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The Use of ePortfolios to Support Metacognitive Practice in a First-Year Writing Program

Jim Bowman, Barbara J. Lowe, Katie Sabourin, and Catherine Salomon Sweet
St. John Fisher College

Recognizing the importance of meaningful reflective writing as an integral component to the portfolios used in the first-year program (FYP), faculty questioned whether a newly developed electronic portfolio offered any pedagogical benefits over the existing traditional paper portfolio. Of particular interest for this work was whether the use of ePortfolios might positively impact students' metacognitive skills. A study conducted with students and faculty in the FYP evaluated student understanding of purpose, significance, and relevancy in their reflective writings. Findings indicate that while both types of portfolios, electronic and traditional paper, contribute positively to students' learning related to "connections to the course," students completing an ePortfolio show heightened levels of metacognition in relation to "connections to learning" and "connections to career or personal goals."

As John Dewey (1916) stated regarding the importance of reflection in the acquisition of new knowledge, "thought or reflection . . . is the discernment of the relation between what we try to do and what happens in consequence. No experience having a meaning is possible without some element of thought" (p. 169). Furthermore, the use of reflection and more specifically metacognition, or the act of thinking about one's own thought processes to enhance learning (Flavell, 1979) is a pedagogical strategy that crosses disciplinary and demographic boundaries (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010; Di Stefano, Gino, Pisano, & Staats, 2015; Kaplan, Silver, Lavaque-Manty, & Meizlish, 2013; Pearson & Heywood, 2004; Pintrich, 2002).

Comparatively, traditional paper-based portfolios might have once been considered a signature pedagogy, a technique which finds its greatest influence within certain disciplines, most often professional studies that focus on teaching the skills and dispositions of practitioners in the field (Shulman, 2005). For example, portfolios have a long tradition within the field of art, serving as a practical format with which to present the artist's work to the viewer. The arrangement of pieces creates an experience similar to turning pages in a book thereby allowing the artist to tell his or her story from beginning to end. In place of the artist's voice, comments and reflections are written across the pages to explain the artist's unique process. This practice of explaining the *whys* and *hows* challenges artists to invoke meaning into their work that goes beyond mere descriptions of the pieces. The act of creating these portfolios as an art student is both a showcase of work and an acquisition of skills necessary for professionals in that field.

Similarly, portfolios have long been a fixture of first-year writing courses and programs found within a wide range of higher educational institutions. Writing program administrators and instructors regarded

portfolios as a powerful and effective means to teach and evaluate students' writing skills—particularly in programs where process-based writing pedagogies emphasize student learning as much or more than polished written products (Black, Daiker, Sommers, & Stygall, 1994; Yancey, 1992). Writing programs and instructors typically ask students to submit many artifacts, including multiple drafts of essays, and to reflect on these artifacts as evidence of learning and skill development over a period of time. By the 1990s, writing programs and instructors had begun to adopt portfolios and their accompanying reflective texts with increasing regularity and enthusiasm, as they were seen to more effectively represent student work and contribute to a writer's development than discrete assignments and essay tests (Yancey, 1992, 2004). Yet certain challenges remained for writing programs intent on improving their pedagogical practices and realizing institutional goals. Course-based print portfolios have sometimes had the unintended consequence of sealing off writing from valuable external contexts. For example, students write and develop their craft in other general education courses and in their majors; in professional situations such as internships and part- and full-time employment, and in diverse personal situations and activities. These practices and experiences too often remain disconnected from even print portfolio construction, notwithstanding reflective prompts inviting commentary on prior writing experiences and invitations to include additional written work from outside the first-year writing course. How portfolios are deployed in writing programs depends very much on the institutional context and its particular mission, goals, and student population.

With the emergence of technological solutions and the transition to electronic platforms for portfolio development, ePortfolios have expanded outside of these early portfolio users to writing programs and almost any other discipline, especially those that

emphasize student self-reflection (Buyarski & Landis, 2014; Hassan, 2011; Parkes, Dredger, & Hicks, 2013; Wong & Trollope-Kumar, 2014; Yueh, 2013). However, in this transition from the traditional paper-based portfolio, primarily within certain disciplines, to an expanded use of ePortfolios across a broad array of content areas, the many new features and functions available in advanced technological platforms will likely impact the main drivers for portfolio development. Specifically, the role of student self-reflection on current work, evaluation of skill development, and goal setting for the future could be diminished or otherwise negatively impacted. As emerging teaching strategies and technological advances become more readily available to colleges and universities—along with the promise of more expansive data collection and assessment resources—it is imperative for program administrators, faculty, and staff to not lose sight of the principles that led to the perceived successes of portfolio-driven pedagogy. As faculty members began to explore and voluntarily adopt ePortfolios in first-year writing courses, program leadership became more curious about the impact of this pedagogy in freshman foundation writing courses. They developed the following specific question: What differences might exist in students' reflective writing when using an ePortfolio compared to a traditional paper-based portfolio?

Literature Review

Reflection and Metacognition in Portfolios

Reflection on individual experience as a key to unlock the doors of learning and knowledge creation is not a new concept in education or general learning theory (Dewey, 1916; Flavell, 1979; Kolb, 1984; Korthagen & Kessels, 1999). However, the best strategies to promote this type of learning environment are continually being developed. For over a decade, the use of ePortfolios have been promoted in higher education to support student learning, serving as both a product of academic coursework and as a process that supports metacognitive thinking (Clark, & Eynon, 2009; Miller & Morgaine, 2009). Specifically the act of reflection through portfolios not only allows students to review their current progress and evaluate their own skill acquisition, but also can facilitate the active process of retrieving knowledge in order to apply it to a novel situation and increase students' ability to reach higher order thinking skills, such as comparing, analyzing, and drawing conclusions on the material in which they are focusing (Oosterbaan, van der Schaaf, Baartman, & Stokking, 2010). Penny Light, Chen, and Ittelson (2012) coined the term “folio thinking” to refer to learning that encourages students to “integrate

discrete learning experiences, enhance their self-understanding, promote taking responsibility for their own learning, and support them in developing an intellectual identity” (p. 86).

Though ePortfolios provide a great opportunity to encourage and promote high quality student reflection, such activities must take place under certain conditions to ensure that the desired outcomes truly are achieved. Driessen, van Tartwijk, Overeem, Vermunt, and van der Vleuten (2005) provided insight into the specific conditions that must be present for ePortfolios to be successful in developing students' reflective skills, including providing students with a well-structured portfolio environment with clear guidelines and expectations and ensuring that students have sufficient prior experiences and material to reflect upon before beginning the portfolio process. They also stated that portfolios should be included in some form of summative assessment to ensure the necessary effort is put forth as part of the learning process. In addition to these points, it is clear that the role of a coach or mentor in the ePortfolio creation process is vital for students to engage deeply in the act of reflection (Driessen et al., 2005; Hadley, 2007; Parkes et al., 2013; Pearson & Heywood, 2004). This mentoring role, which may take the form of a variety of roles in an academic setting, including instructor, tutor, or advisor, provides encouragement to students on their current progress, models the act of asking self-reflection questions, encourages the student to set future goals, and aids in the creation of learning plans to achieve those desired outcomes. Pearson and Heywood (2004) reported that students who received encouragement from their mentor were more likely to discuss the contents of the portfolio with the mentor and more likely to engage in reflection on the portfolio itself. Reflection is not a skill students will often display on their own and, even with basic prompting, they may reflect on it only at a superficial level. Hadley (2007) found the role of the mentor and the role of peer mentors to be essential to encourage students to engage in deeper, more thorough reflection. Through her use of portfolio forums, she has created an environment where students feel safe to share with classmates their work and their personal reflection on how their work has allowed them to achieve the specific learning outcomes of their program. All students aspire to achieve these same outcomes, but each may need to take a particular path. One of the key ways in which Hadley (2007) was able to encourage students to reach higher levels of reflection was through the projection of their work to the rest of the class for feedback. Putting their work on display in this way allows students to look at their work through new eyes and gauge how their work is received from outside perspectives. Scaffolding of reflection activities for students over time and presentation of

reflection as an iterative process, instead of only encouraging reflection as a culminating activity, is another important technique and should be incorporated into ePortfolio activities, as it can stimulate learning and allow students to achieve higher levels of achievement (Hadley, 2007; Qvortrup & Keiding, 2015).

ePortfolio vs. Traditional Paper Portfolios

The prevalence of electronic portfolio platforms has led to its increased use as a pedagogical strategy that is now being adopted by a variety of disciplines—including many that did not adopt portfolio strategies until they were available in an electronic medium. Much of the research on ePortfolios has thus far focused on the benefits and proper conditions for implementation. Only a few select studies have directly compared the effects on student outcomes between ePortfolios and their paper-based equivalents. Driessen, Muijtjens, van Tartwijk, and van der Vleuten (2007) found advantages to administering portfolios in an electronic platform, including increased student motivation and greater usability for mentors when accessing and evaluating student portfolios. In addition, they found the quality of student work and reflection was equivalent between the paper-based and electronic portfolio products. Similarly, van Wesel and Prop (2008) found that student perception of support for self-reflection and their feelings of usefulness on the portfolio creation process in general did not differ between the students who created an ePortfolio or paper-based portfolios. However, their findings indicate that students who created the ePortfolios saw significantly higher grades than those who created paper-based portfolios, which may suggest “a deeper level of reflection . . . [which] might have led to a better metacognitive regulation which in turn led to improvements in the learner’s performance” (van Wesel & Prop, 2008, p. 79). In the study conducted by Smith, Cook, Faulkner, and Peers (2011), it is clear that the transition from a paper-based portfolio to an electronic platform is not always easy for students or instructors. While the initial study included the comparison of a paper portfolio and a commercial electronic platform, a third option of portfolios created electronically stored on flash drives was added as the study progressed. Though student perceptions seemed to indicate a preference for paper portfolios, the researchers opted for the use of the flash drive portfolios moving forward, for several reasons: many of the student perceptions were rooted in prior familiarity with the paper-based process, students did not report difficulty with the technology involved, and further clarity of instructions and purpose of portfolio use were needed, regardless of platform.

Holistic vs. Course Portfolios

While the vital pedagogical strategies involved in the use of portfolios must be present in both paper-

based and electronic platforms, including collecting and selecting exemplary artifacts, as well as reflecting, sharing, and celebrating those works, it is clear the transition to an electronic platform provides its own additional advantages (Barrett, 2007). Especially significant among these strengths is the ability to showcase experience, artifacts, and reflection from a variety of sources all in one location using web technologies. Paper portfolios, limited by their physical size, can only contain so many pages before they become impractical to carry from location to location and are best suited for an individual course or topic. However, with the variety of types of artifacts that can be displayed and the ability to link between many individual pages, web technologies allow for the creation of much larger, more holistic portfolios of the student experience, including not only academic, but also extra-curricular, professional, and personal experiences. Viewers of the portfolio, therefore, get a much broader view of the individual as a whole. The ePortfolio format provides a mechanism for students to make connections between both formal and informal learning experiences, including many high impact practices, such as common intellectual experiences, collaborative assignments, research activities, study abroad, service or community-based learning, and internships (Bass, 2012; Penny Light et al., 2012). Many of these kinds of activities do not take place directly within courses and are therefore invisible to faculty or advisors and often not included in traditional assessment measures. As stated by Bass (2012), ePortfolios “allow students to organize learning around the learner rather than around courses or the curriculum” (p. 26). Unlike their paper portfolio counterparts, which often remain on a shelf of the student or instructor after final review, rarely to be opened, within an ePortfolio system “students are poised to present their whole selves—not simply their academic selves—to their future teachers, schools, colleges, and employers, while allowing them to reflect thoughtfully on the past” (d’Erizans & Bibbo, 2015, p. 80).

A Qualitative Case Study: Portfolio Use in a First-Year Program

St. John Fisher College (SJFC), a small liberal arts institution in Rochester, New York, is an example of an institution whose first-year programs (FYP) ask students to complete portfolios as part of the course requirements. The FYP at this College is made up of the Learning Community (LC) Program and the Research-Based Writing (RW) Program (see Appendix A for a description of the FYP). The LC Program is required of all first-year students at SJFC and is taken in the fall semester. Each LC consists of two courses from different academic disciplines, paired on a

common theme. The RW Program is also required, and students take this course in the spring semester of their first year. Both programs require students to compile a portfolio representing their semester's work. A primary goal of the portfolio assignment is to highlight growth and learning in connection with program goals. Furthermore, as part of the portfolio, students complete a reflective memo in which they discuss their work as relevant to each goal. Until recently, all faculty have used traditional paper portfolios. Two years ago, a faculty-driven Learning Circle resulted in the creation of a Fisher ePortfolio template (see Appendix B for ePortfolio template). It is this template that has been adopted for optional use in the FYP and also for this study. All students in both programs are required to complete a portfolio, but faculty may choose the format: traditional paper-based portfolio or the electronic portfolio using the SJFC template provided (see Appendices C, D, E, and F for LC and RW course guidelines for traditional and electronic portfolios). Regardless of the format chosen, all students are prompted to reflect on the types of skills (academic, personal, and/or career) they have gained as a result of participating in the Program. In addition, students are prompted to consider what they may have gained as a result of completing the portfolio assignment itself.

Participants

Of the 40 faculty involved with the 22 learning communities in the fall semester, nineteen participated in the study. Of these faculty, 10 chose the ePortfolio option, and the remaining nine chose to administer traditional paper portfolios. In the following spring semester, of the 28 course sections of RW offered, 13 of the faculty teaching an RW course participated in the study. Of the 13 participating faculty, eight chose to administer the ePortfolio, and five chose the paper portfolio option.

All of the participating faculty were asked to submit the completed portfolios from three randomly selected students. Upon receipt of the work, it was discovered that some of the work samples were either incomplete, missing reflections, or illegible. These samples were excluded from the study. Of the 28 LC samples of student work accepted for review, seven male and seven female students submitted ePortfolios, and eight male and six female students submitted paper portfolios. During the following semester, of the thirty samples of student work accepted, seven male and nine female students submitted ePortfolios, and six male and eight female student submitted the traditional paper portfolios.

Methods

In order to investigate the perceptions and practices of students when writing reflective summaries using ePortfolios and traditional portfolios, it was necessary to approach the subject inductively, which would allow the

researchers to enter the field without a preconceived hypothesis. This study, therefore, employed a qualitative collective case study design that included several sections of two required courses in the FYP (Miles & Huberman, 1994). As a form of research, the case refers to an event that can be identified as *patterned*, with sequential or coherent behaviors and *bounded*, with certain features that can be identified as in or out of the case (Stake, 2000). As such, the case study methodology provides insight into the complexities involved in a particular situation and allows researchers to compile detailed information to assess specific programs or participants, providing resonance and strength of other studies. Selecting multiple sections of the FYP courses, as Miles and Huberman (1994) suggest, provide the researchers with a deeper understanding of locally grounded causality. Since all sections of the FYP courses are required to include either a traditional portfolio or ePortfolio, the faculty participants who volunteered to use their courses for this study selected the format based on personal preference, thereby allowing a maximum variation sampling (Guba & Lincoln, 1989; Miles & Huberman, 1994) of instructors who supported the use ePortfolios and those who did not want to adopt the electronic version. Faculty bias, if any, would have an equal influence on student perceptions, thereby allowing for increased confidence in the results.

Qualitative researchers are said to be by nature "bricoleurs," using the strategies and materials that are at hand (Becker, 1998, as cited in Denzin & Lincoln, 2000, p. 4). Their methods and procedures vary depending on the context and the question, emerging as the pieces come together. For this study, the students' reflective writings, portfolio entries, and faculty feedback forms provide the data for analysis. In order to measure the students' levels of engagement when writing their reflective summary, a rubric was developed that assessed the students' understandings of the assignment's purpose, significance, and relevance (see Appendix G). Based in part on Anderson and Krathwohl's (2000) revised taxonomy of Bloom's levels of cognitive domains, the rubric looked at ways the students might connect the assignment to the course, to their overall learning, and to their career and personal goals. Student reflective writings were collected after the end of the semester, masked, and reviewed by two members of the research team using the rubric. Finally, to triangulate the findings, faculty comments on the faculty feedback forms were reviewed through a process of open coding by the researchers.

Findings and Analysis: Faculty and Students Respond

Increased Levels of Student Understanding

The results from the rubric scoring of student reflections found that students in both the ePortfolio

sections and the traditional portfolio sections made clear and convincing connections between their assignment and the course goals, demonstrating a level of understanding purpose. During the spring semester, 100% of students in the study, regardless of the portfolio format, reached the developmental level, scoring 2 out of a possible 3 points in this area. Differences between the two portfolios began to emerge when assessing the higher levels of understanding: significance and relevance. The average rubric scores measuring connections to learning, or significance, were 2.6/3.0 and 2.1/3.0 for the ePortfolios, and 1.8/3.0 and 1.6/3.0 for the traditional paper portfolios (Spring and Fall, respectively). Perhaps the most compelling evidence of differences resulting from the use of an ePortfolio rather than the traditional portfolio can be seen at the highest level of understanding, connections to career or personal goals, which demonstrated the students' abilities to articulate the relevance of the assignment. The average rubric scores for the ePortfolio were 2.3/3.0 and 2.0/3.0, as compared to the traditional portfolio scores of 0.8/3.0 and 1.2/3.0 (Spring and Fall). The percentages of students achieving the development level was also significantly different, with 68% and 60% of the students using the ePortfolio reaching this level and only 25% and 40% of the students using the traditional portfolio (see Appendix H for a summary of results).

Students Perceive Value in Seeing their Progress Over Time

Student reflections from the fall LC courses indicate that students were able to see how the creation of the portfolio would be useful to them in the future, in both their academic pursuits to represent the quality work they have produced, and as a means of showcasing and sharing their skills to potential employers and others after graduation. As well, both groups stated that the portfolios allowed them to see their personal development and progress over time. Interestingly, students using paper portfolios often made the claims in the context of the given course while looking back on the work they had completed, for example stating the portfolio was "beneficial to see how my writing has progressed since September" or "the portfolio assignment has given me the ability to see how I have progressed through my first college semester." Students who created an ePortfolio made similar statements but also added broader claims on how their progress would impact their future pursuits. For example, "It is the best tangible evidence of my growth as a student not only during the semester, but into the future as well," and "I will also use this to further my academic career because it will allow me to see my progress as I continue my college journey."

Students Actively Engaged in Portfolio Process

In addition to the rubric scores, the researchers also reviewed the student reflections through an axial coding process that identified several benefits of the use of ePortfolios and of portfolios in general. Interestingly, one of the early findings that held up through both semesters was the students' perception that portfolios were a beneficial activity, allowing them to see progress in their work, and was not seen as a static document repository. One student's comment in particular speaks to the importance of this process: "Sometimes you get lost in the stress and commotion of college and fail to realize how much your professors have taught you, or made you teach yourself."

Faculty Perception of Product and Process

Faculty perception of the value of portfolios was somewhat mixed. While some faculty noted the pedagogical value of making portfolios, in particular in helping students see the connection between the course goals and their own work, other faculty members saw its use primarily as a product or as a repository for the work completed in the course. For example, while one faculty member noted, "I think portfolios are an excellent tool. They invite students to reflect on their work, and to consider the purpose of course assignments." A different faculty member, however, stated, "I have never used portfolios as pedagogical tools . . . I use portfolios as evidence of the work itself that each student has produced over the semester. They are a database or warehouse of that work." In this way, some (though certainly not all) faculty perceive the process of making portfolios as a purely manual way to collect examples of student work, not a cognitive endeavor through which students gain insights about what they have learned, how they have learned, and the value of this learning.

When asked about the experience of creating portfolios for their students and what they perceived as its pedagogical benefit, faculty using both the ePortfolio and traditional formats saw portfolios as providing students with a "professional manner" through which to present their work. Further, faculty noted that portfolios teach students "the importance of branding themselves." Interestingly, faculty using ePortfolios, in some cases, did tend to point out the specific pedagogical value of this tool. One faculty member whose students used ePortfolios commented, "I like the reflection on goals happening concurrently to the uploading of work that serves as evidence for the goal. I think it promotes more concrete, specific reflection."

As for the negatives involved with the portfolio assignment, faculty cited the time and effort required to create a portfolio as the primary drawback because the time needed to assemble portfolios resulted in "less content and

material to be covered by this course.” The benefit, as one faculty saw it, was that from an instructor’s point of view, it was “useful to have all graded work collected in one place.” In spite of the practical implications or drawbacks that some faculty members say portfolios have, most faculty do see the positive benefits that the portfolio process has for student learning in their courses. Several faculty specifically described how the students better understood the connections between the coursework and the course learning goals. As one faculty member explained,

I believe the main pedagogical value of the portfolio lies in the ability to assemble all their work, and to reflect on it in hopes of viewing development and progress. More importantly, the students seem to readily recognize this function, and appear quick to engage in the reflection process, even [if only] on a superficial level.

Faculty Perceptions of ePortfolio versus Traditional Portfolio

Faculty adopting the ePortfolio did recognize benefits that the electronic medium offered over the traditional format. Seeing the ease of both sharing work and providing public access with an ePortfolio, faculty hypothesized that students “are more likely to take the assignment seriously when they understand that their work might live as part of a public repository that others might be able to see.” Others noted that they are “customizable, easy to use,” as well as having a “playful aspect, engaging most students.”

