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ePortfolio and Identity Conference

Editorial: Welcoming IJeP and PEARL to AAC&U

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Beginning with this issue, the *International Journal of ePortfolio* (IJeP) joins the Association of American Colleges and Universities (AAC&U) as one of its official publications. This change in publication home for the journal coincides with directions set forth in AAC&U's new strategic plan, which emphasizes three cross-cutting areas of focus: building evidence, expanding capacity, and accelerating advocacy and outreach. IJeP and the "Publications on ePortfolio: Archives of the Research Landscape" (PEARL) database, also joining AAC&U this fall, offer mechanisms to address all three cross-cutting areas in regard to ePortfolios, AAC&U's newly recognized eleventh High Impact Practice.

At its fall 2017 meeting, the Board of Directors of the Association of American Colleges and Universities (AAC&U) approved a new five-year strategic plan for the future, entitled "ASPIRE: Advancing Student Performance through Integration, Research, and Excellence." The plan for 2018-2022 is grounded in the organization's mission of promoting "the vitality and public standing of liberal education by making quality and equity the foundations for excellence in undergraduate education in service to democracy."

ASPIRE outlines four strategic goals for immediate implementation:

1. Champion faculty-engaged, evidence-based, sustainable models and strategies for promoting **quality** in undergraduate education;
2. Advance **equity** across higher education in service to academic excellence and social justice;
3. Lead institutions and communities in articulating and demonstrating the **value** of liberal education for work, life, global citizenship, and democracy;
4. Catalyze reform in higher education to emphasize **discovery and innovation** as fundamental aspects of a liberal education.

Each of these goals will be fostered through three cross-cutting areas of focus:

- **Building Evidence** that supports the development of best practices within the higher education community, promotes faculty-led assessment of student learning, and demonstrates the value of AAC&U's work;
- **Expanding Capacity** by enhancing faculty and leadership development, identifying and bringing effective practices to scale, and implementing educational reforms that further the goals of AAC&U and its members; and
- **Accelerating Advocacy and Outreach** by providing tools and resources that help faculty, academic and student affairs leaders, provosts and presidents champion AAC&U's mission and communicate broadly the value of an equitable, high-quality liberal education.

The arrival at AAC&U of both the *International Journal of ePortfolio* (IJeP) and the Publications on ePortfolio: Archives of the Research Landscape (PEARL) database (http://eportfolio.aacu.org), offers an extraordinary opportunity for the enhanced creation and dissemination of research to support every one of the objectives and focal areas detailed above. Indeed, as Jessica Chittum, director of PEARL, reminds us, when we talk about ePortfolios in the context of student success, they are being discussed not as repositories, but as part of the learning process; a facilitator of the learning process and student development; and as a vehicle for whole person education (Chittum, 2017).

At AAC&U, we are convinced that fulfilling the promise of American higher education requires a curriculum that emphasizes the LEAP essential learning outcomes (knowledge of human cultures and the physical and natural world, intellectual and practical skills, personal and social responsibility, integrative and applied learning) as necessary for all students' intellectual, civic, personal, and professional development, and for success in a global economy. On this model, disciplinary work remains foundational, but students are engaged in high-impact practices that foster the skills necessary to connect their discipline with others, with the co-curriculum, and with the needs of society in preparation for work, citizenship, and life.

The use of ePortfolio is recognized by AAC&U as a high-impact practice (HIP) that creates unique opportunities for connection and synthesis across courses, semesters, and co-curricular experiences, enabling students to reflect on and construct a cohesive signature learning experience and authentic body of work (Watson, Kuh, Rhodes, Penny Light, & Chen, 2016). We know from George Kuh's (2008) ground-breaking scholarship on high-impact practices that certain types of educational experiences have a more profound effect on students, and that there is a

disparately positive impact on underserved students in relation to self-reported gains, GPA, and retention. Further, within-group comparisons of the relationship between participation in multiple high-impact practices and perceptions of learning indicate significant benefits among first-generation and transfer students that include improvements in deep learning, general education, practical competence, and personal and social development.

The evidence that high-impact practices provide distinctive and compelling benefits illustrates what we refer to as "the equity effects" of HIPS-—smaller gaps in perceived learning at higher levels of participation and larger boosts for groups that view their learning less positively in the absence of these practices. Thus, informing pedagogy and broadening the community of ePortfolio practitioners is critical if we are to make strides toward an equity-minded approach to higher education that rejects, once and for all, a deficit perspective that emphasizes what students are missing, and instead adopt asset models offering evidence-based interventions and strategies that build upon students' distinctive experiences and strengths.

Moreover, encouraging students to reflect on how the academic work they are doing today is creating capacities that will serve them tomorrow, in their employment and as citizens, is crucial in a rapidly-changing world in which the jobs of the future have not yet been invented. As Jeff Selingo highlights in his book, *There is Life After College* (2016), students today who are most successful upon graduation are those who can construct a compelling narrative around the connections between their curriculum and their career aspirations. Yet, only about one-third of the 752 young people Selingo surveyed could do so. Unlike these so-called "sprinters," most students turn out to be what he refers to as "wanderers" or "stragglers." They have ill-defined trajectories, are apt to start but not finish college, or may take six or eight years to complete, without any real idea of how their degree connects to their specific career objectives.

There are clear class markers in the categories of students Selingo proposes. Students who cannot afford to take internships and must take jobs unrelated to their career goals so that they can pay off student debt will have a more difficult time than those without college loan burdens and who have had at least one internship. However, even among the latter group, without guidance from professors, the connection between a liberal education and one's professional aspirations can remain elusive, causing students to question the value of their degrees. For this reason, IJeP's commitment to providing case studies and best practices regarding applications of ePortfolio for learning, assessment, and professional development supported by the scholarship of teaching and learning practices and research methodologies, alongside PEARL's interactive,

collaborative archive tool for researchers and practitioners, is more important than ever.

As AAC&U embarks on our next generation of work, we are proud to house IJeP and PEARL. ePortfolio holds the potential to serve as an important mechanism for assisting us in our quest to redress the growing economic and racial segregation in our society and meet our nation's historic mission of educating for democracy.

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LYNN PASQUERELLA, PhD, is President of the Association of American Colleges and Universities. A philosopher whose career has combined teaching and scholarship with local and global engagement, she has continuously demonstrated a deep and abiding commitment to ensuring that all students have access to excellence in liberal education, regardless of their socioeconomic background. Pasquerella is a graduate of Quinebaug Valley Community College, Mount Holyoke College, and Brown University. She joined the faculty of the Department of Philosophy at the University of Rhode Island in 1985, rising rapidly through the ranks to the positions of vice provost for research, vice provost for academic affairs, and dean of the graduate school. In 2008, she was named provost of the University of Hartford. In 2010, she was appointed the eighteenth president of Mount Holyoke College. Pasquerella's presidency of Mount Holyoke was marked by a robust strategic planning process; outreach to local, regional, and international constituencies; and a commitment to a vibrant campus community. Pasquerella has written extensively on medical ethics, metaphysics, public policy, and the philosophy of law. She serves as senator and vice president of Phi Beta Kappa, as a Trustee of the Lingnan Foundation, and as host of Northeast Public Radio's *The Academic Minute*.

Students as Co-Designers: Peer and Instructional Resources for Novice Users of ePortfolio

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Several decades of ePortfolio research confirm the power of the tool for helping students make meaning of varied curricular and personal experiences. For first-time users, however, the learning curve may be steep, and the gap between institutional or instructor goals and student experiences may be wide. Some studies suggest that students themselves may address this gap by taking a direct role in the implementation of ePortfolio as planners, sources of examples for others, or as peer reviewers. This study explores the use of student co-designers in a linguistics course requiring a cumulative ePortfolio project. Student co-designers held a number of roles over the course of the project and provided feedback to the instructor on the principle challenges students faced with the project. Class-wide feedback reveals that, while most were anxious about this unfamiliar tool at the beginning of the course, peer assistance and continued practice increased their belief that ePortfolio is an effective way for them to see and appreciate their learning progress over the semester.

The strength of ePortfolio as a teaching tool is the ability it lends the learner to weave his learning story from academic and social threads. Increasingly appreciated as a tool to make learning visible and encourage deeper thinking (Enyon, Gambino, & Török, 2014), ePortfolio could be an especially powerful for enhancing learning in areas that require personal, sometimes frightening risk taking. Language learning is such an enterprise. Humans use language to both understand and assert our identity, and we do it with ease and little conscious thought. The use of ePortfolio in language courses is not unique but is most often documented as a cumulative program requirement wherein many of the outcomes of the project relate to acquisition of target language skills and related cultural experiences (Karsenti & Collin, 2010), or is a tool for blended learning (Young & Pettigrew, 2012) or a core component of language teacher preparation (Scida & Firdyiwek, 2014). These contexts are appropriate for ePortfolio pedagogy, as the intensely personal process of language learning takes the learner out of the comfort of the familiar and forces confrontation with new words, personalities, cultures and more, and the space afforded by ePortfolio is the perfect place to create meaning from such experiences. Yet beyond language acquisition, how do we confront language on a daily basis and, more importantly, how do we learn from it?

The study described here is a collection of firsts. It details the implementation of a cumulative course ePortfolio project for first-time users, students in a second language linguistics course wrestling with an analytic approach to language study, and further, explores the benefits of collaboration between professor and students who are acting for the first time as co-designers of a course project. This study is unique to the use of ePortfolios cited above in a couple of significant ways. This is the only course in the larger degree program that uses ePortfolio pedagogy, and the

resulting anxiety is a variable of the study that will be discussed in the following pages. Additionally, because the course assumes a certain level of conversational competence in the target language, the goal of the project is not acquisition but rather the use of and reflection upon language in its many forms and contexts. Students were encouraged to observe and reflect on not only the target language (Spanish) but also other languages spoken or studied, for the larger purpose of becoming more critical observers of language as it occurs in a multi-modal world.

Literature Review

ePortfolio for Learning

An ePortfolio can serve several purposes and a variety of stakeholders. Lorenzo and Ittelson (2005) described four broad uses of ePortfolio: (a) as a mechanism for showcasing student work, perhaps to potential employers; (b) to monitor and assess student learning and development; (c) to document the learning process; and as (d) a hybrid approach that satisfies some combination of the aforementioned purposes. Abrami and Barrett (2005) and Barrett (2007) distinguished a process-based portfolio, as one that documents student learning in perhaps a loose, messy fashion, from a product-based portfolio, with an end goal of showcasing a neat final product to external stakeholders. Bass (2012) notes the ability of ePortfolio to organize learning around the individual rather than the course or curriculum. In language learning, constructivist pedagogies enhance learning by situating the learner among other learners (Bass 2012; Carson, McClam, Frank, & Hannum, 2014), and ePortfolio provides the electronic space to support observation, interaction, and reflection. The ePortfolio described here was learner-driven, often loose and sometimes messy, and connected to but not dictated by course content. The primary function

of the current project was to encourage students to document their personal learning experiences as they drew connections between course content and previous and current language learning experiences in both native and second languages.

One major benefit of ePortfolio is its role in helping to shift learning to the student as participant rather than as mere observer (Shulman, 1998). Even in courses or programs in which the format of the ePortfolio is prescribed or the outcomes defined by non-student stakeholders, the ability of the student to author his own story about learning yields numerous benefits. Perhaps the greatest of these is the ability to connect what is learned in the academic context with what is experienced or learned in any number of other contexts, both in and outside of the academic environment (Acosta & Liu, 2006; Enyon et al., 2014; Tosh, Wedmuller, Chen, Light, & Haywood, 2006). This benefit is the chief reason that portfolio pedagogy was a key feature in the course described in this study. One of the stated course learning outcomes was that students would develop the ability to critically observe language use outside of the classroom. The ePortfolio was both a mechanism for instructor assessment of that outcome (Barrett, 2007; Zaldivar, Summers, & Watson, 2013) as well as way for students to construct their learning and reflection with a great degree of freedom.

Difficulties for First-Time Users

While the benefit of ePortfolio to student learning is widely and increasingly accepted, research also documents the potential difficulty for students engaging in portfolio building for the first time. Jenson (2011) described the difficulties faced by first-year students in producing quality reflections in an ePortfolio study and pointed to the need for specific instructional strategies to help students develop skills for reflection and self-regulation. O'Keeffe and Donnelly (2013), eliciting student feedback on the challenges they faced with an ePortfolio assignment, noted difficulties to be in the area of understanding what was needed, how to present information in diverse ways, and the time involved in putting it all together. For students who are motivated by the end goal (final project, final grade) rather than the process, the task of documenting their learning through artifact creation and reflection can be quite difficult. If, as Neary and Winn (2009) suggested, students approach learning passively, without deep thinking, the development of "folio thinking" (Penny Light, Chen, & Ittelson, 2012) can be difficult.

