemporary contexts.

Ethical Judgment

EJ1: Demonstrate an ability to identify, comprehend, and deal with ethical problems and their ramifications in a systematic, thorough, and responsible way.

Mathematics

MA1: Demonstrate mathematical literacy solving problems, communicating concepts, reasoning mathematically, and applying mathematical or statistical methods, using multiple representations where applicable.

Natural Sciences

NS1: Demonstrate scientific literacy by explaining the process of scientific reasoning and applying scientific principles inside and outside of the laboratory setting.

Science and Technology in Society

ST1: Demonstrate an understanding of issues created by the complex interactions among science, technology, and society

Social Sciences

SS1: Demonstrate an understanding of social science methodologies in order to explain the causes and consequences of human actions.

Self-Representation and Student Identity: A Case Study of International Student Users of Sakai

Evan Snider and Alex McCarthy
Virginia Tech

This case study of two international students, coupled with artifact analysis of 22 eportfolios and observations of the authors as participant researchers, closely explores the ways in which students attempt to self-represent within one particular system (Sakai) and institutional context (Virginia Tech). Using artifacts (the participants' eportfolios) and qualitative interviews with the participants, the study calls attention to challenges international students face when required to craft online identities for themselves with the English ePortfolio. Participant data is discussed in terms of aesthetics, functionality, flexibility, and self-representation. The rigidity of the system denied participants the flexibility to craft identities with which they felt much connection, resulting in eportfolio creation being reduced to a class project rather than a personally and professionally meaningful process and product. Greater flexibility in design and function would make the eportfolio system more useful to student users in this particular context.

The acclimatization process for international undergraduate students at major American universities certainly varies, but it is rarely a quick or easy period of time. These students often find themselves at large and alienating universities with more than 90% traditional students. In both their curricular and extracurricular lives, international students have to deal with both new logistics (e.g., schedules, coursework, etc.) and broader cultural norms (e.g., interpersonal relationships, approaches to time, etc.). How, then, do international undergraduates tackle an assignment that asks them to synthesize the work they have done in courses with personal development, job experience, and extracurricular activities?

ePortfolios present a way for students to synthesize these aspects into continuous narratives, usually in the hopes that they will "develop the self-awareness necessary to transition from a student to an emerging professional" (Graves & Epstein, 2011, p. 343). More and more, educators appreciate eportfolios over traditional portfolios as embodying and supporting the sequential nature of the goals behind them. ePortfolios also respond to the growing movements in higher education of student-centered and integrated learning (Clark & Eynon, 2009). What's more, with the rise of digital communication technologies and "multimedia self-authoring," students are increasingly interested in "creating rich digital self-portraits" (Clark & Eynon, 2009, p. 18). Even as eportfolio development conveys a departure from the static, assessment-centered learning, students face a new kind of challenge in attempting to craft an identity that fulfills the many and multifaceted goals of eportfolios. Concurrently, the eportfolio builder must reconcile notions of development and dynamism with the fact that what appears on the screen to the viewer is still a published web document displaying and representing the individual's work and identity.

This forces students of all kinds to confront challenging questions. How do you approach an assignment that asks you to synthesize as much as four years of work, especially one with open-ended requirements? What do you make of the affordances and limitations of the eportfolio software? How do you want to portray and represent yourself on your eportfolio, given its multiple audiences – your teacher, administrators, potential employers, and even your own friends and family? What even constitutes "you" – personally and professionally – on an eportfolio that bears your name?

These notions – of self-representation, reflection, and identity construction; about technological affordances, limitations, and design – underlie questions facing any student asked to complete an eportfolio. These questions, though, become even more challenging for students coming from cultures that may not have been considered during the conception and development of the existing eportfolio system. International students bring with them cultural assumptions about self-representation and identity construction online that the developers of eportfolios may or may not have taken into consideration. ePortfolio systems may not be meeting international students' needs, and the forms of self-representation that students are encouraged to complete may not overlap with these students' cultural norms.

With these possibilities and questions in mind, this case study considers the perspectives of two international students at Virginia Tech, a major state university located in Southwest Virginia, on their eportfolios. The data we present in this article consists of both artifacts – our case study participants' eportfolios – and qualitative interviews conducted with those students. In the interviews, we asked our participants to reflect on the process of creating an eportfolio; to tell us about their other online personae

(e.g., blogs, MySpace, LinkedIn, Facebook, Twitter); to explain how they have used or plan to use their eportfolios; and to articulate how well their portfolio reflects their own perceived personality.

Our collection and interpretation of this data set is informed by our own roles as participant researchers: one researcher has been involved in development and documentation, and one has been involved in teaching and implementation. Additionally, one of the researchers was an undergraduate English major at Virginia Tech, creating one of the early English ePortfolios still used in the university's online sample gallery today. Our case study data set and our experience as participant researchers were supplemented by artifact analysis of 22 eportfolios on the Virginia Tech English ePortfolio Gallery. We analyzed these artifacts qualitatively, triangulating our findings with our own experiences and our participants' comments.

This study is meant to call attention to a unique institutional context, as well make observations about how our case study participants fit into that context. In the process of highlighting these students' work and reflections, we hope to illustrate the many challenges facing users of Sakai, as well as begin to sketch out possible ways the eportfolio system in this institutional context could have better served the needs of our study participants.

The institutional context for this case study is a rich and complicated one with a long history. The university-wide Virginia Tech (VT) ePortfolio (eP) system runs on Scholar, a customization of the open-source course management and collaboration platform Sakai that can be accessed by anyone with a valid Virginia Tech personal identifier. The VT eP (referred to internally as eP@VT) is a particularly rigid system; users are presented with an interface that allows them to create pages and add content to those pages through a rich-text editor and attachments. Users have minimal control over the visual design of their eportfolios, with only a selection of several dozen visual themes or templates. This rigidity of form is particularly interesting for this study, since it both provides an ease and simplicity and limits student options.

The eP@VT is a large-scale project operated by Learning Technologies. ePortfolios have been adopted at Virginia Tech by a variety of departments and colleges, including the natural sciences, the social sciences, the arts, and the humanities. Our participants come from the English department at Virginia Tech. While this population is not generalizable in the scientific sense, it does provide an interesting case study, especially for an exploratory study such as this. The English department is one of the largest departments at Virginia Tech to fully adopt the eportfolio as a requirement for graduation. The English

department ePortfolio (herein referred to as the English ePortfolio) template is a customized and constrained variation of the eP@VT (e.g., English ePortfolio users have a selection of only four visual themes and do not have direct control over the formatting of content on several pages). All English majors (including Creative Writing; Professional Writing; and Literature, Language, and Culture specializations) take English 2614, a two-credit hour introduction to the eportfolio. Students begin to create their eportfolios in this course – drafting a welcome page, resume, digital narrative, and course of study planner – then are expected to continue to work on them throughout the rest of their studies, completing them just prior to graduation. While the page creator for the English ePortfolio has changed slightly over the years, it still contains categories for academic achievement, showcase on growth, engagement, direction, and synthesis. A gallery of sample English ePortfolios is available online (http://eportfolio.vt.edu/gallery/DeptsProgs/english.html).

In the next section, we situate this study within the existing literature, paying particular attention to the literature on intercultural communication, which informs our thinking about our case study participants, self-representation, and identity. We then present our data, connecting our case study participants' own words with their eportfolios. We explore several major themes, including aesthetics, functionality, flexibility, and self-representation. Further, we examine the ways in which the English ePortfolio system at Virginia Tech calls for a particular, culturally specific type of self-representation. We conclude by exploring tentative implications for different audiences, including researchers, teachers, and developers.

Literature Review

The study of eportfolios is, by nature, interdisciplinary, drawing in scholars from English studies, education, learning technologies, and technology and design. Questions of intercultural communication and identity construction in online environments also receive attention from a range of disciplines, among them cultural studies, communication, and psychology. Though existing literature does not directly address how users of different cultures represent themselves with eportfolios, it does contain research relevant to this study that should be approached with cautious flexibility.

Much of the existing literature on eportfolios pertains to their development, implementation, and best practices as tools for learning, engagement, and reflective practice. While we could speak to this literature, it is only tangentially related to our concerns, and few studies pertain to patterns of use in general,

much less for international student users. One of the few edited collections on eportfolios, by Cambridge, Cambridge, and Yancey (2009), has an entire section dedicated to identity, but that section does not address cultural differences, instead focusing on reflective and professional identities. Tosh and Werdmuller (2004) briefly address identity when they link eportfolios to personal weblogs and the practice of diary writing; their notion of identity, though, is still informed by reflective identity and the reflective practitioner. Oubenaissa-Giardina, Hensler, and Lacourse (2007), however, take reflective practice into the realm of culture by exploring the use of the life story metaphor in developing a model for an intercultural eportfolio. Their project aims to discover how eportfolios can "exploit the mosaic of cultures that characterizes the current learning environment to favor a constructive and proficient intercultural interaction among peers and teachers from diverse cultures and backgrounds" (Oubenaissa-Giardina et al., 2007, p. 1-2). This is where their focus drifts from identity, however, reflecting a prevalent interest in addressing student diversity with flexible online education environments (Dimitrova, Sadler, Hatzipanagos, & Murphy, 2003). An example of such interest is found in Ramirez (2011), where with eportfolios are engaged as an elastic medium for the performance of multiple selves.

At the intersection of culture and identity, Boekestijn (1988) in psychology addresses the dilemma between identity maintenance and cultural adaptation that migrants face and how the choice in such a dilemma has significant influence on identity development. This is an important dilemma to consider in the context of international students' attempts to self-represent on eportfolios: where the affordances of the platform differ from the user's cultural tendencies, the user must choose whether to adopt the new cultural tendency at the expense of some aspect his or her cultural identity.

While not always linked directly to cultural identity, there is an ongoing interest in the affordances of eportfolios for international students. One possible affordance is international students being able to share their learning experiences and accomplishments with family members and friends abroad (Headden, 2011). There is also acknowledgement of a need for eportfolios to take different forms between different cultures, "suggesting new approaches, challenges, and opportunities . . . [that] facilitate global examination of the nature of learning and thoughtful exchange and the future of education" (Clark & Eynon, 2009, p. 23). Hiradhar and Gray's study (2008) showed how an eportfolio system introduced to language enhancement courses at a Hong Kong university enabled students to create an English-specific academic digital identity based on their predominant social digital culture. While

there exists an awareness of the influence of culture on eportfolio development and use, Raven and O'Donnell (2010) show the possibility of eportfolios being used to enhance feelings of national identity through the construction of (and viewing of others') digital stories in a controlled endeavor such as a competition. In this paper, we are focusing on the former and reverse: the influence of culture on eportfolio use.

In intercultural communication, Hofstede, Hofstede, and Minkov's (2010) ever-popular cultural dimensions serve as a natural starting point for examining cultural difference. Individualism versus collectivism, or the degree to which the interest of an individual prevails over the interest of the group or vice versa, is a cultural dimension that is particularly relevant to self-representation on the Internet. Does the individual prefer to use affiliations rather than personal details to convey an online identity? Does the individual try to stand out from other members of her online community or blend in? Also, individualist societies are found to use the Internet more than collectivist societies (Hofstede et al., 2010). Another relevant dimension from Hofstede is uncertainty avoidance, or the extent to which a culture feels comfortable or uncomfortable with uncertain or unstructured situations. For instance, someone from a culture with greater uncertainty avoidance may be more anxious at the prospect of having to design an eportfolios with open-ended requirements.

While dimensions such as individualism and uncertainty avoidance in terms of users' portrayals of themselves through eportfolios may be useful to consider, a problem with using Hofstede et al.'s (2010) cultural dimensions as a lens for examining manifestations of cultural difference is their basis on national culture (McSweeney, 2002; Williamson, 2002). Instead of using essentialist notions of national culture, we should "engage with and use theories of action which can cope with change, power, variety, and multiple influences – including the non-national – and the complexity and situational variability of the individual subject" (McSweeney, 2002, p. 113). Other scholars have challenged the idea of cultural models altogether. Hunsinger (2006) challenges static definitions of culture and the idea that people behave like the groups of which they are part. Although cultural models are practical for understanding cultural difference, static cultural representations should be supplemented "to interrogate the ways cultural practices are intertextually constructed and mobilized for certain purposes" (Hunsinger, 2006, p. 46). This case study sets out to supplement our understanding of cultural models by looking at the ways two international students intertextually construct and mobilize their cultural practices in the form of English ePortfolios.