Interestingly, one of the concerns expressed by faculty using ePortfolios was a concern about the lost potential if the ePortfolio technology is not ultimately adopted more broadly across campus, beyond the FYP and into students’ major or other courses. In this case, the work that went into having the students create the ePortfolio, while valuable for the particular course, would be limited to that course. As one faculty member put it, “While the ePortfolio was much preferred over the regular one, I wonder to what extent there will be frustration with other professors [beyond the FYP] who don’t necessarily require the same kind of work [i.e., the use of ePortfolios]. [In that case, w]hat was the point of the set up? As another faculty member explained, “I think it is hard for students to understand the value of a portfolio when they have never done one before or their discipline may not require it.”

Discussion

ePortfolio Template Facilitates a More Holistic View of the Student

One fundamental difference between the ePortfolios created by students in this study and their paper-based counterparts is the breadth of information

contained within each portfolio type. The paper-based portfolios are typically contained within one three-ring binder and include a series of documents and student self-reflections, organized into sections pertaining to each program goal. The ePortfolio site similarly provides an opportunity to reflect on learning in connection with each goal. However, the ePortfolio does so within an institute-wide template that contains not only opportunities to share the same type of information found in a paper-based, three-ring binder portfolio but also additional web pages that focus on the student’s holistic experience as a learner. The specific pages for both Learning Community and Research-based Writing courses are located within a series of pages related to the overall general education curriculum. The general education curriculum section is also located within a larger framework of experiences the student may choose to showcase about their success, both academic (e.g., major, service learning, internships) and co-curricular (e.g., clubs, student government, athletics).

In addition, unlike the paper-based portfolios, the ePortfolios include a variety of other pages that students might choose to populate with additional information about themselves. This includes pages that provide an overall summary of the student’s goals and aspirations, a photo, major(s)/minor(s), pages specific to their current resume, internship or work experience, extracurricular activities, or additional coursework that may have been completed up to that time. From the outset, this overarching structure puts students’ experiences and what is documented in the ePortfolio from these courses in the context of their longer journey as college students, including both formal and informal learning experiences.

Findings of this study demonstrate that while both types of portfolios, electronic and traditional paper, contribute positively to students’ learning related to connections to the course, students completing an ePortfolio show heightened levels of metacognition in relation to connections to learning and connections to career or personal goals. Though additional study would be needed to confirm this finding, we suspect that the added growth or, in other words, heightened levels of metacognition, is likely to have been facilitated by the holistic format of the ePortfolio template used at this particular institution. This suggests that, while the electronic nature of the ePortfolio may in itself be advantageous for student motivation and engagement, ease of use for students as well as faculty, and, it seems in some cases, improved academic performance (Driessen et al., 2007; van Wesel, & Prop, 2008), an added benefit is realized with a template for the ePortfolio owned by the student that purposefully offers a medium within which connections to the student’s major, personal interests and passions, and

career are not only possible, but prompted by the design of the medium.

Institutions considering the use of ePortfolios or interested in refining their current use may want to consider the template and the medium of the portfolio design as well as how this template is developed. One factor that may have contributed to the success of our findings in terms of higher metacognitive engagement with the ePortfolio student population versus the traditional paper portfolios may have been that the template was purposefully designed to reflect this institution's various program goals and was also designed to put students in touch visually with their major, the core, extra-curricular activities and organizations, and specific career touch points such as the student's resume, personal narrative, internship experiences, and so on. The template is user friendly for any program that desires to integrate his or her specific program into the template and can be personalized by students to meet their specific needs. This enhances, one might surmise, the use of the template for students and programs alike and increases buy-in and ownership of the personal sites created by students and the concept of students creating these personalized ePortfolio sites by faculty.

Holistic View of Student May Influence Student Perception of Learning

Similarly, the holistic perspective of the learner seen in the design of ePortfolios may influence the students' perception of their own learning process. Specifically, for the first-year students in this study the ePortfolio puts the learning, in the form of the students' own work and reflections on that work, directly into a broader view of their overall college journeys. Therefore, there is potential for students to see and perhaps even appreciate that they still have many more experiences ahead of them, in which and through which they will have the opportunity to perfect their skills. Students are able to see with relative ease, facilitated by the format of the ePortfolio template, that their current progress will be useful to them as they reach their future required coursework. In comparison, students using the paper-based portfolio may view learning as a more discrete process in which they should master all skills required in one class before moving on to the next. It is clear from the analysis of student reflective statements that students using the paper portfolios were able to make statements related to the assessment of their own growth and skill development from the beginning of the course to the end. However, students using the ePortfolio were able to make these statements as well as statements that indicated their ability to use these skills in the long term beyond the given course and their ability to continue improving over time. This

indicates that the ePortfolio structure and its holistic view of learning may encourage students to adopt a growth mindset over a more fixed view of learning (Dweck, 2006). There is also a growing field of research investigating student feelings of hope and how these viewpoints may influence student success, both within specific courses and in overall college completion rates (Grasgreen, 2012). The ePortfolio structure, with an emphasis on student ownership of the learning experience, may be one possible technique to encourage these characteristics.

Portfolio Use Should be Integrated into the Teaching Process

An influencing factor in the findings may be the timing of when reflection is encouraged by the instructor of the course. When and how faculty introduce the portfolio assignment (whether electronic or paper-based) and the reflective skills and process connected with this medium of learning matters, because the valuable reflection that portfolios ask students to do is likely to be perfunctory for the faculty member and the student if viewed as and treated as an afterthought to the central work of the course or if placed at the end of the course only, even when valued by the faculty. This is likely because the yield on learning through the reflection on course work is thwarted to the extent that the iterative process required for meaningful reflection is relegated to the end of the semester – for example, in a final assignment completed for finals week. However, as noted above, Driessen et al. (2005) have shown that for the benefits of reflection to be realized, there must be a well-structured medium with clear guidelines and expectations and sufficient experience and materials for the student to reflect on related to their learning. In addition, to ensure student effort, students must see that the portfolio has weight in the summative assessment, in some way, of their course work. Further, as also noted above, the educator, what the authors call “mentors,” must be invested as well in the value of the portfolio for learning and convey this value to students (Driessen et al., 2005). This may explain why students completing ePortfolios had higher levels of metacognitive reflection—if we also assume that those faculty who value the process of portfolio thinking are more likely to embrace ePortfolios as a valuable pedagogical tool and also are more likely to convey this value to their students. Thus, one implication of this study and our reflections on the possible meaning of the findings is that faculty development will be central to realizing the full benefits of reflection on a program-wide level. Future faculty development sessions need to convey the findings and the necessary preconditions for realizing the pedagogical value of portfolio use, which

would likely enhance the value further and may do so, at some level, not only for the electronic format but also for the traditional paper-based format. In the case of the latter, this could occur at less comprehensive levels because of the more limited scope (specific course-focused only) of paper-based medium.

In addition, though it is an individual decision made by each instructor independent of portfolio platform used, the general structure of the ePortfolio, which encourages reflection as an iterative process, may result in more faculty who had adopted the ePortfolio platform to encourage its use early in the semester, as compared to those using a paper-based portfolio. This decision alone creates more opportunity for reflection and the scaffolding of assignments related to these reflection activities, which may result in enhanced reflection skills of students by the end of the term. The general timing and iterative process of reflection compared to summative reflection activities may have possible implications for student's ability to reflect more broadly on their own learning experiences.

Given this, it is important that institutions interested in realizing the full pedagogical potential of ePortfolios support their use and integration into teaching through program or institutional support. Further, they should do so with an emphasis on ePortfolios as pedagogically valuable in-themselves for student learning, rather than as a repository for documents to demonstrate learning that has already occurred. Reflection on artifacts included in the ePortfolio, ideally directly in the vicinity of the artifact itself (as is the case with the SJFC ePortfolio template) and in conversation with specific elements within each artifact included is vital.

Faculty and Student Buy-In is Imperative to Successful Implementation

The findings suggest that while students may be quick to appreciate the value of the opportunity for reflection in a portfolio (paper-based or electronic) faculty, in some cases, are more reticent to embrace portfolios as a pedagogical tool that has the potential to deepen and enhance learning. Faculty development in the form of workshops, online tutorials, etc. and offering tools to engage students in meaningful and cognitively heightened levels of reflection (e.g., higher levels of cognitive engagement as found on the Bloom's taxonomy of learning; Anderson & Krathwohl, 2000) should be integrated as support for the faculty in programs and institutions adopting partial or full implementation of ePortfolios. Further, the positive yield from reflection may also be facilitated, but perhaps less smoothly, with the paper-based portfolio approach. In this case, in order to realize positive yields not only in learning related to the course but also in relation to academics beyond the course and/or in the student's career of choice,

institutions using paper-based portfolios will benefit from purposeful efforts to provide students with opportunities to make the connections that seem to be facilitated seamlessly and somewhat without extended effort in the ePortfolio format used by SJFC. As noted above, this is likely because the template of the ePortfolio for SJFC itself is uniquely and purposefully designed to prompt the student to make these connections.

In addition, students will benefit from explicit education on the value of portfolio creation, especially ePortfolio creation, for depth and breadth of understanding the value of education and of the future possible uses for pursuing continued education and/or career development. To this end, sharing the stories and ePortfolio examples of past students' successful use of ePortfolio to further their pursuits in academics (e.g., major and graduate school), and career (e.g., job applications) will likely prove to be beneficial to ePortfolio adoption at our institution.

Possible Study Limitations

One possible issue with this study is related to faculty selection bias. It is likely that faculty who believe that there is value in portfolios (either format) are likely to be the early adopters of ePortfolios and also are likely to devote more teaching and class time to the portfolio and the reflection required therein.

In addition, the sample size for this study was quite small, and the duration of the study was limited in time (only one cycle of assessment for each Program). It would be informative to complete the study with a larger sample over more semesters, getting multiple years of data from each program rather than just one set from each, as is the case for this study.

Finally, an additional limitation is that the analysis in this study focused exclusively on student and faculty reflections related to the course goals and related to a holistic reflection on the value of the course and the value of the portfolio assignment for their academic, personal, and careers. The study, therefore, is not pointing to content learning or even skill learning (writing, research skills, and so on); rather it is only exploring students' perceptions of the value of the course and the value of the portfolio assignment to their learning and to their future personal or career selves. It would be interesting to see if there is a connection between course learning (as assessed by, for example, course grades or assessment of student writing completed for the course over the semester) and levels of cognitive reflection of the same students in their ePortfolios, as compared with traditional paper-based portfolios.

Conclusion

The findings of this study suggest that the use of ePortfolios, as compared to traditional paper portfolios, yields greater connections not only to learning within the

course but also, and especially, beyond the course, to the students' academic majors and careers. Thus, there appear to be good reasons to continue to encourage the adoption of the ePortfolios over the traditional paper format. It is clear that students who create their portfolios using the template provided for ePortfolios see the value of the course and the assignment in more extended ways, beyond the course, than do students who only completed the traditional paper portfolio. However, this same insight is not necessarily shared by faculty in either group. Rather, as noted above, some faculty participating in the study express at least some skepticism about the value of the portfolio, even when they also might acknowledge its pedagogical potential, beyond its role as a document repository that also facilitates end-of-the semester assessment. Given this, and the evidence that the value of portfolios extends much deeper into the quality of student learning achieved, faculty development that highlights the cognitive benefits of reflection and student learning would be valuable. In addition, faculty development to enhance the pedagogical tools available for promoting meaningful and educational reflection on learning is also important. While some might argue that, given the results, a wide-spread adoption of ePortfolios across the entire FYP and perhaps even by all students at the college would follow, this would be a mistaken conclusion. Instead, because faculty buy-in of the ePortfolio as a pedagogical tool and faculty support to the students throughout the process of on-going reflection is vital to the success of its implementation, ePortfolio use should be encouraged and facilitated through faculty development but not forced.

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Appendix A

Learning Communities & Research-Based Writing: Mission Statement & Program Descriptions

In a college rooted in the liberal arts, the Learning Community and Research-based Writing (199) programs at St. John Fisher College play an important role in the college's central goal of preparing individuals for lives of intellectual, professional, and civic integrity. As such, these programs form the foundation of the college-wide core curriculum by cultivating the fundamental skills (writing, reading, critical thinking, and informational literacy) necessary for academically engaged living and learning. In these programs, students build upon skills and habits necessary for enriched civic engagement and academic success.

Learning Communities

The Learning Community is the first component of St. John Fisher's required core. In the LC, faculty from two different academic disciplines teach linked courses sharing a common theme, giving students an opportunity to learn about a topic from at least two perspectives. Through active participation in class discussion, collaborative learning, and a variety of assignments, all Learning Communities are designed to improve students' writing, reading, critical thinking, and informational literacy. The LCs target writing, discussion, research, and group work skills as the first step in improving students' ability to succeed in college.

CORE 101 (Learning Communities): Student Learning Goals

1. Students will increase their self-awareness via engagement in an important issue(s) and reflection on where they place themselves regarding that issue.
2. Students will approach an issue from multiple perspectives.
3. Students will be able to mount a convincing argument about an issue, demonstrating the ability to write and think critically.
4. Students will increase their information literacy skills.
5. Students will learn to work effectively in collaboration with others.

Research-Based Writing (DEPT 199)

In Research-based Writing (199), students will study and practice skills central to academic and professional research through the development of an independent, inquiry-based project. In their project, students assert, support, and integrate their own position into a scholarly conversation based in research. Students develop competency in the location, evaluation, analysis and documentation of sources that represent a range of different perspectives on important issues.

DEPT 199: Student Learning Goals

1. Students will be able to locate, select, and document secondary source material relevant to topic.
2. Students will be able to analyze and incorporate research in support of their own position, solution to a problem, or answer to a question.
3. Students will summarize, apply, and integrate multiple scholarly perspectives on a text or issue.
4. Through critical revision, students will learn to assert a position and support it using the tools of research in a well-developed, well-reasoned written document.
5. Students will be able to effectively present and defend some aspect of their research, using oral communication skills.

Appendix B St. John Fisher College ePortfolio Template

Example 1:

SJFC ePortfolio Template
Overall reflection on college wide learning goals

HOME BE CURIOUS BE ENGAGED BE READY BECOME EPORTFOLIO HELP

NAVIGATION

- ABOUT ME
 - RESUME
 - SKILLS
 - INTERNSHIPS
 - REFERENCES
- SHOWCASE
 - FRESHMAN SEMINAR
 - THE CORE
 - YOUR MAJOR
 - YOUR MINOR
 - EXTRACURRICULAR ACTIVITIES
 - COMMUNITY SERVICE
 - FIRST GENERATION SCHOLARS PROGRAM
 - HONORS PROGRAM
 - SCIENCE SCHOLARS

Home

Summary Statement
[DELETE THIS TEXT: A summary statement for employment purposes contains the following elements: who you are (as a young professional), what you are good at (skills/achievements) and what you bring to the workplace (this shows motivation/drive as well as an awareness of what you have to offer). A college student with limited experience should represent their *potential* in this section.]

CONTACT INFORMATION

Firstname Lastname
Major
School of your major
St. John Fisher College
email@sjfc.edu

Career-oriented portion, updated continuously

General academic area, applies to all undergraduate students

Specialized areas for participating programs

Also provided in specialized templates for participating majors

ksf

Example 2:

[HOME](#)[BE CURIOUS](#)[BE ENGAGED](#)[BE READY](#)[BECOME](#)[EPORTFOLIO HELP](#)

NAVIGATION

▼ ABOUT ME

[RESUME](#)[SKILLS](#)[INTERNSHIPS](#)[REFERENCES](#)

▼ SHOWCASE

[FRESHMAN SEMINAR](#)

[THE CORE](#)

[YOUR MAJOR](#)[YOUR MINOR](#)[EXTRACURRICULAR ACTIVITIES](#)[COMMUNITY SERVICE](#)[FIRST GENERATION SCHOLARS PROGRAM](#)[HONORS PROGRAM](#)[SCIENCE SCHOLARS](#)

The Core

Fisher's Core curriculum consists of 15 courses, which must be successfully completed to graduate.

The Core experience complements your other academic experiences by helping develop skills and perspectives that are enhanced and applied through study within your major.

The Core is comprised of two tiers of study: Foundations and Perspectives.

▼ **Foundations**

1-Learning Community (LC)
2-Research-Based Writing (RW-199)
3-Cultural Contrasts (CC)
4-Scientific and Quantitative Literacy (SQ)

▼ **Perspectives**

(P1) Perspectives on the Arts
(P2) Philosophical and Religious Perspectives
(P3) Sociocultural Perspectives
(P4) Exploration of the Natural and Technical World
(P5) Intercultural Perspectives and Languages

Skills Across the Core

Example 3:

The screenshot displays a course page layout for '1-Learning Community (LC)'. The page includes a breadcrumb trail 'The Core > Foundations >', a main title '1-Learning Community (LC)', and a descriptive paragraph. A 'Reflective Memo' section is highlighted with a blue box and labeled 'Reflective Memo'. Below this, a list of 'LC Program Goals' is shown, with '1 - Self & Social Awareness' selected and highlighted. An arrow points from this goal to a sub-page titled '1 - Self & Social Awareness', which also features a breadcrumb trail, a title, a description, and sections for 'Description of Artifact:' and 'Reflection:'. A blue box labeled 'ADD FILES' is at the bottom of the sub-page.

The Core > Foundations >

1-Learning Community (LC)

In your Learning Community, faculty from two different academic disciplines teach two linked courses sharing a common theme, giving you the opportunity to learn about a topic from at least two perspectives. You'll explore topics of social importance both in discussions and in writing. Learning Communities target writing, discussion, research, and group work skills as the first step in improving your ability to succeed in college.

Insert Learning Community Title Here
Insert Learning Community course description here.

This Learning Community is made up of two courses:

- Insert Course 1 Title
- Insert Course 2 Title

LC Program Goals

- 1 - Self & Social Awareness
- 2 - Multiple Perspectives
- 3 - Writing & Critical Thinking Skills
- 4 - Information Literacy Skills
- 5 - Collaborating with Others

Reflective Memo


The Core > Foundations > 1-Learning Community (LC) > LC Program Goals >


1 - Self & Social Awareness

Students will increase their self-awareness via engagement in an important social issue(s) and reflection on where they place themselves regarding that issue.

Description of Artifact:

Reflection:



 **ADD FILES**

This layout is consistent for all courses within the core curriculum, including;

- Home page for each course in the core, general description of course type, specific course description and course name
- Link to sub-pages for each of the program goals, the goal itself and prompts for student description of their artifact, reflection and location to attach artifact

Appendix C
St. John Fisher Learning Community Program
Portfolio Guidelines for Students
(Paper/3 Ring Binder Format)

As a requirement for the Learning Community. All LC students must submit a portfolio of their work. The primary purpose of the portfolio assignment is to offer you an opportunity to synthesize your experiences gained in your Learning Community and situate those experiences in relation to the LC Program goals. In addition, through your work on this assignment we hope that you will become more aware of the skills you have developed, the knowledge you have gained, and the relevancy of these skills and knowledge to your particular academic, professional and personal aspirations.

To complete the portfolio assignment, each student should:

- Obtain a one-inch binder in which you can place your learning community materials. At the end of the semester, you will submit this binder to one of your LC instructors as determined by your LC faculty. This portfolio will contain a significant amount of your work; you should be sure to treat it professionally, as a representation of your ideas.
- Create a structure for the portfolio with a Table of Contents so that your professors can easily locate the different assignments, the drafts, and the revisions.
- Include in your portfolio appropriate writing assignments, drafts of formal essays, and revisions of those essays as directed by your LC faculty. In addition, at least one paper must be a revision of a previous draft, and you should be sure to identify this revision for your readers.
- Include at least one written assignments from both courses in the cluster.
- Finally, write a reflective memo in which you evaluate your performance in relation the learning community learning goals. Those learning goals are:
 1. Students will increase their self-awareness via engagement in an important issue(s) and reflection on where they place themselves regarding that issue.
 2. Students will approach an issue from multiple perspectives.
 3. Students will be able to mount a convincing argument about an issue, demonstrating the ability to write and think critically.
 4. Students will increase their information literacy skills.
 5. Students will learn to work effectively in collaboration with others.

In your memo, you should refer specifically to your work, pointing to particular moments in essays and assignments that demonstrate the quality of your performance in reference to the goals, and use these to illustrate and demonstrate the ways you have improved over the semester. This reflective memo is an opportunity to make your case about what you have learned in the LC cluster.

- Place your reflective memo as the first item in your portfolio, following the Table of Contents.

Name _____ Learning Community Reflective Memo

1. One goal of learning communities is to teach you to approach an issue from multiple perspectives. As you review the paper in your portfolio that you feel best represents your ability to do this, please identify here the perspectives through which you considered the topic and how those perspectives differed.
2. This learning community should help you to increase your information literacy skills, especially in relation to the use of scholarly databases and other library resources. What did you learn about information literacy that you did not know before and how is that learning reflected in the work in your portfolio?