Instruction That Promotes Portfolio Building

There are ways to mitigate the learning curve of ePortfolio. Previous research has pointed to the need for specific instructional strategies to better support students' ability to integrate learning experiences and reflect on them. Clearly stated guidelines and expectations, a well-structured medium, scaffolding, mentoring, and assessing the process of portfolio building have all been shown to be beneficial to students (Bowman, Lowe, Sabourin, & Sweet, 2016; Hadley 2007). Also, research has noted the need for professors to better integrate ePortfolio into the instructional process (Bowman et al., 2016; O'Keeffe & Donnelly, 2013). The timing of that integration is particularly important, and previous studies show that the scaffolding of activities—artifact creation and reflection—should be done over time and presented as an iterative process (Bowman et al., 2016; Hadley 2007; Qvortrup & Keiding, 2015). Lastly, inclusion of the ePortfolio as some percentage of summative assessment is recommended, as it increases student perception of the value of the effort invested (Bowman et al., 2016).

Students as Participant Designers

The purpose of ePortfolio and the outcomes attached to it are most often decided by instructors, course designers, program leaders, and perhaps institution administrators directing learning initiatives. The degree to which the ultimate stakeholders—the students themselves—determine the purpose and approach to ePortfolio construction is still an emerging area of study. It is far more commonplace for teachers and designers to infer or predict student perspectives in course planning than it is for them to actually include students in the process of design and implementation (Könings, Brand-Gruwel, & van Merrienboer 2010). Yet valuing the student stakeholder has been shown to improve student engagement and acceptance of the final work (Lizzio & Wilson, 2013) and, perhaps most importantly, may bridge the gap between teacher and student perspectives (Könings et al., 2010). Previous research has examined the ways that students can act as participant designers in the creation and implementation of ePortfolio, and suggests several broad areas of involvement: as designers, as models for ideas and examples, and as peer reviewers.

Könings et al. (2010) examined a number of teachers from two secondary schools in the Netherlands that collaborated with students in the instructional design process. Teachers and students together designed instruction, discussed student perspectives, and made changes. Evaluations of all students showed agreement with proposed changes, suggesting the benefits of including peer perspectives in the planning process. McNair and Borrego (2010) involved graduate engineering students as collaborative co-designers in a problem-based learning assignment that utilized ePortfolio. Data revealed that students developed increased awareness

about program and career assessment as a result of their involvement in the design process.

Involving students as sources of ideas and examples has also been cited as good practice.

O'Keeffe and Donnelly (2013) cited student feedback indicating that learning from peers, and specifically seeing what others had done, provided the inspiration to try new things. Similarly, Sadler (1989) found that giving students the opportunity to review peers' high-quality work can increase understanding of requirements and what constituted a good artifact. Parkes, Dredger, and Hicks (2013) also gave their teacher education students access to the work of a previous cohort so that they might have good models for their own. Carpenter, Apostel, and Hyndman (2012) cited a need for peer review of the technical aspects surrounding the design, layout and organization of ePortfolio.

Perhaps the greatest role for students to play is that of mentor and reviewer, to listen to, reflect upon, and question each other's experiences (Ring, 2015). Wade, Abrami, and Sclater (2005) cited the critical element of self-assessment and peer-assessment in successful ePortfolio projects. Yet, as Ring noted (2015), while we know the advantages of peer feedback in general, there is abundant evidence supporting the advantages of peer feedback related to the use of ePortfolios. Hadley (2007) found the mentors and peer mentors to be essential in helping students to engage in deeper, more thorough reflection. Through portfolio forums, students felt safe to share their work and reflections with classmates, an activity that promoted their attainment of program learning outcomes. Silva, Delaney, Cochran, Jackson, and Olivares (2015) collected data from undergraduate students involved in the developmental phase of an institutional ePortfolio system. Students reported that ePortfolio design influenced their thinking and engagement in the project, and the authors suggest a larger role for students in institutional assessment.

Research Aims

This study seeks to answer two questions. The first asks if ePortfolio increases students' ability to connect course content to language usage in context outside of the classroom, and if this skill increases over the semester. In particular, can students demonstrate the ability to think critically about their own language use or the language they observe in others? The second question asks if the student experience with ePortfolio is aided by assistance from peers. This study explicitly involved students in the implementation of an ePortfolio project by enlisting them as designers and implementers and sources of peer review and assistance; does their assistance benefit their peers?

Methodology

The Course and Students

The backdrop for this study is an upper division Spanish linguistics course, required for students majoring in the language and also popular with many pursuing a minor. The course is offered by the department in both fall and spring semesters, with several sections offered each term. It is designed to introduce students to the major subfields of linguistic study. While the course focuses on the Spanish language and is conducted in Spanish, it incorporates a small degree of cross-linguistic comparison to English. Language data analyzed throughout the class is derived from written and oral sources. This course is a gateway course in that it introduces many students to linguistic study and requires them to view and analyze language differently than they had in previous conversation, writing, and literature courses.

Twenty-four students were enrolled in the class during the semester of this study. All students were native speakers of English, and three were heritage speakers of Spanish. Students at all levels of class standing were enrolled in the course. Two of the students were also Honors students at the university and were pursuing Honors credit in the course. They earned that credit by serving as peer designers and reviewers on the ePortfolio, and their responsibilities in that role will be discussed below.

The inclusion of the ePortfolio stems from the instructor's belief that the knowledge and skills targeted by the course can only be attained and, ideally, generated to other language courses and experiences if students are led to connect course content to authentic language use outside the classroom. The implementation of this project grew from a pilot study conducted in a previous semester and jointly with an instructor of another section (Gordon & Mata, 2014). Several key findings from the pilot resulted in improvements and additions to the current study that will be detailed in the following pages. The ePortfolio project described in this paper was a required component for all students and accounted for 35% of the total course grade. Other course requirements included participation and preparation (10%), practice sets and pop quizzes (25%), and two exams (30% combined). Several intermediate deadlines were set in order to stimulate consistent work on the project, so that students had to submit or prepare for (1) a general design plan; (2) the first three artifacts and reflections; (3) three more artifacts and reflections; and (4) remaining artifacts, reflections, and final format of the ePortfolio. These dates aligned with the timing of in-class workshops led by the Honors students, and those

Table 1
Timeline of Course Requirements and Data Collection

Week	Course Requirement	Data Collection
2	ePortfolio guidelines distributed	Pre-portfolio survey
3	Students select preferred platform	
4		1st peer workshop (3 artifacts, reflections due)
8		Mid-semester survey
10		2nd peer workshop (6 artifacts, reflections due)
12	Student presentations of ePortfolios	
14		End-of-semester survey

will be described further on. Table 1 outlines the timeline for meeting the checkpoints just described.

Situated in the context of the larger aims of the course, the ePortfolio provided a way for students to show attainment of learning outcomes in a personalized fashion, distinct from the other, more traditional assessments of the class (practice, quizzes, and exams). Learning outcomes that targeted the broader skills of analyzing language data, identifying linguistic processes, and using appropriate tools and terminology, among others, could be assessed with evidence that students sought or encountered in their individualized learning both inside and outside of class.

Instructional Strategies

The current project employed a number of the recommended pedagogical strategies previously cited for improving the student experience with ePortfolio. Throughout the semester the instructor employed several of the strategies recommended by previous research for the purpose of giving continual assistance to students for building their ePortfolios. In the second week of class the professor distributed and explained the guidelines for the project, which outlined (a) the definition and characteristics of ePortfolio; (b) the definition and examples of artifacts and reflection; (c) the required number of topics, artifacts and reflections to be included; and (d) the grading rubric and weight of final ePortfolio in final course grade calculation (30% of final grade). The professor consistently emphasized the importance of reflecting on artifacts as they were added. The students were also given links to examples from other institutions and also to the work of students in the pilot project. Lastly, the guidelines also included an assessment rubric for the final project. Two days were scheduled for in-class workshop time in which students could engage in peer review and also receive help from the Honors student assistants. More detail follows on these workshops.

On several occasions during the semester the professor's content included an artifact and reflection that demonstrated the concept under discussion, shared

in a way that scaffolded the process for the class. These examples came from both the professor's own bank of artifacts and reflections, collected over time, and also from the work of students in the previous pilot experiment. For example, given a topic of discussion, the instructor would provide an artifact and a complete example of an accompanying reflection. A second example in the same class or the following day would provide the artifact but an incomplete reflection, perhaps with prompt questions, that students worked on individually for a few minutes in class and shared with others. Figures 1 and 2 are examples of artifacts and reflections included in class presentations.

Student Designers and Reviewers

To determine the benefit of student assistance and peer review, two Honors students participated in the project as co-designers and reviewers. The procedure for obtaining Honors credit for non-Honors courses is to obtain the permission of the instructor and to enter into an agreement about an advanced project that the student will complete in order to earn the credit. The required ePortfolio project had already been announced to the class, and was for the instructor an opportunity to extend the research started on the aforementioned pilot. At the invitation of the instructor the Honors students agreed to participate on the project for Honors credit. Their responsibilities were to assist the instructor throughout the semester by (1) assisting in the development of pre- and post-portfolio surveys, (2) participating in the first class workshop on the project and facilitating the second workshop, (3) relaying classmates' feedback to the instructor, and (4) writing their own blogs about their experience as ePortfolio creators and as participant designers. These students also had to include four more artifacts and reflections than their peers in their final ePortfolios. As one of the students described their role in her blog:

Our real emphasis is on acting as co-designers for this project. We are going to try to stay one step ahead of the class in the portfolio so that we can help our peers understand what the project entails,

Figure 1
Class Example of Artifact and Reflection

Figure 2
Example of Scaffolded Artifact and Reflection (Incomplete, With Prompt)

and we want to achieve a deeper understanding of how the process works for each student. [Our professor] used the term "participatory research" to describe this.

Data Collection and Analysis

In order to address the research aims of the study, data were collected from two sources: (a) brief surveys on the student experience administered at three points over the semester, and (b) the Honors students' blogs. Additional feedback collected from various students, not included in the sources just noted, were also archived by the instructor in order to provide fuller understanding of the student experience and to motivate improvements to instruction in future classes.

Brief surveys were administered to all students at the beginning of the semester (week 2), at the midpoint of the semester, and at the semester's end, after submission of final ePortfolio projects. The first and third surveys gathered pre- and post-project data, while the second was designed to monitor the progress of student work and elicit feedback on their concerns and problems, for the purpose of informing the instructor's intervention strategies. The mid-semester survey included one item related to the role of peer assistants. The survey items are included in Appendix A-C. The timeline of required assignments and data collection methods are presented in Table 1.

The Honors student blogs had two goals: for the Honors students to reflect on their own experiences as ePortfolio authors, discussing challenges as well as rewards, and to note their experience as designers and reviewers on the project. In their role as assistants on the projects, they had several opportunities to interact with other students on the ePortfolio project, and were encouraged to describe their experiences in that role as well as to note common challenges the class faced on the project. Two in-class workshops were a prime opportunity for these students to assist their classmates. The first workshop was led by the professor and students worked with each other in small groups. All students completed a peer review feedback form that was returned to the professor and then to the students. The second workshop followed the format of the first but was led by the Honors student assistants. After the second workshop they submitted to the instructor a written report of any persistent challenges or questions coming from their classmates. Lastly, their blogs were an additional way to report on their observations. A component of their own ePortfolios, the blogs recorded their processes as portfolio authors well as their findings as project assistants. Some extracts from their blogs will be shared in the following pages.

Results

Beginning of Semester Survey

Data collected at the beginning of the semester shows that most students were truly new to ePortfolio and were anxious about the project. Twenty-three students responded to the beginning of semester survey, and 18 indicated no previous experience with ePortfolio. Four of the remaining five respondents indicated that their previous experience came at the same institution. While the survey did not ask for additional information on that item, it is likely that those students had completed a portfolio required in the university's first-year writing program. Figure 3 shows the predominant themes mentioned by the students when indicating their feelings at the outset of the semester. In open-ended responses to the question "What are your feelings toward the ePortfolio at this time?" answers were divided between those who felt good or possibly even interested in the project and those who indicated stress or anxiety. A smaller number of comments explicitly predicted difficulty with the assignment. Of those indicating stress or anxiety, the focus of that feeling was evenly distributed between worries over the time it would require (four comments), a feeling of technical inadequacy (four), and uncertainty about what would constitute an artifact or where to find them (five). The final survey item asked if students anticipated any benefits from the project. Of the 12 open-ended responses given, seven expressed the expectation that the project would help them with their daily Spanish or other language skills. The remainder cited the expectation for technical skills that could be used in the future for other purposes (e.g., classes, resumes).