As with any eportfolio system, the English ePortfolio in this study functions both practically and visually to permit particular kinds of identity formation. The practical and visual are often at odds, as "the price of ease of use in many cases is an increasingly standardized look and feel" (Clark & Eynon, 2009, p. 21). When students are made to drop in text, photos, and video onto a web page that cannot otherwise be customized, "the loss of visual richness is potentially significant" (Clark & Eynon, 2009, p. 21) and the student is kept from enthusiastic experimentation with aesthetics and multimodal authoring. While ease of use is important to student eportfolio adoption, so is ownership (Garrett, 2009). In Garrett's (2009) study, students' feelings of control over the visual aspects of their portfolios correlated positively with their feelings of ownership over their portfolio. Further, Garrett (2009) underscores the significance of this result: that eportfolio systems should allow greater flexibility in students' ability to modify the look and feel of their portfolios.

Digital identity and cultural difference are crucial considerations in any attempt to explore how eportfolio users of varying cultures self-represent in this context. A final important consideration with regards to the affordances of eportfolio is what Yancey (2004) calls "textured literacy" (p. 750-751) – the ability of an eportfolio to evoke deeper thought with a more multiple and elaborate arrangement of narratives and connections than, say, a print portfolio possibly can. Indeed, this format would even allow for international students to speak more than one culture with their eportfolios, as is the case with the LaGuardia model, which invites students to represent both their home culture and their school culture (Yancey, 2004). Given the literature, we expected, and found, our case study participants facing the dilemma of identity maintenance versus cultural adaptation, primarily due to the system's relative inflexibility and the little attention paid to cultural variance in its implementation. The choices students make in the face of this dilemma cause them to reconfigure their cultural identities to suit the eportfolio.

Aesthetics

ePortfolios are published web artifacts, designed to look and function a particular way. How an eportfolio looks is just as important as how it functions. This is especially true of professional eportfolios, where *ethos* can undermine an otherwise effective website. In this section, we discuss how the visual affordances and limitations of the English ePortfolio template affect the users in this study.

The Virginia Tech English ePortfolio is a fairly rigid system in terms of visual design. Users have a significant amount of control over the content area, including layout (one- or two-columns), typographic elements (typeface, size, color, margins, etc.), and background color. Users also have the option to link to web content and files stored in their own personal folders in Scholar (Sakai). Visual changes to the content area are made using a rich-text editor akin to those used in many e-mail clients (Figure 1).

Additionally, users with knowledge of HTML can access and manipulate the source code that structures the content area, though few students have the coding skills necessary to do so.

Outside the content area, however, users have little control over visual design. Users select from a small selection of themes – when our participants completed their eportfolios, there was only one theme, but that number has since grown for the English ePortfolio to four – which structure the header, footer, and background of the site. Users of Virginia Tech's broader ePortfolio system, eP@VT, can upload their own banner image, add pages in the navigation, and choose from several dozen themes. The English ePortfolio, though, is much more restricted. Students have only four themes – all of them almost identical – and have no control over those themes, including the fonts used in the header navigation, the background color, the size of the content area and header, the footer text, and so on.

We found that this schism in control – almost complete control over some parts of the eportfolio and almost no control over others – resulted in visual inconsistencies that frustrated our participants, who noted dissatisfaction with the aesthetics of their eportfolios. Both cases reported that their dissatisfaction primarily resulted from these visual inconsistencies, especially the fact that content appears to be "dropped in." In other words, it is clear from the final product that content is mostly copied and pasted from a word processor, and that may reflect poorly on the student (and her abilities). For instance, one of our participants, a recent graduate, noted that the content area of her site looked so dramatically different from the rest of it that she did not feel it looked professional enough to use (Figure 2).

Granted, some of this inconsistency could be fixed if the user were taught how to change the background color in the rich text editor to fit the theme background color. We found this schism, however, in all of the participant portfolios we viewed, which makes it clear that the technical design skills necessary to overcome the aesthetic limitations of the template are not being taught. Our other case study participant expressed dissatisfaction with the less than professional aspects of her eportfolio, noting, "If I cleaned [it] up, I would use it." "I don't think it looked very neat," she later said. This messy feel stems primarily from visual

Figure 1
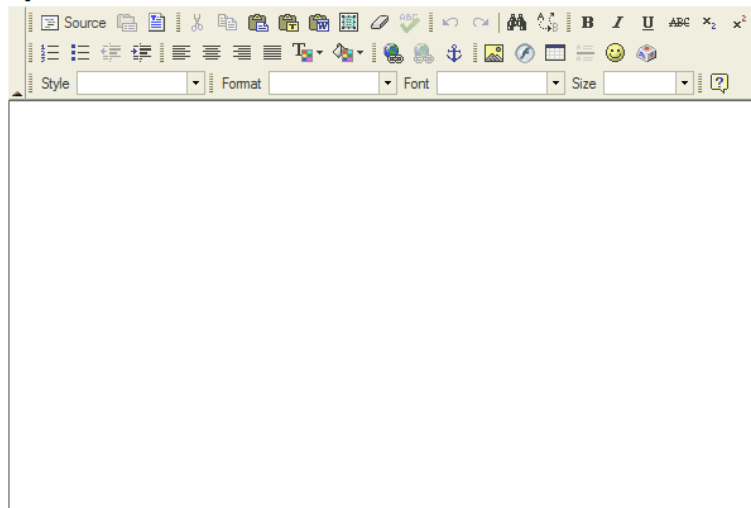*Screenshot of the Virginia Tech ePortfolio Rich-Text Editor, as of Spring 2011*

Figure 2
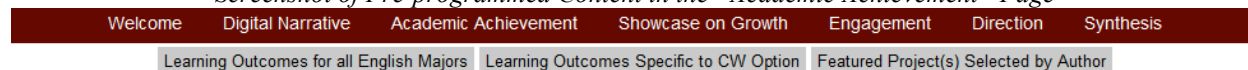*Screenshot of a Portfolio with a Strong Break Between Theme and Content Area*

inconsistencies such as those between the content area and theme.

Other visual inconsistencies plagued our participants' portfolios and threatened to undermine their *ethos*. Some of those were under user control – such as different font sizes across different pages – but others were not. The English ePortfolio utilizes some pre-programmed content, especially on the "Academic Achievement" page, which asks users to reflect on outcomes specific to their major. The text users enter (using the rich-text editor) is then rendered as expandable (by clicking "hide/show"). Users do not, however, have any control over how any pre-programmed text is displayed. These kinds of pre-programmed content then limit users to a small subset of font choices if they want to mirror those used in the pre-programmed content areas (Figure 3).

Such inconsistencies are what our participants found to be the primary problem with their eportfolios and the primary reasons they did not use them. In many

Figure 3
Screenshot of Pre-programmed Content in the "Academic Achievement" Page

(though not all) cases, users had ways of overcoming these inconsistencies, but those ways were either not intuitive enough, too difficult to access, or simply not taught.

Ultimately, then, we found that our case study participants struggled with the visual design components of the English ePortfolio. (One noted that the visual *ethos* of Virginia Tech and the English department was a benefit to the eportfolio; despite wanting more control over visual design, she would rather use a portfolio with that *ethos* and less control over design.) We set out to find the fracture points, the places where users give up the creation of their eportfolios and the artifact shifts from personally meaningful to a "class project." Visual design is one of those fracture points, perhaps the most significant. When we asked our recent graduate (whose home page is displayed in Figure 1) whether she started out engaged in her eportfolio, she responded,

> Yeah, definitely, I thought it was actually pretty cool, and I actually did spend a lot of time on it. I wanted to see what I could do with it, show it to my friends and family, and maybe, if I liked it enough, grad school and employers. But then, I guess, while I'm doing it and clicking the preview button and seeing how it turned out, it didn't seem that professional, so I just – to me – so I just said, oh, let's get an A and get over it.

Once this user did everything she could to adjust the site's visual design to her liking, clicked "Preview," and was unhappy with the results, she did not maintain the level of engagement necessary to treat the eportfolio as a meaningful artifact. We later argue that flexibility in terms of visual design can help solve these issues. First,

though, we examine users' experiences with eportfolio functionality, including structure and content types, and explore how function, like form, affects how our case study participants interact with their eportfolios.

Functionality

When incorporating technology into the classroom, a great deal of energy is focused on teaching students how to use the technology. This is to be expected, as how a tool functions affects the ways in which its users can and choose to use it, and thereby what they take away from the experience. Indeed, if an eportfolio is difficult to use or has limited functionality, while it affords students the possibility of having a portfolio that can be shared across the web and present different types of content than a paper portfolio can, it also limits how students can and choose to express their skills, experiences, and broader identities. What's more, struggles with functionality are likely amplified by challenges associated with cultural adaptation, especially when particularly strong questions of cultural identity and cultural difference characterize every step of the process, as with international students.

Our participants reported that they received a great deal of technical help outside of the classroom when building their eportfolios. One participant said that the digital narrative component – a required digital video consisting of images, text, and videos that tells a story or represents some aspect of the author's identity – of the English ePortfolio requirements was the primary technical challenge of creating an eportfolio and consumed the greatest amount of time and resources, especially outside of the classroom. For both participants, time was a major issue, particularly given the learning curve of the associated tools. Although

strides have been made in the past several years to make the system for building eportfolios more intuitive, the participants' relative unfamiliarity with the Scholar (Sakai) software (as well as audio recording and video-editing software) combined with the time constraints of producing their eportfolios made them unable to do more than meet the basic requirements that their introductory English courses outlined for the project. One participant reported wanting to be able to customize her site more, but she felt her only option in doing this was to add more pictures because she "didn't know how to properly use the [rich-text editor]."

Further hindering our participants' ability to conceive of and use their eportfolios as more than class projects were technical malfunctions, namely with creating and uploading their digital narratives. After spending many hours receiving technical assistance in the InnovationSpace – an on-campus technology lab with dedicated assistants – one participant's video had no audio when she first attempted to upload it to the Scholar ePortfolio system. When combined with larger usability issues, technical issues like this inhibited our participants' ability and desire to consider their eportfolios as something they could use to generate an online identity, both during the project's initial development and continuously. Now, three years later, one participant's personal reflection page does not display the video that was her digital narrative. Our other participant's digital narrative video also fails to display, and her eportfolio is only one year old.

Difficulties with learning how to create an eportfolio and digital narrative and technical issues with producing and maintaining them were only part of the problem. Participants also reported that functional limitations of the Scholar ePortfolio system and English ePortfolio template contributed to their consideration of eportfolio as merely a requirement and their eventual abandonment of the project. While they considered the existing structure of the English ePortfolio page – which includes a pre-made header, horizontal navigation, and large content area for text, images, and video – useful, they expressed interest in being able to personalize the site with more layout and formatting options. For example, one participant described a desire to be able to have certain general content fixed on a left-hand bar. Currently, students can modify only: (1) the eportfolio's theme (i.e., which pre-defined header appears across the top of the page paired with a certain appearance for the navigation), (2) the designated content area (using a rich-text editor), (3) the layout of the content area (by selecting from preset layouts), and (4) the creation, order, and names of certain pages (but not where the navigation to those pages is located). Some English students have also created sample eportfolios using

the eP@VT university-wide system, which provides more themes and the option of right-hand navigation.

While the selection of eportfolio themes has expanded within the past several years, students are still limited in the content they can modify as well as in the way much of the content is presented. Students have access to the source code of their content through the rich-text editor, but this is not useful for them unless they either already know how to use website markup or have enough time to teach themselves, which is uncommon. The participants reported that they only had time to make use of the rich-text editor's most basic functionality for text: changing font, size, color, and style. With every other aspect of eportfolio design being pre-defined in some regard, images and basic text formatting – confined to the designated content area – become the only ways in which students can truly customize the look of their eportfolios.

A further functional limitation is a lack of available content types. The case study participants did not seem to have considered other ways in which content could be presented, such as through slideshows, feeds from other sites, comment tools, etc. One participant said that she would consider an integrated private messaging system useful, however. A lack of diverse content types, technical issues, interface struggles, and layout and formatting limitations are the main problems with Scholar's ePortfolio functionality. These problems are intensified for students also struggling with cultural adaptation as they attempt to articulate an identity for themselves, increasing their tendency to feel overwhelmed by the project or "give up" on initial plans they had for their eportfolios.

Flexibility

Flexibility is an important characteristic of any technology. Flexible technologies allow for more diverse uses and accommodate the needs of more users. Most social media sites are flexible enough to accommodate different types of users. Twitter, for example, has been used for academic research, communication and social networking, conveying news, organizing groups of people, and much more. It accommodates these different uses not because it has a wide array of features (it does not), but because it is flexible and its affordances (retweeting, hashtags, PMing, etc.) do not funnel users into a particular form of use. Rigid systems, on the other hand, may have a significant number of affordances, but those affordances are more likely to direct usage in a certain way. We found the Scholar (Sakai) ePortfolio to be a particularly rigid system that does not readily accommodate different users and uses.