3. A third goal of learning communities is that you should be able to construct a convincing argument about an issue, demonstrating the ability to think and write critically. Looking over your portfolio, please choose one paper and comment on how the thesis, the organization, and the treatment of evidence all work to make a convincing argument.
4. An additional goal of the learning community was to assist students in learning to work effectively in collaboration with others. Please use the space below to reflect on how your learning community helped you to do this during the semester and please point to particular assignments, activities and/or group projects that facilitated you learning this skill.
5. Finally, one of the goals of the learning community is that you will increase your self-awareness through an engagement in an important issue. How did your work in the learning community help you do this during the semester and where in your work do you demonstrate this?
6. What types of skills (academic, personal, and/or career) have you gained from participating in the Learning Community Program?
7. Now that you have nearly completed this assignment, reflect on what you have gained, if anything, from the process (creating the Portfolio and all its elements and completing the reflective memo). Do you see yourself using this portfolio in some way in the coming months, years, etc.? If so how?

Appendix D
St. John Fisher Learning Community Program
Portfolio Guidelines for Students
(ePortfolio Format)

Learning Community Topic: _____ **ePortfolio Guidelines**

Professor Names: _____ **Due Date:** _____

As a requirement for the Learning Community, all LC students must submit a portfolio of their work. In this Learning Community we will do this in electronic form, as an ePortfolio. The primary purpose of the portfolio assignment is to offer you an opportunity to synthesize your experiences gained in your Learning Community and situate those experiences in relation to the LC Program goals. In addition, through your work on this assignment we hope that you will become more aware of the skills you have developed, the knowledge you have gained, and the relevancy of these skills and knowledge to your particular academic, professional and personal aspirations.

A few ePortfolios will be selected at random and will be read by members of the Learning Communities assessment committee. All students enrolled in the learning communities participate in this portfolio assessment program, and submission of a portfolio is a requirement for a passing grade in this course.

Included in the ePortfolio should be:

- I. LC Reflective Memo (See detailed guidelines below.) Post completed as a *Word* doc in the tab labeled “Reflective Memo” on your ePortfolio site.
- II. Completed Assignments, posted as “Artifacts” for the goal that best connects with this assignment. [Faculty may specify required artifacts to post, if they wish, here.]
- III. Post at least one “Artifact” for each goal.
- IV. For the “Description of Artifact” connected with each goal on your ePortfolio website, tell the reader what this assignment asked you to do and what the reader will find, in general terms, when they view the completed work. Include in your attachments the guidelines (if provided) by your professors in relation to each assignment posted.
- V. Each goal must include a “Reflection”. In your reflection connected with each goal, you should explain how the work you have provided demonstrates achievement of the particular goal. In your reflection, be sure to be specific, pointing to particular parts of your work and/or passages in your attached completed assignments that demonstrate your achievement of each goal.

General Guidelines: Your portfolio is due on _____. Be sure to either make your ePortfolio accessible to all individuals within the “sjfc.edu” domain; to people with the “sjfc.edu” domain and the appropriate link; or, at the very least, specifically to the professors of your course.

Guidelines for the LC Reflective Memo

The Reflective Memo offers a chance for you to reflect holistically (rather than in relation to each Program goal) on the experience in your LC and of the process of completing a portfolio as part of the LC Program requirements. To complete your Reflective Memo, please follow the following instructions:

In a 2-3 page response, please respond to the following writing prompts. To support your reflections, be sure to refer to elements of your written work as well as to various readings from both of the courses that make up your LC.

- A. This group of questions asks you to think about your personal response to the issues we have discussed in this Learning Community: What issues do you think about differently after this LC? Has your outlook on the world changed, and if so how? In your answer, point to specific reading assignments, LC experiences, and/or writing projects that influenced your ideas about these matters.
- B. All Learning Communities at SJFC pair together two courses on a common theme and work together to achieve the goal of the LC Program. In this section of your Reflective Memo, please reflect on what you take to be the

purpose of this particular aspect of the Program and reflect on how it has or has not been valuable for you and your learning.

- C. Discuss developments or modifications in your usual writing practice and/or your sense of yourself as a writer since the beginning of the course and offer reflection on what aspects of your writing you are still working on in order to continue to improve.
- D. What types of skills (academic, personal, and/or career) have you gained from participating in the Learning Community Program?
- E. Now that you have nearly completed this assignment, reflect on what you have gained, if anything, from the process (creating the Portfolio and all its elements and completing the reflective memo). Do you see yourself using this portfolio in some way in the coming months, years, etc.? If so how?

Appendix E
St. John Fisher Research-Based Writing Program
Portfolio Guidelines for Students
(Paper/3 Ring Binder Format)

Guidelines to Student Portfolios for DEPT. 199

All students who take a DEPT. 199 course at St. John Fisher need to submit a portfolio of their work in the course.

- Please obtain a one-inch binder in which you can place your materials; at the end of the semester, you will turn this binder into your professor. This binder will contain a significant amount of your work; you should be sure to treat it professionally, therefore, as a representation of your ideas.
- You should set up a structure for the portfolio with a Table of Contents so that your professor can easily locate the different assignments, the drafts, and the revisions.
- Your portfolio will contain your research paper; all drafts of this paper; the research proposal; your follow-up assignment to the library session; material from your oral presentation; assignments regarding research methods and processes (e.g., annotated bibliography, research journal, critical review, etc.); assignments having to do with identifying appropriate sources (print or database); assignments having to do with incorporating quotations from source material; assignments having to do with summarizing or paraphrasing source material.
- Finally, you must write a reflective memo in which you develop a response to the following:
 - A. Evaluate your performance in relation to the student learning goals for Research-based Writing (199). These learning goals include:
 1. Students will be able to locate, select, and document secondary source material relevant to topic.
 2. Students will be able to analyze and incorporate research in support of their own position, solution to a problem, or answer to a question.
 3. Students will be able to identify multiple perspectives on a text/issue and articulate those perspectives.
 4. Through critical revision, students will learn to assert a position and support it using the tools of research in a well-developed, well-reasoned written document.
 5. Students will be able to effectively present and defend some aspect of their research, using oral communication skills.
 - B. What types of skills (academic, personal, and/or career) have you gained from participating in the Research-based Writing Program?
 - C. Now that you have nearly completed this particular project (your portfolio), reflect on what you have gained, if anything, from the process of creating the portfolio and all its elements as well as the reflective memo. Do you see yourself using this portfolio in some way in the coming months, years, etc.? If so how?

In this self-evaluation, you should refer specifically to your work over the semester, pointing to specific moments in the research paper and the assignments that demonstrate the quality of your performance in reference to the goals, and use these to illustrate and demonstrate the ways in which you have improved over the semester. This reflective memo (in whatever format your professor has asked you to complete it) serves as an opportunity to make your case about what you have learned in the course. It should be the **first item in the portfolio following the Table of Contents**.

Please note: A random sample of student portfolios will be collected for assessment purposes for the SJFC First-Year Program and may not be returned to students.

Appendix F
St. John Fisher Research-Based Writing Program
Portfolio Guidelines for Students
(ePortfolio Format)

Research-Based Writing

ePortfolio Guidelines

Professor Names: _____ **Due Date:** _____

As a requirement for the Research-based Writing (199), all 199 students must submit a portfolio of their work. In this 199 course we will do this in electronic form, as an ePortfolio. The primary purpose of the portfolio assignment is to offer you an opportunity to synthesize your experiences gained in your Research-based Writing course and situate those experiences in relation to the Research-based Writing program goals.

All students enrolled in Research-based Writing create a portfolio and submission of a portfolio is a requirement for a passing grade in this course. A few ePortfolios from each 199 course will be selected at random and will be read by members of the Learning Communities assessment committee.

Please include the following in your ePortfolio:

- I. 199 Reflective Memo (See detailed guidelines below.) Post completed as a *Word* doc in the tab labeled “Reflective Memo” on your ePortfolio site.
- II. Completed Assignments, posted as “Artifacts” for the goal that best connects with this assignment.
[Faculty may specify required artifacts to post, if they wish, here.]
- III. Post at least one “Artifact” for each goal.
- IV. Each goal asks for a “Description of Artifact.” For this, explain to your reader what this assignment asked you to do and what the reader will find, in general terms, when they view the completed work. Include the guidelines (if provided by your professor) for each assignment posted.
- V. Each goal must include a “Reflection.” In your reflection explain how the work you have provided demonstrates achievement of the particular goal. In your reflection, be sure to be specific, pointing to particular parts of your work and/or passages in your attached completed assignments that demonstrate your achievement of each goal.

General Guidelines: Your portfolio is due on _____. Be sure to either make your ePortfolio accessible to all individuals within the “sjfc.edu” domain; to people with the “sjfc.edu” domain and the appropriate link; or, at the very least, specifically to the professors of your course.

Guidelines for the 199 Reflective Memo

The Reflective Memo offers a chance for you to reflect holistically (rather than in relation to each Program goal) on the experience in your Research-based Writing course and of the process of completing a portfolio (or ePortfolio) as part of the 199 Program requirements. To complete your Reflective Memo, please respond to the writing prompts below. In your response, be sure to refer to elements of your written work and/or various readings from your 199 course.

- Discuss developments or modifications in your usual writing and research practice and/or your sense of yourself as a writer since the beginning of the course and offer reflection on what aspects of your writing and/or your research you are still working on in order to continue to improve.
- What types of skills (academic, personal, and/or career) have you gained from participating in the Research-based Writing Program?
- Now that you have nearly completed this particular project (your ePortfolio), reflect on what you have gained, if anything, from the process (creating the Portfolio and all its elements as well as the reflective memo. Do you see yourself using this portfolio in some way in the coming months, years, etc.? If so how?

Appendix G
Rubric for Assessing Student Reflections in ePortfolios

| | Highly Developed | Developed | Emerging | Initial |
|--|---|--|---|---|
| Connections to Course <i>(Understanding Purpose)</i> | Student describes the artifact and explains why it satisfies the course assignment. Student clearly articulates the relationship between the assignment and a goal of the course. Student evaluates the success of his/her work. | Student describes the assignment and the artifact. Student describes how the assignment relates to specific topics taught in the course. | Student describes the artifact and references an activity or topic from the course. | Student describes the artifact but does not reference any specific class activities or topics. |
| Connections to Learning <i>(Understanding Significance/Meaning)</i> | Student identifies specific skills and/or knowledge learned in the course and explains how the skills and/or knowledge learned relate to the intent of the core curriculum and/or their academic major. Student clearly states the academic importance of the skill and/or content knowledge beyond the importance to the course alone. | Student identifies specific skills and/or content knowledge and explains their importance to their academic work beyond the significance of the course. | Student mentions an academic skill or some content knowledge learned through the course but does not explain its significance . | Student does not identify specific academic skills or content knowledge that is separate from the assignment (i.e., “writing” vs. defending a thesis statement) |
| Connections to Career or Personal Interests <i>(Understanding Relevancy)</i> | Student identifies specific components of the artifact that relate to career objective, or personal interest. Student describes why the artifact is personally significant. | Student describes how the assignment relates to the course and how the course relates to their career or personal plan. Student mentions why they took the course or why the topic is personally meaningful. | Student describes the assignment and is able to explain how it relates to their personal interests or plan. | Student describes the assignment as being “required” and does not see it as personally or academically significant. |

Appendix H Summary of Rubric Scores

Table H1
Average of Rubric Scores on Student Reflections

| | ePortfolio <i>Spring 2015 – 199</i> | ePortfolio <i>Fall 2014 – LC</i> | Paper Portfolio <i>Spring 2015 – 199</i> | Paper Portfolio <i>Fall 2014 – LC</i> |
|---|--|-------------------------------------|---|--|
| Connections to Course | 2.9 | 2.5 | 2.9 | 2.2 |
| Connections to Learning | 2.6 | 2.1 | 1.8 | 1.6 |
| Connections to Career or Personal Goals | 2.3 | 2.0 | 0.8 | 1.2 |

Table H2
Percent of Students with a “2” (Developed) or higher

| | ePortfolio <i>Spring 2015 – 199</i> | ePortfolio <i>Fall 2014 – LC</i> | Paper Portfolio <i>Spring 2015 – 199</i> | Paper Portfolio <i>Fall 2014 – LC</i> |
|---|--|-------------------------------------|---|--|
| Connections to Course | 100% | 93% | 100% | 80% |
| Connections to Learning | 82% | 87% | 63% | 80% |
| Connections to Career or Personal Goals | 68% | 60% | 25% | 40% |

Table H3
Mean and Comparison p-values (T-test)

| E 15 Course | E 15 Learn | E 15 Goals | E 14 Course | E 14 Learn | E 14 Goals | P 15 Course | P 15 Learn | P 15 Goals | P 14 Course | P14 Learn | P14 Goals |
|--------------------|---------------|---------------|----------------|---------------|---------------|----------------|---------------|---------------|----------------|--------------|--------------|
| Mean | | | | | | | | | | | |
| 2.89 | 2.64 | 2.25 | 2.53 | 2.13 | 2.07 | 2.91 | 1.84 | 0.84 | 2.27 | 1.60 | 1.27 |
| Percent \geq 2 | | | | | | | | | | | |
| 100% | 82% | 68% | 93% | 87% | 60% | 100% | 63% | 25% | 80% | 80% | 40% |
| Standard Deviation | | | | | | | | | | | |
| 0.31 | 0.78 | 0.93 | 0.63 | 0.63 | 0.94 | 0.30 | 0.77 | 0.81 | 0.78 | 0.81 | .069 |
| | | | | | | | | | | | |
| Group 1 | | Group 2 | | Course | | Learning | | Goals | | | |
| ePort 2015 | | ePort 2014 | | 0.008 | | 0.009 | | 0.459 | | | |
| ePort 2015 | | Paper 2015 | | 0.866 | | 0.000 | | 0.000 | | | |
| ePort 2015 | | Paper 2014 | | 0.000 | | 0.000 | | 0.000 | | | |
| ePort 2014 | | Paper 2015 | | 0.005 | | 0.108 | | 0.000 | | | |
| ePort 2014 | | Paper 2014 | | 0.152 | | 0.006 | | 0.000 | | | |
| Paper 2015 | | Paper 2014 | | 0.000 | | 0.230 | | 0.030 | | | |

ePortfolios and Faculty Engagement: Measuring Change Through Structured Experiences

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In this paper we examine a faculty development structure that supports general education, specifically ePortfolio, assessment focusing on identifying the characteristics of engaged faculty. It is through this inquiry that we have developed an action plan that includes a system of best practices that can lead to increased faculty engagement. Participants in our study were members of a series of General Education and ePortfolio Summer Assessment Institutes (2013, 2014, 2015). Most of the participants were either tenured faculty or lecturers. The resulting framework proposed here is a more inclusive systems-approach to faculty development throughout the university. As a result of our research, we have come to recognize that if we are to transform teaching and learning, a faculty development system must be in place that provides faculty a purposeful, integrated collection of engagement activities rather than a menu of options from which to choose. Doing so fosters a culture of continuous learning on the part of faculty that encourages innovation and creativity in the classroom.

In addition to increased obligations related to teaching, research, and service, higher education faculty are often expected to participate in programmatic assessment of student learning. Unfortunately, much of what has been done in the name of programmatic assessment has failed to engage large numbers of faculty in significant ways (Hutchings, 2010). Supporting our strategic plan to enhance student quality and performance while addressing the changing nature of accreditation, Clemson University implemented an ePortfolio requirement designed to provide assessment data for its general education competencies. In our original plan, students collected assignments from their general education courses, linking them to the appropriate competencies. Central to the success of this program were the support and engagement of our faculty, particularly those teaching general education courses. In an earlier article published in this journal, Ring and Ramirez (2012) pointed out that to be successful the program needed to address challenges related to faculty buy-in, clarity of purpose, motivation, and use of technology. In this paper, we examine a faculty development structure that supports general education assessment, specifically focusing on identifying the characteristics of engaged faculty and the activities that contribute to increasing this engagement in general and with ePortfolio assessment in particular. It is through this inquiry that we have developed an action plan that includes a system of best practices that can potentially lead to increased faculty engagement. The resulting framework proposed here is a more inclusive systems approach to faculty development throughout the University.

Literature Review

In her 2010 report, Hutchings suggested that the real promise of assessment depends on faculty

involvement, providing reasons why faculty are not, by and large, involved in university assessment. First, for many faculty the language of assessment has been less than welcoming. Second, faculty are not trained in assessment nor has assessment had a central place in professional development experiences for faculty. Third, the work of assessment is not part of the institutional reward system. According to Hutchings (2010), at many institutions, assessment—like teaching more generally—has often been undervalued or invisible in promotion and tenure deliberations, contributing to this lack of engagement. Moreover, she argued that faculty have not seen evidence that it makes a difference (Hutchings, 2010). According to Hacker and Dreifus (2011, as cited in Kirschner, 2012), at most institutions, faculty are rewarded as individual performers of their research and their contribution to their field, but have no incentives for institutional loyalty or accountability for student success, with several scholars suggesting that higher education has an obligation to create a faculty reward system that takes into consideration the multiple ways faculty contribute to their students, discipline, and society (Boyer, 1990; O'Meara, 2006).

Giving credence to the Scholarship of Teaching and Learning, Boyer (1990) urged the academy to expand the idea of scholarship to include teaching, integration, application, discovery, and in 1996, engagement. This expansion of scholarship, as defined by Boyer (1990), elevated teaching to a field of study, thus laying the foundation for the research of Barr and Tagg (1995), who suggested a shift from a teaching to a learning paradigm in undergraduate education. In this new paradigm, colleges recognize and support their mission to produce learning results rather than instruction, and as members of a learning institution, educators design the learning process. In this paradigm,

educators and students form communities designed to create holistic, connected environments of learning. Our research is focused on the strategies that encourage faculty engagement in this learning process: developing learning outcomes, developing activities that support these outcomes and finally, developing assessments of these activities.

A change of this magnitude requires a shift in culture and an acknowledgment that change is a process that must be both deliberate and purposeful. There is a preponderance of research related to the adoption and the spread of an innovation throughout systems. Rogers (1995), thought by many to be the Father of Innovation Diffusion Theory and certainly the most cited researcher on this topic, provided a comprehensive analysis of the adoption and diffusion process in his book, *Diffusion of Innovations*. He explored the rate at which innovations were adopted by systems, as well as how and why, describing how groups of people vary along the change continuum and classifying them into five adopter groups:

- innovators, representing 2.5% of the population;
- early adopters, the opinion leaders representing 13.5%;
- early majority, the 34% who observe and model the opinion leaders;
- late majority, also 34%, who take more time to study the innovation to look for benefits associated with the change; and
- laggards, the 16% of the population who are resistant to change and may even try to subvert the innovation.

The multi-dimensional nature of Rogers's (1995) model is relevant to this study because it helps us understand how ideas are spread throughout a system. Using his model, we were able to identify early adopter participants who could help us shift our culture from a focus on teaching to a focus on learning.

Similar to Rogers's research, Hagner (2001) identified categories related to engaged faculty: entrepreneurs or *first wave adopters* who, like Rogers' (1995) innovator group, seek out the resources to implement new technologies on their own. The next group, *second wave faculty*, share the first wave group's commitment to learning but are more risk averse and cautious, waiting for the institution to provide an environment that is low risk. Hagner (2001) identified two additional groups: *careerists*, who will engage or adopt new technologies when it will help them advance their professional careers, and the *reluctants*, who believe that traditional models of teaching and learning are superior. The characteristics of this environment include, according to Hagner (2001), universal student

access (to technology), reliable networks, multiple opportunities for training and consulting, a faculty ethos that values experimentation, and a tolerance for problems. The research of both Rogers (1995) and Hagner (2001) reminds us of the importance of the environment and the extent to which it "enables" institutional change.

It is vital, then, to design faculty development opportunities with university culture and the degree to which it encourages faculty to become aware of their teaching beliefs in mind. To implement a faculty development initiative with the potential for that kind of success, we looked to the research of Hall (1979) and his Concerns Based Adoption Model. As Rogers (1995) and Hagner (2001) helped us see how groups approach change, Hall (1979) provided a way to understand the concerns of individuals related to change, separating them into the seven categories identified below:

0. Awareness: Limited knowledge of the initiative
1. Informational: Desire to learn more
2. Persona: Concerned about how it will affect me
3. Management: Concerned about the time involved
4. Consequence: Impact of the innovation on the learners
5. Collaboration: Learning from and working with colleagues
6. Refocusing: Extending the initiative to implement new approaches

This model (and other developmental models of its type) suggests that people considering and experiencing change evolve in the concerns they have and the kinds of questions they ask related to their use or integration of the innovation. According to Hord, Rutherford, Huling-Austin, and Hall (1987), early questions are more self-oriented: "What is it?" and "How will it affect me?", while questions that occur after involvement with the innovation are more impact driven: "How will this impact students?" These researchers suggested that as individuals adopt an innovation they go through these seven stages which can be combined into the broader categories of self (levels 0-2), task (level 3) and impact (levels 4-6). Their model provides a roadmap for professional development, reminding us that to understand and address the highly complex process of adopting an innovation (i.e., ePortfolios, evidence-based programmatic assessment), we must not lose sight of user concerns.

According to Lewin (1947), the framework for implementing organizational change involves three stages: unfreezing, moving, and refreezing. As early as 1961, and more recently in 2010, Schein elaborated on this model. He described the goal of leadership in Stage 1, unfreezing, as disconfirming current beliefs,

creating survival anxiety or guilt, and creating psychological safety to allow members to overcome any learning anxiety (fears of loss of power, identity, competence, and punishment) that they may feel as they adopt new concepts. The relationship between survival and learning anxiety is important for Schein (2010), as it is for Hall (1979). At different stages in the innovation process, these concerns shift; however, both of their models remind us that progress is best achieved by lowering learning anxiety as opposed to raising survival anxiety.