The Honors student blogs reflect some of the concerns expressed by their classmates. However, the predominant worry was in regard to time, and how to work regularly and consistently to find artifacts and, more importantly, write the accompanying reflections in a timely way. One entry noted, "The hardest thing for me thus far has been gathering the willpower to actually sit down and write these things." Another said, "I keep having ideas for artifacts but I don't know to which category they should belong."

Mid-Semester Survey

At midpoint of the semester 21 students completed a brief survey designed to check their progress on the project, their feelings toward the project, and specific comments on particular components (artifacts,

Figure 3
Student Feelings Toward ePortfolio at the Start of the Semester
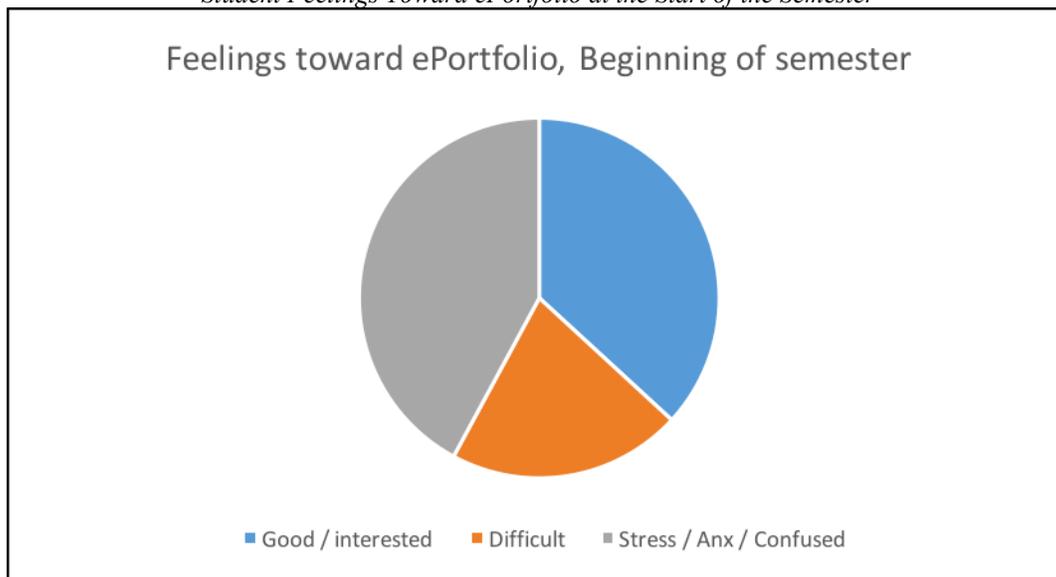
reflections, technology, time investment). Regarding their progress, only one-third indicated that they had four to five artifacts (of the required 12). Ten students had only completed one to three artifacts. Half of the students indicated that they did not have reflections to accompany all of their artifacts. The midpoint survey asked where students were finding their artifacts, and the two most popular sources were personal interactions and entertainment (e.g. tv, music, internet).

The final question of the mid-semester survey asked students to give open-ended responses to their feelings regarding several aspects of the ePortfolio. Almost all students still indicated concern for their ability to find artifacts. Time invested and the design and function of the ePortfolio were also major concerns. These two items received the same number of responses, and it might be that the two were related if students were investing a lot of time around design and technical issues.

End of Semester Survey

Upon completion of the ePortfolio, students completed a survey that targeted their feelings toward the project, their reactions to the help they received during the semester, benefits of the project, and things they might do differently if they could do it again. Results indicate that, while students found the project to be difficult, they made fewer comments regarding the stress or anxiety that the project produced for them. In addition, students frequently cited benefits to their linguistic learning. Figure 4 shows the predominant

themes mentioned by the students when indicating their feelings at the completion of the project.

When noting the benefits to learning, several comments in particular stand out: For example, (a) "I feel that it helped me learn the material more and really showed me how much I had learned throughout this class"; (b) "Good way to apply themes learned in class to our daily lives"; (c) "I think it challenged us to be more aware of examples of linguistics in our everyday life"; (d) "I think it was pretty fun and similar to how I look for language use naturally in life"; and, (e) "It was neat to connect what we were learning in class with the real world. This helped me be more aware of real-world linguistic phenomena, and it helped me to internalize what we learned in class." Furthermore, when noting the difficulty of or time invested in the project, several students mitigated those responses with a positive observation. For instance, (a) "It took a lot of time and effort but I feel accomplished"; (b) "It was difficult, but I enjoyed it"; and, (c) "I think it was an enjoyable way to learn a lot—'a spoonful of sugar.'"

The survey asked if students experienced any other benefits from doing the ePortfolio, and a sample of their responses follows: (a) "Designing skills and learning about different cultures"; (b) "Used and analyzed Spanish in a more daily setting"; (c) "I made one for another of my classes for a project because I was introduced to it this semester. It was also an extra thing that forced me to think about linguistics every day"; (d) "It kept linguistics in my everyday life in a way that I would not have been able to do otherwise"; (e) "I enjoyed seeing what I have been learning in class in

Figure 4
Student Feelings Toward ePortfolio at the End of the Semester
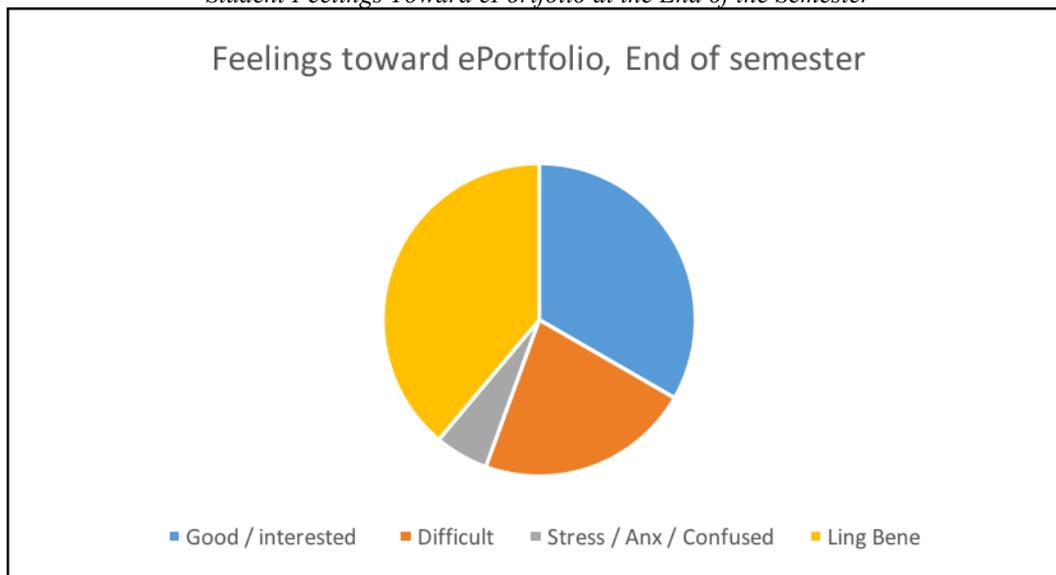
everyday life"; and, (f) "I was able to explain some linguistic concepts to my family!" The Honors students' blogs echoed to some degree the responses of their classmates. One of the two, reflecting on the experience as a whole, said the following:

> I expected this class to be easier than it was. But I don't regret taking it at all because I had always wanted to learn about linguistics and now, having [completed this project], I am able to notice things about language that I didn't before, both in English and in Spanish.

A second student wrote, "This blog project has really succeeded in making me think about linguistics pretty much all the time on some level. And I think this project has improved my time management and Spanish composition skills."

The final survey also gave students the opportunity to reflect on the things they might do differently if doing another ePortfolio. The dominant themes among the 23 responses pertained to earlier completion of artifacts and reflections, choice or organization of platform, and the type of artifacts selected and, for some, the thematic organization of them. These themes are consistent with the concerns expressed at the beginning of the semester, yet the responses convey a sense of personal responsibility for the choices made and the work done. Some also indicated a realization of the integrated nature of the artifacts and reflections and the need to work on both in a consistent manner. For example, some students noted the following:

- "I would make sure I wrote reflections at the same time of finding artifacts, it was mentioned in class that that was important, but I did not feel the motivation to do it and then suffered later for it."
- "Find artifacts more tailored to my personal everyday life."
- "Find artifacts earlier and look out for more unique and interesting ones."
- "I understand that [writing reflections on time] is important because the longer I spend between posting artifacts and reflections, the more I forget what I found notable about the artifact in the first place."

With regard to the value of peer assistance with the ePortfolio, 88% of students responded that it was helpful to receive help from others. In a follow-up survey question, students indicated specific sources of help that were helpful or not helpful. Response options included the various forms of human assistance and examples that were offered throughout the semester. Figure 5 displays the responses to this survey item. Most students felt that seeing the professor's examples during the semester was helpful, followed by working with classmates, as happened in and outside of class. The in-class workshops in which students worked in groups of three and were assisted by Honors students was least frequently cited as being helpful, and in fact a

Figure 5
Effectiveness of Resources Offered for ePortfolio
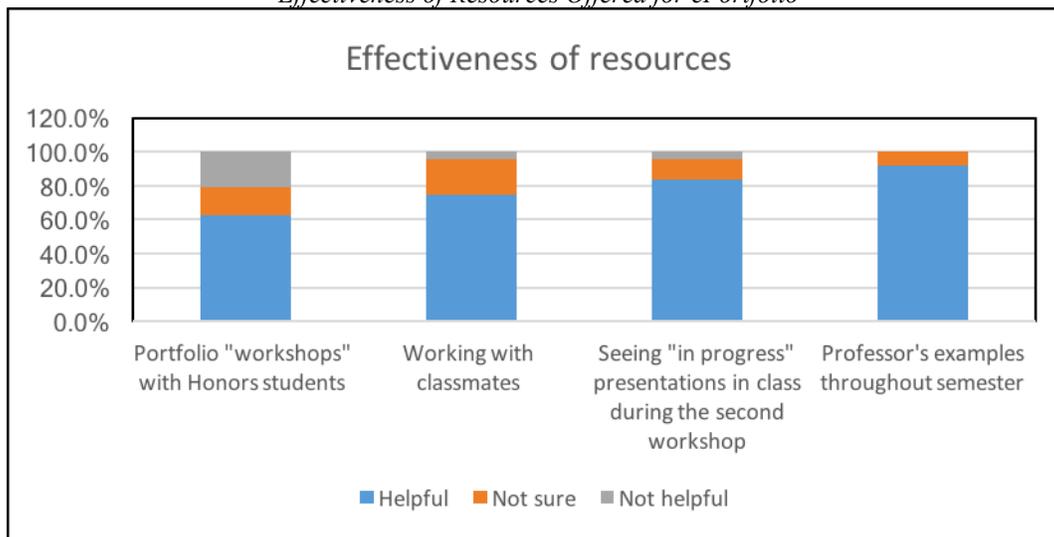
small number of students also indicated that those sessions were not helpful.

When reflecting on their observations of their classmates' experiences, the Honors students noted a range of reactions as the semester moved along. One of the two did not sense many technical issues at work at the time of the first survey, and noted, "I doubt that even the people who were anxious about working with these sorts of sites could be having too much difficulty." Later in the semester the other Honors student noted a continued sense of worry among her classmates with regard to potential sources for artifacts, saying, "One thing I think students understand better now is where artifacts should be coming from, after seeing [the professor] show several examples in class. Despite that, I think they are still worried about finding their own artifacts." After the first peer workshop, assisted by the Honors students, one of them noted the positive effects of the peer review process and exchange of ideas, writing,

At the end of the peer workshop, everyone seemed to have a better idea what was going on an even a new motivation to continue working on the portfolio. After class, one classmate asked if he could email me with more questions.