There are distinct advantages and disadvantages to an inflexible system. A rigid system, for example, can

make it easier for beginning users to create content without worrying about the wide array of options available to them. It can also, however, frustrate users of all kinds who want to do something that they find they cannot. Our participants expressed this frustration; they felt limited by the eportfolio system, though in different ways. It is precisely when the users became frustrated that they disengaged. As one participant told us, the rigid structure of the pages made her stop looking at each page individually and start simply filling in missing information: "At some point, it just became a fill-in-the-blank thing . . . just put something there because there was a blank page."

As English majors trained in understanding context and the rhetorical situation, our participants displayed a particular sharp eye for the value of flexibility. One participant, for example, noted that she would have liked more control over structure and navigation so that she could change her eportfolio for different purposes, including creating an online resume of sorts. Instead, she ended up simply linking to her resume on her Welcome page (Figure 4).

The lack of flexibility – or, in this case, the *perceived* lack of flexibility – prevented her from doing what she wanted to with her eportfolio. The result is that she began to disengage from her eportfolio as a meaningful artifact.

Flexibility is important both in terms of aesthetics and functionality. Our participants found the fixed navigation layout and site structure to be mostly positive. Rather, their biggest complaint about the functionality of the site was the lack of tools. They would have liked to have more content types and tools available to them. Our participants found uploading video to be time-intensive and glitch-prone, which left them with only images and text to convey their content. One participant noted a desire for private messaging/commenting, while the other suggested slideshows and other content types (which have since been added to eP@VT, though not to the English ePortfolio). Of course, users can turn to other sites,

such as social media sites, for these tools, but they are more likely to be invested in their eportfolios if these tools are available to them within the system. From their answers to questions pertaining to functionality, it is clear that our participants had not fully considered the possibility of having other content types and site structuring options available. But upon a moment's reflection, both participants were able to articulate a feature that they would have found helpful or desirable. These responses suggest that with more options for determining layout and content types, users will find more uses for and gratifications from their eportfolios and be likely to engage with them more fully.

Aesthetic flexibility likely means both a wider diversity of themes and more control over those themes. One participant expressed dissatisfaction with the selection of themes, noting that their homogenous look meant that "it's gonna be the same thing, with a different name on the top." "I would want it to represent my sense of design, my sense of style, of presentation," she went on to say. When asked how she could do that, she said that more control over the design of the theme – including the size of the content area, the background, the header banner, and so on – would allow her to customize her page. One participant also wanted the ability to change her portfolio for different audiences: "I might want to make it a little louder or a little simpler, [depending on] whoever the audience is."

This flexibility in design could be achieved with a WYSIWYG editor for themes. Blogger's "Template Designer" – which allows users to customize templates by changing background colors, layout, page elements, column size, and so on – could provide a model (Figure 5).

It is intuitive and easy to use, yet flexible. It allows users to choose from a wide array of templates, and then apply their own design ideas to the template. In other words, it circumvents the problems and frustrations our participants expressed: visual

Figure 4
Screenshot of a Participant's Resume Hyperlink on her Welcome Page

In this ePortofolio, I aim to display my achievements and progress as a writer through the pieces of work that have made significant impre

ssions on my career academically as well as represent my growth as an inspired student and woman in our community.

Enjoy!

"The best way out is always through."
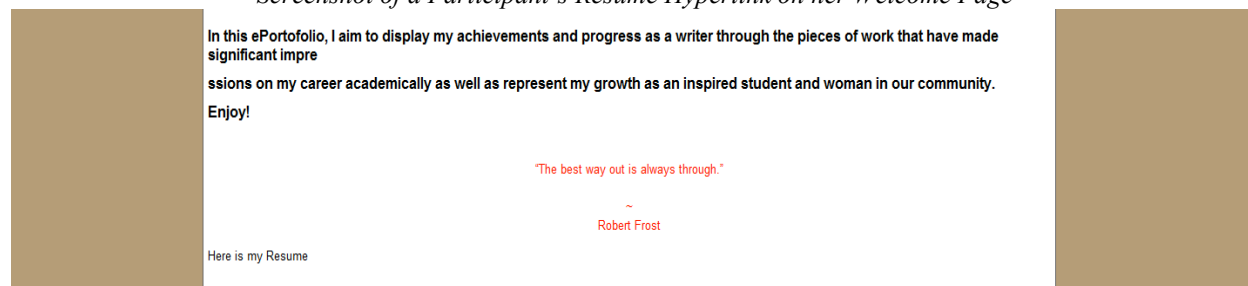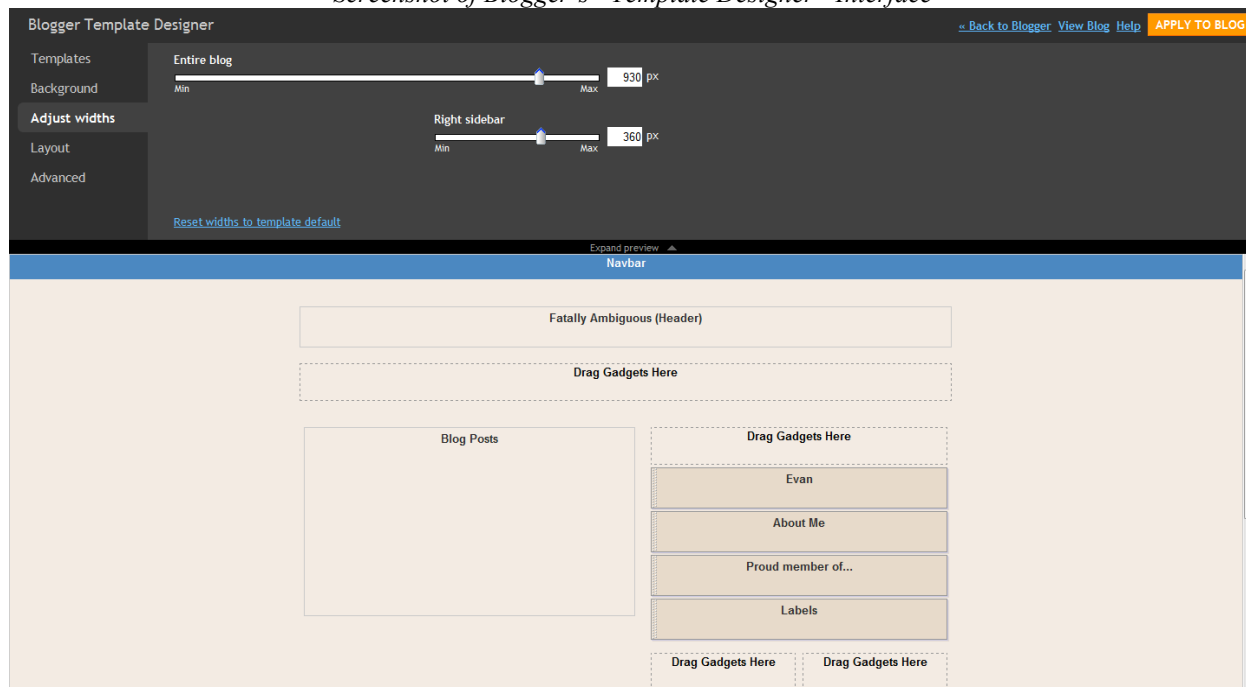
~
Robert Frost

Here is my Resume

Figure 5
Screenshot of Blogger's "Template Designer" Interface

inconsistencies and an inability to customize themes for different audiences and purposes.

Our research suggests that the desire for flexibility is not culturally specific: other populations of users would benefit from a more flexible theme system and more tools. Rather, the rigidity of the Scholar ePortfolio system funnels users into particular forms of self-representation and communication that *are* culturally specific. In the next section, we explore what that form of self-representation looks like and how it functions for international student users.

Self-Representation

A final point of consideration in examining how international students use their eportfolios is the ways in which they self-represent through them. How students choose, craft, and manage their online identities is significant to approaching whether the tool they are using – in this case, eportfolio – is serving their needs. In turn, as students try to shape themselves with the eportfolio, the aesthetic and structural affordances and limitations shape them. Thus, there are two sides to the question of self-representation: what users are able to put into their eportfolios and what they are able to get out of them. International students – who may be grappling with questions and conflicts of cultural identity on a larger scale than are the majority of undergraduates – illustrate in a clear manner how the

eportfolio calls for a particular, culturally specific type of self-representation.

The first way in which we examined self-representation was in terms of how personal versus professional our participants' content was and which they reported emphasizing. While the requirements of the eportfolio assignment suggest that students use the platform for professional development, the degree to which they can share personal insights as opposed to exclusively professional attributes and connections is quite flexible. While different instructors may emphasize different characteristics that can sway students in one direction or another, their inclinations toward crafting a personal rather than a more professional eportfolio identity are also characterized by culture or struggles between cultures (among other influences that are beyond the scope of this paper).

Consider one participant's case: Michelle is a recently graduated English and Political Science double major from Korea. Michelle's content reflects her reported emphasis: personal. On her welcome page, she opens with an admission that she is questioned for her choice of major, incorporating questions, mentions of friends, and an awareness of self that gives her portfolio an immediately personal flair. Her description of her grandfather, her past, and her self paired with an apparently candid photo further the personal feel of her homepage – and thereby her entire eportfolio (since the homepage is the first page a viewer sees and forms the

initial impression of the site and its user). She incorporates a few details that can be seen as professionally oriented (and part of the eportfolio requirements), including why she chose to become an English major and some organizations in which she participates, but they are couched in a personal narrative. The personal emphasis is carried throughout her eportfolio, with the academic achievement page revealing her own feelings about the projects and disclosing insecurities in her showcase on growth. Both her academic achievement and showcase on growth pages share her discomfort with English grammar.

Michelle said that she approached the crafting of the content for her eportfolio from a personal perspective, but that this was because she was basing it on the models she saw. She said that the personal emphasis enhanced the clarity of her message – the identity she was trying to convey – and that she would consider incorporating it into her even more personal identity on Facebook in the form of a direct link if the page looked "prettier or more professional."

Our other case study participant reported emphasizing the professional in her eportfolio. Although her portfolio does reveal some personal details, they are situated within the overall projection of a professional identity (in contrast with Michelle's case). For example, when she expresses apprehension on her showcase on growth page, she follows with a narrative about having overcome that apprehension, thus turning the personal insight into a professional pitch. This participant reported an intention to keep her eportfolio professional given her discomfort in making her eportfolio more personal. As a major in the professional writing concentration and given the limitations she faced with time, the system, and aesthetics, she was most inclined to maintain an identity she was used to forming for the purposes of her coursework. Unlike Michelle, this participant felt that her eportfolio functioned as a different aspect of her online presence, one that was unlike her more personal presences, such as Facebook.

In both cases, though, our case study participants mark themselves as international students within the first few sentences of their introductions on their homepages, and much of their eportfolios are situated within the perspective of an international student. They are both candid about what makes their perspectives as international students unique, suggesting one way in which users at the crux of maintaining their original culture and adopting a new one may choose a middle ground, though how comfortable users are in this middle ground likely varies. Michelle seems quite comfortable with her situation between cultures. She reported not seeing the point of the direction page, but when one reads it, it seems to have come as easily as the rest of her eportfolio, indicating that she is able to

maintain a cross-cultural identity even in situations of conflict.

Michelle has adopted an air of confidence in her identity in the midst of conflicting cultures; "I was just another international student who came to the States but I am quite different from everyone," she says on her synthesis page. Our other participant reveals insecurities with her cultural position in the past, and her personal reflection introduction describes her experiences having to establish and reestablish herself in the midst of cultural confusion. She admitted discomfort – especially with regards to her cultural position and eportfolio – by saying that she was relying on models because "as an international student, I was trying to fit in because I stood out so much already." She also admitted that she had hoped for more feedback on the content she had written before putting in on the page and "needed someone to tell me 'you're doing okay.'" Further, she reported that she was intimidated by the concept of the project and that fulfilling the requirements were enough of a goal for her.

Both participants said they relied heavily on models, but the results of their efforts to do so are quite different. Whereas Michelle relied on models to convey a persona that highlights her uniqueness and individualism, our other participant did so to convey a professional identity given a discomfort with the prospect of trying to self-represent with eportfolio. This latter participant indicated a particular tendency to rely on precedent, as she chose Blogger as her personal weblog because that was what her friends were using and Yahoo Photo as her photo sharing software because that is how she and her family share photos. When users are unsure about how to present themselves with eportfolio, they often will rely heavily on existing models. This is evident with our participants, but it can also be seen in the fact that most welcome pages of sample eportfolios listed on the English ePortfolio site contain a section about the user and a section about their eportfolio with an image or two and similar use of language. Almost every sample from 2010 has this home page format combined with an actual listing of each page and what it contains, a trend that goes back at least to two samples from 2008. Even the eportfolio models themselves reflect a strong tendency for students to imitate the ways in which other students have represented themselves with the system.