Methods

To explore this issue of faculty engagement, our team of researchers collected multiple forms of data to answer the research questions below as part of the Inter/National Coalition for Electronic Portfolio Research (INCEPR) Cohort 7:

1. What factors in the environment lead to increased faculty engagement, specifically related to programmatic assessment such as ePortfolios?
2. What are the characteristics of engaged faculty?
3. What activities contribute to increased faculty engagement? (Ring, Brackett, Ramirez, & Fishman, 2015)

Participants in our study are faculty at Clemson University, a large Research I University located in the southeastern United States with approximately 1,100 faculty and a population of approximately 18,000 undergraduate students. Participants were selected because they attended a series of General Education and ePortfolio Summer Assessment Institutes (2013, 2014, 2015) and in this capacity were compensated for their time. Faculty were personally invited to participate with the Director of the Institute, highlighting the value that they could bring to it as well as the value that they would receive as a result of their participation. Most of the participants were either tenured faculty or lecturers, with 12 of the 24 participants teaching general education courses. While at our university lecturers teach most of these courses, the tenured/tenure-track faculty participants, by and large, engage in leadership activities such as serving on the University or College curriculum or assessment committees. These campus leaders are essential for both the dissemination of information and the adoption of new and the modification of existing initiatives. The data collection methods used in this study included faculty interviews, exploratory and feedback surveys, observations of participant interaction during the Institutes, and researcher notes. All participants were interviewed by

the Director of the ePortfolio Program and completed anonymous surveys prior to and during the Institutes. Using multiple forms of data, as Creswell and Plano-Clark (2011) suggest, strengthen the results obtained from a study.

Results and Discussion

As we conducted the Summer Assessment Institutes, we observed that the participants seemed to reflect Hall (1979) and his colleagues' concerns. Because our potential participants were at Stage 0, we found that e-mailing faculty inviting them to disconnected professional development sessions was insufficient to help them shift their concerns from self to task and, ultimately, to impact. Had we not visited their offices and personally invited them to participate, articulating both the contributions they could make to the Institutes (and the ePortfolio Program) as well as how participation could be beneficial to them, we would not have been successful in our recruitment efforts. We found that faculty needed both a reason and an invitation to participate. Because we identified potential participants based on their connections to general education, membership on the University Curriculum Committee, or College Assessment Committees, we could make a strong case for participation. Most of those invited accepted our invitations because they wanted to learn more about ePortfolio, general education, and/or general education assessment.

Once they agreed to participate, we met with each for an individual consultation to give him/her an opportunity to share both his/her concerns and goals for the Institute. At this point, most participants were at the informational/personal stage, and their concerns were focused on self, wondering how the experience would affect them. Conversations often included the words burden, time, and energy. Moreover, we found that in the Assessment Institute participants with self-level concerns (usually first-year participants) did not contribute to the conversations as actively as second-year participants, whose concerns were focused more at the management or task-level. An example was a participant who in her second-year exit interview admitted to feeling out of her depth and somewhat hesitant to contribute to the discussion in her first year of participation. Interestingly, she did not actually become aware of these feelings until her second year, when she felt that the year of practice and reflection provided her with deeper understanding and empowered her to contribute. It is for this reason that we strongly encourage participants to participate for two to three consecutive years and that we partner these experienced assessors with novice ones.

Realizing that most participants were at Stage 0 or Stage 1, on the first day of the Institute they were asked, as they introduced themselves, to explain why

they were participating and to tell the group one thing they “knew” about the ePortfolio Program. This activity gave participants an opportunity to get to know one another and to reiterate their goals (and concerns), and gave the Institute’s facilitator the opportunity to dispel misconceptions commonly found at the early stages of adoption. Most of what was mentioned by first-time participants was typically very basic knowledge or misconceptions that we addressed in the subsequent presentation, designed to clarify and extend their knowledge. This activity defines our session as a safe place to share and clarify misconceptions. Once we establish that we are all learners, the learning can begin in earnest.

Throughout the week-long Institutes, participants worked in both small and large groups, and the relaxed nature of the event, as well as the snack table, contributed to rich discussions and relationships that in some cases extended beyond the Institutes. Through extensive scaffolding, at the end participants had additional information related to the program, as well as increased confidence enabling them to share this knowledge with colleagues. Borrowing from the literature on action research, we encouraged them to develop an action plan and work towards enacting this plan in the upcoming academic year, reflecting on the results and revising their goals when necessary.

The academic year between the Assessment Institutes is critical, providing participants time to reflect on both what they had learned and how to shift their practice to apply this knowledge. It is this in-between time when assignments and/or curricula are modified and tested. However, in the first year we observed few changes, which is why we urge faculty to attend back-to-back Summer Institutes. After the second, concerns start to shift to Stage 3, the management level, with concerns related to the task at hand as mentioned in the following comment: “The biggest challenge, I assume, will be to keep the extra work load to something manageable.” Participants at this stage also mentioned tweaking or adding components to assignments to fit the competency better or eliminating some assignments altogether. This is the point, the consequence level, Stage 4, where we encourage the more experienced participants to share with newcomers their experiences related to tweaking assignments and revising student learning outcomes and rubrics. Finally, faculty begin to take ownership of the program and to act as ePortfolio or assessment ambassadors, which exemplifies Stage 5, the collaboration level. Once hesitant to speak up, members of this group, as long as they felt empowered by their departments, began to discuss the results of the Assessment Institutes and volunteer to collaborate with colleagues to rethink and refine the assignments in their courses. A very important consideration related to

faculty concerns is the extent to which the administration supported and was explicit in their support of the initiative. This administrative support, we found, was critical as non-tenured faculty and lecturers, those who most frequently taught general education courses, were sometimes hesitant to speak up for something that was not overtly supported. As noted by one participant,

If this were accepted higher up, then I would be happy to show other faculty what I do in my class for assessment and help them. However, without that support I do not want to stand up at a faculty meeting or some other venue and defend the process.

In our many discussions with faculty participants, one of the most commonly articulated benefits about participating in the Assessment Institutes was the opportunity to engage in conversations about the purpose of the ePortfolio Program. It was through these discussions that faculty began to recognize the need to be clear about general education goals and outcomes in their classes. These comments and conversations are important and were the basis for this research and the design of our faculty development system.

One of the most important contributions of this project is the reconceptualization of faculty development that we propose here, based on Hall’s (1979) Stages of Concern, which we extended by developing goals and strategies to address the concerns of faculty (Figure 1). In this figure, the two columns on the left delineate the stages of concern conceptualized by Hall (1979), while the two columns on the right extend his research to include goals and strategies we implemented with our faculty to achieve these goals. As an overlay, this table integrates the self, task, and impact categorization of Hord, Rutherford, Huling-Austin and Hall (1987) with Hall’s (1979) stages and our strategies. The result is a best systems approach that contributes to a deeper understanding of faculty concerns related to programmatic assessment and the ePortfolio Program, the innovation studied in this research. As seen in Figure 2, the resulting faculty engagement system is based on a double helix to represent the multiple opportunities for engagement that the application of these strategies and goals suggests.

One of the challenges related to shifting faculty concerns is providing focused and sustained support throughout the change process. This support should take into account faculty concerns, providing multiple opportunities for them to face and work through these issues. In this model, faculty progress through a purposefully planned system of professional development (PD) experiences, with space in between to apply, critically reflect on the experience and the

Figure 1
Stages of Concern and Strategies

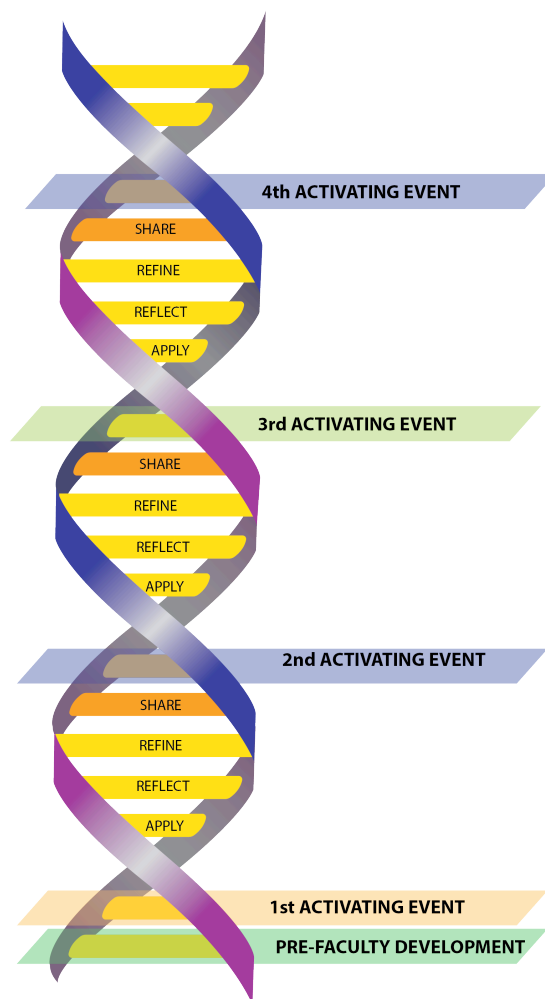
| | Stage of Concern | Description of Concern | Goal | Strategies |
|--------|------------------|--|---|--|
| Self | 0 (Un)awareness | "I have limited knowledge about the initiative/innovation." | Raise awareness | Personally invite stakeholders to engage in the implementation process, articulating the value of participation. |
| | 1 Informational | "I would like to learn more." | Increase knowledge and dispel misconceptions | Schedule individual consultations with participants to discuss their concerns about the innovation. |
| | 2 Personal | "How will it affect me?" | Provide support | Develop relationships with key people who provide scaffolding at various stages of the implementation process. |
| Task | 3 Management | "I am spending a lot of time getting materials ready." | Demonstrate procedures for integrating the pedagogy with the technology to make the task manageable | Guide faculty in developing course materials appropriate for the innovation through mentoring and tutorials. |
| | 4 Consequence | "How can the initiative/innovation affect my learners?" | Evaluate effective teaching techniques | Provide a safe place to experiment with new teaching techniques and spotlight innovative practices. |
| Impact | 5 Collaboration | "How can I learn from and work with others to make a greater impact on my students?" | Collaborate and disseminate ideas | Share and connect with colleagues to increase knowledge and involvement in the initiative. |
| | 6 Refocusing | "I would like to extend what I know to implement new approaches." | Continue advancing innovation | Help faculty extend their practice and engage in next direction research. |

application of new ideas, and further refine their work prior to the next planned PD experience, as reflected in the 3D double helix model (Ring et al., 2015). The idea of activating and deactivating proteins changing a molecule is an apt metaphor as we began to view each of the faculty development experiences as one of these proteins, or in our case, an activating event. Faculty participate in these events, and if the content resonates with them, it can "activate" a change in mindset and

practice. Different experiences will stick with different members of any faculty.

As we applied the strategies developed to support faculty, we found that, in addition to shifting their focus from concerns about the initiative, they began to take ownership of it and helped inform and educate their colleagues. We observed that this progression appears to be more of a pathway to professional growth (Figure 3) than simply Hall's (1979) categories (Ring et al., 2015).

Figure 2
Best System for Increased Faculty Engagement
FACULTY ENGAGEMENT SYSTEM



As a result of this continuous and systematic approach to faculty development, taking into account participant concerns, we have noticed a shift from self: “I didn’t know much about ePortfolio or programmatic assessment prior to the Institutes” to “I get the importance of ePortfolio as an assessment tool, but I worry that it will take too much time away from teaching” (Task concerns) to “I realize the effect that this innovation [ePortfolio] can have on student learning” (Impact).

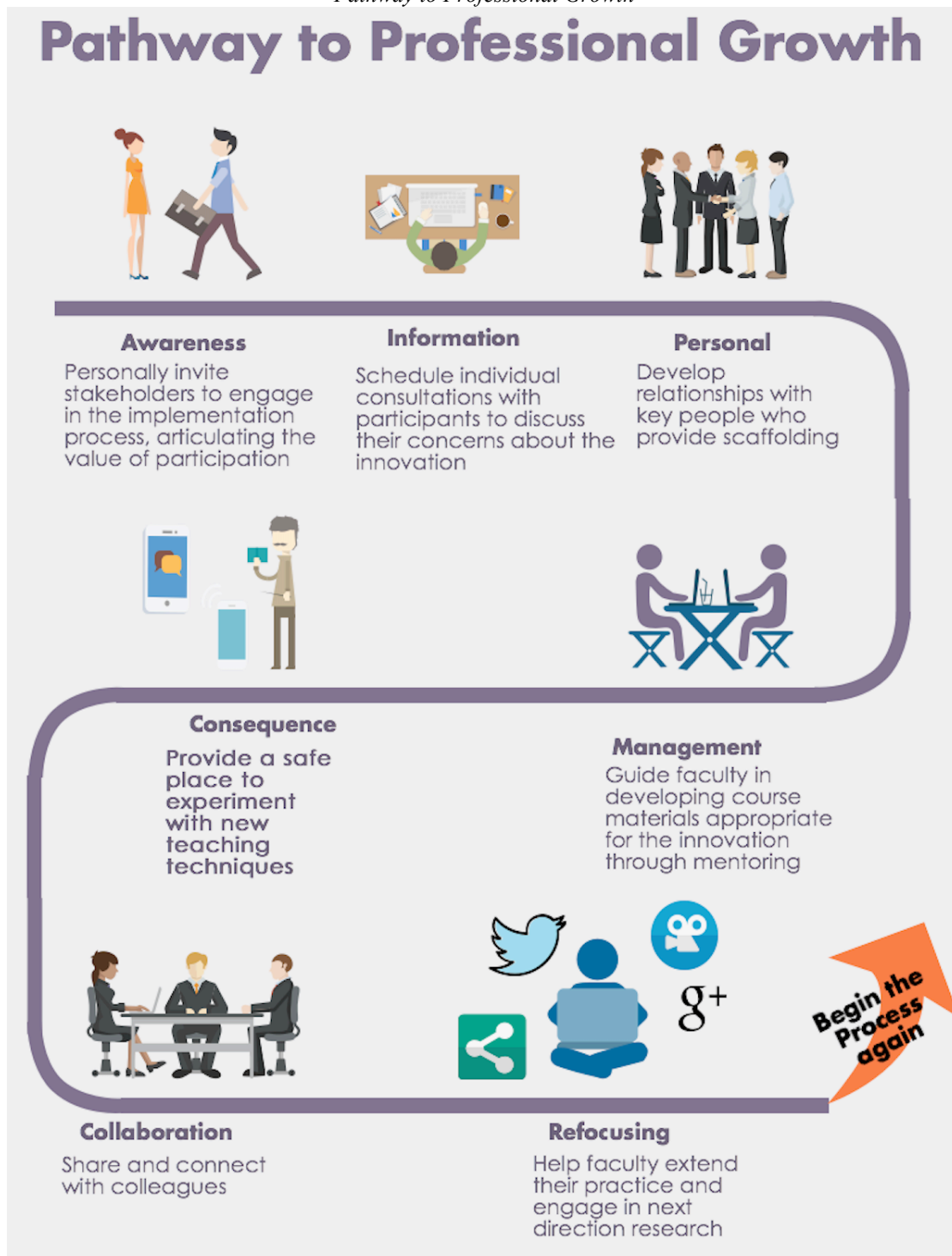
Best Practices

Throughout this paper we have provided strategies for encouraging and sustaining faculty engagement with programmatic assessment and ePortfolios. We believe that these strategies can be adapted to other

innovations/initiatives on College and University campuses. As a result of our ongoing interactions with faculty, we have identified the following best practices that can facilitate a more proactive, iterative, and faculty-centric approach to their professional development:

- Best Practice 1: Make it personal. Reaching out to faculty on an individual level to highlight the value and the benefit of their participation.
- Best Practice 2: Meet them where they are. Visiting with faculty in their offices or classrooms to listen more than talk to better understand their perspectives, goals, and potential concerns related to participation.
- Best Practice 3: Provide scaffolding designed to help faculty achieve their goals. Develop

Figure 3
Pathway to Professional Growth



multiple opportunities for professional development with time to apply, reflect, and refine between these activating events.

- Best Practice 4: Encourage collaboration among faculty both within and outside of their disciplines. These opportunities will help them develop new goals for learning, as well as provide multiple opportunities to share their experiences, expanding faculty awareness to other initiatives occurring on campus.

Employing the strategies presented in this paper, however, requires university-wide support. In fact, we argue that both the reward system and the institutional culture need actively to encourage changes of this magnitude. As we have stated earlier, the extent to which the administration explicitly supports the initiative is essential to the success of this faculty engagement model.

Conclusion

While we believe that our model of faculty engagement is a powerful one, it is too early in the process to be certain about its sustainability and the continued engagement of our faculty. As a result, we are implementing processes that we hope will help. For example, in our current model faculty participants shift to a mentoring role after their first year of participation in the program, and we hope that with proper support, some of these one-on-one mentor-mentee relationships will evolve into communities of practice, and as such, extend our model beyond ePortfolios and assessment. These learning communities will be led by faculty scholars who wish to continue in the mentoring role, as well as engage in the scholarship of teaching and learning.

As a first step to strengthen faculty voice, we gave them ownership of the data collected in the assessment institute by changing the report writing from an external person (the workshop facilitator) to the faculty assessors themselves. This is beneficial on multiple levels: faculty now take ownership of the report and can discuss the findings with their colleagues; second, it provides an opportunity to reflect on the work done throughout the week, as summarized by a member of one of the assessor groups:

This way we have a record of our recommendations and it will be simpler to bring them to our departments Reflection is an important step in the assessment process. We recommend that assessors continue to write these reports at the end of each session. Then the combined report needs to be disseminated widely to all departments.

To further support contingent faculty who are the primary educators of the general education classes, we conceived of a group between Hagner's (2001) entrepreneurs and the risk-averse groups, one which we have labeled the connector group. This group is important because it bridges the gap between the entrepreneurs and those who are risk averse, often connecting or acting on the activities of the entrepreneurs, to make them more manageable to the population at large. In other words, this group serves as a bridge to connect those on the periphery to mainstream faculty.

Most important, as a result of our research, we have come to recognize that if we are to transform teaching and learning, a faculty development system must be in place that provides faculty with a purposeful, integrated collection of engagement activities rather than a menu of options from which to choose. The best practices identified through our research serve to empower faculty by giving them a voice, opportunities to share, and the scaffolding necessary to help them achieve their learning and teaching goals. Doing so fosters a culture of continuous learning on the part of faculty that encourages innovation and creativity in the classroom.

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Finding Common Ground: Identifying and Eliciting Metacognition in ePortfolios Across Contexts

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Research has suggested ePortfolios reveal and support students' metacognition, that is, their awareness, tracking, and evaluation of their learning over time. However, due to the wide variety of purposes and audiences for ePortfolios, it has been unclear whether there might be common criteria for identifying and assessing metacognition in ePortfolios across varied contexts. The purpose of this study was to identify evidence of metacognition across ePortfolios of three distinct populations of students: traditional-age undergraduates, graduate Education students, and adults returning to school to complete a bachelor's degree. We set out to explore if and how ePortfolios could support these different learners' growth as reflective, intentional learners and professionals. Through a qualitative coding process, we identified four key metacognition markers across students' ePortfolios in these three populations. We conclude students can be guided to engage in metacognition in concrete ways through thoughtful assignment design and assessment process, no matter their context.

ePortfolios are designed to promote the integration of learning (Peet et al., 2011) so that students are not only learning a specific subject but also developing an awareness of their learning and thinking processes as well as an ability to monitor, assess, control, and change those processes, a skill generally referred to as "metacognition" (Flavell, 1987; Schraw & Dennison, 1994). Since multiple artifacts are posted and reflected upon within an ePortfolio, students can begin to recognize and assess their learning across time, their learning strategies, and their strengths and weaknesses as learners (Chen, 2009). Universities seek to foster the development of such metacognitive skills institution-wide and to assess their attainment in students across units. These goals support the efforts of higher education to prepare individuals who are responsive to change, engaged with the world, life-long learners, creative thinkers, and flexible problem-solvers (AAC&U & National Leadership Council, 2007). ePortfolios have been adopted across institutions of higher education for these purposes. When ePortfolios are focused on process rather than product alone (i.e., how students have made sense of ideas over time), they can become a tool for identifying and supporting metacognition, allowing students to look into their prior, current, and post-educational experiences and "to talk across them, to connect them, to trace the contradictions among them, and to create a contingent sense of them" (Yancey, 2009, p. 16). However, one challenge of guiding students in developing metacognition through ePortfolios is creating assessment tools and practices that can accommodate a diversity of manifestations of metacognition in learning

products from different student populations. With such tools and practices, institutions can establish common learning goals related to students' metacognition and evaluate their achievement across programs, disciplines, and fields.