Discussion

The findings from this study suggest that for first-time users of ePortfolio, the challenge is great but for many, so is the reward. The first question asked by this study was if the student experience with ePortfolio

improved over the semester, and it appears that it did in terms of overall satisfaction with the experience. While the anxiety that students noted at the beginning of the semester regarding what constituted an artifact, how to reflect on them, and how to organize it all in the electronic space endured through much of the semester, this stands to reason, as the development of folio thinking is one that requires time and a great deal of practice. Yet the findings also suggest that the students left the project with a sense of accomplishment and an ability to see their progression over the semester, progression not only in their ability to construct an ePortfolio but also to observe language more critically and reflectively. These results echo those found by O'Keeffe and Donnelly (2013), whose students expressed that despite the challenges, the endeavor of building a portfolio was ultimately worth the effort. Particularly noteworthy were the comments, such as those cited earlier, that referenced a heightened awareness of language use around them, and an increased amount of time that they thought about language outside of the classroom. Overall, the findings suggest a shift in the way students thought about ePortfolio, from initial worry about its contents to a realization that it increased their awareness outside of class of principles discussed in class.

The second question addressed by this study was in regard to the value of peer review and assistance. While students did find peer review and workshop time with co-designers to be helpful, it did not rank as the most helpful resource offered to them. Rather, the instructional strategies implemented during the semester—additions motivated by the instructor's pilot

project the year before—were cited as most helpful in moving students toward a better understanding of how to find artifacts, categorize them, and reflect on them. Such examples were, in large part, the instructor's personal artifacts that she used to model for the class the way they might encounter language data and think deeply on it. Some of the examples given in class were from the pilot project, the work of students who succeeded in achieving folio thinking in their linguistic experiences. Surprisingly, the time spent with the Honors student co-designers in the class workshops did not rate as very helpful for most students. While these students were a few steps ahead of their classmates with regard to the project and the work they were required to do, it is possible that their classmates did not perceive them as authoritative sources. This was not the case for all students, of course, as some did reach out to the co-designers for assistance after the workshops and at other times during the semester.

The blogs written by the Honors students reveal that these students took their responsibilities to the project seriously as they reflected on the multiple roles they played in the project. These students wrote honestly about the challenges they faced as authors of their own ePortfolios: time needed to build the space, types of artifacts needed, and most notably, the ability to keep up with reflection writing. These students, just like their classmates, were ePortfolio novices, but their blogs reveal a desire to use their own experience to give good counsel to their classmates. Ironically, their roles in this project may have helped them as much as, or possibly more than it did their classmates.

The findings on these two questions may be of greatest utility for anyone thinking to implement ePortfolio in a course or program. While the implementation of this pedagogy in a single course immediately introduces certain challenges, it is nevertheless a worthwhile endeavor to explore the initial stages of the student experience with ePortfolio. As discussed earlier here, gaps often exist between the instructor's vision and goals for student learning and student perceptions about what they want to learn and can do. In the work of ePortfolio creation, the first gap one might encounter is a technological one. There is an assumption on the part of many digital immigrant instructors that our digital native students have an intuition for all things technological and all forms of social media. Yet research has stated (Carpenter et al., 2012), and it has been observed here, that there are hurdles that some of our students must overcome in order to build the space, before they can begin to acquire, demonstrate, and refine their critical and reflective thinking skills. The experience of the students described here underscores the importance of giving adequate consideration and resources to students' technological preparation.

Peer assistance was a valuable addition to this iteration of the ePortfolio semester project. The value in peer review is in the safe space it creates, a time for students to express insecurity and lack of ability and to find help. Findings from this study suggest that peer assistance of any type is valuable, and that the help offered through the study co-designers was perhaps on par with, and no more valuable than, assistance from other peers in the class. This finding may be attributable to the limited time allotted to training these two students, confined to a few hours of meetings with the instructor and several discussions by email. Nevertheless, as their blogs reveal, their experiences as both novice ePortfolio authors and project assistants attributed an additional measure of depth to their experience, and confirms that peer review is a key component of the ePortfolio experience.

The findings of this study are relevant to teaching in many disciplines. As asserted here and elsewhere, the time required for the development of folio thinking suggests that ePortfolio use is most powerful when it spans courses or related experiences. An interesting extension of this research would be in service-based courses or programs, such as service-learning courses or programs that engage students in experiential learning. Students involved in such experiences tend to seek out other such experiences, so that tracking the learning journey from the first experience and subsequent experiences could provide compelling evidence for a robust educational experience over time. Additionally, ePortfolio could be effective in large classes such as those often required in the hard sciences or social sciences. In such a context, the ePortfolio might provide a way for smaller working groups of students and teaching assistants to learn together in a different space, thus reducing the anonymity that many students experience in such courses. Given that the large science class of the first semester is often the starting point for students who declare a science major and ultimately pursue graduate study, ePortfolio would be an excellent tool for tracking several years of learning. There are many avenues yet to be explored with this versatile pedagogy.

Limitations

The chief limitation of this study is that it was carried out in one semester. As noted elsewhere here and in the larger body of ePortfolio research, acquiring the ability to document and reflect on synthesized learning experiences requires time and practice. While the student experience did improve over the course of the semester, it is worth noting that those gains might be even greater had more time been given for students to become more proficient in their efforts. The same might be said for the co-designer students in their roles

as peer assistants. With more time and practice, and the confidence of a completed project, their efforts might have been more impactful to their classmates.

Conclusion

The present study makes unique contributions to our understanding of the benefits of ePortfolio for learning. The context of a single course and a short project timeline provides a very focused perspective through which to view the experience of the new ePortfolio user. The findings give a glimpse into the opinions, concerns and initial outlook of students who are creating their first ePortfolio. Despite initial anxiety, the data collected at the beginning, middle and end of semester reveal that students ultimately found value in the project and could describe the progression of their learning.

As a study of language learning, this research has a unique focus on linguistic study. In the course and program that provide the backdrop of this study, students are introduced to tools of language analysis, and the metacognitive strategies employed by students in this context are ideal for ePortfolio learning. This course, like many similar courses in programs around the country, is often the course that changes the trajectory for students with declared interest in language, but for whom language study may have been limited to classes in conversation and literature. This is an instructional context ripe for future research.

Peer connections are vital to both language learning in particular and classroom learning in general. In the present study student peer reviewers and project co-designers had a positive yet limited impact on the experience of the class as a whole. Future research should consider the best ways to select and prepare peer mentors for their role. One possibility would be to engage students from a previous class who have completed an ePortfolio and, ideally, who continue to study language. Their experience and motivation as language learners could prove highly beneficial for students in their first encounter with the material and ePortfolio. Additionally, as suggested in earlier sections of this analysis, implementing the project in collaboration with other class sections or other courses in a series would contribute to a fuller experience for all. The versatility of ePortfolio opens a broad avenue of research on not only the individual language learner but also the communal language learning experience.

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Appendix A
Beginning of Semester ePortfolio Survey

Q1 Have you ever done an ePortfolio before?
○   Yes
○   No

Q2 If you have done an ePortfolio, where?
○   UGA class
○   Personal
○   Other _____

Q3 How would you describe your feelings toward the ePortfolio right now?

Q4 Would you be interested in receiving help from your peers on building your ePortfolio?
○   Yes
○   No
○   Maybe

Q6 Do you think it is possible that this project will help you be more observant of language use?
○   Definitely yes
○   Probably yes
○   Might or might not
○   Probably not
○   Definitely not

Q5 Do you anticipate any other benefits from doing ePortfolio? Please explain.

Appendix B
Mid-Semester ePortfolio Survey

Q1 How many artifacts do you have in your ePortfolio so far?
○ None
○ 1-3
○ 4-5
○ more than 5

Q2 Do all of your artifacts have reflections to accompany them?
○ Yes
○ No

Q3 Where are you looking for artifacts?
❑ This class
❑ Other classes
❑ Personal interactions
❑ Entertainment (TV, movies, music)
❑ Internet search
❑ Other _____

Q4 How would you describe your feelings toward the project right now, with regard to the elements that follow?
❑ Finding artifacts _____
❑ Writing reflections _____
❑ ePortfolio design/function _____

Appendix C
End-of-semester survey

Q1 Have you ever done an ePortfolio before?
○   Yes
○   No

Q2 If you have done an ePortfolio, where?
○   UGA class
○   Personal
○   Other _____

Q3 How would you describe your feelings toward the ePortfolio right now, after completing it (or nearly completing it)?

Q4 Was it helpful to receive help from others on building your ePortfolio?
○   Yes
○   No
○   Maybe

Q7 If you answered YES above, please provide additional information as requested below

	Helpful	Not sure	Not helpful
Portfolio "workshops" led by Honors students (small groups)	○	○	○
Working with classmates informally (in/out of class, asking questions, etc)	○	○	○
Seeing "in progress" presentations in class during the second workshop	○	○	○
Seeing artifacts and reflections that the professor presented in class	○	○	○

Q6 Do you think it is possible that this project will help you be more observant of language use in the future?
○   Definitely yes
○   Probably yes
○   Might or might not
○   Probably not
○   Definitely not

Q5 Did you experience any other benefits from doing ePortfolio? Please explain.

Q8 If you could do it again, what would you do differently? Feel free to repeat what you said in your in-class presentation, and to add more if you like.

ePortfolios and Interdisciplinary Adult Degree Programs

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This article discusses the use of ePortfolios in interdisciplinary online adult degree programs at two universities. Whereas one university uses the ePortfolio only in a capstone course, the other institution introduces the ePortfolio in an introductory course that focuses on goal setting and then has students add content to the ePortfolio in the final course of their program of study. Additionally, one institution implemented the ePortfolio for assessment purposes, while the other did not. The study of these cases explores the different approaches to ePortfolio use in two interdisciplinary adult degree programs, as well as the benefits of ePortfolio use within this student population.

In 2014, adult students 25 years of age and older accounted for approximately 40% of all students enrolled in undergraduate degree programs in the United States (National Center for Education Statistics, 2015). Furthermore, some estimates indicate that more than 70% of all undergraduate students are in some way nontraditional (Ross-Gordon, 2011). This large population of students creates considerable need for degree programs, delivery methods, and instructional strategies that are consistent with adult-learner theory and responsive to adult-learning needs. Using ePortfolios in adult degree-completion programs, as demonstrated in two case studies of students at East Tennessee State University (ETSU) and Middle Tennessee State University (MTSU), provides a way for adult and nontraditional students to connect prior knowledge to their classroom learning; set program and career goals; showcase their academic work within and outside the classroom; and practice the reflection skills necessary to be proficient lifelong learners.

Literature Review

Brief Overview of Adult Learning and Goal Setting

According to early adult-learning theorists, adult students have an innate need to be self-directed in their learning. Knowles, Holton, Elwood, and Swanson's (2005) work also commented on adult motivation to learn and indicates that adults need a "what for" in their learning (i.e., they must know why it is important to learn before they undertake a learning activity). Attached to their independence, adult learners also must feel that their experiences are valued. They need opportunities to connect prior knowledge and experiences to the learning they are pursuing. Integration of ePortfolio practices into undergraduate programs designed for adult students may be one way to honor students' prior knowledge, especially if the curriculum is designed to prompt students to extend and apply their classroom learning to prior life experiences.

Goal setting and hope theories are often relevant to the study of adult learning, as well. Snyder et al. (2002) defined hope as more than just optimism. Rather, it is the ability to "develop workable goals, find routes to those goals (pathways thinking); and become motivated to use those pathways (agency thinking)" (Snyder, 2005, p. 73). According to Snyder et al. (2002), students who have high hope, and therefore more advanced goal-setting ability, perform better academically. Students with high levels of hope succeed because they have clear goals, employ study strategies with great agility, and devote more effort to those study strategies. In short, this is a "say, see, do" strategy. Students with hope say or recognize their goals, see the avenues for achieving these goals, and do so by implementing action toward achieving them (Snyder, 2005). Learning goals require strategic thinking and produce greater academic achievement (Snyder et al., 2002).

Savage and Smith (2008) applied Snyder's (2005) hope theory to adult students enrolled in degree-completion programs at the Community College of the Air Force. The researchers who conducted that study attempted to examine the associations between effective use of goal setting (or hope) and the likelihood of persistence to graduation. Students in that study with high hope were significantly more likely to graduate than those with low hope. In fact, goal-setting skill was the strongest predictor of earning a degree. Savage and Smith conclude that institutions should find ways to enhance student goal-setting ability (Savage & Smith, 2008).