It should be noted, though, that these similarities between eportfolios emerge not only from models, but also from the affordances and limitations of the system. In particular, the rich-text editor funnels users into a particular form of self-representation. The blank space beneath the editor (see Figure 1) leads users to write a narrative, often about themselves and their academic progress. While that space can be used for different kinds of information (e.g., a profile, link list, etc.), text

(and, secondarily, image) are foregrounded, and the presentation of that text takes a backseat to the narrative. For instance, one of the researchers taught the English ePortfolio in a class, and of the 20 students to complete a portfolio, 19 wrote introductory narratives. Only one subverted the obvious affordances of the system to create a "profile" layout characteristic of a social networking site, with age and other personal information listed. We find the foregrounding of narrative to be problematic, considering our participants' experiences and struggles to self-represent as international students. Other, less narrative forms of self-representation may have given our participants, as well as other users, more flexibility to create different kinds of content.

Implications

To conclude, we'd like to make some tentative suggestions about how eportfolio systems can accommodate more diverse users' needs, including those facing similar dilemmas to our case study participants. While we imagine our primary audience is eportfolio developers—our interest is in the affordances and limitations of the technological system—our suggestions do have relevance for teachers and administrators, as well. In particular, we found the implementation of eportfolios to be just as important for our participants as the technological system itself. Many of the problems and limitations our participants reported had workarounds of which they were simply not aware. Of course, some of that responsibility falls on teachers, but some also falls on developers: if the workarounds are hidden, undocumented, and/or not intuitive, users (both students and teachers) are less likely to locate them or even be aware of their existence.

Our participants also suggested that the structure and content of eportfolio classes was crucial to whether or not they found the process (and product) useful. One said that the attached course, which she took her sophomore year, "came too early in my college career" to be useful. The other noted that the course would have been better attached to one on web writing and HTML. These observations are important for administrators and curriculum developers to take into consideration when developing eportfolio courses. Instructors, too, should consider carefully how much class time they dedicate to both technical and rhetorical aspects of the eportfolio. Both of our participants wanted more feedback and in-class opportunities for work, especially on video production, which was the most difficult for them to learn and gave them the most technical issues. One of the participants complained of a poor balance of teaching the technical skills associated with the English ePortfolio and teaching the content that would become

a part of the eportfolio. This complaint played out in our participants' dissatisfaction with their resulting eportfolios: they were happy with the content they developed and wrote (often in other classes), but they were not happy with the final product—the synthesis of that content into an actual portfolio.

Given the issues addressed in this research, developers may wish to consider several expansions and modifications of the existing ePortfolio system at Virginia Tech and/or the larger Sakai initiative. The first is greater flexibility in users' ability to choose and modify colors and layouts, even with the ability to designate certain areas for their own background or header images. This level of flexibility would likely give users greater ownership over their eportfolio and increase the likelihood of them finding it to be a useful tool. Another suggestion is a greater availability of content types, examples of which may include feeds, widgets, wiki capabilities, an "ask" form, and ways of integrating their social media sites. In conjunction with flexibility of layout and design, these additions would help users personalize the look and functionality of their eportfolios, optimizing their usefulness. Further, if other sites students use are incorporated into their eportfolios, eportfolios become integrated into their online presence and can hold a more lasting and effective position in the development of their online identities. There are strong benefits to making the eportfolio a meaningful artifact from both pedagogical and professional development standpoints, particularly when you begin to hear from student users that they mostly abandon their eportfolios post-graduation.

What our case study participants were most dissatisfied with was the ineffective visual design of their eportfolios. There are two main ways to meet the visual design needs of more users: a wider variety of themes and more control over the presentation of those themes (such as through a robust WYSIWYG editor). The theme library of eP@VT is expanding (at the time of this writing, there were 22 themes available for any Scholar user), even as the themes for the English ePortfolio stay roughly the same. While some of those themes simply add small variety in the header banner, others provide different background colors and layouts. Importantly, several themes suggest elements of personal identity (e.g., a sports theme and a "green" theme), while others foreground the visual *ethos* of Virginia Tech (one looks identical to pages on the Virginia Tech homepage). This variety of personal and professional themes helps meet the needs of diverse users with diverse purposes. Our participants – whose needs ranged from creating a heavily professional portfolio to expressing a personal design sense and style – would have options to meet their needs. We see the expansion of the theme library as an encouraging step and hope that it continues to move in that direction.

That said, users have very little control over the presentation of their site beyond the content area. Everything that the theme structures (background, header, footer) is beyond the user's control. Our participant who wanted to express her own sense of design and style might become frustrated with this lack of control. Drawing from other WYSIWYG editors like Blogger's "Template Designer," we believe that an ability to control column width, layout of page elements, and so on, is an important affordance that would benefit more users. Some of these options (such as layout) are currently available, but they are not all located in the same place and are often extremely limited. Foregrounding and grouping these options together would help users who want to express themselves through the visual design of their eportfolios.

We should note that these suggestions are informed primarily by the authors' experiences interviewing to two international English majors at Virginia Tech. Our study would have benefited from more participants. It is recommended that future studies use a larger participant pool and experiment with different populations and methods. Our study is meant to be exploratory rather than definitive in nature, and much of our data comes from personal experience with English ePortfolio creation, development, and implementation. Additionally, ours is a unique institutional context, and Sakai as it is instituted at Virginia Tech (and particularly in the English department) is different from the myriad other eportfolio platforms currently in use. Our case study is not meant to make generalizable assertions about all eportfolio users, all Sakai users, or even all international student users of the English ePortfolio at Virginia Tech. Rather, it is meant to highlight issues of self-representation and student identity and how those issues intersect with one particular technological platform. That said, we believe the questions we pose and the revisions we suggest are valuable for anyone concerned with eportfolio development and practice to consider.

International student users face their own particular set of challenges representing themselves in a system when their particular cultural tendencies may not have been considered in its development. It is likely that the challenges facing international students – those struggling to represent themselves as they grapple with opposing cultural influences – are often magnified by the limitations of rigid eportfolio systems. While the recent expansion of themes and layout options is a useful first step, further changes like those we suggest above would likely benefit not only international student users, but any user: they would make the system more flexible to accommodate the needs of more diverse users.

It is important that we ask ourselves, as teachers and developers of eportfolios: what is our primary goal?

What would we consider a success in the development and implementation of eportfolios? Do we simply want students to go through the process and complete the assignment? Do we want students to learn the technology? Do we want them to produce something that we can use for assessment? While answers to this first question vary depending on institutional context and pedagogical approach, we think there's one answer all of us could embrace: we want students to *use* their eportfolios, to be *invested* in their eportfolios, to be *passionate* about their eportfolios. While there are a number of ways to achieve this, we believe our study indicates that the structure of an eportfolio system heavily influences how invested students are in their eportfolios – personally and professionally – and thus how they interact with them, as meaningful artifacts or simply as class projects. If we take the former as our goal, the burden is on us to make eportfolios as flexible, functional, feature-rich, and intuitive as we possibly can.

References

Boekestijn, C. (1988). Intercultural migration and the development of personal identity: The dilemma between identity maintenance and cultural adaptation. *International Journal of Intercultural Relations, 12*(2), 83-105. doi:10.1016/0147-1767(88)90042-9

Cambridge, D., Cambridge, B., & Yancey, K. B. (Eds.). (2009). *Electronic portfolios 2.0: Emergent research on implementation and impact*. Sterling, VA: Stylus.

Clark, J. E., & Eynon, B. (2009). E-portfolios at 2.0: Surveying the field. *Peer Review, 11*(1), 18-23.

Dimitrova, M., Sadler, C., Hatzipanagos, S., & Murphy, A. (2003). Addressing learner diversity by promoting flexibility in e-learning environments. *Proceedings of the 14th International Workshop on Database and Expert Systems Applications, Prague, Czech Republic, 287-291*. doi:10.1109/DEXA.2003.1232037

Garrett, N. (2009). *An eportfolio design theory supporting ownership, social learning, and ease of use* (Doctoral dissertation). Available from Dissertations and Theses database. (UMI No. 3361806)

Graves, N., & Epstein, M. (2011). ePortfolio: A tool for constructing a narrative professional identity. *Business Communication Quarterly*, *74*(3), 342-346. doi:10.1177/1080569911414555

Headden, S. (2011, Winter). New ways to measure student learning: Better tools for assessment are key in ensuring quality. *Lumina Foundation Focus*. Retrieved from http://focus.luminafoundation.org/winter2011/

Hiradhar, P., & Gray, J. (2008). From a social digital identity to an academic digital identity: Introducing eporfolios in English language enhancement courses. *Canadian Journal of Learning & Technology*, *34*(3).

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind* (3rd ed.). New York, NY: McGraw-Hill.

Hunsinger, R. P. (2006) Culture and cultural identity in intercultural technical communication. *Technical Communication Quarterly, 15*(1), 31-48. doi:10.1207/s15427625tcq1501_4

McSweeney, B. (2002). Hofstede's model of national cultural differences and their consequences: A triumph of faith – a failure of analysis. *Human Relations, 55*(1), 89-118. doi:10.1177/0018726702055001602

Oubenaïssa-Giardina, L., Hensler, H., & Lacourse, F. (2007). e-Portfolio as intercultural cognitive environment to enhance teachers' professional development and personal growth. *Proceedings of the Seventh IEEE International Conference on Advanced Learning Technologies, Niigata, Japan*, 911-912. doi:10.1109/ICALT.2007.131

Ramirez, K. (2011). ePerformance: Crafting, rehearsing, and presenting the eportfolio persona. *International Journal of ePortfolio, 1*(1), 1-9.

Raven, J., & O'Donnell, K. (2010). Using digital storytelling to build a sense of national identity amongst Emirati students. *Education, Business and Society: Contemporary Middle Eastern Issues*, *3*(3), 201-217. doi:10.1108/17537981011070118

Tosh, D., & Werdmuller, B. (2004). *ePortfolios and weblogs: One vision for eportfolio development.* Unpublished manuscript, University of Edinburgh, Edinburgh, UK. Retrieved from http://www.morrisville.org/classrooms_curriculum/ hive_portal/documents/ePortfolio_Weblog.pdf

Williamson, D. (2002). Forward from a critique of Hofstede's model of national culture. *Human Relations, (55)*11, 1373-1395. doi:10.1177/00187267025511006

Yancey, K. B. (2004). Postmodernism, palimpsest, and portfolios: Theoretical issues in the representation of student work. *College Composition and Communication, 55*(4), 738-761.

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On the Right Track: Using ePortfolios as Tenure Files

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ePortfolios have been used in many disciplines for different purposes. In the following paper, I describe how I created and used an eportfolio as my tenure file over a five-year period. As the first tenure-track faculty member at Delaware County Community College to attain tenure through the use of an online tenure portfolio, the tenure eportfolio played many roles including as a summative, reflective, and showcase tool. Using an eportfolio for tenure promotion has become increasingly popular at my institution which now has an institutional eportfolio software package that all new tenure-track faculty use to create their online tenure files. This paper also discusses the advantages and disadvantages of using a prescribed eportfolio software package in creating tenure eportfolios.

Teachers and students in the education disciplines have used portfolios and eportfolios for years as reflective tools to assess and track growth. In recent years, eportfolios have moved beyond the education field and are now being employed in many different disciplines (Brandes & Boskic, 2008; Diller & Phelps, 2008; Lowenthal, White, & Cooley, 2011; Parker & Hillyer, 2009). Even with this growth, not much literature exists on creating eportfolios for purposes of promotion and tenure in higher education. The purpose of this paper is to describe my use of an eportfolio as a tenure file as part of the process towards tenure promotion. Rather than use a traditional paper binder portfolio, I was the first faculty member at my college to use a tenure eportfolio to go through the tenure process.

Background

As a faculty librarian at Delaware County Community College (hereafter referred to as "the College"), a suburban community college with 9,000 FTEs located approximately 15 miles from Philadelphia, I was hired in late 2005 to a tenure-track position. I was given a print tenure binder to assist me with the five-year tenure process and its requirements. Tenure binders must be filled with a variety of documents including teaching observations, student evaluations, curriculum vitae, reflections on instructional design, college service examples, and professional development competencies. Although librarians are considered "non-teaching faculty," they teach scores of information literacy sessions a semester to students. As a result, many of the librarians' tenure requirements match those of "teaching faculty." In addition to instruction, a college librarian has many other responsibilities. A tenure file helps document and showcase these eclectic and numerous job requirements to other members of the university community.

From Paper to Online – Risky?