This study explores the possibility of gaining a more holistic view of student learning, especially metacognition, through ePortfolio analysis and shows that ePortfolios can be discussed and assessed across programs and units of the university. Portfolio reading is thought to be highly discipline-specific, and the common contention is that only experts in the content area can evaluate the learning in portfolios (Shavelson & Klein, 2009). With this in mind, we searched for a way to identify evidence of metacognitive ability within the work of three very different student populations enrolled in courses at our institution with varying intentions, content, and disciplines:

- Graduate student teachers in the College of Education (COE): Participating COE students are graduate preservice teachers preparing for a career in elementary education. These students are focused on their development as effective educators as well as their employability in the field. Students complete a professional educator ePortfolio intended as a supplement to their resume during a 10-week seminar concurrent with their student teaching experience.
- First-year students taking courses in the Writing, Rhetoric, and Discourse (WRD) Department: Almost all first-year undergraduates (approximately 2,500 students) at our institution are required to take a two-course sequence in

First-Year Writing (FYW). The program aims to prepare students for reading and writing in college and beyond. In FYW courses, students learn about rhetorical concepts and strategies. In the second course of the sequence, students also learn how to research with a critical lens and how to recognize and write arguments. Both courses require a reflective final portfolio that is central to program pedagogy. Instructors explain to students that portfolios allow them to develop writing over time, to consider process as well as product, and to become reflective practitioners.

- Returning undergraduate students in the School for New Learning (SNL): Undergraduates at the School for New Learning (SNL) are “post-traditional learners” (Soares, 2013, p. 5-7). They are 24 or older, usually attend school part-time, work full-time, and have multiple responsibilities. In returning to college, these students bring a wealth of professional and personal learning experiences, which they are encouraged to connect to academic learning experiences in order to promote a synthesis of learning and to increase their confidence. They begin developing an ePortfolio in their introductory Foundations course to integrate learning from past experiences and to develop metacognition relative to their learning processes.

Our research team consists of faculty from these three units within DePaul University, as well as our Associate Provost. The team analyzed ePortfolios for evidence of metacognition across their respective student populations: graduate student teachers, first-year traditional-aged undergraduates, and adults returning for their bachelor’s degree. In searching for common ground for identifying and assessing metacognition in ePortfolios, we found four patterns of metacognitive markers that exist across ePortfolios from different programs and student populations: references to learning over time, to processes of learning, to strengths and weaknesses, and to affect or values. These markers appear in an ePortfolio when the student focuses on his or her experience as a learner rather than solely on course content. Having identified these markers inductively, we now use them deliberately in teaching students to reflect upon their learning, in assignment design, and in assessing reflective components of portfolios.

Literature Review

This literature review covers two key aspects of our study: (1) metacognition and its role in student success and achievement, and (2) the role of the ePortfolio and related assignments to reveal and/or support students’ metacognition.

Metacognition is an individual’s awareness of and thoughts about his/her own thinking and learning processes; it is also an ability to monitor, track, evaluate, and change those thinking and learning processes (Flavell, 1987; Schraw & Dennison, 1994). An example of a learner engaging in metacognition is when she says to herself, “I tend to do X better when I do A and B first,” or “In order to be more successful at presenting my research than I was last time, I should get a review from a peer and practice the presentation aloud in front of a mirror a few times beforehand.” Research has shown that metacognitive ability like this leads to stronger learning transfer, deeper learning, academic improvement, and personal success (Akyol & Garrison, 2011; Bransford, Brown, & Cocking, 2000; Dede, 2010). In higher education, there is a positive correlation between metacognitive awareness and end-of-course grades, as well as GPA (Young & Fry, 2012). Additionally, research on the relationship of performance, self-efficacy, and metacognition has shown that undergraduate students with mastery goals (i.e., goals to master a particular subject), rather than simply performance goals (i.e., goals to simply perform well on a test), will have a higher GPA; the students with these mastery goals also tend to have higher metacognitive awareness (Coutinho, 2007).

Furthermore, metacognition changes and can be learned over time (Kuhn & Dean, 2004; Lewis et al., 2014; Paris & Paris, 2001). In an effort to better support learners’ cognitive and metacognitive development, pedagogical tools and processes that facilitate development of, critical reflection upon, and representations of learning have evolved rapidly in the last two decades in terms of their scope and reach. One pedagogical practice that researchers claim facilitates metacognition and critical reflection is a student’s development of an educational portfolio or learning portfolio. Helen Barrett (2007) noted that

An educational portfolio contains work that a learner has collected, reflected upon, selected, and presented to show growth and change over time, work that represents an individual’s or an organization’s human capital. A critical component of an education portfolio is the learner’s reflection on the individual pieces of work (often called artifacts) as well as an overall reflection on the story that the portfolio tells about the learner. (p. 436)

Researchers have asserted that ePortfolio development in higher education is valuable for metacognitive development because it helps learners track and reflect on their learning over time (Barrett, 2007; Blackburn & Hakel, 2006). It allows students to analyze and synthesize their experiences across the

curriculum while connecting them with learning experiences outside of the classroom and sharing them with instructors, other students, and outside organizations (Cambridge, 2008). Studies have shown evidence of metacognition in ePortfolios by focusing on analysis of text-based reflective artifacts within the ePortfolio and post-ePortfolio-development self-reports (Dalal, Hakel, Sliter, & Kirkendall, 2012; Meyer, Abrami, Wade, Aslan, & Deault, 2010). The new media aspects of ePortfolios have been examined as well for evidence of metacognition suggesting that photos, videos, and hyperlinks can reveal learners' understanding of learning processes, their role as learners in broader contexts, and their participation in learning communities (Wozniak & Zagal, 2013).

Many assignments that prompt metacognition are not deliberately designed with metacognition in mind, nor do they make this goal explicit to the student, so they are not as effective as they might be. Recent research on ePortfolios clearly shows that many educators and educational researchers want students to reflect upon their learning and make connections about their learning over time, but there is not a clear set of criteria by which this metacognitive action is ultimately assessed. For example, Luther and Barnes (2015) stated that one purpose of the ePortfolio for their students is to "reflect upon developmental growth and skill application" (p. 27). It is clear here that the researchers aim to encourage students to demonstrate their metacognitive abilities in their ePortfolios; evidence of this is referred to as "reflective statements" in their assessment rubric (Luther & Barnes, 2015, p. 33). Later, they stated that educators should "teach and model the use of a feedback and reflection cycle" (Luther & Barnes, 2015, p. 35), but there is no further elaboration upon or definition of reflective statements. Less clear is whether students know from this rubric why reflective statements are important for their learning or how they might be written well according to a faculty member's expectations. Our review underscores the need to identify and collect best practices for teaching and modeling a reflection cycle in the context of ePortfolio development, as the authors suggested.

Overall, existing research shows that metacognition is key for 21st century learners to succeed in academic and professional contexts and reveals the need for metacognitive support in higher education. It also suggests that learning ePortfolios can be used not only as a means of finding evidence of students' metacognition but also as a means of supporting metacognitive development in higher education. Our goal was to determine what, exactly, metacognition looks like in learners' ePortfolios and whether we could find common ground across the various learners and learning situations in higher

education today. We believe that our findings can help educators design assignments that facilitate metacognitive development and provide a way for students to demonstrate evidence of it in their ePortfolios. Moreover, by providing a common vocabulary, our findings can help educators to structure assessment across units and programs.

Methods

Taking a qualitative research approach, our study involved an analysis of student ePortfolios using descriptive coding (Saldaña, 2012) with an intentional focus on discovering any evidence of metacognition in the ePortfolios from the three populations. We then conducted a post-hoc analysis of each unit's ePortfolio assignment design to discover any relationships or patterns between these and the coding results.

Research Question

Early in 2012, as part of our participation in Cohort VII of the International Coalition of ePortfolio Research, our team came together to design a study of students' metacognition across three units of the university. We formulated the following research question: How do students demonstrate metacognition in their ePortfolios? In other words, we sought to understand in what ways students demonstrate awareness of their learning process in their ePortfolios. In formulating this research question, we defined metacognition according to the education and learning literature: the knowledge of information or action that has been learned in the past and, through the learner's monitoring, is applied strategically or is considered for application in future scenarios (Flavell, 1987; Schraw & Dennison, 1994). We were not looking for demonstrations of learning (i.e., submitted assignments or products that meet different curricular standards or goals) but rather for evidence that students were aware of their learning.

Participants and Context

Our participants are from three programs at DePaul University that were each early adopters of ePortfolios, and that represent very different student populations: traditional-age undergraduates taking First-Year Writing, graduate students in their final seminar in the College of Education (Elementary Education program), and adults returning to school to complete a bachelor's degree in the School for New Learning (SNL). Our nine-person research team includes faculty and staff from these three programs and Academic Affairs: a pedagogy and technology specialist who teaches writing, the (tenured faculty) director and (staff)

associate director of First-Year Writing, a faculty member and an associate dean in SNL who also teaches, a tenured faculty member in Education, two instructors from the different programs, and an associate provost. The members of the research team served as the ePortfolio coders and analyzed the data.

Our sample came from courses that were taught before our research project began, so instructors designed and implemented assignments around their own and their departments' goals, rather than the goals of this study. In all three courses, the instructors directed learners to include artifacts and assignments they created in the course and reflections on their learning (influenced by research from Peet et al., 2011), but also welcomed other artifacts and elements and encouraged them to explore all the features of the platform. Students built their ePortfolios in Digication, which includes a flexible web page editor and offers features of a social learning network such as sharing, tagging, a directory of other individuals' portfolios from within the university, and privacy settings.

ePortfolio Collection and Analysis

Members of our research team contacted students from the three units (SNL, COE, WRD) who had completed ePortfolios as part of their regular coursework in a required course in the respective program and asked them to share their ePortfolios for analysis in this study. From the pool of 60 students who gave their permission, we randomly selected 10 student ePortfolios from each population for analysis. We chose coding as our method of portfolio analysis because it offers an opportunity to analyze static documentation to find concrete evidence of learning, cognitive skills, and metacognition (Akyol & Garrison, 2011; Newman, Webb, & Cochrane, 1995; Saldaña, 2012). Initially, we attempted to use a common rubric adapted from Alverno College's rubric, Developmental Perspectives on Reflective Learning (Rickards & Guilbault, 2009), to evaluate the SNL, WRD and COE ePortfolios. However, after piloting the use of the rubric on a small group of ePortfolios, the research team discovered that too many changes had to be introduced to the rubric to accommodate the traits of each group of ePortfolios. The rubric did not feel common; it was not useful to describe evidence of learning awareness in the different ePortfolios across units. Yet, as a team, we observed evidence of metacognitive processes, or reflection, in the ePortfolios crafted by all three student populations.

Therefore, we decided to develop a codebook with which we could code students' demonstration of awareness of their learning in the 30 ePortfolios selected for the study. Each researcher used descriptive coding (Saldaña, 2012) to identify text or new media in each page of the ePortfolios and describe, through an

inductive process, what we saw in the ePortfolios from these three units with regard to students' awareness of their learning. Since ePortfolios offer affordances with new media, we not only looked at text in the ePortfolios, but also analyzed images, embedded documents, forms, videos, audio clips, and links. For example, if a student included an image of a winding pathway on a page of her ePortfolio to support her discussion of the difficulties she encountered while completing a project, a researcher may have coded this image as a form of metacognitive awareness.

In the first round of coding, each researcher analyzed three ePortfolios from each program for a total of nine portfolios. The research team then met in person to share their descriptive codes with each other and identify patterns that would suggest common manifestations of students' awareness of learning in the ePortfolio sub-sample (Saldaña, 2012). After identifying common patterns and themes, we developed a codebook of nine codes: past/present/future; process; strengths/weaknesses; strategies; learning outcomes; broader issues; social; artifact integration; emotional response. We then attempted to re-code the nine portfolios with these nine codes, using one ePortfolio web page as our unit of analysis and looking for evidence of any of the codes on each page of an ePortfolio. Portfolios could have more than one code per page, and, if a code was present, the coder noted at least one example of text, image, video, etc. that demonstrated that code on that page. We subsequently reduced the codebook to four codes to narrow our focus and reduce overlap. We refer to these four codes as "markers" of metacognition:

1. Awareness of transfer of learning over time. This occurs when students connect or transfer a prior learning experience to a present or future one: "I used to think/do X, but then I experienced Y, and I now think/do Z." It may also include plans for the future: "Now that I understand P, I plan to apply that knowledge to Q in the future."
2. Awareness of processes and strategies for learning. These discussions address *how* the learning came about. They may describe what activities students engaged in that resulted in learning, what procedures they may have followed, and/or who helped them or inspired them in the learning.
3. Awareness of strengths and weaknesses in learning. In these discussions, students may identify the skills they bring to an experience and/or the weaknesses they want to address. They may also describe the skills gained as a result of their learning and point to areas that still need to be addressed.

4. Awareness of affect and values while learning. Here students include their emotional response to a learning experience (“I loved . . .” “I hated . . .”). They may also relate some aspect of their learning to their values (“This experience was important to me because . . .” or “This experience confirmed/refuted my belief that . . .”).

We also included a suffix code to append to any of the above four codes to note when students used digital new media (image, video, audio, hyperlink) to demonstrate their awareness of learning. We refer to this code as *Marker E*. While all these markers appeared in the ePortfolios of students in all three of our populations, they appeared in different combinations and proportions for each group, shaped by the assignment and context for creating the ePortfolio.

Before coding all the portfolios for the presence of the four markers, we met as a team to collectively code one portfolio from each program using the final codebook. After reaching agreement about the markers present in those three portfolios and establishing inter-rater reliability, each remaining portfolio was then coded by two raters: one who was from the program from which the portfolio was developed and one rater who was not. The partners met individually to resolve any disagreement about their codes and submitted their final codes per ePortfolio page to a shared spreadsheet. After an initial assessment of the results by individual team members, the team reconvened to collectively synthesize and discuss the findings. As a result of that discussion, each unit recognized and analyzed the role of their ePortfolio assignment design in students’ development of their ePortfolios.

Results

We found the four markers of metacognition in ePortfolios from all three units of the university. Table 1 shows the percentage of total number of markers for each population in order to account for differences in coding frequency, since the total number of markers in each set varies. A primary finding of our study was the realization of the commonality of student reflection across these three very different student populations. One overarching pattern here is that Marker 2 (awareness of processes and strategies) was the most frequently appearing marker of metacognition found in the ePortfolios overall. To provide the necessary context to explain these findings, results are discussed according to each unit.

The Adult Undergraduate: School for New Learning

SNL undergraduates are post-traditional learners (Soares, 2013) who have multiple responsibilities and roles. They are encouraged to connect their professional

and personal learning experiences to academic learning experiences in order to promote a synthesis of learning and to increase their confidence. Reflecting on these students’ ePortfolios, we conclude that the design of our assignment probably affected students’ development and/or demonstration of their metacognitive skills.

Foundations of Adult Learning is a required introductory course designed for reflection on prior learning and planning of future learning goals. Influenced by the work of Peet et al. (2011), we added the ePortfolio to this course to promote the integration of past experiences and the development of metacognition relative to students’ learning processes. We designed this course based upon research indicating that adult learners are most likely to persist when they see a direct connection between their goals and their learning, are most likely to learn when they can connect new to prior learning, and are more likely to graduate if they have the opportunity for prior learning assessment (PLA), which involves the documentation of knowledge and ability for credit (e.g., Brookfield, 2013; Knowles, Holton, & Swanson, 2012; Kolb, 2015). In their Foundations portfolios, students articulated their goals, reflected upon and connected their learning, identified opportunities for PLA, and planned their program of study. The primary goal of the Foundations portfolio assignment was to scaffold learner agency and efficacy. As a result, it deliberately prompted metacognition. Students were told in the assignment that the portfolio will help them “further develop the metacognitive skills that enhance lifelong learning.”

The analysis of our students’ 158 portfolio pages generated 311 instances of the metacognitive markers described earlier. Each SNL student’s portfolio had at least one instance of each of the four metacognitive markers, demonstrating our students’ varied awareness of their learning.

Of all markers tallied for SNL portfolios, the highest frequency was for awareness of processes and strategies for learning (Marker 2) at 32%. For example, one student articulated an awareness of how networking within her community will enhance her knowledge and effectiveness professionally and civically: “My networking in the autism community will give me a better understanding of the funding and in general how to communicate with key universities and corporations in order to show them who individuals with autism really are.” Another student reflected upon learning processes as a caretaker for her mother: “I have learned to listen better to my [chronically ill] mom when she’s not feeling well in an effort to learn what might be wrong. By doing so, I have found that she gives me more real information.”

Across all populations, SNL portfolios had the highest evidence of awareness of affect and values in

Table 1
Frequency of Metacognitive Markers Across Portfolios

| Marker | WRD | COE | SNL | All |
|--|--|--|--|--|
| | <i>n</i> = 10 ePortfolios (195 total markers) | <i>n</i> = 10 ePortfolios (292 total markers) | <i>n</i> = 10 ePortfolios (311 total markers) | <i>n</i> = 30 ePortfolios (798 total markers) |
| 1. Awareness of learning over time | 22% 42 markers | 23% 67 markers | 20% 62 markers | 21% 171 markers |
| 2. Awareness of processes and strategies | 31% 60 markers | 23% 68 markers | 32% 98 markers | 28% 226 markers |
| 3. Awareness of strengths and weaknesses | 19% 38 markers | 15% 43 markers | 18% 56 markers | 17% 137 markers |
| 4. Awareness of affect and values | 13% 25 markers | 16% 46 markers | 20% 61 markers | 17% 132 markers |
| E. Use of digital elements | 15% 30 markers | 23% 68 markers | 11% 34 markers | 17% 132 markers |

learning (Marker 4) at 20%. Typically, students expressed emotion about finding more confidence in academic settings and skills, or in workplace accomplishments, as did these two students:

- Student 1: “I would like to feel comfortable in my classes so that I could be more confident in asking questions and freely giving my ideas about the reading literature.”
- Student 2: “What I found most rewarding about this experience was that I was pleased with myself for setting these files up in this way, and it saves me time from searching for documents while I am on the phone with vendors.”

Lastly, across all populations (COE, SNL, WRD), SNL portfolios demonstrated the lowest percentage of digital representations of learning (Marker E) at 11%.

We hypothesize that these findings are a direct result of the language of the Foundations portfolio assignment. While the assignment only noted once that students should incorporate “visuals” into their portfolios, which likely led to the low frequency of Marker E, students were given several prompts that encouraged their tendency toward Markers 2 (awareness of processes and strategies) and 4 (awareness of affect or values). Regarding Marker 2, the assignment stated that students should “document what you already know and can do, how you learn, and what behaviors and elements of your personality contribute to your successes.” It also stated that students should “review the knowledge, skills and behaviors you will need to cultivate to

achieve your goals.” Similar language throughout the assignment may explain why Marker 2 was the marker most frequently found in SNL portfolios.

In reference to Marker 4 (awareness of affect or values), the assignment emphasized the portfolio as a “personal development portfolio,” reinforced through statements such as “you own your portfolio” and “your style of writing can be relatively informal.” The assignment also stated that “the portfolio should allow you to celebrate your growth through the SNL program” and that “the portfolio will evolve with you as you develop as a learner.” We believe this emphasis on growth led students to be expressive and relate affectively to their learning.

Preservice Teachers: College of Education

College of Education graduate preservice teachers were developing ePortfolios for a career in elementary education. Students completed their ePortfolios during a 10-week student teaching seminar that followed the integrative knowledge ePortfolio (IKE) model (Peet et al., 2011). The ePortfolio was intended to show their employability as effective educators. Upon analysis of COE ePortfolios, we conclude that the design of the assignment, as well as the perceived audience for whom the ePortfolio is constructed, affects the development and/or demonstration of students’ metacognitive skills.

As part of the IKE model, students selected, reflected on, and integrated key learning experiences across time (i.e., connecting past to present and projecting into future) and contexts (e.g., in and out of school). There was a deliberate attempt to mark the contrast between IKEs and the more traditional

ePortfolios of the past, which were typically a collection of work samples gathered in a binder format. Three main traits of IKE or folio thinking (Chen, 2009) were emphasized for students: IKE is a new genre, a text with unique traits stemming to a great extent from the affordances and constraints of the digital space in general and of the adopted digital tool in particular (i.e., Digication), which addresses a specific audience (i.e., professional). The crafting of the ePortfolios was highly structured; the pieces to be posted constituted required course assignments that had to include specific components. Each piece was heavily modeled using past student IKE samples and scaffolded via ongoing feedback from peers and instructors on preliminary drafts.

The framework and structure described above explain the higher incidence of Markers 1 (awareness of learning over time), 2 (awareness of processes or strategies), and E (using digital elements) observed in the COE sample ePortfolios included in this study. Students were directed to search for and reflect on past learning experiences and to connect them to current professional work and future goals, yielding frequent statements that provide evidence of Marker 1, such as the following:

I'm a webzine publisher, music journalist, award-winning fiction writer, and poet who caught the teaching bug after working for more than half a decade in these writing-related fields. My goal is to bring my real-world experience, practical knowledge, and passion for writing to both college and high school classrooms.

Similarly, statements describing process and strategies (Marker 2) were also frequently observed as the prospective teachers showcased their professional skills: for instance, "Incorporating movement into the activity not only helped students to stay focused but also demonstrated how measurement is used in sports and how it connects to students' everyday lives." Marker E (e.g., images, videos, links to external sites or across artifacts) was also prevalent in COE ePortfolios. Since students had gained experience in the schools as part of their program, they were encouraged to document those activities with (permission-granted) photos and videos. Again, the role and function of these digital elements as well as the relationship between text, images, extra- and intralinking as meaning-making devices were discussed, modeled, and required throughout the quarter.