Cross's (1981) seminal work points to the importance of goals to adult learners. At the time that Cross's (1981) "Adults as Learners" article was published, Cross was the Chair of the Department of Administration, Planning, and Social Policy at the Harvard Graduate School of Education. She claimed that a program was successful if it had met the learner's goals. This was true regardless of whether an adult's goal was to learn a new skill or earn a credential.

However, Cross explained that determining a learner's goals could be a great challenge, and called for more in-depth, qualitative research (as opposed to the existing proliferation of adult-student survey research) to provide a more complete understanding of learning goals. Cross contended that a deeper understanding of short-term and long-term goals would allow adult-learning providers to create richer and more fulfilling programs for adult students.

Additionally, Tovar's (2008) study of firefighters and police officers in adult degree- completion programs confirms that goal setting and program planning are essential to the effectiveness of their learning. In that study, an adult who had learned how to learn was able to develop clear learning objectives, direct his or her own learning, and develop a personal plan of action to achieve his or her learning goals. ePortfolios can help students engage in meaningful goal setting and develop hope for achieving their goals.

ePortfolio

Many researchers consider ePortfolios to be a High-Impact Practice (HIP). Eynon and Gambino (2017) in their recent book titled, High-Impact ePortfolio Practice, make the case for why ePortfolios should be considered a HIP. HIPs are strategies, programs, and activities that contribute to student success and persistence to graduation. ePortfolios require students to practice higher-order thinking skills, and produce a product that showcases not only their learning, but their thinking about their learning. Further, ePortfolios require students to integrate knowledge from other high-impact practices. A robust ePortfolio may require a student to reflect upon both in-class and out-of-class activity. Woven throughout a program of study, a student may reflect upon and document artifacts from a first-year course, a living-learning community, and an internship or research experience, all of which are HIPs (Hubert, Pickavance, & Hyberger, 2015; Kuh, 2008; Watson, Kuh, Rhodes, Light, & Chen, 2016). Kuh has recently discussed ePortfolios as the 11th high impact practice (Center for Engaged Learning, 2016).

Because of the ability of ePortfolios to serve a variety of purposes, many colleges and universities have implemented them in the curriculum. Chatham-Carpenter, Seawel, and Raschig (2010) surveyed higher-education institutions to determine how they were using ePortfolios. Nearly three quarters of the institutions they surveyed use ePortfolios to prompt students to reflect upon their learning. Furthermore, nearly 70% of institutions use ePortfolios to help students develop a platform through which they can showcase their knowledge, skills, and abilities to potential employers. Not as prevalent as reflection or career-related purposes,

58% of institutions report using ePortfolios for assessment and program-review purposes. Further, approximately 54% of respondents use ePortfolios to spotlight mastery of professional standards. The study also asked respondents to identify some of the challenges of using ePortfolios at their institutions. Three challenges emerged, including a lack of top-level administrative buy-in and support for using e-portfolios; combating the perceived time and effort that many faculty believe ePortfolios require; and the most frequently reported, the cultural challenge—institutions report that successful ePortfolio implementation requires changing existing constructs of teaching practice, student learning, and program assessment.

Based upon the results of their survey, Chatham-Carpenter et al. (2010) recommend four best practices for implementing an ePortfolio project at a college or university. The first recommendation includes systematic planning for the implementation and sustainability of ePortfolios. Second, the authors suggest asking early adopters to engage in a pilot. Third, institutions should use early adopters from the pilot stage to help promote buy-in to the benefits of using ePortfolios. Early adopters can function as ambassadors for transition to an ePortfolio system that can function as an assessment tool that effectively improves student development and learning. Finally, implementing ePortfolios on any campus requires training and support for both faculty and students.

Where Chatham-Carpenter et al. (2010) focused on the purpose of ePortfolios, Cheng and Chau's (2013a) research focused on the learning outcomes students were able to attain by participating in ePortfolio activities. In this study, students who earned high scores on ePortfolio assessments also reported that they engaged in a number of learning strategies, including learning from peers, self-regulation grounded in metacognition, critical thinking, organization, and elaboration. In a second study by the same authors, the researchers focus on goal setting and reflection in ePortfolio use. The study sought to determine if students' ePortfolios demonstrated performance goals (the desire to achieve at higher levels than their peers) or mastery goals (the desire to completely and thoroughly understand and improve). The study found that most ePortfolios were designed to reveal students' mastery of material, themes, and concepts. Some students' ePortfolios contained evidence of both performance and mastery goals; these students were also determined to have greater reflective ability than students whose portfolios featured mastery goals alone (Cheng & Chau, 2013b).

Indiana University-Purdue University Indianapolis (IUPUI) developed a conceptual model for ePortfolios that included four domains: increasing awareness of self and others; setting self-concordant goals;

developing hope; and shaping education and career plans (Buyarski et al., 2015). In this model, students use the ePortfolio to develop an authentic voice. Developing a strong sense of self includes evaluating personal values and beliefs, as well as examining relationships to others. Furthermore, reflection helps students determine their own goals according to their values. These self-concordant goals consist of short- and long-range goals. Students who set goals and monitor their progress toward goal attainment are more likely to persist to graduation. Developing hope is the third element of the IUPUI ePortfolio conceptual model. As mentioned earlier, hope requires more than optimism; it also requires students to develop pathways to success toward their goals. Students with high hope can persist in the face of obstacles and barriers. Given that adult students face obstacles distinct from those of traditionally aged students, pathways thinking is particularly useful for nontraditional learners. The final aspect of the IUPUI model is the development and constant monitoring of degree and career plans. Each aspect of the conceptual model requires faculty to provide meaningful feedback to students throughout the creation and curation of the ePortfolio. Armed with specific, actionable feedback in each of these domains, students can use this ePortfolio model to succeed in college and their careers.

A 2013 study found that student resistance to changing existing beliefs hinders ability to engage in meaningful reflection. In this study, we examined the ePortfolio work of three populations of students—(a) first-year undergraduates, (b) third-year undergraduates, and (c) professional students. We conclude that students who are more mature (i.e., in their late 20s and older) are better equipped to examine both themselves and the views of others with different opinions. This study may support the use of ePortfolios in adult degree-completion programs, given that a majority of students enrolled in these programs have advanced maturity levels (Faulkner, Aziz, Waye, & Smith, 2013).

ePortfolio and Adult Learners

Bolliger and Shepherd's (2010) study of ePortfolio integration in online courses explored adult students' attitudes and opinions about how ePortfolios affect their learning and their feelings of connectedness in the online environment. Most students (80%) in the study indicated that the ePortfolio process improved their motivation to learn and that they enjoyed the opportunity to share the ePortfolio with their peers. A large majority of students indicated that the ePortfolio process helped them become better acquainted with their instructors and reported diminished feelings of detachment, which are often present in an online environment. An important finding of the study was

that over 50% of respondents learned more about program expectations through the ePortfolio process. For some students, this clarification reveals a disconnection between their personal goals and the department's objectives. Another student was able to use the ePortfolio process to select courses that aligned with his/her own goals. However, because the study yields mixed results, the authors conclude that ePortfolios are not the only strategy that should be used to clarify program expectations and build community in the online environment. Rather, the ePortfolio should be part of a long-term plan to impact student learning, improve student connectedness and engagement, and clarify personal and program objectives.

Josephsen (2012) suggested nine strategies for successful implementation of ePortfolios in distance programs, three of which relate to technology. The author suggested developing a comprehensive set of technical requirements for the ePortfolio system to work. She also recommended developing instructions for ePortfolio use in multiple media to comply with differences in learning preferences. Josephsen (2012) further recommended providing technical support and instruction for students and faculty and encouraged institutions to provide faculty with mentors to aid in the implementation of the ePortfolio program. Developing a rubric to assess the ePortfolios was also among the author's suggestions. In addition, she warned against making assumptions about the ease with which faculty and students would embrace the ePortfolio. The author was also careful to point out that faculty and student resistance is to be expected, and she encouraged persistence in the ePortfolio process in the face of initial faculty or student hesitancy.

Similarly, in their discussion of the implementation of an ePortfolio program at the Virtual Learning Academy Charter School, Cote and Emmett (2015) suggested 10 components fundamental to adopting an ePortfolio system. Nearly all of the strategies they outlined relate to choosing the appropriate technology. These suggestions include: (a) ensuring that the technology is compatible with and integrated into the broader technology infrastructure of the institution; (b) selecting a platform that is easy to use and painlessly accessible for all users; and (c) choosing a product that allows users to make appropriate privacy decisions. Further, the authors advised selecting a platform that supports multiple file types and allows users to customize their exhibits. Two of the suggestions relate to pedagogy. The first encourages institutions to determine how the ePortfolio intersects with the curriculum, and the second encourages schools to require a reflective component in ePortfolio work. Reflection is a crucial component in the portfolio process, regardless of whether the portfolio is in paper or electronic form.

Herman and Kirkup (2008) studied ePortfolio use by adult women who were returning to school. A compelling number of women (70%) in this study reported finding ePortfolio assignments useful, and even more (77%) claimed they would make use of ePortfolios later in their careers. Many of these students found that the portfolio helped them remember many of their prior learning experiences and recognize their own skills and abilities.

Madden's (2015) discussion of ePortfolio use among adult human-services students reveals another benefit of ePortfolio use among nontraditional learners. In addition to improving students' self-knowledge and discovery of connections between their courses, Madden (2015) reported that the ePortfolio helps to document student activities in the community. Furthermore, the ePortfolio helps the program understand its students' better and clearly illuminates the reasons why they chose the institution. The author suggested that these newly discovered ideas about the student population could aid the university's marketing efforts.

ePortfolios and Interdisciplinary Programs

Both cases presented in this article examine ePortfolio use in interdisciplinary undergraduate programs. Repko, Szostak, and Buchberger's (2014) work is particularly relevant to ePortfolio implementation at both MTSU and ETSU. The authors argued that portfolios are particularly important to programs that require students to integrate concepts from two or more fields of study. The critical thinking and reflection practice required to develop an interdisciplinary portfolio both aids student learning and helps students compile the knowledge and ability they have gained throughout the program of study. Creating the ePortfolio also gives students an opportunity to practice marketing to potential employers their interdisciplinary degrees and the skills they have acquired. Eynon and Gambino (2017) noted that integration is one of the three essential design principles of ePortfolio pedagogy: "Guided by integrative pedagogy, students use ePortfolios to bring together work from multiple contexts, consider the relationship between their classrooms and their lives outside of class, and construct new identities as learners" (p. 35). As an essential ePortfolio principle, integrative pedagogy can help students in interdisciplinary programs make the integration of their studies more visible to others and themselves.

Case Study 1: ePortfolio in a Senior Capstone

Middle Tennessee State University is a large regional doctoral university in the geographic center of the state, with more than 22,000 undergraduate and

graduate students (MTSU, 2016). The primary student population includes traditional on-campus students; however, the university enrolls an increasing number of nontraditional undergraduates. To serve better adult students returning to MTSU to complete their degree, the institution's University College offers interdisciplinary bachelor's degree programs in Liberal Studies and Professional Studies. These programs provide flexibility of scheduling and curriculum design needed by students who cannot enroll in a full-time campus-bound degree program due to work or family commitments. As a result, adult students comprise 70% of the population in these majors, compared to 27.3% of the students in all other undergraduate degree programs offered by the university (MTSU, 2016). Interest in these interdisciplinary programs continues to grow, and in academic year 2015-2016, there were 490 graduates from both programs combined, a 79% increase in five years (MTSU, 2016).

While students may choose to take on-campus courses as part of their program of study, all courses required in the Liberal and Professional Studies programs are available through online delivery. In addition, the university has a prior-learning assessment program to award course credit to students who can demonstrate achievement of established learning outcomes. The depth and breadth of course offerings enable adult students to create a degree plan that aligns with their graduation goals.

The Liberal and Professional Studies degree programs share three student learning outcomes: information literacy, critical thinking, and media communication, measured in a common capstone course (UNIV/PRST 4995) that is typically taken during the final semester before graduation. In the programs' infancy, student media communication proficiency was measured using a multimedia presentation. After a review of the use of ePortfolio at other institutions, the program coordinator and capstone course developer decided to pilot an ePortfolio for Liberal and Professional Studies majors in fall 2013. The process began with a closer review of ePortfolio use at other institutions and the ePortfolio tools they used. The University of Michigan's MPortfolio project was a very helpful resource (University of Michigan MPortfolio, 2015) for developing the ePortfolio template and the reflective writing prompts for program majors. Because MTSU did not have an institution-wide portfolio option, University College contracted with an outside vendor and covered the cost of the portfolio for all students in the program. Although this system worked well for the program, in fall 2016 the University's Learning Management System added an ePortfolio tool (initiated in fall 2017), which is available to all MTSU students. This ePortfolio assignment is now a requirement for these majors, used to demonstrate the students' media-

communication skills, and to provide many benefits to enrolled adult learners. As Herman and Kirkup (2008) mentioned, students noted that an ePortfolio assignment gives them more self-awareness of their knowledge, skills, and abilities.