Within my first year of hire, my supervisor and I had the idea to take my tenure file and convert it to an online eportfolio. Taking a tenure file and changing it from a print format to an online medium can be a risky decision and may not be possible for all tenure-track faculty, depending on their institution. A faculty member hired a few years before me had attempted to create a tenure eportfolio and was denied this option. In my case, the timing to switch to an online tenure file format was perfect as the momentum and use of eportfolios had increased significantly at the College. There was also a culture of support for eportfolios that did not exist in the past. The Provost of the College hired a few years before I began also supported the switch to a tenure eportfolio format.

Despite this administrative support, my supervisor and I had to formally seek approval to make this switch from many constituents including the Departmental Dean, the Provost, and the Tenure Committee (comprised of five elected faculty members) who reviewed all tenure files. I sought approval *in writing* to create the eportfolio tenure file. Upon receiving approval (also provided in writing) from all these groups, I started the process of taking my print tenure file and making it an online tenure eportfolio. Obtaining approval in writing cannot be overemphasized but in terms of shifting to an eportfolio environment, I literally was "at the right place at the right time" and had a culture of support behind me for this shift at all administrative and academic levels. It must be acknowledged that not all institutions provide such opportunities to take such risks. I was fortunate to have such institutional support in pursuing the eportfolio route as I made my way through the tenure process – a process that is often filled with risks and potential political perils.

There are different schools of thought on whether or not a print portfolio can successfully serve as a model for an eportfolio (Gathercoal, Love, Bryde, & McKean, 2002; Love, McKean & Gathercoal, 2004) or whether an eportfolio should be something that is created as an original dossier with no transition from a paper portfolio (Lowenthal et al., 2011). In my particular situation, I did use the original paper binder

to start my transition to an eportfolio format. Using the paper format as a base helped me build a template for the tenure eportfolio and create a structure that I altered significantly over the five-year tenure-track process. By the end of the process, despite its "paper base," my eportfolio looked significantly different from the original print tenure binder I received when hired.

Building the Tenure ePortfolio

In creating the eportfolio, I chose to start "from scratch" rather than use an eportfolio software package. Building my own eportfolio offered a lot more freedom and independence from the restrictions often found in eportfolio packages designed for students or in-house university use (to be discussed later). In creating a "homemade" eportfolio, I customized it in ways that highlighted all aspects of my position as a librarian while fulfilling all the criteria needed for the tenure file. I created files using HTML coding and cascading style sheets which I would edit using Notepad[++] and occasionally Dreamweaver. I housed the entire tenure eportfolio on my designated faculty server space that the College provides to all faculty. With the help of the College's web staff, I password-protected the entire eportfolio and created a database of usernames and passwords. This database enabled only specific individuals including Tenure Committee members, the Dean, and etcetera (each with their own username and password) to access and view the eportfolio through a provided link. The tenure file had to include academic

transcripts and administrative evaluations of my teaching and job performance, so it had to have some privacy protections placed on it for confidentiality purposes. Password-protecting the eportfolio in this way gave it some security, similar to the print tenure binders, which remain in a locked cabinet in the Provost's office.

As I began designing the tenure eportfolio, I kept the original paper binder in mind. The paper binder contained tabs that listed the required elements to be included in a tenure file including College Service, Professional Responsibilities, Progress Reports, and an Academic Credentials section. The welcome page (see Figure 1) and all subpages on my eportfolio included a sidebar with separate boxed sections that preserved this "tab" feel for easier navigation. I was also *required* to keep this tab format to facilitate the use of this eportfolio by Tenure Committee members who had scores of print binders to peruse and evaluate in addition to mine.

Many constituents reviewed my tenure file and provided feedback on my progress. This structure made it easier for them to comprehend my responsibilities, track my growth, and verify whether I met all yearly tenure requirements. Various reviewers at the College (see Figure 2) used different criteria to track my progress towards tenure, and as a result, the eportfolio had to be carefully designed. The Library Director, under the oversight of the Dean, evaluated my job performance and ensured I fulfilled the requirements of my position on a yearly basis. My faculty mentor had

Figure 1
Welcome Page of Tenure ePortfolio
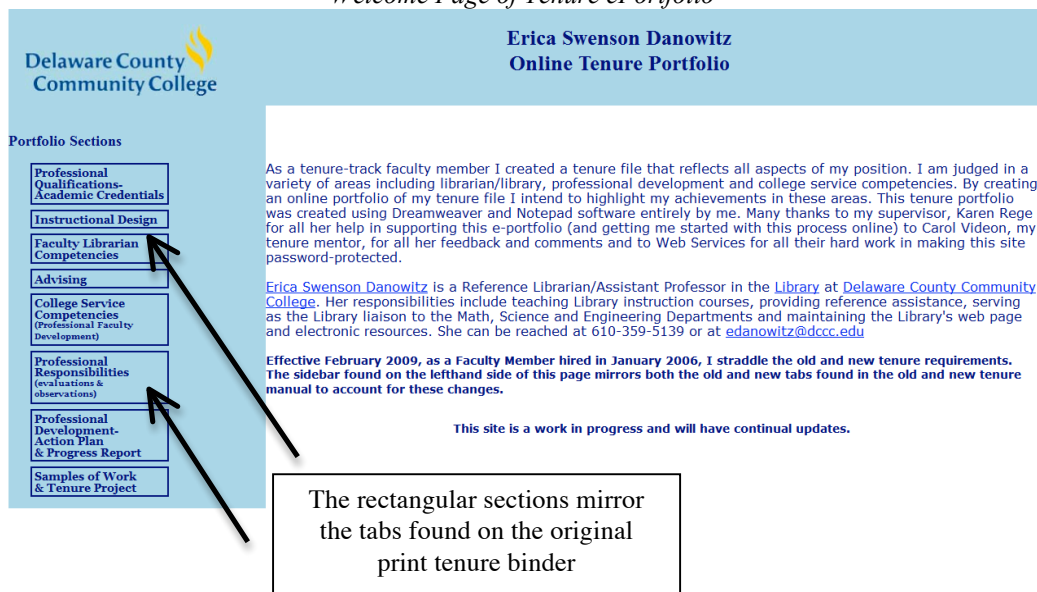
Figure 2
Various Reviewers of the Tenure ePortfolio
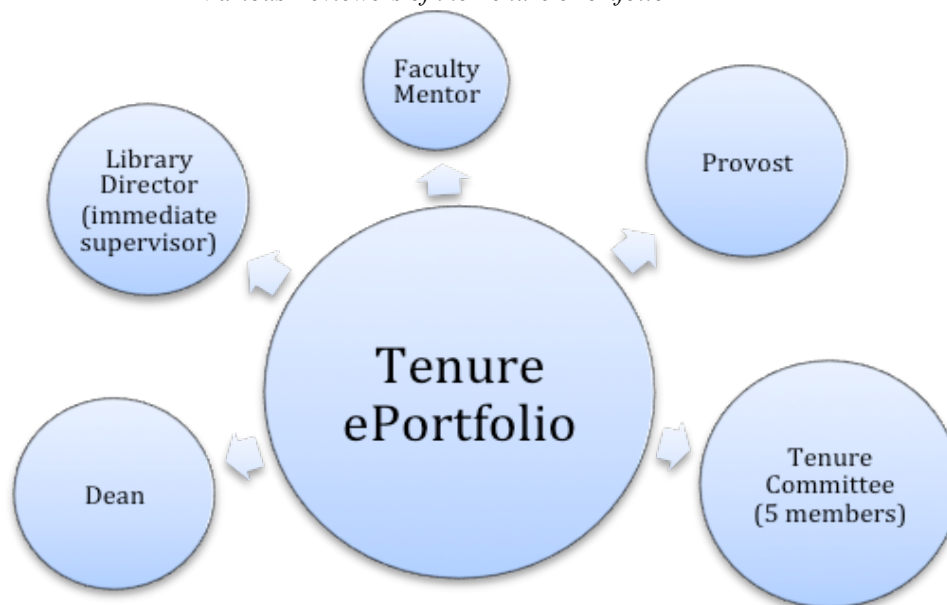
access to the file in order to provide advice and suggestions. The Provost tracked overall progress and met with all tenure-track faculty members individually to discuss elements of the tenure file and areas of weakness and growth. The Tenure Committee had the most crucial responsibility of reviewing scores of files biannually to ensure that all tenure-track faculty were making adequate progress towards tenure.

Creating an Evaluation Rubric

Despite the numerous constituents that review tenure files, no official evaluation rubric exists at the College for either print or eportfolio formats. Tenure-track faculty often receive little feedback about their dossiers unless some element is missing. Ideally, the College's Tenure Committee could create a rubric of evaluation that would provide detailed criteria, rating scales and guidelines (Lin, 2008) for both formats. The Tenure Committee would consult administrators and faculty from all disciplines to create the rubric that could be used by everyone involved in the tenure process (for reviewing, evaluating, and creating files). This rubric's guidelines would include a list of what is required during each stage in the tenure process and identify what documents should be included in the tenure file. The guidelines section of the rubric could also assist individuals attempting to transition their tenure files from a print to an online format as it could serve as a kind of checklist. Regardless of a tenure

file's format, the rating scale part of the rubric could be used (by the Tenure Committee, the Provost, and other administrators) as a feedback tool. These different reviewers would fill out the same rating scale to track common strengths and weaknesses for each tenure file. With a print tenure file, each reviewing party could fill out a separate rating scale. In a tenure eportfolio environment, this rubric could be designed in such a way so that all reviewing parties filled out a rating scale that could be posted and viewed simultaneously online. When using an eportfolio, this rubric could be taken a step further where all parties could fill out a rubric and also provide comments or feedback in an online forum. These comments could be shared and addressed by the other reviewing parties. In the ePortfolio environment, this rubric would enable every member involved in the tenure review to easily collaborate openly about an individual's progress towards tenure. By keeping the tenure eportfolio password-protected, only those individuals involved in the tenure review process would see these comments. Each participant in the tenure process (including the tenure-track faculty member) would contribute to the rubric either through filling out a rating scale or contributing to the online forum (see Figure 3). Creating a common evaluation rubric and allowing for online commentary about an individual's progress could change the whole tenure eportfolio review and evaluation process by making it more of a collaborative, collective, and transparent effort.

Tenure ePortfolios – Summative, Reflective, or Showcase Tools?

Based on the feedback I did receive, I constantly made changes and added documents to the eportfolio over a five-year period as I would have done with a print tenure binder. During this process, the tenure eportfolio played many roles. Hewett (2004) describes most portfolios as being three separately distinct types: a summative, reflective, or a showcase tool. A tenure eportfolio, however, does not necessarily fit into one of these separate categories. All three functions can be represented in one eportfolio and play an important role towards promotion.

Summative Role

My eportfolio served as a summative (Hallam & McAllister, 2008) collection of all the requirements I had to fulfill during my tenure-track years at the College. It also tracked my development as a librarian and as a member of the College's faculty. Hewett (2004) describes this kind of eportfolio as a documentation portfolio that shows growth toward achieving specified standards. The College's tenure requirements are competency–based and using the eportfolio as a documentation/summative file helped demonstrate how these specific competencies were met.

The faculty librarian competencies section (see Figure 4) of my tenure file is a good example of my eportfolio as a summative tool. I provided a year-to-year summary of how I evolved as an instructor, a librarian, and faculty member at the College. This part of the eportfolio also listed all the required elements of my position and how I accomplished them. The competencies section summarized my various librarian responsibilities and included yearly updates in specific areas, such as in the Teaching/Learning Environment. It also included information about my collection development duties (where I listed all books I ordered and withdrew from the library) and how I collaborated with teaching faculty from other disciplines during my tenure-track years.

Reflective Role of the Tenure ePortfolio

The tenure eportfolio also served as a reflective piece (Lin, 2008) as it included many areas where I reviewed my own experiences as an instructor and librarian and what I learned from my administrative and student evaluations. Hewett (2004) would call this kind of a portfolio a "process portfolio" (p. 26) where progress is tracked and reflection is emphasized. My tenure eportfolio had many elements that made it a reflective/process type of portfolio including a teaching philosophy section where I stated my beliefs on teaching

Figure 3
Adding an Evaluation Rubric to the ePortfolio
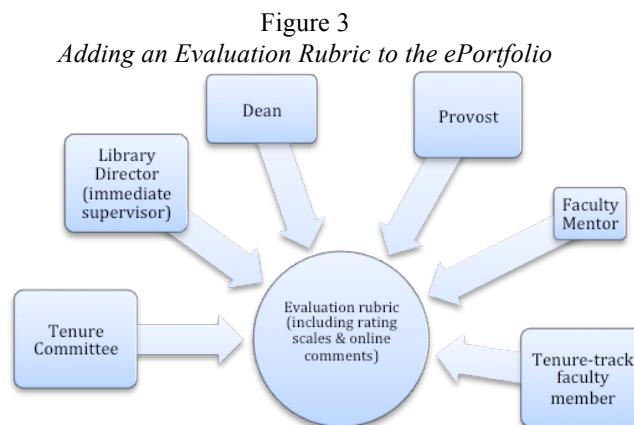
Note. Arrows represent feedback

and learning. I also included reflections on my best practices as an instructor and an assessment component where I assessed and compared my student and administrative evaluations over the years (see Figure 5).