The two markers that were less prevalent within COE students' ePortfolios were Marker 3 (awareness of strengths and weaknesses) and Marker 4 (awareness of affect and values), and when they were present, they were typically clustered with other metacognitive

markers. Pre-service teachers frequently represented their work in the classroom using this pattern: (1) here's the context within which I was working (Marker 1, awareness of learning over time); (2) in this particular classroom situation, I tried this type of teaching methodology (Marker 2, awareness of processes and strategies); and (3) using the knowledge of my students and my knowledge in the field demonstrates why I will be a good teacher (Marker 3, awareness of strengths and weaknesses). This pattern was repeated across the ePortfolios, as students tended to include only information about their strengths (not weaknesses) or that revealed their affective learning in conjunction with contextual and step-oriented information. For example, in one student's Work Showcase area, three of her four pages were coded with Marker 1, Marker 2, and Marker 3. In those pages, she describes teaching ESL courses at a community college, developing work habits in her students, and establishing a safe space in her classroom.

Given the audiences for these ePortfolios, it is not surprising that pre-service teachers were less likely to write about instances that focused on either weakness or an emotional experience. As one student noted in a follow-up survey about her ePortfolio, these ePortfolios provide their first impressions to "prospective employers, principals, other teachers, and students who are building their own portfolios. It is a great resource to have and great way to market yourself as an educator." In their student teaching seminar, students are encouraged to "paint a professional portrait" of who they are as a teacher. A professional ePortfolio is significantly different from a process or a working ePortfolio, and the markers that we found within the students' writing connect with the type of reflective content that one would use in a professional portrayal. Thus, the markers are helpful for analyzing the work, not only of different student populations from different disciplines, but also of different kinds of portfolios.

First-Year Writers: Writing, Rhetoric, and Discourse

First-year undergraduates taking FYW courses learned how to shape language to audience and purpose, develop an appropriate stance, read college-level material, and write in multiple genres, including researched arguments. The two-course sequence required reflective final portfolios that are central to program pedagogy. The portfolio was assigned to promote students' critical practice. As stated in the FYW program's Portfolio Guidelines for faculty, "We value and emphasize the way portfolios prompt meta-awareness and metacognition, allowing students to articulate not only what they learned but how they learned it, why it was significant, and who they are as learners."

Hence, the overall approach is specified, and a common assignment sheet is available for the required portfolio assignment, yet instructors are permitted to shape the specifics of their portfolio assignment to their course. Although there is some resulting variation, in general the assignments ask for evidence about both product and process. Metacognition is explicitly requested, as students are asked to write reflective comments, using evidence from assigned papers and class activities to explain their experience with and degree of success in meeting the learning outcomes of the course. The common assignment calls attention to how to integrate metacognition (called “reflection” here):

Reflection refers to the *iterative process* that we engage in when we want to look back at some activity or decision we’ve made, to think about what we’ve learned from it, and how we might use it in the future.

All portfolios used in the study were final assignments worth approximately 50% of the course grade.

A portfolio approach has been used in the FYW program since the mid 1990s, and the program shifted to required digital portfolios in 2011. Since we taught these required courses to most DePaul undergraduates, we have collected and reviewed as many as 5,000 portfolios per year. Students were told to think of the audience for the portfolio as multiple and layered. The primary audience is the instructor, but the use of the portfolios in program assessment also entails that students consider important secondary audiences like administrators and other instructors. In other words, students were explicitly told to make the portfolio comprehensible to someone outside the course environment.

Our study results indicate that the most prevalent marker noted in FYW students’ portfolios was Marker 2 (awareness of processes and strategies), at 31% of FYW’s total markers. As is the case for the other two units, this result is consistent with the assignment emphasis. Students are asked to use the portfolio to show how their written work meets learning outcomes. Because we taught and valued process-based approaches to learning to write, we are pleased though not surprised to see comments about process and strategy in both reading and writing, such as the following, from two different students: “As I read each of my sources, I took notes on the margins regarding any themes I found on the way. Then, I compared all sources,” and “After the in-class self-evaluation, I did some cleaning up and reordering of paragraphs before I tackled writing a conclusion.”

In contrast to the frequent use of process and strategy comments, results indicate that FYW portfolios

demonstrated the lowest frequency of text showing awareness of affect or values (Marker 4). Our coding identified this marker only 13% of the time for FYW portfolios, less often than the other markers (even less than the E marker) and less than student work in the other two units. Here, the program assignment specified how the portfolio allowed students to present “academic and professional identities,” and the emphasis on collecting credible support for one’s statements is likely to dissuade a first-year student from including affect. The assignment reminds students that:

The design and composition of your digital portfolio draw on the very same strategies and outcomes that you’ve been practicing in your WRD first-year writing course: Readers will attribute credibility and authority to you when your design and arrangement are done with care; thoughtfully integrated examples of your work will support your reflective essay’s main points; and you will get practice in articulating and presenting your academic and professional identities.

The relative absence of Marker 4 (awareness of affect or values) is of note, since writing assignments otherwise ask students to take a stance, and therefore typically involve value identification. Further, in this gateway course so crucial for student success and retention, helping students find and articulate affective connections to their learning is especially important. Hence, our finding indicates an opportunity to examine more effective ways to help first-year students appropriately integrate affective responses to learning into course writing.

Discussion

Our findings suggest that all four metacognition markers appear in students’ ePortfolios across these three populations. In other words, metacognition can be recognized and described across different contexts, and in ePortfolios with varied purposes. While we welcome further identification of additional “boundary-crossing” markers, we believe it is of great significance that we now have a vocabulary to talk about metacognition across populations. With this vocabulary, students in multiple contexts can be guided to engage in metacognition in concrete ways, and faculty can use the metacognition markers to aid in their assignment design and assessment process. Overall, used individually or in combination, the markers help us to pinpoint more specifically what kinds of metacognitive comments we find most useful and pertinent to our courses and our students’ learning, and where and how to enhance metacognition.

A Heuristic for Marker Integration and Assignment Design

Much of the literature on ePortfolios supports assignments with a “collect, select, reflect, connect” process, along with the integration of scaffolded learning tasks and assignments that facilitate and contribute to metacognitive development within or tangential to the ePortfolio development process. For example, Parkes, Dredger, and Hicks (2013) provided their graduate students in education with a series of assignments and an ePortfolio assessment rubric that make the expectation for metacognition and reflective activity in the ePortfolio clear with two distinct requirements in a “Reflective Practice Component of ePortfolio” category (beyond the NCATE requirements): “Reflection on Practice” and “Critical Reflection on Growth” (Parkes et al., 2013, p. 115). Jenson (2011) used surveys, prompts, and discussions around metacognition to prepare first-year writers for articulating their metacognitive ability in their ePortfolios. Similarly, at DePaul, our ePortfolio assignments have required students to reflect on and articulate their practice and growth as learners.

Upon comparing the assignments with the resulting ePortfolios, we noticed that the context and details of the assignment shaped the focus of authentic metacognition and reflection for various purposes, audiences, and learning goals. ePortfolio assignments are not always transparent regarding what metacognition is, why reflective statements are important for their learning, and how they might be written well. We believe the markers can aid with these issues. The markers can be used to help students better understand what we mean by reflection and metacognition. In other words, they can be used as a heuristic tool to develop reflective content. Students can be shown the four markers and prompted to use them with questions such as:

- What did you think in the past, and how has your thinking changed? (Marker 1)
- What strategies or processes did you use and how might they be useful in other contexts? (Marker 2)
- What worked well? What do you need to improve? (Marker 3)
- What inspired, influenced, or shaped you while learning this? (Marker 4)

In a similar vein, a teacher can use the markers to guide assessment:

- Does the student compellingly use a past/present/future scheme to consider his or her learning? (Marker 1)

- Does the student identify and adequately describe his or her processes and strategies of learning? (Marker 2)
- Does the student discuss strengths and weaknesses relevant to this learning experience with honesty and accuracy? (Marker 3)
- Does the student write convincingly about the impact of the learning experience on his or her emotions or values? (Marker 4)

We have also found that the markers have a pedagogically self-analytic function, helping us to see our own assignments more clearly by recognizing the kinds of metacognition we are seeking. Using the markers to examine our own assignments and student portfolios made it clear how the rhetorical context for the assignment shaped the focus of metacognition we sought. For example, as regards Marker 3 (awareness of strengths and weaknesses), in FYW we have a long-held belief that when we ask students to comment on their strengths as learners, they too often “schmooze” us—the student shows off rather than shows, and we go through considerable effort to get students not to schmooze us. Further, a student’s recognition of weakness often appears to be more authentic and meaningful, largely because it adheres to a recognizable narrative of failure, learning, and growth (see Yancey et al., 2014, p. 135, on the role of failure). In contrast, pre-service teachers in COE addressed an intended portfolio audience of prospective employers, for whom a message of weakness was considered inappropriate and even damaging. In this setting, we envision students initially using the full set of markers as heuristic, and subsequently refining that yield as they revise for a specific audience and implement their specific ePortfolio goals. Use of the markers in this regard would ensure that these learners have indeed reflected upon their weaknesses: instructors can use assignments and assessments that ask students to identify both their capacities and areas of future growth. At the same time, instructors can coach ePortfolio authors in the effective representation of themselves to multiple audiences in a way that suggests integrity and honesty. While we all stumble over the inevitable interview question, “What do you see as your weaknesses?” ePortfolio authors have the opportunity to hone an answer that indicates an interest in continuous growth as a person and as a professional without inappropriate personal revelation.

As a tool for pedagogical self-reflection, the markers allow instructors to recognize the extent to which they value each of the metacognitive markers, to confirm why and whether the markers work in relation to respective contexts, and then to use this knowledge more explicitly to help students, given their purpose, understand what appropriate reflection is. That

appropriate metacognition will vary with context is another lesson we should help students to see because this helps them understand how and why they will be assessed by the audience, including the instructor. Studying our own valuation of the markers, then, helps us concretely identify what we want from students, and contributes to effective assignment design. Moreover, it is the act of using the markers as analytical tools together that has led us to insights about our own pedagogy and greater understanding of one another's contexts, even within the same institution. The markers have helped us cross intra-institutional boundaries by helping to highlight both our commonalities and our differences.

A Tool for Thoughtful Assessment

We believe our markers are of great use in assessment across multiple contexts, as the study shows that the markers can be expected to be present in and useable with different populations, reflecting a range of age, academic exposure, and assignment contexts. Perhaps our most significant takeaway regarding the use of the markers is that they help us to recognize and explain a good response when we read one. This is no small feat, since assessing portfolios can be an overwhelming task, especially for newcomers. Use of the markers answers instructors' ever-present question, "What do I look for?" In other words, what assessors should look for is awareness of learning over time (Marker 1), of process and strategy (Marker 2), of strength and weakness (Marker 3), and of affect or values (Marker 4). Moreover, we found through our assessment with the markers that it is the combination of several markers in one metacognitive comment that creates the fullest sort of reflection. For example, in the following passage, the student relates her learning at earlier points in her life, as well as in the present, and its future potential (Marker 1); she suggests useful processes or strategies she can engage in (Marker 2); she sees strengths and weaknesses (Marker 3); and acknowledges affect or values related to learning (Marker 4):

I learned more about myself [3] than anything else in this class. I was once a proud writer [1 and 4], too proud [3] to believe I could change or get better; maybe I was just too scared to think about it [4]. I realize now [1] that, much like the soldiers that I have studied so dutifully all term, I can thrive and get better [1, 3] with the help of others [2].

This student comment comes from a FYW portfolio, but our observations about it apply to all study groups. The student's ability to integrate several markers is what makes her reflective comment compelling, such

that we believe that real learning has occurred. We note in particular her recognition of the emotional component of learning—she does not simply identify an isolated emotion (e.g., "I've always hated writing"), but understands and demonstrates how her affective responses affected her receptivity and resistance to learn (e.g., "I was too proud or scared to change").

Another example comes from a FYW student who wrote about video games because of his own gaming involvement:

Regardless of how many player controlled characters I murder on a daily basis, or cities I sack in order to advance my virtual cause, in the real world, *I am courteous and respectful and do my best to be an example [3, 4] for others to follow. I feel strongly [4] about my public appearance because I do not think there are enough 'normal' people that act in a way to make society as a whole better [4].* Because this angle defines my social role and normally places a negative light on video games, *I again can use this to prevent the media's and politicians' use of violent video games as a scapegoat [1, 2] when violent crimes are committed.*

The student consciously articulates the values (Marker 4) he adheres to in the real world that he thinks are strengths (Marker 3; courtesy, respect, being an example), underscores that he feels "strongly" about them (Marker 4), and goes on to connect these values and emotions to his choice of an argument strategy that he can use now or in the future (Markers 1 and 2).

Hence, after students have been shown how to use the markers to generate reflective content, they can next be taught to interweave that content in meaningful ways. Then, when assessing, instructors can look for a combination of markers as a potential sign of added strength. The instructor can assess portfolio comments by looking for the presence of individual markers and how their combination enhances the quality of a statement.

Conclusion

To conclude, the markers explain what we think a portfolio with effective metacognition looks like. We began the study knowing we valued portfolios, and that we did so because we believed students used ePortfolios to enact and demonstrate an authentic depth of reflection. Now, we know how to identify the kinds of comments and artifacts that reveal such qualities—by looking for the presence of these four markers. Moreover, we understand that the combination and integration of several markers in a single ePortfolio excerpt help to further strengthen that excerpt, yielding

more than the sum of its parts. Understanding how to use the markers can help practitioners understand what to look for when assessing metacognition. Similarly, we have found that markers help us to teach reflection; explicitly teaching students about the available markers and how to integrate them into portfolio or other metacognitive assignments will help practitioners to elicit metacognition. But perhaps the most important outcome of this study is the institutional value of our cross-disciplinary conversation and vocabulary. By reading and coding ePortfolios from one another's programs, we learned about the goals and methods of colleagues next door, down the street, and across town. We can only hope that for others, too, the process may prove to be an unexpected resource for fertile and rewarding institutional dialogue.

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Using ePortfolios to Assess Applied and Collaborative Learning and Academic Identity in a Summer Research Program for Community College Students

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We evaluate the extent to which ePortfolios can be used to assess applied and collaborative learning and academic identity among community college students from underrepresented minority groups who participated in a summer research program. Thirty-eight students were evaluated by their research sponsor and two or three naïve faculty evaluators. Faculty sponsors evaluated students based on personal interactions and the students' ePortfolios. Naïve faculty evaluated students using only the ePortfolios. We found: (1) The rubrics designed to assess applied and collaborative learning and academic identity had good internal consistency, (2) naïve evaluators found some evidence of all learning outcomes, (3) faculty sponsors found evidence of more learning outcomes than naïve evaluators, and (4) individual ePortfolios varied in the extent to which they documented learning outcomes. We conclude that ePortfolios can be used as a reliable means of documenting applied and collaborative learning and academic identity.

Research experiences help students develop an academic identity that increases underrepresented minority (URM) student persistence in STEM disciplines (Jackson, Starobin, & Laanan, 2013). Participation in research has also been found to improve the persistence of URM women who begin their studies at community colleges (Jackson et al., 2013) and is associated with higher levels of perceived support and academic persistence among all students from underrepresented groups (Barlow & Villarejo, 2004; Maton & Hrabowski, 2004; Yelamathi & Mawasha, 2008). The ability to document learning that occurs in the context of research experiences would be useful for both research purposes and efforts to credit prior learning. In the current paper we describe the evaluation of our efforts to use ePortfolios created during a research program to assess applied learning and academic identity in URM community college students. By comparing assessments made by faculty who worked directly with students to those made by faculty who were unfamiliar with the students, we are able to evaluate the extent to which ePortfolios document actual learning.

As more learning is taking place outside traditional higher education settings, learners need means of documenting their knowledge and skills (Travers, 2012). Portfolio review (both electronic and traditional) is commonly used by academic institutions to evaluate prior learning (Conrad & McGreal, 2012). Prior learning assessments are relatively high stakes and should afford students the opportunity to present their learning fully (Stenlund, 2013). ePortfolios allow students to include a variety of documents along with reflection, providing a rich account of the learning that has taken place (Travers, 2012). The opportunity for students to provide context for their work is especially important because many institutions review only the work products, without having any contact with the student.

We focus on assessment because we believe that this constitutes a unique contribution to the existing literature on ePortfolios. Despite reasonable theoretical justification for using ePortfolios, there is little empirical evidence for their effectiveness. In their review of the empirical literature, Bryant and Chittum (2013) found that only 15% of peer-reviewed articles addressed student outcomes, and only half of those articles assessed academic learning outcomes specifically. Bryant and Chittum (2013) argued that researchers should assess the extent to which ePortfolios are linked to student learning outcomes, especially in STEM disciplines. Rhodes, Chen, Watson, and Garrison (2014) also pointed to the need for more rigorous research on the benefits of ePortfolios.

Our examination of ePortfolio use was conducted in the context of a residential summer research program. Since 2000, Purchase College of the State University of New York has offered the Baccalaureate and Beyond program to support URM students as they transition from community colleges to four-year institutions. Each year, the program serves approximately 25 students from six community colleges. Students work full-time in small groups conducting original research in biology, chemistry, computer science, environmental science, neuroscience, or psychology.

In the current work, we elected to use the applied and collaborative learning proficiency from the Degree Qualifications Profile (DQP) as the basis for our assessment. The DQP was developed to provide a complete description of the proficiencies that students should obtain in higher education. The DQP purpose has been described as “what students should know and be able to do once they earn their degrees—at any level, in any field of study” (Adelman, Ewell, Gaston, & Geary Schneider, 2014, p. 7). As such, the DQP is well suited to assessing students who are transitioning

between community college and a four-year school. Applied and collaborative learning, one of the five areas of proficiency outlined in the DQP, includes research and creative activities that involve “innovation and fluency in addressing unscripted problems in scholarly inquiry, at work and in other settings outside the classroom” (Adelman et al., 2014, p. 6). At the bachelor’s level, applied and collaborative learning includes four areas that are present in summer research programs: (1) presents a project, (2) negotiates a strategy for group research, (3) writes a design, and (4) completes a substantial project (Adelman et al., 2014). Because applied and collaborative learning is the proficiency that is most likely to occur in non-traditional settings (Adelman et al., 2014), its assessment can present a challenge. ePortfolios have the potential to serve as a useful tool in the reliable assessment of applied and collaborative learning.

ePortfolios are useful as a means of documenting learning from non-traditional activities such as research experiences (Wang, 2009) and are hypothesized to support reflection, engagement, and active learning (Yancey, 2009). Accordingly, ePortfolio use in higher education has become increasingly prevalent (Rhodes, et al., 2014). There is evidence that ePortfolios help students and faculty evaluate growth and reflect on students’ academic achievements (Buzzetto-More, 2010). Eynon, Gambino, and Török (2014) found evidence that ePortfolio use correlates positively with student success indicators (course pass rates, GPA, and retention rates) and can help advance and support deep thinking, integration, and personal growth. The creation of ePortfolios has also been found to help students develop a sense of academic identity, future orientation, and belonging to a community of scholars (Nguyen, 2013; Singer-Freeman, Bastone, & Skrivanek, 2014).

Unfortunately, to date, much of the research examining ePortfolio use as an assessment tool has focused on student and faculty attitudes about ePortfolios rather than on the usefulness of ePortfolios as a means of reliable assessment (Rhodes et al., 2014). For example, Curtis and Wu (2012) reported that healthcare educators have become more accepting of ePortfolio use as an assessment tool. Similarly, Garrett, MacPhee, and Jackson (2013) found that nursing faculty considered ePortfolio evaluation an effective means of assessment. When ePortfolios were used as the primary means of assessment in a Child Development class, 84% of students felt they encouraged reflection, 77% felt they provided a permanent record of learning, and 87% felt their use in the class should be continued (Singer-Freeman & Bastone, 2015). Bryant and Chittum (2013) cautioned that attitudes are not necessarily a good indicator of usefulness as a learning tool.

Additional evidence for the usefulness of ePortfolios is provided by Buyarski and Landis (2014), who examined the efficacy of using ePortfolios to

assess learning in a first-year seminar. Using rubrics, along with examination of students’ narratives, trained faculty unfamiliar with the students whose work they assessed were able to provide reliable evidence of learning. We adapt Buyarski and Landis’s (2014) methodology to examine the efficacy of rubrics as a means for assessing applied and collaborative learning and academic identity in ePortfolios.

In a review of research examining the value and educational consequences of rubric use, Jonsson and Svingby (2007) found that analytic, topic-specific rubrics were most useful in assessment of student performance. In general, rubric use makes assessment by multiple evaluators more reliable. Jonsson and Svingby (2007) reported that inter-rater reliability rates ranged from 4-100%, with the majority falling in the range of 55-75%. In general, reliability rates were lower in instances in which tasks or products were not uniform. More extensive rater training was generally associated with higher levels of reliability. However, high reliability was not necessarily associated with high validity. Validity of rubrics varies widely and depends on the care with which rubrics are developed to align with a construct of interest. Rubrics also enhance learning and instruction by making expectations clear to both students and faculty. Accordingly, a good rubric that is in alignment with a construct might guide instruction to align more fully with the construct.