The ePortfolio assignment requires students to complete five components: (a) personal introduction, (b) professional goals, (c) reflections, (d) evidence of knowledge and skills, and (e) contact information. In the personal introduction section, students write about their personal and academic background and upload a professional photo. In the professional goals section, the students include short-term and long-term career goals. In the knowledge and skill section of the portfolio, faculty members require students to identify at least three competency areas and to upload two artifacts to demonstrate their achievement of each competency area. Artifacts can be chosen from coursework, jobs, internships, service/volunteer work, and training outside of college. A written reflection accompanies each artifact. In their reflections on their artifacts, students connect the experience or work to their academic learning, and reflect on how the competency will benefit their future employer. The hope is that this process allows students to better communicate their interdisciplinary major and corresponding competencies to future employers, a benefit of ePortfolios noted by Repko et al. (2014). As discussed in the literature review, connecting experiences to academic learning can be very motivating for adult learners. Students are able to submit the link to their ePortfolio to potential employers and also to potential graduate schools, should they wish to continue their education.

At MTSU, the ePortfolio is also used to assess student-learning outcomes. As Chatham-Carpenter et al. (2010) noted, of the institutions that report using ePortfolio, fewer report using them for assessment and program review (58%) than for reflect ion and career-related purposes (approximately 70%). However, learning outcomes assessment was one of the main reasons the MTSU adult degree program adopted the ePortfolio. Capstone faculty use a common rubric to assess students' ability to use the multimedia software effectively to promote their skills and abilities to potential employers after graduation. Annually, a team of faculty reviewers evaluates a sample of ePortfolios from graduating students, to assess students' achievement of the learning outcome. As noted by Eynon and Gambino (2014), "conducting outcomes assessment through ePortfolios grounds assessment in the authentic work of students" (para. 4). Authentic assessment is one of the benefits of using ePortfolios. In interdisciplinary studies programs where a major field test or other examination is not practical as an assessment of student learning, the ePortfolio provides a way to assess students' achievements in learning and, in some cases, their progress over time.

Case Study 2: Using ePortfolio in a Required Interdisciplinary Course

East Tennessee State University is a midsize regional university located in Northeast Tennessee. Similar in mission to MTSU, the University is comprised of 11 colleges and schools. The School of Continuing Studies and Academic Outreach is home to four undergraduate interdisciplinary degree programs, designed primarily to serve adult and nontraditional students. In fall 2016, the school enrolled 317 students. Just over 56% of the students enrolled in these four degree programs fit the nontraditional student definition, being 25 years of age or older. By comparison, only 18% of all undergraduates at ETSU are 25 or older (ETSU, Office of Institutional Research, 2016).

The School of Continuing Studies and Academic Outreach requires its undergraduate majors to enroll in the course BGSD 2300, Interdisciplinary ePortfolio and its Application. In contrast to the MTSU program, ETSU introduces the ePortfolio to its interdisciplinary majors earlier in their academic program. The primary goals of the ETSU ePortfolio course are twofold. The first goal is that students be able to articulate their interdisciplinary degree program of study as it applies to their educational goals and educational focus. The second goal is that students be able to articulate their interdisciplinary educational competencies to potential employers. Throughout the entire course, students are asked to demonstrate critical thinking about their uniquely interdisciplinary programs of study, as they articulate how their coursework coheres to an integrative educational focus. The hope is that students are not only able to articulate their interdisciplinary program of study for personal reflection but also to represent their diverse competencies to potential employers. The ePortfolio course is the starting point for being able to put these goals into action.

To accomplish the first goal of understanding their interdisciplinary program of study and their interdisciplinary degree, students are required to complete the following assignments: (a) statement of academic goals and objectives; (b) program of study rationale; and (c) general-education reflection. In the statement of academic goals and objectives assignment, students are tasked with writing an essay reflecting upon why they enrolled in the university, their aspirations (both personal and professional), and what skills they will need to achieve their goals and objectives. This assignment relates to Snyder's (2005) research suggesting that students who set clear goals are more likely to achieve their goals. This assignment also helps to establish an intentional goal, thereby enhancing adult

students' motivation to learn—a factor that is essential to adult learning, as established by Knowles et al. (2005). The program of study rationale assignment tasks students with creating their program of study through to the end of the program. This assignment is meant to get students to think critically about their entire education program while at the university, and how each course may benefit their goals and objectives. This assignment also challenges students to engage in pathways thinking (an essential element of hope theory) by forcing students to outline a plan that will culminate in the achievement of their personal and professional goals (Snyder et al., 2002). The general-education assignment is a two-part assignment requiring students to visit the university's general education website, to learn more about the general education philosophy, and to think about how students benefit from general education courses. After the student reflects on the philosophy of general education, he/she chooses one of the general education courses from the program of study taken and outlines the academic benefits of the course while reflecting upon the benefits of the course work.

To accomplish the second goal of the ePortfolio course (i.e., articulating an interdisciplinary program of study and an interdisciplinary degree to future employers), students must complete assignments geared toward showcasing their academic skills and value, including a (a) resume assignment, (b) classroom-to-work-reflection assignment, and (c) ePortfolio upload assignment. The classroom-to-work assignment requires students to write an essay reflecting upon a time in their life when they were able to apply something they had learned in the classroom to their personal or professional life. Students are also able to reflect upon a time when something in their personal or professional life helped them to better understand a classroom concept. The ePortfolio upload assignment requires students to upload a clean and edited copy of each of the assignments created in the ePortfolio course to a platform maintained by the University Career Services (UCS). One of the benefits of the UCS platform is that students have free access to the ePortfolio when currently enrolled and, as university alumni, retain access to the ePortfolio after graduation. From this platform, students currently enrolled and university alumni have access to this free service. Once an actual ePortfolio is created and uploaded to the platform, students are able to access online both regional and national job boards. Additionally, potential employers also have access to student ePortfolios through this platform. Students also must post the link to their ePortfolio to the final course discussion board, so that their classmates may view their portfolio for peer-review purposes.

The instructor of the class vets all assignments and artifacts uploaded to the student's ePortfolio for publication. The student has the opportunity throughout the course to make appropriate changes and corrections to the artifacts before uploading to ePortfolio and the University platform. Additionally, staff members in Career Services also vet the student's resume before the student is allowed to publish the ePortfolio. In addition to offering students the opportunity to create and design an ePortfolio and a unique digital presence, the ePortfolio course aligns students with other University Services available to them as students and alumni of the University.

Once students successfully complete BGSD 2300, Interdisciplinary ePortfolio and its Application, and publish the ePortfolio on the University Career Services platform, they are free to edit and add artifacts at any time. As part of the graduation requirements for the School of Continuing Studies degree programs, all students must take and successfully complete a Senior Capstone course. As part of the requirements of this course, students will upload two assignments from the Capstone course to their ePortfolio: the Capstone Reflection Assignment and the Final Capstone Project Research Paper. The Capstone Reflection Assignment allows students the opportunity to reflect upon their journey to completing their degree. The capstone is meant to be a culmination of a student's university career and life experience, with the goal of showcasing the vast body of knowledge and academic skills students have acquired over their college experience. In this assignment, students reflect upon their chosen Capstone project, how they may be able to apply it to their personal and professional life, and what this process says about the value they place on finishing their degree. The Final Capstone Project Research Paper is meant to serve as a showcase of the student's research, writing, and critical thinking skills, as well as a polished piece of scholarly academic work. Many students will be able to submit the link to their ePortfolio to potential employers, as well as to potential graduate schools, should they wish to continue their education.

Suggestions for ePortfolio Implementation

When institutions consider implementing an ePortfolio in an adult degree-completion program, several considerations are important. First, an institution should consider which units will use the electronic portfolio system. In some institutions, multiple departments, degree programs across several units, or even the entire university may be interested in using the ePortfolio tool. Institutional-effectiveness units may be interested in the assessment feature. Advisors or student affairs staff may be interested in using the ePortfolio to showcase student development. Career Services may be interested in the ePortfolio as a tool to assist students with job acquisition. Academic affairs may consider the use of ePortfolios for faculty

tenure and promotion. The identification of units considering use of the electronic portfolio system will drive who must be involved in discussion of selecting and implementing an ePortfolio. As mentioned by Chatham-Carpenter et al. (2010), systematic planning is essential. In both of the cases presented here, faculty and staff in adult degree program units originally self-initiated contracts with a third-party ePortfolio vendor. These unit-based contracts were pursued because there was no university-wide ePortfolio system. Later, both units abandoned those contracts to integrate their ePortfolio courses with ePortfolio products available to the entire university population. MTSU used an ePortfolio housed within a learning management system, and ETSU started using an ePortfolio platform offered through University Career Services. If adult degree programs at other universities adopt ePortfolio practices, best practices indicate that it is ideal to adopt an ePortfolio system that would meet the needs of all university stakeholders. This practice means that faculty, staff, and students only need to be trained to use one system and that student work can be housed in one platform to be used for many purposes.

Determining the purpose of the ePortfolio is related to these considerations. In our cases, the purpose was:

- to help students identify and better understand their interdisciplinary knowledge/competencies;
- to enrich student learning by helping students connect prior knowledge to classroom learning, and practice reflection skills; and
- to assess student learning outcomes in a major.

Institutions may want to assess course-level outcomes or program-level outcomes, showcase student development, foster integrative thinking and reflection, or achieve some other learning outcome. Knowing the purpose will assist institutions, as they consider which technology tool is the best fit and how to structure the ePortfolio.

ePortfolios offer many features. When evaluating a tool, institutions should consider usability, customizability by the institution or the student, assessment tools (e.g., rubrics, reports), single sign-on capability (integrated with institution's learning management system), as recommended by Cote and Emmett (2015), easy portability after graduation, design capabilities, and file storage limits. Depending on the institution's purpose(s) for the ePortfolio, some features will be more or less important.

In addition to the features each offers, the institution should also consider whether an institutionally created, open-source, or purchased turnkey solution, a hosted or non-hosted solution, or a student-purchased subscription is best for its student population and the institution. Each of these has benefits and drawbacks. As noted in the literature review, choosing the appropriate technology is a fundamental decision with many considerations (Cote & Emmett, 2015).

Although the cost of purchasing, or paying someone to design, the ePortfolio system is the primary resource need, other resources must be considered, As noted in the literature (Chatham-Carter et al., 2010; Josephson, 2012) successful implementation requires training and support for faculty and students. Instructors will need pedagogical guidance, technical training, and ongoing professional development on best practices. Students will also need technical support and user guides, which may or may not be provided by the ePortfolio provider. Information technology resources will be needed if Learning Management System integration is chosen. If the solution does not offer a single sign-on feature, staff time will be required to initiate and maintain student and faculty access to the system.

With any type of new educational tool, evaluation is critical. Before implementation, institutions should consider what evidence is needed to evaluate the ePortfolio's impact and provide feedback for improvement. The Catalyst for Learning (n.d.) website is a recommended resource for institutions considering ePortfolio implementation and the development of an outcomes assessment plan. The site showcases stories from institutions that have implemented ePortfolio-based outcomes assessment, as well as resources and links to articles.

Best Practices for ePortfolio Implementation With Adult Student Populations

When implementing ePortfolios in adult degree completion programs, it is important to embrace strong adult learning principles. In both of the cases presented here, ePortfolios enhance adult students' ability to self-direct their learning, define workable goals, and craft plans for the achievement of those goals. Savage and Smith (2008), Tovar (2008), and Faulkner et al. (2013) all produced studies that linked hope theory with adult learner success. The case studies presented here also help illuminate the importance of the elements of hope theory. In both cases, students are required to define and discuss personal and professional goals. Goal setting is the first-step in hope theory. In the ETSU case, students are also asked to define a path to graduation. In defining this path, students also examine how each course in the degree plan contributes to the achievement of their stated goals and objectives. By playing an active role in developing the degree plan, students are able to self-direct their learning toward their personal goals and to create a pathway to the achievement of those goals. This process helps adult students develop both pathways thinking and agency thinking—the second and third elements of hope

theory. Using the ePortfolio to help adult learners define their goals and develop a plan for degree completion can help them persist to graduation. Faculty should consider crafting ePortfolio assignments that heighten the presence of hope among adult students.