My tenure eportfolio also included yearly action plans and progress reports where I reflected on every aspect of my position and highlighted how I developed and grew each year (see Figure 6). I would also track and comment on changes I made to my teaching and other job responsibilities in order to improve.

In retrospect, I wish I had used the reflective area of my eportfolio in more creative ways such as including a film or an audio clip of me reading my teaching philosophy (Hewett, 2004) aloud (in addition to including a text version). Such creative inclusions would not only have further enhanced the reflective characteristics of this section of the eportfolio, it would have underscored the scale of possibilities associated with using the eportfolio format.

The ePortfolio as a Showcase

As a librarian working in a field plagued with unfair anachronistic stereotypes, the tenure eportfolio also served as a showcase tool (Hewett, 2004) that helped debunk some of the myths and challenge the common images of the shushing "hair in a bun" librarian. Most modern day librarians are very tech-savvy and embrace cutting-edge services in order to assist others. In choosing the eportfolio format as a promotion tool, I hoped to also use it as a kind of marketing "technology tool" (Lin, 2008) that would advertise not only my skills but also market some of the technical accomplishments and advancements of the College's library. In demonstrating my technical skills, I also showcased the library's participation in a 24/7 live chat service, the creation of online library-research

Figure 4
Librarian Competencies – Summative Section

Figure 5
Reflective Section of the ePortfolio

Figure 6
Yearly Reflections Section (seen here – final tenure-track year)

tutorials to assist students with their research needs, and the use of social media to promote library resources. As a faculty librarian, my many responsibilities could be listed in a paper tenure file. In an eportfolio, *not only* were these responsibilities highlighted they were also showcased *prominently* by including links to film clips, social networking projects, and actual online tutorials. A "Samples of Work" section (see Figure 7) on the eportfolio exhibited teaching artifacts, film clips of my teaching, copies of publications, examples of effective online chat reference transactions, completed student web tutorials, and other projects.

The ePortfolio as a Model

Besides serving summative, reflective, and showcase functions, my tenure eportfolio also serves as a "prototype" for newer tenure-track librarians who have been hired by the College. I was the first faculty librarian to attain tenure in over 10 years and many of the tenure requirements were newer when I began my employment. My eportfolio currently functions as a sample model of the faculty librarian tenure process. It demonstrates what documents should be included and outlines what requirements must be met each year. I provided the newer tenure-track librarians with a login to my tenure eportfolio so that they could access and refer to it any time they needed a guide.

Why do a Tenure ePortfolio when Print is Enough?

At the time of my hire, paper tenure binders were still the norm, and eportfolios were only being introduced to some select student populations at the College. Lowenthal et al. (2011) underscore that an eportfolio should have a purpose and a structure in order for it to be a success whether as a reflective, summative or assessment portfolio. A tenure file *has* a specific purpose – it serves the ultimate goal of attaining tenure. As discussed earlier, it also fits the characteristics of all three types of portfolios (summative, reflective and showcase) in one. A tenure portfolio's structure and specific goals make it a logical candidate for an eportfolio format.

Advantages of an ePortfolio Format

Creating the eportfolio took time and required some technical skills; however, the extra effort needed to create a tenure eportfolio was worth the many resulting benefits. Those benefits include the following:

- Many different learning objects such as videos or online tutorials (as mentioned earlier) can be included on eportfolios as teaching samples or artifacts that can be readily accessed and viewed.
- Tracking growth from year to year is much easier with eportfolios where all documents are available simultaneously for viewing, assessing and (when necessary) comparing (i.e., when using the rating scale mentioned earlier).
- eportfolios are readily accessible to anyone, anywhere, unlike paper portfolios which are often locked in an administrator's office and are not easily available. They can also be edited instantly.
- Tenure eportfolios can be used as lifelong dossiers even after tenure is attained. Faculty could use their original tenure eportfolios as benchmarks to measure and track their professional growth and development over time.
- Using online portfolios saves paper and space.
- As mentioned earlier, eportfolios can help market an individual's and department's (in this case, the library's) advancements, technical strengths, and other achievements.
- eportfolios can provide cross-references that are hyperlinked between documents (Driessen, Muijtens, van Tartwijk, & van der Vleuten, 2007). In my tenure eportfolio, I was able to cross-reference areas of my "Best Practices in Teaching" section and link it to my "Samples of Work" section. Users simply click on hyperlinks to quickly access different sections – a feature not possible in a print portfolio.
- If designed well, eportfolios can be easier to read and navigate than a paper folio as a result of this carefully organized structure and the use of these hyperlinks (Driessen et al., 2007; Jun, Anthony, Achrazoglou, & Coghill-Behrends, 2007).

Disadvantages of Using an ePortfolio

The advantages of using an eportfolio far outweighed some of the disadvantages associated with putting a tenure file online, but there are some upfront time commitments that need to be considered. Keeping files in a print folio medium eliminates having to scan and upload certain documents, which can be time-consuming. Keeping the eportfolio password-protected meant that every new academic year I had to remove former and add new members of the Tenure Committee which was a complicated process that required web staff assistance. During my tenure-track period, the College also changed servers, which required me to backup all online files (another time-consuming process) to ensure I lost nothing during the server transfer. In my case, knowledge of HTML and CSS was

Figure 7
Samples of Showcased Work
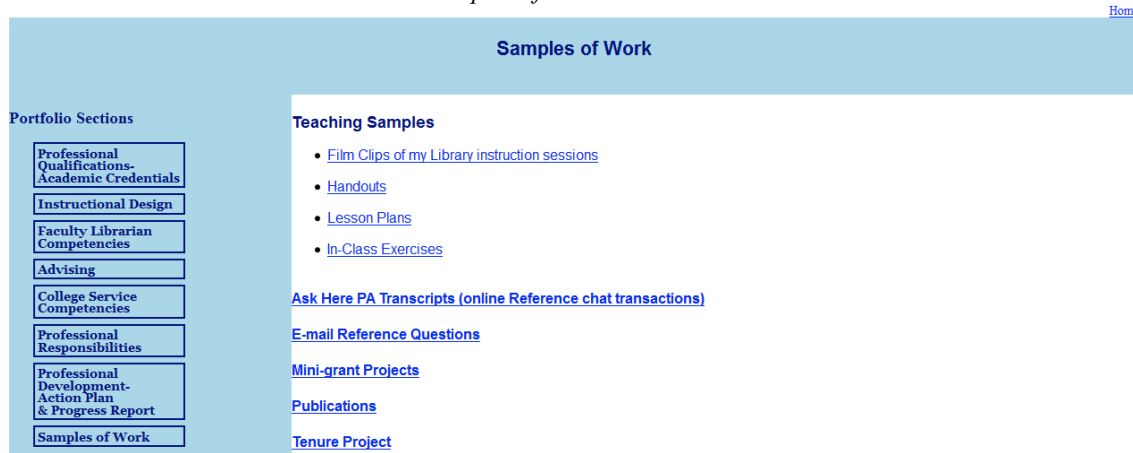
crucial in creating an original eportfolio, which initially required much more time than inserting pages into a print binder. Individuals who are not as tech-savvy may struggle with building their own eportfolios and might benefit from using an eportfolio software product or system that has its own "built-in" template and requires minimal technical skills.

Using ePortfolio Software Products – The Pros . . .

A few years after I started my tenure eportfolio, the College introduced an eportfolio product for in-house use by faculty, students and staff. Prior to the introduction of this product, the College had provided iWebfolio to the few students and faculty who used eportfolios in their courses. This new product was associated with the College's course management system, called WebStudy. A member of the College's Computer Science faculty worked closely with WebStudy's technical staff to create this eportfolio product called WebFolio. This product is available to any member of the College (student, faculty or staff) with a WebStudy account who wishes to create an eportfolio. In minutes, anyone on WebStudy can create an eportfolio. Currently at the College, WebFolio is the preferred product of choice for newer faculty who want to use an eportfolio for their tenure file. Using WebFolio requires a much lower learning curve in terms of technical skills. It is a fairly user-friendly product that also provides technical support through WebStudy's technical staff and the Computer Science faculty member who created instructional tutorials on using and working with WebFolio.

Although I had already built my eportfolio, I assisted the Computer Science faculty member by experimenting with WebFolio. I "recreated" my tenure eportfolio using WebFolio to help test and troubleshoot any possible problems (see Figure 8). In experimenting with WebFolio, I also wanted to compare the advantages and disadvantages of using an eportfolio software package against my "from scratch" model.

In using this product I found many benefits to using an eportfolio software package including:

- Knowledge of HTML coding or other web markup languages is not necessary. Although it is advantageous to possess these skills, they are not required when using these software products to create an eportfolio. Users have the option of typing content using regular text editing views or using HTML coding if they prefer.
- Most products allow eportfolio owners to easily lock down certain areas of their eportfolios to ensure privacy. Having the ability to mark certain sections private also does not require advanced technical skills. Many eportfolio products simply provide different links to different users that will only allow access to certain areas of an eportfolio. Figure 9 shows how WebFolio would look to a particular user (in this case, an employer).
- The basic structure and template of the eportfolio is already created for the user – there is no time-consuming design planning or development.

. . . And the Cons

There are limitations to using an eportfolio product including having to adhere to the preset templates and structure created by an institution. Being forced to use a

Figure 8
My Tenure ePortfolio as it Appeared on WebStudy's WebFolio (in edit mode)
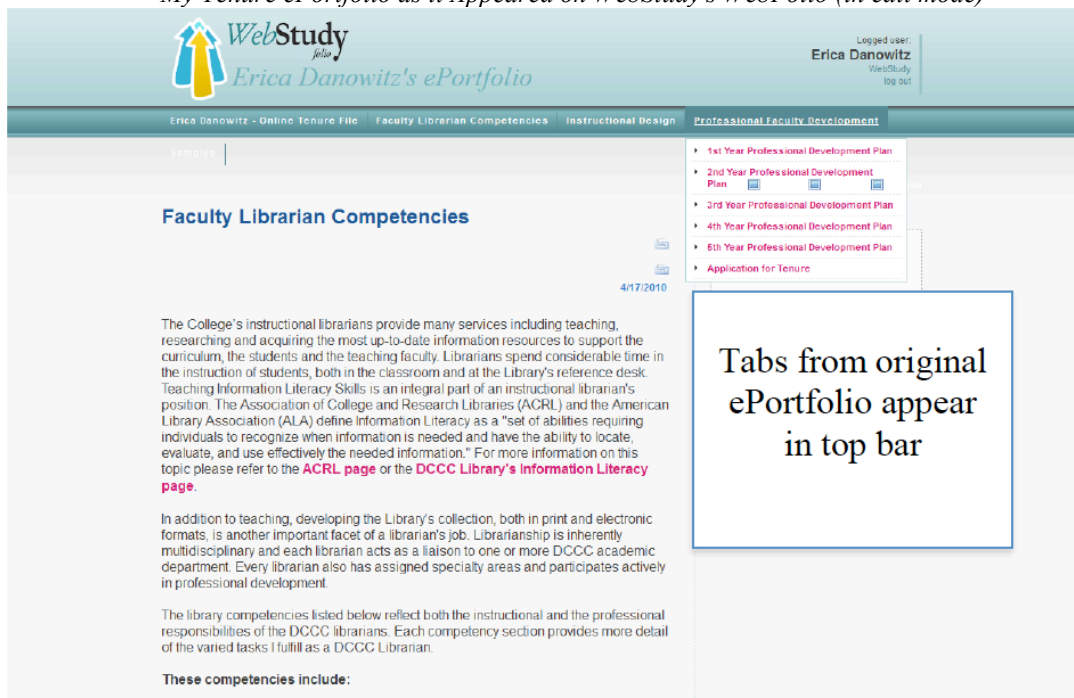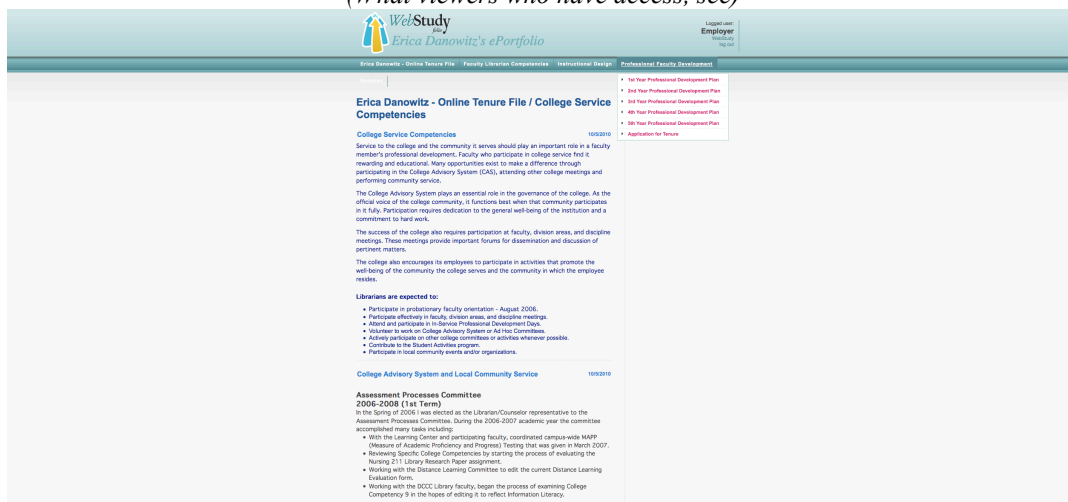

Figure 9
My Tenure ePortfolio as it Appeared on WebStudy's WebFolio
(What viewers who have access, see)

template to give eportfolios a similar look and feel can stymie innovativeness and individuality (Lin, 2008). ePortfolio products can be prescriptive and may circumscribe creativity or originality if templates cannot be edited. Some institutions also require the use of a specific eportfolio package or vendor, which certain faculty members may not want to use to create their eportfolios. WebFolio is one of many eportfolio product options available to faculty. As a relatively new product, it is still a work in progress in certain areas. WebFolio users currently cannot export the content of their eportfolio to another product. If a student or a faculty member leaves the College, the eportfolio cannot be exported or easily downloaded; however, the

original eportfolio can be accessed for up to five years after leaving the institution.