In the current work, we assessed whether evaluators could reliably use an ePortfolio to assess applied and collaborative learning and academic identity. We utilized two sets of evaluators, with different levels of direct knowledge of the students, in order to gain insight into the extent to which ePortfolios capture authentic learning. Faculty who directly supervised students in the research lab (faculty sponsors) evaluated students using their complete knowledge of the student from personal interactions as well as from the student’s ePortfolio. Faculty unfamiliar with the student are referred to as naïve evaluators because they assessed learning using only the ePortfolio and were naïve with regard to performance in the research lab. We hypothesized that naïve evaluators would see less evidence of learning than faculty sponsors because they had less information. However, should naïve evaluators report stronger evidence of learning than faculty sponsors, this would raise the possibility that students might be able to inflate their proficiency artificially in an ePortfolio. We hypothesized that ePortfolios would document applied and collaborative learning and academic identity, but that direct faculty knowledge of students would provide more robust evidence than ePortfolios alone. We were also interested in assessing the extent to which the created rubrics were valid and reliable measures of applied and collaborative learning and academic identity.

Method

Participants

Students. The summer research program included 22 students in 2013 and 22 students in 2014. Four students who participated in the research program in 2013 were excluded due to the death of their research sponsor, and two students were excluded due to failure to share their ePortfolios. This resulted in a sample of 38 students (29 females and 9 males). Our sample included 24 students who identified as African American, 10 who identified as Latino, two individuals who reported mixed African American and Latino ancestry, one who identified as Asian, and one who identified as Native American. Fifteen students completed research in psychology or neuroscience, 13 in biology, seven in biochemistry, and three in environmental science.

Faculty sponsors. Eight faculty served as research sponsors: Four of these were sponsors in both 2013 and 2014, two sponsored students only in 2013, and two sponsored students only in 2014. All sponsors had PhDs in a STEM discipline and were full-time faculty members at the college. There were five assistant professors, two associate professors, and one full professor. There were five males and three females. All faculty identified as White.

Naïve evaluators. We decided to have faculty sponsors evaluate both the students they sponsored and students with whom they were unfamiliar to ensure that similar standards would be used for both sets of evaluations. When rating unfamiliar students, faculty are referred to as *naïve evaluators*. Three additional STEM faculty who did not sponsor students served as naïve evaluators. They all had PhDs and were full-time faculty members (one lecturer, one associate professor, and one full professor). There were two females and one male, and all identified as White.

Materials and Procedure

Learning outcome and rubric development. To identify expected proficiencies, six faculty research sponsors individually created lists of learning outcomes that were then discussed in a focus group with the authors and two outside experts in rubric construction. The group reached consensus on the desired learning outcomes and the products that could be used to evaluate mastery of these outcomes. The outcomes included items associated with both applied and collaborative learning and academic identity (see Table 1). The applied and collaborative learning outcomes were brought into alignment with the applied and collaborative learning proficiency from the DQP (Adelman et al., 2014). Rubrics were developed to

clarify expectations for each of the learning outcomes. The six faculty sponsors piloted the rubrics, using them to assess 20 ePortfolios. Results of this pilot work and a focus group with the participating faculty revealed that the ePortfolios did not include sufficient information for assessment of the quality of revisions or the development of collaborative strategies. Accordingly, these learning outcomes were removed (see Figures 1 and 2).

ePortfolio creation. We instructed students to create ePortfolios that would document their summer experiences. Students were provided with the expected learning outcomes and products and shown how to create and share pages. Work on the ePortfolios occurred after the students' work day was complete. Students created their ePortfolios independently, without direct supervision from the research sponsor. Program staff held weekly workshops in which the students were required to contribute a minimum of one journal entry, one image that documented learning in some area, and one piece of writing that documented learning. Students were required to provide a caption for each image that explained how it documented learning. Additionally, students were required to respond each week to a specific written prompt (see Appendix). Students were not provided with a template. Instead, staff worked individually with students to develop content and design the ePortfolio. The ePortfolios were not graded. However, program faculty, staff, and students provided comments on the ePortfolios that individual students shared with the group.

Evaluator training. Faculty sponsors were instructed on the use of the rubrics during a faculty meeting that took place one week before the faculty were to begin evaluating. Two naïve evaluators who were not faculty sponsors attended the group instruction session. The remaining naïve evaluator who was not a faculty sponsor received individual instruction. During the training, evaluators reviewed the rubrics and discussed possible products that could be used to document proficiency. Evaluators were instructed to read reflective writing carefully as a source of information about academic identity proficiencies. The evaluators completed the rubrics by selecting from five possible ratings: *exceeds expectations*, *meets expectations*, *approaches expectations*, *does not meet expectations*, and *cannot evaluate*. All 38 students were assessed by their respective research sponsors. Twenty-one students were assessed by three naïve evaluators and 17 students were assessed by two naïve evaluators. We elected not to have faculty reach consistency on sample ePortfolios because we were interested in the rubrics' utility in a minimal training environment. Although research has established higher inter-rater reliability with practice sessions, this sort of training is

Table 1
Initial Learning Outcomes Generated by Faculty Research Sponsors

| Construct | Learning outcome | Evidence |
|------------------------------------|---|--|
| Academic identity | Identifies hopes and goals for experience Demonstrates confidence sharing ideas Engages with the research Identifies learning from experience Constructs plans for academic future Refines ideas about possible careers | Journal entries Interim and final report |
| Applied and collaborative learning | <u>Literature</u> Summarizes research literature Articulates contribution to existing knowledge <u>Research Design</u> States project goals Articulates research hypothesis Describes research design <u>Data Collection</u> Successfully implements methodology Documents data collection <u>Data Analysis</u> Organizes data Performs calculations correctly Draws appropriate conclusions Communicates results <u>Collaboration</u> Demonstrates collaboration skills Works with team to draft research abstract Works with team to draft final presentation <u>Revisions</u> Uses faculty feedback to revise work <u>Oral Presentation</u> Presents work orally with confidence and clarity | Annotations Interim and final report Interim and final report Journal entries Experimental results Interim and final report Journal entries Experimental results Interim and final report Interim and final report Journal entries Abstract Interim and final report Conference submissions Final report |

not associated with improved validity (Jonsson & Svingby, 2007). Additionally, in real world applications, rubrics are frequently used by individuals who have not received reliability training.

Results

Coding

Because our primary goal was to determine whether ePortfolios could provide reliable information that would enable ePortfolio-based assessment of prior learning and academic identity, we focused on whether

evaluators reported that a learning outcome had been met (grouping *meets expectations* and *exceeds expectations*) or not met (grouping *approaches expectations*, *does not meet expectations*, and *cannot evaluate*). We treated *cannot evaluate* as an indication that a learning outcome had not been met because this response was given in instances in which material related to an outcome was not present in the ePortfolio.

Inter-Item Reliability

To determine inter-item reliability we calculated Cronbach's alphas for ePortfolio-based assessment of

Figure 1
Academic Identity Rubrics

| | Exceeds expectations | Meets expectations | Approaches expectations | Does not meet expectations |
|--------------------------|---|---|--|--|
| Hopes and goals | Provides a fully developed discussion of goals for experience. | Provides a good discussion of goals for experience. | Identifies some goals for experience. | Does not identify goals for experience. |
| Confidence sharing ideas | Demonstrates confidence in sharing intellectual ideas. | Demonstrates some confidence in sharing intellectual ideas. | Demonstrates limited confidence in sharing intellectual ideas. | Does not demonstrate confidence in sharing intellectual ideas. |
| Engagement with research | Notes indicate full engagement with the research process. | Notes indicate good engagement with the research process. | Notes indicate some engagement with the research process. | Notes indicate limited or no engagement with the research process. |
| Learning from experience | Offers fully developed insights into learning gained from experience. | Offers good insights into learning gained from experience. | Offers some insights into learning gained from experience. | Does not identify learning gained from experience. |
| Careers | Shares fully developed ideas about possible careers. | Shares somewhat developed ideas about possible careers. | Shares poorly developed ideas about possible careers. | Does not share ideas about possible careers. |
| Academic future | Shares fully developed plans for academic future. | Shares somewhat developed plans for academic future. | Shares poorly developed plans for academic future. | Does not share plans for academic future. |

each construct. We only included ePortfolio-based ratings in these calculations because we were interested in the use of the rubrics as measures of proficiencies demonstrated by the ePortfolio and not as measures of proficiencies demonstrated by direct knowledge of the student. We observed alphas of .78 for applied and collaborative learning and .69 for academic identity.

Inter-Rater Reliability

To determine the level of agreement between faculty sponsors and naïve evaluators, we calculated the reliability between faculty sponsors and naïve evaluators responding to the same student. We found that the average sponsor-evaluator reliability was 0.45 ($SD = 0.19$). This low reliability score is consistent with our presupposition that sponsors would have available to them substantially more information than naïve evaluators when evaluating students.

To determine whether naïve evaluators were assessing the ePortfolios similarly, we calculated the reliability between naïve evaluators responding to the same ePortfolio. We excluded the scores provided by the single naïve evaluator with a reliability score of 0.42 because this is outside the typical reliability range

reported by Jonsson and Svingby (2007). With this naïve evaluator excluded, the remaining naïve evaluators had reliability scores of between 0.62 and .72. In instances in which there were only two naïve evaluators, reliability was 0.71 ($SD = 0.14$), with reliability scores ranging from 0.50 to 0.93. In instances in which three evaluators assessed a single ePortfolio we calculated the reliability between the two evaluators who had the highest level of agreement. We found that the average reliability was 0.86 ($SD = 0.11$), with scores ranging from 0.64 to 1.00.

Individual Learning Outcomes

Tables 2 and 3 report the number and percentage of instances in which sponsors and naïve evaluators credited each learning outcome. Because two or three naïve evaluators assessed each ePortfolio, there were a total of 90 naïve evaluator assessments. As can be seen in Tables 2 and 3, faculty sponsors were aware of learning that was not evident to naïve evaluators, explaining the low levels of sponsor-evaluator reliability reported above. Faculty sponsors credited between 47% and 87%, and naïve evaluators credited between 7% and 66%, of individual outcomes. In fact,

Figure 2
Applied and Collaborative Learning Rubrics

| | Exceeds expectations | Meets expectations | Approaches expectations | Does not meet expectations |
|------------------------|---|--|--|--|
| Understands literature | Demonstrates an excellent understanding of the literature. | Demonstrates a good understanding of the literature. | Demonstrates some understanding of the literature. | Does not demonstrate understanding of the literature. |
| Analyzes literature | Very effectively analyzes literature. | Effectively analyzes literature. | Offers limited analysis of literature. | Does not analyze literature. |
| Project goals | Demonstrates excellent understanding of the project significance. | Demonstrates a good understanding of the project significance. | Demonstrates some understanding of the project significance. | Does not demonstrate understanding of the project significance. |
| Project hypothesis | Demonstrates an excellent understanding of the research hypothesis. | Demonstrates a good understanding of the research hypothesis. | Demonstrates some understanding of the research hypothesis. | Does not demonstrate understanding of the research hypothesis. |
| Research design | Demonstrates an excellent understanding of the project research design. | Demonstrates a good understanding of the project research design. | Demonstrates some understanding of the project research design. | Does not demonstrate understanding of the project research design. |
| Data collection | Collects and records data with no errors. | Collects and records data with very few errors. | Collects and records data with some errors. | Does not collect and record data. |
| Data analysis | Fully understands the analyses. | Generally understands the analyses. | Understands some of the analyses. | Does not understand the analyses. |
| Draws conclusions | Fully understands the relation between results and hypothesis. | Generally understands the relation between results and hypothesis. | Understands some of the relation between results and hypothesis. | Does not understand the relation between results and hypothesis. |

Table 2
Evaluations Crediting Academic Identity Outcomes

| Learning outcome | Faculty sponsor | | Naïve evaluator | |
|--------------------------|-----------------|-----|-----------------|-----|
| | <i>n</i> | % | <i>n</i> | % |
| Hopes and goals | 18 | 47% | 27 | 30% |
| Confidence sharing ideas | 31 | 82% | 59 | 66% |
| Academic future | 31 | 82% | 43 | 48% |
| Careers | 33 | 87% | 50 | 56% |
| Learning from experience | 27 | 71% | 43 | 56% |
| Engagement with research | 32 | 84% | 50 | 56% |

Note. Faculty sponsor *n* = 38. Naïve evaluator *n* = 90.

for all outcomes assessed, faculty sponsors reported higher rates of acquisition than naïve evaluators. Differences between faculty sponsor and naïve evaluator assessments of individual learning outcomes ranged from 15% (learning from experience) to 69% (data collection).

The naïve evaluators reported that ePortfolios included evidence of academic identity outcomes

between 27% and 59% of the time and included evidence of applied and collaborative learning outcomes between 7% and 41% of the time. Although the evidence for individual applied and collaborative learning outcomes was low, because there were eight unique outcomes, students could show evidence of applied and collaborative learning without having provided evidence of every learning outcome. Naïve

Table 3
Evaluations Crediting Applied and Collaborative Learning Outcomes

| Learning outcome | Faculty sponsor | | Naïve evaluator | |
|------------------------|-----------------|-----|-----------------|-----|
| | <i>n</i> | % | <i>n</i> | % |
| Understands literature | 25 | 66% | 20 | 22% |
| Analyzes literature | 21 | 55% | 15 | 17% |
| Project goals | 32 | 84% | 37 | 41% |
| Project hypothesis | 33 | 87% | 32 | 36% |
| Research design | 29 | 76% | 29 | 32% |
| Data collection | 29 | 76% | 6 | 7% |
| Data analysis | 22 | 58% | 22 | 24% |
| Draws conclusions | 20 | 53% | 20 | 22% |

Note. Faculty sponsor *n* = 38. Naïve evaluator *n* = 90.

evaluators agreed that five (13%) of the 38 ePortfolios failed to show evidence of any applied and collaborative learning. However, the faculty sponsors of these students reported evidence of between four and eight of the applied and collaborative learning outcomes. We conclude that these five students demonstrated applied and collaborative learning but failed to document mastery in their ePortfolios.

ePortfolio Capture Rates

To determine the extent to which naïve evaluators were aware of students' mastery of learning outcomes, we limited our sample for each learning outcome to students who had been credited by their faculty sponsor. These numbers are reported in Tables 4 and 5. We then calculated the number of times at least one naïve evaluator credited each of these students in order to determine the percentage of times naïve evaluators credited learning that had been credited by sponsors. We believe that these percentages are the best measure of the extent to which naïve evaluators were able to see evidence of actual learning. We will refer to this measure as *ePortfolio capture*.

As can be seen in Table 4, the ePortfolio capture rates for academic identity outcomes were excellent, with rates ranging from 67%-87%. However, as can be seen in Table 5, ePortfolio capture rates for applied and collaborative learning outcomes were lower, ranging from 14%-67%. Capture rates were over 50% for project goals, project hypothesis, and research design. Capture rates ranging from 30%-40% were observed for understands literature, analyzes literature, data analysis, and draws conclusions. The lowest capture rate of 14% was observed for data collection.

Differences in Sponsor and Naïve Evaluator Ratings

Another way to determine whether naïve evaluators can reliably assess student learning is to compare the frequency with which faculty sponsors

credited students with learning that the majority of naïve evaluators did not to the frequency with which the majority of naïve evaluators credited a student with learning that the faculty sponsors did not. Because the faculty sponsors had the benefit of both ePortfolio review and personal knowledge, we expected there would be more instances in which sponsors credited learning than the reverse. We found that there were far more instances in which sponsors credited students with learning when the naïve evaluators did not (18%-58%) than there were instances in which naïve evaluators credited students with learning when the sponsors did not (0%-11%). The most common applied and collaborative learning outcomes credited by naïve evaluators but not sponsors were draws conclusions (11%), project goals (8%), and research design (8%). The most common academic identity outcomes that were credited by naïve evaluators but not faculty sponsors were confidence sharing ideas (11%) and plans for academic future (8%).

Differences between Students

Although all of the students who participate in our program are enrolled in community colleges when they apply, some students enter our program ready to attend a 4-year school while others plan to return to community college. We divided our sample into students who would be attending a 4-year institution after completion of the summer program (*n* = 16) and students who would be returning to their two-year institution (*n* = 22). We hypothesized that more advanced students might have been better able than less advanced students to master (or document) applied and collaborative learning at the bachelor's level. Table 6 reports the average number of learning outcomes associated with applied and collaborative learning and academic identity as a function of academic status and evaluator.

To investigate the effects of academic status and evaluator on applied and collaborative learning we

Table 4

Academic Identity Outcomes: Frequency of Naïve Evaluator Credit for Outcomes Credited by Faculty Sponsor

| Learning outcome | Number credited by sponsor | No. and % credited by naïve evaluator |
|--------------------------|----------------------------|---------------------------------------|
| Hopes and goals | 18 | 12 (67%) |
| Confidence sharing ideas | 31 | 27 (87%) |
| Academic future | 31 | 21 (68%) |
| Careers | 33 | 23 (70%) |
| Learning from experience | 27 | 20 (74%) |
| Engagement with research | 32 | 27 (84%) |

Table 5

Applied and Collaborative Learning: Frequency of Naïve Evaluator Credit for Outcomes Credited by Faculty Sponsor

| Learning outcome | Number credited by sponsor | No. and % credited by naïve evaluator |
|------------------------|----------------------------|---------------------------------------|
| Understands literature | 25 | 10 (40%) |
| Analyzes literature | 21 | 8 (38%) |
| Project goals | 32 | 20 (63%) |
| Project hypothesis | 33 | 22 (67%) |
| Research design | 29 | 15 (52%) |
| Data collection | 29 | 4 (14%) |
| Data analysis | 22 | 8 (36%) |
| Draws conclusions | 20 | 6 (30%) |

Table 6

Average Number of Learning Outcomes Associated with Applied and Collaborative Learning and Academic Identity Reported as a Function of Academic Status and Evaluator

| Learning outcome | Evaluator | Community college students | 4-year college students | All students |
|--|------------------|----------------------------|-------------------------|---------------|
| | | <i>M (SD)</i> | <i>M (SD)</i> | <i>M (SD)</i> |
| Applied and collaborative learning (8 items) | Faculty sponsor | 5.41 (2.40) | 5.75 (2.05) | 5.58 (0.35) |
| | Naïve evaluators | 1.61 (1.82) | 2.77 (2.57) | 2.19 (0.24) |
| Academic identity (6 items) | Faculty sponsor | 4.23 (0.37) | 4.94 (0.44) | 4.02 (0.27) |
| | Naïve evaluators | 2.98 (0.23) | 3.01 (0.32) | 3.61 (0.22) |

calculated a 2 (academic status: 2-year school, 4-year school) x 2 (Evaluator: faculty sponsor, naïve evaluator) ANOVA on the total number of learning outcomes credited. We observed a significant and strong effect of evaluator, $F(1, 127) = 63.11, p < .001, \eta_p^2 = .33$, such that faculty sponsors reported more evidence of learning ($M = 5.58$) than naïve evaluators ($M = 2.19$). We also observed a marginally significant effect of academic status, $F(1, 127) = 3.11, p = .08, \eta_p^2 = .03$, such that more advanced students were credited with higher levels of applied and collaborative learning ($m = 4.26$) than less advanced students ($m = 3.51$). We failed to observe an interaction.

To investigate the effects of Academic Status and Evaluator on Academic Identity we calculated a 2 (Academic Status: 2-year school, 4-year school) x 2 (Evaluator: faculty sponsor, naïve evaluator) ANOVA on the total number of academic identity outcomes

credited. We observed a significant effect of Evaluator, $F(1, 127) = 19.74, p < .001, \eta_p^2 = .14$, such that faculty sponsors reported more evidence of identity ($M = 4.58$) than naïve evaluators ($M = 3.04$). We failed to observe an effect of academic status or an interaction between academic status and evaluator.

Discussion

In the current work, we describe our use of rubrics to assess applied and collaborative learning and academic identity in ePortfolios that were created during a summer research program for community college students from underserved groups. Faculty sponsors evaluated individual students using their knowledge from personal interactions as well as the student's ePortfolio. Naïve evaluators evaluated students using only the ePortfolio. As hypothesized, we

found evidence that ePortfolios document applied and collaborative learning and academic identity. We also found that the rubrics we designed to assess these constructs appear to be reliable measures of the constructs under investigation.

The rubrics were developed following practices that support their validity. Experienced mentors who were familiar with the research program and its goals worked with assessment experts to develop and refine the rubrics over a year during which they used them to assess students. Construct reliability is supported by the adequate levels of inter-item similarity obtained for each measure. We observed variations in the quality of individual naïve evaluators' work. The range of quality was demonstrated by the improvement in inter-evaluator reliability when three evaluators assessed a single student and the two with the highest levels of agreement were included in the calculation. Nonetheless, the observed levels of inter-rater reliability are well within the range of reliability generally seen with rubric use (Jonsson & Svingby, 2007). We conclude that these rubrics are valid and reliable tools that might be used in the assessment of student ePortfolios.

As expected, faculty sponsors credited students with more learning outcomes than naïve evaluators. We believe that this level of disagreement should be interpreted as evidence of the rubrics' sensitivity. An effective rubric should differentiate between the learning evidenced in an ePortfolio alone and the learning evidenced in many hours of shared work in addition to an ePortfolio. This interpretation is supported by the finding that, for every measured learning outcome, faculty sponsors gave credit more frequently than naïve evaluators. Similarly, faculty sponsors gave credit when naïve evaluators did not more frequently than naïve evaluators gave credit when faculty sponsors did not.