Faulkner et al.'s (2013) study also revealed that adult students are often better at reflecting upon their academic experiences than their traditionally-aged counterparts. Both MTSU and ETSU students engage in reflective activities when engaging in the ePortfolio process. At both universities, reflection produces two outcomes. First, reflection helps students integrate knowledge from two or more disciplines. Second, the reflection helped students identify skills and abilities they had learned from their coursework that would help them in their careers. The Repko et al. (2014) and Herman and Kirkup (2008) studies both supported the best practice of including reflective assignments when implementing an ePortfolio program for adult students.

The ePortfolio tool can also be a process through which institutions can learn more about adult learners. Cross (1981) explained that adult learning providers could improve programming for their students if they had a better understanding of adults' short-term and long-term goals. Further Faulkner et al. (2013) discovered that a deeper understanding of adult students' motivation, as expressed through the ePortfolio process, assisted with marketing efforts. Academic units who serve adult students can benefit from the in-depth exploration of student goals and student learning that emerge from ePortfolio implementation.

In summary, using ePortfolios in adult degree programs can heighten levels of hope, improve students' abilities to integrate knowledge from two or more disciplines, and help students link their learning to career skills. Furthermore, institutions can use ePortfolios to learn more about their students' short and long-term goals and this learning process may help institutions market to and better reach the adult student market.

Discussion

This case study demonstrates that ePortfolio use has been beneficial in interdisciplinary adult degree programs at two comprehensive universities. Both institutions plan to continue and expand their ePortfolio usage in these programs. Even though the ePortfolio implementation at these two institutions has been successful, three key lessons were learned. Some of the lessons are unique to the adult population served. First, a returning student population heightens the probability that students will not have retained academic artifacts from their previous coursework to showcase. If a program asks the student to create a showcase ePortfolio, the ePortfolio requirements should be flexible, adaptive to students' reentry points, and able to allow students to incorporate artifacts from outside their

coursework. Second, students typically declare degree-completion majors as juniors and may not come into these programs or courses with a knowledge base about interdisciplinary studies, writing reflections, or integrative thinking. As a result, having a course such as the one at ETSU, which introduces these concepts and the ePortfolio early in the program, is beneficial. Finally, although both institutions began with an ePortfolio system that was not integrated into a campus ePortfolio system, both programs have moved to an integrated campus ePortfolio system, which has resulted in greater efficiency in terms of administration, cost, and student access. Given these benefits, this approach is highly recommended. In summary, institutions looking to implement ePortfolio as a major part of an interdisciplinary adult degree program should ensure that the goals of the ePortfolio align with the learning outcomes of the major; that students have the background or tools to be successful; and that faculty understand the goals of the portfolio, know how to assess the student work, and receive adequate training and support.

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Unifying Experiences: Learner and Instructor Approaches and Reactions to ePortfolio Usage in Higher Education

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This paper explores the alignment of student and instructor experiences when employing ePortfolio activities in a Canadian higher education context. Successful ePortfolio activities are operationalized as exhibiting alignment of expectations between students and instructors, whereas misalignment of expectations is characteristic of a poorer experience for the learners. Our research has shown that although this is typically the case, there exist instances of misalignment where the students still have a positive learning experience, and as a result, we attempt to determine other factors that may contribute to positive or negative ePortfolio experiences. Through a mixed-methods study using focus groups, interviews, and surveys, we examine the experiences of over 800 students across 30 courses over two semesters at the University of Waterloo. Our findings suggest that although current best practices should still be adhered to when designing effective ePortfolio activities, best practices alone cannot ensure that the ePortfolio assignment will be successful.

ePortfolios as a pedagogical strategy have been the subject of much interest in higher education in the last decade; our own context, at the University of Waterloo in Ontario, Canada, is no different. Research conducted by the Catalyst for Learning research group (see http://c2l.mcnrc.org/; Eynon, Gambino, & Török, 2014a) has been influential in spearheading ePortfolio research initiatives across the United States, and the research presented in this paper lends a Canadian perspective. With a decade's worth of ePortfolio usage at our institution, and increased reception towards the central maxims that ePortfolios support—namely, encouraging metacognition and deepening student learning through evidence—we have observed the innovative use of ePortfolios in various disciplines and their successful implementation. We sought to better understand the challenges that inherently come with an educator's initial—and at times continual—adaptation of ePortfolios.

The Catalyst for Learning research group proposes that ePortfolio initiatives support reflection, social pedagogy, and deep learning, advance student success, and catalyze learning-centered institutional change (Eynon et al., 2014a). Yet are these benefits perceived by students and instructors alike? Does each group of ePortfolio users (i.e., student and instructor) approach the ePortfolio assignment similarly? Expectations as to how the assignment will be employed, as well as how it will benefit the learners who are engaging with it, are set by course instructors. To what extent, though, do students understand these expectations and the potential benefits?

The notion of constructive alignment in course design (Biggs & Tang, 2011) underlies our own understanding of alignment and misalignment in ePortfolio task design, where alignment assumes that the outcomes of the ePortfolio assignment are appropriately assessed and that students have opportunities to practice this type of activity before being assessed. Furthermore, we extend the notion of

alignment to the student and instructor's shared understanding of the goals of the ePortfolio task. Misalignment, then, occurs when the instructor and student do not share an understanding of the ePortfolio activity, or value components of the activity differently than the instructor does. Misalignment, although often a negative consequence, may in fact be positive for the students in some cases, where they value the ePortfolio activity more than the instructor does.

Our research seeks to explore and document the use of ePortfolios at the University of Waterloo over the course of two semesters. In particular, we examine how the instructor using ePortfolios introduces and supports the ePortfolio activity throughout the course and the impact this has on student learning. To do so, we pose the following research questions:

- Are the expectations of students and intended learning outcomes of instructors aligned, and how does this alignment impact the experience of the student?
- What steps can be taken to better ensure alignment of student and instructor expectations?
- How do student and instructor orientations to ePortfolios change over the course of a semester?

We will address the aforementioned research questions and propose future directions for research in this field.

Literature Review

The benefits of ePortfolios, such as efficiency in terms of saving time and enhancement of skill development and feedback provisions (Joyes, Gray, & Hartnell-Young, 2010) have been frequently highlighted in research concerning the efficacy of this

educational approach. Recently, ePortfolios have been added to the list of high impact practices (Watson, Kuh, Rhodes, Penny Light, & Chen, 2016) and, like all high impact practices, ePortfolios emphasize the social dimension of learning through the formation of learning communities, promoting collaboration, and allowing learners to showcase the work that they have done to employers or external parties with whom the learner may eventually work (e.g., Bass, 2012; Eynon & Gambino, 2017; Eynon, Gambino, & Török, 2014b; Kahn, 2014). Both the field of ePortfolio research, and our understanding of the applicability of high impact practices in higher education are relatively new, and therefore much of what is known of ePortfolio use comes from the users, or the learners, themselves.

To this extent, the majority of studies conducted analyze learners' perceptions as their primary source of data; a meta-analysis of 118 articles analyzing ePortfolio usage and administration found that only 49% of all articles were empirical in their methods design, or included original data on ePortfolio usage (Bryant & Chittum, 2013). Furthermore, the majority of these empirical articles analyzed learner-reported data after having worked with the ePortfolio. Rhodes, Chen, Watson, and Garrison (2014) called for more rigorous ePortfolio research, claiming that "very little research has been published that meets the most rigorous standards expected of educational research" (p. 2).

Recent studies have begun to address this criticism; robust, empirical analyses employing diverse methodologies such as analyzing user-experience data (Nguyen & Ikeda, 2015), mixed-method analyses of questionnaires and discussions (Bolliger & Shepherd, 2010), and case studies (Landis, Scott, & Kahn, 2015) all emphasize the utility of ePortfolios as a pedagogy to support self-regulation, build online community, and encourage reflection. Of particular interest is research conducted by the Catalyst for Learning research group and the development of the C2L Core Survey, designed to facilitate rigorous data collection on the use of ePortfolios amongst a group of 24 selected partner campuses. Amongst the survey's many goals is its attempt to document evidence of the impact of ePortfolio implementations and construct a common data set to help substantiate the effectiveness of future ePortfolio initiatives (Chen, 2013). With 24 distinct institutions undertaking research to various degrees, over 9000 student responses were obtained (Eynon et al., 2014b). Substantial findings amongst the many institutions include the benefits of "reflective and social pedagogies [that] make learning visible, helping students to link different parts of their learning and connect their own learning to others" (Eynon et al., 2014b, p. 103).

Yet even with the evidence supporting the use of ePortfolios, lack of awareness on behalf of instructors emerges as a recurring theme. Instructors may be unaware of how ePortfolios align with course objectives or developed competencies (Appling et al., 2015), which may be due to the many individual and institutional challenges—such as technological limitations, lack of educational support, poorly-designed ePortfolio activities—that come with ePortfolio design and implementation (e.g., Gaitán, 2012). Landis et al. (2015) specifically identified a need for faculty professional development concerning ePortfolio usage, as many instructors expressed surprise at the importance of reflection and the ways in which reflection can and should be assessed in ePortfolio activities. Joyes et al. (2010) conceptualized this within a threshold concepts framework, whereby the process of understanding the key concepts related to ePortfolio usage simply takes time. Once understood, a threshold is crossed where the instructor's perspective regarding ePortfolios is forever altered; yet with this framework, they also recognize that rigorous, well-thought out implementation may actually impede the adoption of ePortfolios.

Research has expressed, perhaps unsurprisingly, the challenges that arise when adopting a tool or learning activity as potentially complex as the ePortfolio. Habron (2015) noted that unless specifically instructed to focus on personal development, students tend to focus on the content of the course and aspects directly related to the curriculum, and not the more relevant and beneficial aspects of ePortfolios that are consistently lauded (Eynon et al., 2014b). Our research aims to provide additional empirical evidence that can help substantiate the research already conducted in this field, while also proposing methods for future analysis that these current studies do not yet actively consider.

Methods and Results

The data for this project was collected at the University of Waterloo, a research-intensive university in Southern Ontario, and took place over the course of two four-month semesters. Our institution uses Desire2Learn's ePortfolio tool that is built into the learning management system. Data was collected from both students and instructors by employing a mixed-methods methodology, incorporating both quantitative analyses of survey results and a grounded theory analysis of focus group discussions. For the purposes of this paper, we concentrate on the student data due to the resulting interactions between students and instructor expectations leading to findings that do not fit within the confines of this paper, but will be alluded to and explored in a future study.

Survey Data

We made minor revisions to the surveys created by the Connect to Learning (C2L) national ePortfolio

Table 1
List of Goals for the ePortfolio Activity and Sample Corresponding Items From the Student Survey

Goals	Item
1. Course content	To help me deepen my understanding of key course content or concepts
2. Learner identity	To help me understand myself and grow as a learner
3. Reflection	To help me reflect on my learning
4. Course connections	To help me see the connections between this course and other courses
5. Outside School	To help me see the connections between this course and other experiences outside of school
6. Community building	To help me build community with other students
7. Education planning	To help me develop my own educational goals and plans
8. Career planning	To help me develop my career plans
9. Synthesizing ideas	Synthesize and organize ideas, information, or experiences in new ways
10. Applying theories	Emphasize applying theories or concepts to practical problems or in new situations
11. Writing	Contribute to students' knowledge, skills, and personal development in writing clearly and effectively
12. Understanding themselves	Contribute to students' knowledge, skills, and personal development in understanding themselves
13. Teamwork	Contribute to students' knowledge, skills, and personal development in working effectively with others
14. Problem-solving	Contribute to students' skills in exploring and solving complex, real world problems such as those they might face in their lives, including their careers

network (Eynon et al., 2014b) to fit the context of our institution, and adapted the questions to ask about students' and instructors' experiences with the ePortfolio activity specifically rather than their overall course experience. The adapted surveys were administered at the end of the fall 2014 and winter 2015 academic semesters to all instructors and students in 30 courses that used ePortfolios. The courses included students from first to fourth year and came from four different faculties: Applied Health Sciences, Arts, Environment, and Science. Class size ranged from small (15 students) to large (over 350 students).