Besides commercial packages, there are also open source options (such as Elgg, Google's Googlio and RCampus) and "homegrown" alternatives. Faculty from different disciplines and backgrounds should be permitted to choose which eportfolio option (commercial, open source, or homegrown) they would prefer to use to design and showcase their tenure eportfolio.

Limitations and Challenges to Using Tenure ePortfolios

In order for tenure eportfolio programs to increase in popularity and be successful, faculty need the support of their administration and governing bodies who oversee tenure. Finding and maintaining this support can be a challenge especially when considering the culture of many academic institutions. Support from all parties involved in this process is crucial because tenure committees and administrators can change. Even when support to create a tenure eportfolio is obtained, a faculty member should seek this approval *in writing* as a precaution. An administrator supportive of tenure eportfolios could leave. The possibility also always exists that a committee that previously supported tenure eportfolios could completely change in composition. Most tenure committee members are elected to their posts for stints that are not as long as the entire tenure process. Newer members of tenure review committees might not support the eportfolio initiative (and would rather review a traditional print tenure binder), which would be disastrous for any tenure-track professor close to tenure who had spent years putting all documentation online.

Tenure-track faculty interested in creating a tenure eportfolio also needs to keep in mind "the three p's" (practices, policies and politics) of tenure for their institution. These "three p's" may prevent or limit their ability to create a tenure portfolio online. Using a tenure eportfolio might not be the best choice for a faculty member in a particular academic field and/or who works at a college (or within an academic department) with a less supportive culture for eportfolio formats. Tenure rubrics and portfolio criteria are usually not the same between faculty members who teach in different disciplines. The tenure file of an English faculty member will look very different from that of faculty member who teaches Biology. This difference might further complicate the tenure file process if eportfolios were used in certain institutions. Many institutions also send out final tenure files for review by peers located at other colleges who might not support or accept an online tenure file format in this review process. These kinds of issues can pose many challenges to the success of any tenure eportfolio initiative.

Recommendations

Creating a tenure eportfolio may seem like a risky venture for many new faculty who already feel uncertain about their roles in a particular institution. Institutional cultures can change and keeping a tenure file in a print format may seem like a safer option. Faculty may also question how an eportfolio could advance their career. However, eportfolios are becoming more pervasive in all areas of higher education and hopefully my experience will encourage more tenure-track faculty to make the decision to try the tenure eportfolio option. The recommendations listed below provide some best practices and advice to assist faculty (and administrators) who might make the decision to use a tenure eportfolio.

Get it in Writing

As mentioned earlier, depending on the institutional culture or context, tenure-track faculty may feel nervous about committing to a tenure eportfolio. It is recommended that all tenure-track faculty who decide to employ tenure eportfolios seek support in writing to pursue this option. The ultimate purpose is to protect against potential changes in this support. Support, when granted, should also be garnered in writing and include a "grandfather clause" which guarantees that the tenure eportfolio can serve as the tenure file throughout the process. All tenure-track faculty should keep this written approval until tenure is attained. The intention of such documentation would be to protect the individual faculty member from changes in policy and personnel that might endanger earlier agreements.

Start Early and Find the Time

All tenure-track faculty know that they need to dedicate time to work on their tenure files in print or online. In the long run, eportfolio maintenance is not too difficult or time-consuming, but it may take more time to develop, especially earlier in the process, due to needs associated with envisioning a navigable structure and template design. It is also important to find time to edit and add to the eportfolio to keep it updated. Scanning documents, checking hyperlinks, and creating new files can take significant time. In my case, I updated my eportfolio almost weekly and in busier periods, monthly. Ultimately, having the file online was more advantageous because I could make updates instantaneously from anywhere.

Backup

Backing up all files related to one's eportfolio is also crucial and should be done regularly. Servers can crash and if something has not been backed up, years of eportfolio work could be lost. One should back up an eportfolio on a jump drive, on a work PC and if possible, on a personal computer or network cloud to be safe. The files from my eportfolio were saved as HTML files so that I could have easily converted them to another eportfolio platform or server if it had become necessary. Many eportfolio programs currently do not allow files to be exported, but that feature will become more crucial as eportfolio use continues to increase. eportfolio content that is not saved in the HTML format should be saved as text files as a safeguard so that they can be easily inputted into another eportfolio program or format if needed.

Provide Choices and Flexibility

Administrators who allow faculty to create tenure eportfolios should also permit them to choose what kind of eportfolio product they want to employ. As long as the necessary criteria required for the tenure file are included in the eportfolio, the choice of product or platform should be left in the hands of the faculty. Fewer faculty would fear transitioning to a tenure eportfolio format if they were given more options and freedom regarding what to use. Some faculty may be more comfortable using a preset, institutional software template, other faculty might value creating an eportfolio on their own; either way, the choice should be theirs.

Faculty should also think about the end-user and provide some flexibility when creating eportfolios. When adding documents and files to an eportfolio, I would suggest creating a printable-friendly option for those individuals who still prefer reviewing work in a print format. As much as this suggestion seems contradictious to the eportfolio environment, it provides a choice to an individual who might not be used to reviewing online tenure files. By providing this option, a tenure eportfolio that needs to be peer-reviewed outside of the institution in a print format, could also be easily assembled for that case.

Solicit Feedback and Remind Them You are There

As mentioned earlier, eportfolios have the advantage of not taking up any physical space. eportfolios only take up server space. However, as a result, it is important to remind everyone who reviews the tenure eportfolio that you exist. The print tenure binder in itself is a reminder that a file has to be reviewed. In an environment where tenure files may be both in a print or online format, it is important to remind tenure committees and other administrators that your file exists online. As the sole faculty member with a tenure eportfolio initially, I emailed all reviewers annually with information about my eportfolio and how to access it. I also reminded them that I had been granted approval to follow this online format because every year new tenure committee members were elected that did not know my history or my years of work building my tenure eportfolio.

It is also important that faculty solicit and receive feedback as much as possible. In my annual email to all parties who reviewed my tenure eportfolio, I asked them to provide me with comments to ensure that I remained on the right track in addressing everything required of me with each tenure review. As mentioned earlier, my institution had no common evaluation rubric. Creating such a rubric for tenure would have played a valuable role in not only tracking this progress and ensuring all tenure files met the right criteria, but it would have established better lines of communication.

Form a Support Group, Serve as a Mentor

As more tenure-track faculty begin to create tenure eportfolios, they should consider forming a support group to assist each other in the process. Newer hires at my institution now meet regularly, once a month, to discuss all aspects of the tenure process. Individuals who choose the eportfolio option would benefit from meeting with their "ePortfolio peers" regularly (either online or in face to face forums) to discuss issues, provide suggestions, and to assist each other in the eportfolio tenure process.

As a librarian, my tenure file looks a bit different from the tenure files of the teaching faculty at the College. Despite these differences, my tenure file on Webfolio is used as a model for other tenure-track faculty. I also presented my eportfolio in a poster session held at my College to further advertise its potential. As mentioned earlier, within my department, I serve as a mentor to two newly hired librarians. They have both chosen to do a tenure eportfolio, and they use my eportfolio as a guide.

Think "Outside the Binder"

If an institution permits the use of tenure eportfolios, the possibilities are endless. Take advantage of the eportfolio format by presenting yourself in ways that a print file cannot. Film yourself reciting your teaching philosophy and then include a film clip of you teaching. List your professional development accomplishments and include audio/film clips and/or multimedia slideshows of your conference presentations. Make the tenure eportfolio reflect all of

the areas of your position in a dynamic way. Ideally, even when tenure is reached, these eportfolios could be updated and used as lifelong eportfolios (Lorenzo & Ittelson, 2005) for assessment and reflection purposes. What happens to an eportfolio after tenure promotion is attained (or in the case of student eportfolios, graduation or employment is achieved) could be a topic of further inquiry.

Conclusion

Using an eportfolio to go through and achieve tenure was an excellent experience which helped pave the way for future faculty to create tenure eportfolios at my institution. As the first member of the faculty to create an eportfolio tenure file and to be granted tenure at my institution, the trend is becoming more popular and acceptable at the College since I began (2006) and completed (2010) the process. The WebFolio version of my tenure file serves as a model for newer tenure-track faculty interested in creating a tenure eportfolio since WebFolio remains the preferred eportfolio product at the College. Newer tenure-track faculty now can choose between a paper or an eportfolio dossier, and the number of faculty putting their files online continues to increase. However, as mentioned earlier, tenure eportfolios are not for everyone. Individuals who have few technical skills or prefer a paper format should not consider this option. Using eportfolio as tenure files is not a mandate at the College, and newer faculty who choose the paper option are not penalized for sticking to tradition.

Creating a tenure eportfolio was such a rewarding experience for me that I plan to continue using eportfolios in the future. Not only did my use of an eportfolio help improve the image of my particular profession, it also served as an excellent reflective and summative tool. The tenure eportfolio enabled me to easily track my growth and accomplishments as an instructor and a librarian. I also had the opportunity to use technology in creative ways. Now that I have attained tenure, my file remains online but it is a static format. I no longer make any changes to it as it serves as a model. However, as part of my post-tenure review, I plan to create a new eportfolio to highlight key aspects of my position and to continue improving and growing as an educator.

References

Brandes, G., & Boskic, N. (2008). ePortfolios: From description to analysis. *International Review of Research in Open and Distance Learning*, *9*(2), 1-17.

Diller, K. R., & Phelps, S. F. (2008). Learning outcomes, portfolios, and rubrics, oh my! Authentic assessment of an information literacy program. *Portal: Libraries & the Academy*, *8*(1), 75-89.

Driessen, E. W., Muijtjens, A. M., van Tartwijk, J., & van der Vleuten, C. M. (2007). Web- or paper-based portfolios: Is there a difference? *Medical Education*, *41*(11), 1067-1073. doi:10.1111/j.1365-2923.2007.02859.x

Gathercoal, P., Love, D., Bryde, B., & McKean, G. (2002). On implementing web-based electronic portfolios. *Educause Quarterly*, *25*(2), 29-37.

Hallam, G., & McAllister, L. (2008). Self-discovery through digital portfolios: A holistic approach to developing new library and information professionals. *IATUL Annual Conference Proceedings*, *18*, 1-34.

Hewett, S. M. (2004). Electronic portfolios: Improving instructional practices. *TechTrends: Linking Research & Practice to Improve Learning*, *48*(5), 26-30.

Jun, M., Anthony, R., Achrazoglou, J., & Coghill-Behrends, W. (2007). Using ePortfolio[TM] for the assessment and professional development of newly hired teachers. *TechTrends: Linking Research and Practice to Improve Learning*, *51*(4), 45-50. doi:10.1007/s11528-007-0055-3

Lin, Q. (2008). Preservice teachers' learning experiences of constructing e-portfolios online. *Internet & Higher Education*, *11*(3/4), 194-200. doi:10.1016/j.iheduc.2008.07.002

Lorenzo, G., & Ittelson J. (2005). An overview of eportfolios. EDUCAUSE Learning Initiative. Retrieved from net.educause.edu/ir/library/pdf/ELI3001.pdf

Love, D., McKean, G., & Gathercoal, P. (2004). Portfolios to webfolios and beyond: Levels of maturation. *EDUCAUSE Quarterly*, *27*(2), 24-37.