The few instances in which naïve evaluators gave credit when faculty sponsors did not may provide insight into the standards employed by the two types of evaluators. It is possible that faculty sponsors have higher standards of proof than naïve evaluators. We believe this is likely to have affected the evaluation of the applied and collaborative learning outcomes. The applied and collaborative learning outcomes that were most often credited by naïve evaluators but not faculty sponsors were draws conclusions, project goals, and research design. For each of these learning outcomes, two or three students received credit from naïve evaluators but not faculty sponsors. These three outcomes are the most conceptually difficult applied and collaborative learning outcomes and the most specific to the individual research group. Accordingly, faculty sponsors may have been somewhat less lenient than naïve evaluators in crediting these outcomes.

We were primarily interested in determining the extent to which actual learning could be assessed via ePortfolios. Naïve evaluators credited individual students with 2.19 outcomes on average (out of eight possible). On the basis of this finding we conclude that, in general, naïve evaluators require a high standard of proof before credit is awarded. Additionally, when we limited our sample for each learning outcome to students who had been credited with the outcome by their faculty sponsor, we observed relatively high ePortfolio capture rates (30%-67%) for all individual learning outcomes except data collection (14%). We believe that high ePortfolio capture rates indicate that naïve evaluators were able to credit actual learning.

Individual ePortfolios varied in their quality and completeness. We found that there was a trend in which students who were ready to transfer to four-year schools demonstrated evidence of more applied and collaborative learning outcomes than students who were planning on returning to community colleges. Given that we assessed applied and collaborative learning at the bachelor's level, it is not surprising that students who were prepared to transfer demonstrated more proficiency than those who were not yet ready to transfer. This finding can be interpreted in several ways. It is possible that more advanced students learned more than less advanced students. However, it is also possible that students who were about to transfer to a 4-year school were more able or more motivated to document their learning than students returning to community college.

We found that, regardless of academic level, students were similarly able to document academic identity in their ePortfolios. We believe that this is an important finding. In previous work we have argued that the development of academic identity in summer research programs may be a central element that leads to increased academic persistence (Singer-Freeman et al., 2014). Students with an enhanced sense of academic identity who return to community college may be more likely to transfer to a four-year school in the future and those who go on to four-year schools may be more likely to complete their bachelor's degrees.

Limitations and Implications

This research occurred in an applied setting. Consequently, it was subject to lower levels of control than a more structured experiment would be. We elected to provide relatively little training to our evaluators. By examining the use of the rubrics without extensive training we were able to determine the extent to which the rubrics themselves enabled reliable evaluations. We found that levels of inter-rater reliability were within ranges reported elsewhere.

Nonetheless, if these rubrics were to be used with the purpose of crediting prior learning, training on sample ePortfolios would be advisable. If such training is not conducted, using three naïve evaluators would be preferable to using two.

Because this research was conducted in the context of a summer research program, we compared the ratings of faculty sponsors to naïve evaluators. In addition to having more knowledge of the student's abilities, faculty sponsors also had a personal relationship with the student. A more controlled evaluation would compare the ratings of two sets of naïve evaluators: one that reviewed only the ePortfolio and a second that reviewed the student's work over the entire program. We hypothesized and found that for most outcomes, faculty sponsors credited students with greater learning than naïve evaluators. We interpreted this to reflect the fact that faculty sponsors had more genuine knowledge of students' abilities. However, it is also possible that faculty sponsors credited more learning because of the influence of having a personal relationship with the student. We believe that this interpretation is unlikely for several reasons. First, faculty sponsors were not sharing their evaluations with the student. This should reduce faculty sponsors' focus on their personal relationship with their students. Second, faculty sponsors also served as naïve evaluators. Serving as a naïve evaluator should help the faculty sponsor take a neutral perspective when considering the work of his/her own students. Third, faculty sponsors knew that their students were also being assessed by naïve evaluators. This knowledge should encourage impartiality. Finally, the few instances in which faculty sponsors did not credit learning that was credited by naïve evaluators involved outcomes that were the most conceptually difficult. This suggests that in these instances faculty sponsors used their more extensive knowledge of the student to determine that the evidence in the ePortfolio was not sufficient to document mastery. It seems unlikely that if faculty were biased to credit students because of a personal relationship they would exhibit this bias only for the less difficult learning outcomes.

To give students a sense of autonomy in the creation of their ePortfolios, we allowed students to create their ePortfolios without using a template. We believe that this may have increased the extent to which students documented and developed academic identity by encouraging them to fully engage with the ePortfolio as a creative project. However, students' different organizational choices likely made it difficult for some evaluators to locate evidence of individual learning outcomes. We hypothesize that inter-rater reliability was impeded by the unstructured nature of the students' ePortfolios. Were students creating ePortfolios for the purpose of receiving credit for prior learning, it would

be advisable to develop a template that was organized by learning outcome and specified the products to be included to demonstrate mastery. In contrast, for those using ePortfolios as a means of developing and documenting academic identity, it may be important to allow students more independence in the creation of their ePortfolios.

Miller and Morgaine (2009) found that the reflective practices embedded in ePortfolio creation helped students to develop academic identity as they engaged in complex projects. The use of writing prompts (see Appendix) appeared to encourage expressions of academic identity in student ePortfolios. Our current evidence of academic identity in student ePortfolios replicates Singer-Freeman et al. (2014). The rubrics tested in this work appear to be a reliable means of assessing academic identity. The construct of academic identity is similar to those of academic self-efficacy and academic goals, which have been found to be moderately related to academic persistence (Robbins et al., 2004). We believe that academic identity should be a central element of student ePortfolios and that the evaluation of academic identity in student ePortfolios is an important area for future research.

We found evidence to support our hypothesis that ePortfolios would be useful in the evaluation of academic identity and applied and collaborative learning at the bachelor's level. As expected, direct faculty knowledge of students provided more robust evidence of learning and identity than ePortfolios alone. Nonetheless, ePortfolio assessment did provide evidence of prior learning and identity in the current study. Proficiencies similar to those evidenced by our students are likely to be present in other high-impact activities (e.g., internships, global learning, learning communities). The use of rubric-based assessment of ePortfolios by trained evaluators in these contexts could have similar value.

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Appendix
Reflective Writing Prompts

1. List your favorite 5 “I am” statements (they do not have to match your original ones). Write your goals for the summer, the next several years, and the next 10 years. Write about the ways in which the last week has been similar to and/or different from other weeks of your life.
2. List the personal values that you hold. Describe an experience in your life that made you proud of yourself and your values. Reflect on the reason that the experience made you proud of your values. Discuss how your values fit with the values of the scientific community.
3. You are now half way done with your summer experience. Please take a look at your goals for the summer that you created during the first week. Describe the progress you have made in meeting your goals. Propose ways you could increase your progress towards meeting your goals.
4. Write a reflection on your thoughts about your ideal career. Be sure to address the following questions in your response: What skills do you currently have that you think make you well suited for this career? What skills might you need to develop further to succeed in this career? Have your thoughts about your ideal career changed as the summer has progressed?
5. Write a reflection on ways that you have and have not changed over the past 5 weeks. If you could do the summer program again, what would you do differently and what would you keep the same?

Making and Sharing Connections: Review of *Leveraging the ePortfolio for Integrative Learning: A Faculty Guide to Transforming Student Learning* by Reynolds and Patton (Stylus, 2014)

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This article contains a review of the book, *Leveraging the ePortfolio for Integrative Learning: A Faculty Guide to Classroom Practices for Transforming Student Learning*. The book provides a set of stories, reflections, and resources around ePortfolio development at all stages of implementation. The authors, Reynolds and Patton, deliver their concrete experience around integrative learning and ePortfolio use. They also provide faculty and staff with a series of realistic and vetted instructional practices, that when applied to ePortfolio processes, have shown tremendous power to transform student learning. Publisher: Stylus (Sterling, VA, 2014). ISBN-978-1-57922-900-9. List price: \$95.00. 164 pages.

Over 40% of all higher education institutions in the United States have invested resources in ePortfolio instruction and development (Rhodes, Chen, Watson, & Garrison, 2014). These institutional commitments to ePortfolios are demonstrated by significant budgets, expanding faculty participation, and the numerous programs involved in their use. Most of these commitments are attached to purported increases in retention, completion, digital identity management, preparation for employment, and graduate school opportunities (Eynon, Gambino, & Török; 2014; Hartman, 2013; McAlpine, 200; Wells, 2015). These commitments and claims make it clear that the stakes are high for institutional players in the ePortfolio game. Practitioners across the globe have proceeded to develop a plethora of uses for the ePortfolio in hopes of meeting the above stated goals. Administrators are looking for solid data and best practices to drive their decisions around funding and the continued proliferation of ePortfolio use on their campuses. This level of investment and hope around the potential of the ePortfolio has spurred a recent call from Bryant and Chittum (2013) for an increase in research regarding empirical data around their use. The authors, Reynolds and Patton specifically addressed these calls, indicating that “administrators of programs and institutions will find this book useful by providing a framework for understand the roles ePortfolios can play in improving student learning” (p. xv).

In the years leading up to the publication of Reynolds and Patton’s book, *Leveraging the ePortfolio for Integrative Learning: A Faculty Guide to Classroom Practices for Transforming Student Learning* (2014), we see evidence of a several other research and writing efforts to promote fundamental practices in relation to the creation and instruction of ePortfolios. As early as 2004, we saw publications such as Heath’s (2004), *Electronic Portfolios: A Guide to Professional Development and Assessment*. This tool

for professional development provides frameworks on which educators can develop ePortfolios and guides educators through their organization, presentation, technology, and portfolio design. In 2007, we saw another volume by Stefani, Mason, and Pegle, entitled *The Educational Potential of e-Portfolios: Supporting Personal Development and Reflective Learning*, in which the authors argued that students can utilize ePortfolios to exploit technology for both professional and personal purposes. The book by Cambridge, Cambridge, and Yancey (2009), entitled *Electronic Portfolios 2.0: Emergent Research on Implementation and Impact*, provides us with research from across 20 educational institutions in which the authors examined ePortfolio use and the effects it had on multiple student practices such as reflection, integrative learning, establishing identity, and organizational learning. Cambridge et al. (2009) also described how institutions have responded to multiple challenges in ePortfolio development, from engaging faculty to increasing the scale of their practice.

In 2010, we saw two strong publication efforts. First, Buzzetto-More’s (2010) book *The E-Portfolio Paradigm: Informing, Educating, Assessing and Managing With e-Portfolios*, which focused on ePortfolios as a way to document both individual and organizational progress towards goals, marketing of talent, assessment and evaluation, professional development, examination of the efficacy of operations, and support for learning. Second was Cambridge’s (2010) *ePortfolios for Lifelong Learning and Assessment*, which depicts an educational vision that is specifically supported by ePortfolio use. Drawing on work across the disciplines and exploring international ePortfolio practice, Cambridge (2010) suggested future directions for higher educational institutions in terms of curriculum, assessment, and technology. A slightly more recent guide can be found in Penny Light, Chen, and Ittleson’s (2011) book, *Documenting Learning*

With ePortfolios: A Guide for College Instructors, in which the authors indicated that ePortfolios can take on roles in higher education at both an institutional and student level. This book provided guidance for instructors specifically working in online settings around creating and implementing ePortfolios as they discuss strategies to help faculty assess and design significant ePortfolio experiences for both themselves and their students.

Although these prior books have relevant information designed to help faculty and administrators understand the use of ePortfolios and provide visionary examples of how to set up ePortfolio programs on a campus, Reynolds and Patton's (2014) book targets faculty pursuing pedagogy that specifically incorporates the elements of integrative learning practices. The abbreviated and practical nature of Reynolds and Patton's (2014) book and its information and activities are a striking shift from some of the lengthier ePortfolio books focused on multiple topics that we have briefly reviewed. Tying "knowledge-age" skill sets and "21st century learning" with ePortfolio practice is common, both of which claim integrative learning as an essential skill (Harasim, 2012; Mentkowski et al., 2000; AAC&U, n.d.). How to achieve these specific skills revolves around the key instructional practices brought to us by Reynolds and Patton (2014). In many ways, this focus on integrative learning practices and activities renders this text an ultra-relevant guide for ePortfolio practitioners everywhere, regardless of the type of ePortfolio they seek to promote and instruct. The foundational nature of integrative learning, which helps in creating connections that can champion personal and professional growth, are not likely to expire in the near future, making this slim guide a must have.

As the process of researching and documenting what ePortfolios can accomplish for both institutions and students continues, Reynolds and Patton (2014) have offered us an insightful throwback to their essential core practices related to ePortfolios—integrative learning. In their book, they provide a practical guide for faculty and staff who want to help their students integrate their learning. The authors argue that reaching the goal of integrated learning rarely, if ever, just happens without some significant strategies employed in a classroom setting. With their combined 30 years of practical ePortfolio experience, they offer us concrete and vetted practices known to create successful transformational learning through integrative learning, which they have both facilitated and witnessed. This guide was designed to provide ideas to any educational professional who can easily review the suggestions and solutions included, and get to work applying them immediately.

Reynolds and Patton worked together at Portland State University in the University Studies General Education Program (UNST), where full-scale use of ePortfolios has been taking place for well over a decade. Along with their colleagues, they pioneered the use of ePortfolios across first-year learning experiences. They worked closely together when Reynolds was the Mentor Director and Patton was starting up their dual enrollment first-year experience high school program. Both have gone on to hold various prestigious positions across higher education and are active in giving national conference presentations, and workshops and in consulting with universities across the country and in Canada and Japan, with Reynolds also recently providing these services in the Middle East. In their book, they capitalize on the relationships they have built, both inside and outside of Portland State University, to provide us with an ensemble of these shared practices. The book includes dozens of references to students' and colleagues' experiences, outlining multiple step-by-step successful real-world experiences that include examples, frameworks, protocols, and rubrics. The conclusion one could draw while reading their book is that they have crafted a response to years of consulting around the topic of ePortfolios, and those have been fashioned into a toolkit of resources, all contained in this slim single volume. The result promotes a feeling of being invited into a group of ePortfolio super-users for an authentic "lets get down and dirty" workshop session.

The book is broken into four cohesive sections and is first and foremost about integrative learning, and the concepts and activities presented are useful for integrative learning even without an ePortfolio in the mix. As Reynolds and Patton (2014) have indicated, "the true work of creating a transformational ePortfolio is not in the actual making of the ePortfolio . . . but in the process of integrating one's own learning," which allows students "to be able to connect knowledge they are learning and apply it to the problems of the day" (p. 3). Many of the activities can be used straight from the book with little to no adaptation. The topic of ePortfolio facilitation is delivered as a leverage point in education to address integrative learning practices. Yet, they also present ePortfolio use as sitting squarely in the center of practices and professions such as personal branding, managing online identities, digital literacy, and digital storytelling.

Part One of the book (Chapters 1-3) includes descriptions of the key concepts of the ePortfolio and integrative learning, and shows how the latter can be included in both classrooms and programs. This section of the book includes a description of ePortfolio, as well as a definition of integrative learning, a discussion of its importance, and an account of how it is assessed. There are some succinct resources and tables that allow

us to overview quickly the types of ePortfolios in use, a substantial selection of ePortfolio examples, and further institutional breakdowns of how they are currently applying ePortfolio practice on their campuses. In their segment, *Beyond College*, they touch on lifelong learning as it is related to the ePortfolio. Further discussion around how to make integrative learning a goal in courses or programs includes a rubric that identifies ways in which integrative learning can be demonstrated and provides a framework and criteria for judging that work.

Part Two (Chapters 4-7) includes classroom practices and assignments that support the actual development and scaffolding of integrative learning. In “Fostering Reflective Practice” (Chapter 4), the authors have provided the Guiding Principles of Reflection to illuminate reflection as a learning process and to help students develop reflective practice skills in students. In Chapter 5, “Making Connections or Integrating Knowledge,” they focus on “intentionally building links between prior understanding of material and the material that is currently being learned” (p. 75) And provide a sampling of activities that help learners make connections between course content-personal lives, course-course connections, course-major connections, and bridging theory and practice. Although they recognize the seemingly opposing qualities of structure and autonomy, they also help us to see that even though “we don’t have full control over student engagement, we do have control over how we structure our activities and how we motivate our students” (p. 91). They drew from self-determination theory to generate activities that promote self-directed learning and provide types of structure that are appropriate to the beginning, middle, and end of the ePortfolio phasing process. When discussing digital presence, they address the need to educate students about how to manage their presence on the Internet, and role of communication, such as presentation, design, appearance, audience and appropriate content selection.

Part Three (Chapters 8 and 9) addresses the practical and functional aspects of helping students create their ePortfolios, including activities for creating effective ePortfolio structures and issues of privacy and control. The authors define privacy as “deciding who can see the ePortfolio,” and control as “who is allowed to access it and when” (p. 117), as well as offer sage advice on how to regulate both of these processes. Templates are a common occurrence with ePortfolio use and development, and these, including their pros and cons, are discussed, and portfolio structures are provided. With so many platforms available, it is good to see the inclusion of a section on choosing a platform for your needs. They round out this section with a discussion on ePortfolios for faculty, the selection and use of free web-based software, and sharing their own program-wide protocol.

In Part Four (chapters 10 and 11), the authors journey into the all too familiar waters of assessment; while clearly this is not the focus of the book, the offering of ePortfolio-specific rubrics is valuable. Touching on the mechanics of assessing reflective practice, they offer rubrics to score writing and student journals, and an additional holistic assessment rubric. They define holistic assessment as “looking at the construction, design, and work as a complete artifact” (p. 138). They end their book with the prediction that “ePortfolio use will continue to grow” (p. 149) and offer a few gems in the way of parting thoughts. The references they provide for the work they are presenting are a treasure trove for researchers and practitioners.

Reynolds and Patton (2014) clearly spell out their audience for this book as faculty and staff at high schools, colleges, or universities. Practitioners who are at the beginning of their practice can capitalize on Part One of the book, which concerns pedagogical practices, whereas advanced users can benefit from Part Two, concerned with improving existing pedagogy. As integrative learning often involves learning that happens outside the classroom, student affairs professionals can also benefit from the significant amount of content provided about how to facilitate integrative learning. For administrators, beyond the aforementioned framework for understanding the role of ePortfolios in improving student learning, the sections around course, program and institutional assessment provide a helpful set of active rubrics. Additionally, those who help develop teaching with faculty and staff, such as trainers and instructional designers, can benefit from the content relating to ePortfolio structure, privacy, and control.

The scope of the book and the number of resources and suggestions available within are top notch. Yet, in many ways the book focuses heavily on program-level efforts that lack connections to and dialogue with the overlapping internal institutional and external digital identity-based climates a practitioner may inhabit. Institutional level policies and practices can, and often do, have an impact on program level delivery and instruction. Since the publication of this book we have seen a continued expansion of the use of ePortfolios in educational settings. Along with this expanded practice, issues that have been attached to their instruction and use have become more pressing to address. As an ePortfolio practitioner, an area I found to be underdeveloped within the book is in regard to the topic of privacy and control, about which this book offers us a single paragraph. As practice has begun to expand to encompass entire institutions and third-party hosts, administrators and executive teams are noting that there is ambiguity about what goes into an ePortfolio, who can view its contents, and who owns that content. Participating faculty and students alike may both ask

specific and salient questions around who is ultimately responsible for ePortfolio content created at, or hosted by, higher education institutions and third-party platforms. These questions may breed some discomfort around a lack of institutional policy (Kift et al., 2007). Addressing such concerns should be approached before extending access to external audiences such as potential employers and program evaluators. Batson (2002) identified this security as a primary concern and urges us to remember that maintaining the security of personal information is an important consideration.

As many institutions opt to select third-party web hosts and platforms to achieve their ePortfolio initiatives, the concerns over who owns and can access the information in them becomes more complicated. In this era of big data, the topic of “digital dossiers” and the ability of Internet Service Providers (ISPs) to aggregate your online information and activity through third-party providers is a current and critical concern (Solove, 2002). Future publications could include insights on the creation of policies or guidelines that can help along program or institutional level conversations in regard to collaborative ePortfolios and intellectual property. In the United States, additional layers of existing law such as the Federal Educational Rights and Privacy Act (FERPA) bind us. Creating internal institutional level policy that addresses security, privacy, ownership, intellectual property, and digital rights can produce an environment for both practitioners and creators to proceed with the development of ePortfolios with less ambiguity. An institution’s responsibilities under FERPA need to be considered in the creation, hosting, and sharing of ePortfolios (Fiedler & Pick, 2004).

As the culture of promotion and tenure begins to turn its eye toward ePortfolios, other considerations may be to link these integrative classroom practices with a faculty member’s personal practice to help model the way for students (Martino, 2015). Additionally, this book exposes the institutional-facing nature of many integrative learning portfolios, which could be enhanced by balancing the instructional supports and topics for creating learning ePortfolios with equal opportunities for creating personalized showcase ePortfolios (Chen, 2016). Without this balance in learning vs. showcase practices, the “learning ePortfolio” is often co-opted to provide the student with an ePortfolio that tries ineffectively to address multiple audiences and intents.

When reading through this book, one becomes strongly connected to the stories and narratives that Reynolds and Patton have produced and begins to feel welcomed into a group of elite super-users. The attention to details and the clear goal of enhancing student experiences through integrative learning

shines through on each page. There are consistent reminders that this process is academic but also both creative and fun. With integrative learning identified as an essential skill, these authors remind us “it is not really a matter of should we address the need, but how we address the need” (p. 150), which they have done here with great skill.

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