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 ePortfolios*, *1*(1), 61-70.

Parker, L. L., & Hillyer, N. (2009). e-Portfolios for librarians: myMAPP—mapping academic performance through e-Portfolios. *Technical Services Quarterly*, *26*(1), 13-20. doi:10.1080/07317130802225076

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The Quest for Expertise: A Review of *Documenting Learning with ePortfolios: A Guide for College Instructors*

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This article provides a review of *Documenting Learning with ePortfolios: A Guide for College Instructors* by Tracy Penny Light, Helen Chen, and John Ittelson. A much needed and highly accessible manual for understanding the significant pedagogical foundations for the use of ePortfolio in the college classroom, the text offers a practical design for instruction that facilitates the successful implementation of folio thinking and, subsequently, the development of effective ePortfolios. *Documenting Learning with ePortfolios: A Guide for College Instructors* is not a how-to guide for using a specific portfolio product; instead, it prioritizes thoughtful pedagogy over technological tools. The authors focus on the development of effective instances of student learning and provide advice on selecting the best tool for the job. Publisher: Jossey-Bass (San Francisco, 2012). ISBN: 9780470636206. List price: $40.00 (U.S.). 160 pages.

Nearly twelve years ago, I attended a workshop that introduced the use of asynchronous discussion forums as a part of a course management system that was being adopted by my university. The presentation was very interesting, as the concept was relatively new back then; it was the dawn of the 21st century, after all, and new and exciting tools promised to revolutionize teaching and learning. Once the presenters completed their exhibition of the discussion tool, I raised my hand and asked a question that—unbeknownst to me—would lead me down myriad paths and permanently impact my own practice. The question was simple enough: "What are the pedagogical implications of this tool?" The two gentlemen looked at one another and chuckled—Were they embarrassed? Did I put them on the spot? "That's a good question," one answered. They said nothing else, but proceeded to hand out instructional booklets on how to create a CourseInfo site as if in response to my query. I didn't press them further, feeling a bit self-conscious and naïve; I was the new kid, and I didn't want to cause trouble. I clutched my instructional booklet tightly, vowing to read every word.

In the wee hours of the following morning, I pushed my chair back from my desk and sighed deeply. I must have missed something. I read every word of that instructional booklet. I dutifully followed the steps and set up a course site. Intuitively it seemed the right thing to do—building new technology into my Medieval Humanities course was sure to be a hit with the students, almost Guttenbergian, I felt—but something was missing. I learned the *how* of the technology, but I still didn't know *why*. Going back to the booklet, I actually searched the back pages for a toll-free number to call. I needed an expert, someone to tell me why I should use this technology, when and under what circumstances it would be the most appropriate, and who would ultimately benefit from its use. Of course, the booklet yielded no such toll-free number. There was to be no answer to my question; it

was up to me to determine the pedagogical implications on my own—for better or for worse.

As an early adopter of new technologies and a social constructivist who believes in a learner-centered teaching and learning environment, I have grown accustomed to the struggle of determining the pedagogical value of new tools. Over the years and through trial, error, honest reflection, and a dedication to my philosophy of teaching, I have come to live by the rule of the three E's: If a technology does not enliven, enrich, or extend my students' learning experiences with the content, then I simply do not use it—regardless of its bells and whistles. There are myriad technological tools at our fingertips, but just as we wouldn't use a hammer to drive a screw into the wall, neither should we adopt a tool that fails to align with our pedagogical purpose. This premise is appreciably addressed in *Documenting Learning with ePortfolios: A Guide for College Instructors* by Penny Light, Chen, and Ittelson (2012).

With the publication of *Documenting Learning with ePortfolios: A Guide for College Instructors* earlier this year, Penny Light et al. (2012) provide a text that contributes to the development of master teachers of the 21st century who seek to possess a "content-pedagogical-technological expertise" (Pierson, 2001). Beyond what researchers have defined as *pedagogical-content expertise*, "knowledge about specific learners, curriculum, and the various and most useful ways to represent the particular subject matter being taught" (Pierson, 2001, p. 427), a qualitative study by Pierson (2001) found "technological expertise" to be a critical quality of a practicing teacher. Defining technological expertise as "not only a basic technology competency but also an understanding of the unique characteristics of particular types of technologies that would lend themselves to particular aspects of the teaching and learning processes" (p. 427), Pierson (2001) suggests that true technology integration lies at the intersection

of content knowledge, pedagogical knowledge, and technological knowledge. Lest our instruction seem disjointed and our methods superfluous, the seamless synthesis of content, pedagogy, and technology is our Holy Grail as educators.

To aid us on our epic quest for true integration as we seek to become content-pedagogical-technological experts, *Documenting Learning with ePortfolios* (2012) provides a comprehensive guide to understanding the use of ePortfolios in the instructional environment. Predicating the technological *hows* with the pedagogical *whys*, authors Penny Light, Chen, and Ittelson offer a strong pedagogical argument for the use of technology in the form of ePortfolios by prioritizing the concept of folio thinking and the significance of documenting learning for specific stakeholders; by illustrating the learner-centered, authentic, and developmental nature of the technology; and by providing practical considerations for the implementation of the technology to serve both local (course-specific and departmental) as well as global (institutional and beyond) missions.

The Whys: Folio Thinking and Habits of Mind

For two decades I have had in my possession a three-inch three-ring binder that is bursting with samples of my work, selections of lesson plans and learning activities, reflections about the viability of those plans and activities, notes from former students, and various miscellany, all of which contributed to my growth as a professional educator. With yellowed pages that have torn with age and wear, this binder—my first teaching portfolio—accompanies me to class as a prop, a visual representation of reflective practice. It is a cumbersome object to tote to class, inelegant in its bulk and forced linearity; however, my portfolio contains documents that denote the discreet moments that impacted my learning, and subsequently, the way I think about and approach my role as a teacher. My portfolio is evidence of the development of the habits of mind that now tacitly function throughout my everyday life.

While my giant binder facilitated my reflection and growth in one area of my learning, and while my other life experiences may have been implicitly revealed through my reflections and musings about my teaching practice, my paper-based portfolio did not allow for the exploration and overt integration of the connections to the myriad events that reciprocally impacted my learning and my identity. Penny Light et al. (2012) explain to their readers that ePortfolios contribute to the greater act of "folio thinking" by adding a multidimensionality, a "richer representation of the learners' experiences" (p. 61), which text-based portfolios cannot readily provide. As noted by

Backlund et al. in their 2001 *Personal Learning Portfolios: Folio Thinking* proposal to the Wallenberg Global Learning Network Funding Program, "faculty and academic advisors increasingly feel that the 21st Century student experience lacks coherence" (p. 2). This lack of experiential coherence results in a "fragmentation of purpose," which establishes silos of student experience and fails to encourage integration and synthesis among them. Through such fragmentation, individual experiences are preserved historically as stand-alone and arbitrary, memorialized as being "outside" or "separate from" other acts of student learning and knowledge-building. The principles inherent in folio thinking encourage the development of a habit of mind "that builds connections across experiences and ideas and across learning experiences inside and outside formal schooling" (Cambridge, 2007, p. 5); this connection of experiences allows for a more comprehensive integration of learned ideas and affords students an opportunity not only to create a living scrapbook of their "learning careers" (Penny Light et al., 2012, p. 36) but to synthesize what they have learned into a holistic view of who they have become as a result of their learning—both experiential and classroom-based.

The potential for encouraging the processes involved in metacognitive reflection and epistemological growth through folio thinking should not be understated and should serve as the ideological foundation upon which the use of portfolios in instruction is based—whether text-based or electronic. The pedagogical imperative of folio thinking requires learners to "evaluate the knowledge claims offered by authorities, construct their own convictions, seek out new possibilities and sources, and apply the knowledge they are acquiring to complex and real-world problems" (Penny Light et al., 2012, p. 15). This preference for active and critical reflection also encourages learners to examine their own belief systems: why they have them, where they come from, and "what points in their learning caused their belief systems to shift or change" (p. 15). As a tool for operationalizing these pedagogical principles, ePortfolios enable students to collect those impactful artifacts across time and space and to explain and reflect upon how the culmination of the series of documents contribute to their overall growth.

The Hows: Stakeholders and Strategies

Simply being presented with the opportunity to create an ePortfolio does not instill in the learner the ability to effectively use the tool. Because "making connections among learning experiences . . . is not necessarily a natural part of what students come to colleges and universities knowing how to do" (p. 41), Penny Light et al. (2012) dedicate considerable time in *Documenting Learning with*

ePortfolios to the ways in which instruction may be designed to encourage both folio thinking and ePortfolio development through the deliberate selection of evidence and the critical reflection of its significance. The authors speak of students as the most critical stakeholders among a potential plethora of stakeholders involved in an ePortfolio initiative, and, as such, they must buy-in to the activity of creating an ePortfolio; they must see its value and recognize it as an integral part of their learning, not just as an add-on activity. Appropriate scaffolding must be provided for students to become aware of and skilled in the acts of collecting, reflecting upon, and integrating evidence of learning. Students must also be encouraged to identify the various other stakeholders and audiences of their ePortfolios and develop a sense of appropriateness for their work by being empathetic toward the needs and concerns of those stakeholders and audiences.

In consideration of these concerns, and what I find to be the most instructive aspect of their text, Penny Light, Chen, and Ittelson promote the use of "design thinking," made manifest in the principles or "d.mindsets" used in the Stanford d.school; further, they highlight eight issues for ePortfolio implementation (see Chen & Penny Light, 2010) that serve also as guideposts for effective and efficient instructional design. In *Documenting Learning with ePortfolios*, the authors include relevant, real-world examples from colleges and universities that showcase the methods our colleagues are using to address the issues of

- designing and articulating learning outcomes;
- understanding our learners;
- identifying stakeholders;
- designing appropriate learning activities;
- including multiple forms of evidence in ePortfolios;
- using rubrics to evaluate ePortfolios;
- anticipating the external use of the evidence included in an ePortfolio; and
- evaluating the impact of ePortfolios.

While addressed directly in Chapter 3, "Designing Effective ePortfolio Learning Activities," these eight issues are also threaded throughout the text as the authors explore the value and functionality of folio thinking and the construction of an effective and comprehensive ePortfolio for a variety of stakeholders. These issues are also omnipresent when considering the many guises of assessment and evaluation inherent with ePortfolio creation and implementation; Penny Light et al. (2012) support the development and use of rubrics for instructor-based assessment as well as for learner-centered self-assessment, which encourages further reflection and objectivity with respect to an individual's own process and ultimate ePortfolio product.

Documenting Learning with ePortfolios is, indeed, a true "Guide for College Instructors." With the exception of the chapter outlining faculty development issues and the chapter discussing the evaluation of the institutional impact of ePortfolios, both of which seem more appropriate for an audience geared toward resource management and administration, Penny Light, Chen, and Ittelson offer a highly accessible and informative manual that provides readers with both the *whys* and the *hows*. While the authors do not provide a toll-free number to call in the event of a pedagogical emergency, they do provide a web-based companion to their text, documentinglearning.com, which gives readers access to an abundance of examples and resources. Perhaps even more useful than a toll-free number, the website invites readers to join the online community of educators who thoughtfully and reflectively incorporate the use of folio thinking and ePortfolios into their instruction in their continuing quest for content-pedagogical-technological expertise.

References

Backlund, J., Gustafsson, J., Handberg, L., Lunsford, A., Stringer, J., Chen, . . . & Cannon, D. (2001, March 27). *Learning portfolios: Folio thinking. Proposal to the Wallenberg Global Learning Network Funding Program*. Retrieved from http://dart.stanford.edu:8080/sparrow_2.0/pages/teams/FThome.html

Cambridge, B. (2007). Learning, knowing, and reflecting: Literacies for the 21st Century. *International Journal for the Scholarship of Teaching and Learning, 1*(2), 1-7.

Chen, H. L., & Penny Light, T. (2010). *Electronic portfolios and student success: Effectiveness, efficiency, and learning*. Washington, DC: Association of American Colleges and Universities.

Penny Light, T., Chen, H. L., & Ittelson, J. C. (2012). *Documenting learning with ePortfolios: A guide for college instructors*. San Francisco, CA: Jossey-Bass.

Pierson, M. E. (2001). Technology integration practice as a function of pedagogical expertise. *Journal of Research on Computing in Education, 33*(4), 413-430.

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