863 undergraduate students (M_{age} = 20.1 years, 64.6% identified as female, 24.4% as male, 11% identified as other or did not indicate their gender), the majority of which were full-time students (87.6% full-time students, 2.5% part-time students, 9.8% unidentified), completed the survey for a chance to win $50 cash. Overall response rates across all courses were 21% for students and 77% for instructors.

The students and instructors completed slightly different versions of the survey: Students were asked about their perceived goals of the ePortfolio activity, their attitudes towards the activity, and outcomes (e.g., Did they engage in reflection and integrative learning?) as a result of completing the ePortfolio activity. Instructors were asked about their goals for the ePortfolio activity in their course, their experience with ePortfolios in general (e.g., Are they first time users?), and the parameters (e.g., Is the ePortfolio part of students' final grades?) of the ePortfolio activity. Each

had opportunities to answer open-ended questions as well to express their thoughts about the ePortfolio, and in particular, what the best and most challenging parts of working with ePortfolios were.

Survey Measures

Alignment between students' and instructors' goals. To analyze the alignment between students' and instructors' goals for the ePortfolio activity in the course, we examined the parallel items from the surveys completed by the students and instructors that were related to the goals for the ePortfolio. Students were given a list of goals (see Table 1 for the list of goals and corresponding items from the survey for students) and asked to indicate on a Likert-item scale, based on what they knew or what they were told by their instructor, the extent to which they agreed on each goal of the ePortfolio or the extent to which the ePortfolio contributed to each goal. Instructors were shown parallel items, but were asked to indicate how important each goal was, or the extent to which the ePortfolio was designed to meet each goal.

Students' experiences and outcomes. To assess students' experiences and outcomes with ePortfolios, students were asked to indicate on a Likert-item scale the extent to which they agreed or disagreed with a series of statements pertaining to their experience with ePortfolios in the course. Prior to data analysis, we created different subscales representing seven different student outcomes and assigned relevant items from the

Table 2
Sample Survey Items for Students' Outcomes and Experiences With the ePortfolio

Student outcome	Outcome description	Sample item	No. of items	Reliability
Instructor and student feedback	Feedback is provided on ePortfolio by either fellow students or instructor.	My instructor provided useful feedback on my ePortfolio.	4	$\alpha = .75$
Reflection	The extent to which reflection was incorporated or valued in the ePortfolio.	Building my ePortfolio helped me to think more deeply about the content of my course.	5	$\alpha = .92$
Showcasing	The ability to share the ePortfolio with other classmates or individuals outside the university.	I'd like to use my ePortfolio to show what I've learned and what I can do, to others, such as potential employers and professors at another university.	2	$r = .70$
Positive attitude	The student or instructor's satisfaction with the ePortfolio experience.	I enjoyed building my ePortfolio.	3	$\alpha = .85$
Going beyond	Doing more than was asked in the ePortfolio assignment.	I included information or experience from other courses I am taking or have taken.	4	$\alpha = .86$
Integrative learning	Incorporating learning experiences outside of the current class context.	How often have you combined ideas from different courses when completing assignments?	5	$\alpha = .86$
Future use	Willingness to use the ePortfolio after academia.	How likely are you to voluntarily continue to use your ePortfolio in other courses?	3	$\alpha = .89$

Table 3
Correlations Among Factors Influencing Students' Experiences and Outcomes With the ePortfolio

	Instructor and peer feedback	Reflection	Showing ePortfolio	Positive attitude	Going beyond	Integrative learning	Future use
Ease of ePortfolio technology	.25**	.44**	.36**	.47**	.10*	.24**	.40**
Discussion of ePortfolio pedagogy	.43**	.42**	.29**	.39**	.05	.19**	.27**
Misalignment	-.47**	-.62**	-.40**	-.58**	-.20**	-.46**	-.41**

Notes. The variables above represent a sample of items from the survey.
* $p < .01$.
** $p < .001$.

survey to the appropriate subscale (see student outcomes in Table 2). The reliability of the subscales were calculated using Cronbach's alpha or Spearman's correlation where appropriate.

Survey Analysis

ePortfolio technology's impact on students' experiences. We conducted a correlational analysis to examine the relationship between the ePortfolio technology (one item) and students' experiences. As shown in Table 3, students reported more positive experiences (e.g., wanting to use the ePortfolio in future courses) and achieved greater positive outcomes (e.g., students engaged in more integrative learning) across all seven indicators when they found that the ePortfolio environment easy to use.

In the open-ended survey questions, students also commented on ePortfolio technology. Qualitative coding showed that when asked to comment on the challenges of

the ePortfolio, 50% of students reported negative experiences with the technology. When asked to comment on the benefits of the ePortfolio, only 5% of students reported positive experiences with the technology.

Alignment of expectations between students and instructors. Using a correlational analysis, our data shows that overall alignment in students' and instructors' expectations for the ePortfolio is related to positive experiences and outcomes with the ePortfolio for students. As shown in Table 3, ratings of the extent to which instructors who discussed the ways the ePortfolio helps students learn was positively correlated with students' experiences and outcomes with the ePortfolio with six of the seven indicators.

To directly compare students' and instructors' expectations for the ePortfolio activity in their course, we examined aggregated data for 18 courses in which both instructors and their students completed the survey. We operationalized alignment between students' and instructors' expectations by examining differences between instructors' and students' ratings on the different possible goals of the ePortfolio activity in their course. A difference score was calculated for all the goals, and the absolute value of the difference scores was taken as a general measure of misalignment in students' and instructors' goals and perceptions of the ePortfolio. The higher this value, the more misaligned the expectations were between students and

instructors for the ePortfolio. These difference scores were then aggregated across all courses in which instructors and students completed the survey. As shown in Table 3, the extent to which the instructors' and students' expectations for the ePortfolio were misaligned (i.e., the extent to which the instructors and students disagreed on the goals of the ePortfolio activity in their course) was negatively correlated with students' experiences and outcomes with the ePortfolio activity across all seven indicators.

When examining each of the 14 individual potential goals for the ePortfolio activity (see Table 1), a similar pattern was observed for most goals except for course content, making course connections, fostering community, and working with others, in which the pattern of data is less inconsistent or not statistically significant. This pattern of findings illustrates one of the challenges of using aggregated data as courses had vastly different goals for the ePortfolio—ranging from personal and career development to increasing understanding of course content.

We also conducted the above analyses for nine individual courses in which there was sufficiently large sample size ($N > 20$ student participants). The pattern of data for the relationship between misalignment and students' experiences is less consistent. Four out of nine courses showed a consistently negative correlation between misalignment of students' and instructors'

Figure 1

Students' Averaged Ratings of Their ePortfolio Activity Experience in Their Course as a Function of Whether or Not the ePortfolio Activity was Part of Students' Grades
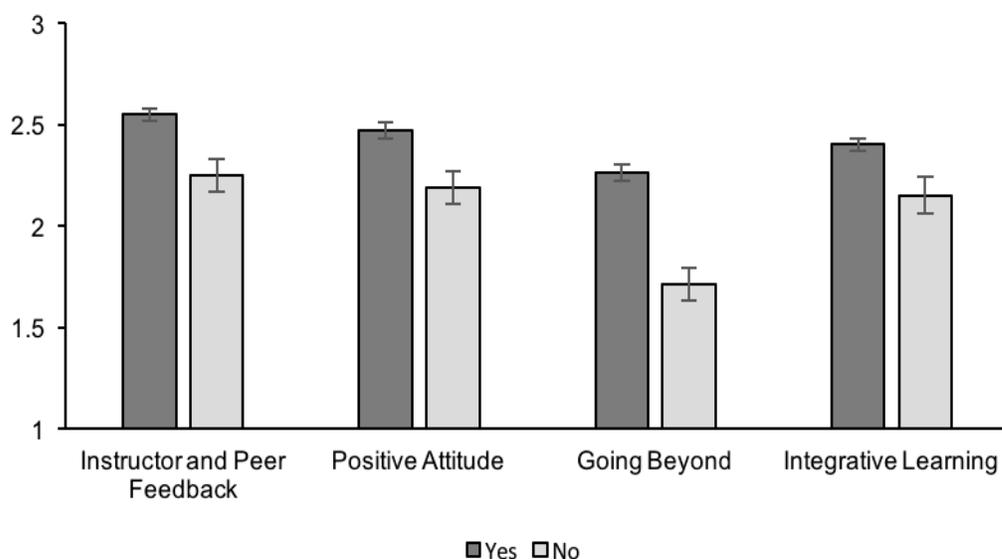
expectations and students' experiences. However, the pattern of data was less consistent for five courses. For example, in a first-year arts course and a first-year biology course in which students' experiences and outcomes with the ePortfolio were positive, misalignment in expectations was not related to students' outcomes. For some goals, misalignment was actually related to greater positivity and achievement of outcomes with the ePortfolio. This finding suggests that the success of the ePortfolio does not rely solely on the alignment of expectations—other factors undoubtedly contribute, a point that will be explored later.

To this end, we examined whether students' experiences and outcomes with the ePortfolio were impacted by instructors' engagement in best practices for using ePortfolios. One such best practice is to give students' grades for the ePortfolio activity (Kuh, 2008). Independent samples t-tests were used to examine differences in students' experiences and outcomes if the ePortfolio activity was or was not part of the students' grade for the course. Because of the large sample size difference between courses that gave students grades for the ePortfolio activity, Levene's tests were employed and degrees of freedom were adjusted if there were unequal variances between groups.

Figure 1 demonstrates that students' experiences with the ePortfolio are more positive and their learning outcomes are higher when the ePortfolio activity is part of students' grades. Our analyses indicated that that students' ratings for instructor and peer feedback were higher if the ePortfolio activity was part of the students' grades for course ($M = 2.55$, $SD = .73$) than if they were not ($M = 2.24$, $SD = .79$), $t(678) = 3.84$, $p < .001$, $d = 0.40$. Students also reported more positive attitudes about the ePortfolio when the activity was part of the students' grades ($M = 2.47$, $SD = .86$) than if it was not ($M = 2.19$, $SD = .81$), $t(692) = 3.13$, $p = .002$, $d = 0.34$. Students also scored higher on going beyond if the activity was part of the students' grades ($M = 2.26$, $SD = .89$) than if it was not ($M = 1.71$, $SD = .74$), $t(141) = 6.34$, $p < .001$, $d = 0.67$. Lastly, students reported greater integrative learning when the activity was part of the students' grades ($M = 2.40$, $SD = .70$) than if it was not ($M = 2.15$, $SD = .84$), $t(117) = 2.67$, $p = .009$, $d = 0.32$. These effects were replicated when the ePortfolio activity was a mandatory activity for the course.

This pattern of findings demonstrates that employing best practices for the ePortfolio—in this case, giving students grades for their work—are beneficial for students' learning and their experiences with the ePortfolio activity. However, other factors, such as lack of alignment in instructors' and students' expectations, can impede the effectiveness of the ePortfolio even when the instructor follows best practices.

Focus Groups Methods

Our quantitative analysis of the survey results was combined with student focus groups and interviews, with the instructors from three of the courses employing ePortfolios in the fall 2014 term (see Table 4). The courses were chosen due to factors such as the instructors' willingness to participate, familiarity with ePortfolios, class size, and the importance placed upon the ePortfolio in terms of its assessment. We intended to compare numerous variables that may impact the success of the ePortfolio activity, such as instructor experience level and the impact of whether or not the assignment was mandatory. The focus groups and interviews, each lasting approximately one hour, took place at regular intervals throughout the term: beginning, middle, and end of term. The instructors were interviewed individually and did not attend any of the student focus groups.

Focus groups were held to discern the extent to which the ePortfolio assignment was being worked on actively, how well each learner understood the goals of the assignment, and what their expectations were for the assignment going forward. During the first focus group, students were asked to reflect on the initial orientation to the ePortfolio assignment and their experience with ePortfolios. During the second focus group, students described how they worked on their ePortfolio, what they perceived to be the instructor's rationale for having them complete the activity, and the type and quality of feedback thus far received. In the third focus group, students summarized their experience working on the ePortfolio activity throughout the term and their thoughts relating to its effectiveness in the course.

A grounded theory analysis (Glaser & Strauss, 1967; Strauss & Corbin, 1990) was employed to code the responses obtained through the focus groups and interviews, with a shared set of codes developed for all qualitative data collected. Grounded theory can perhaps best be explained as the "collection, coding and analysis of qualitative data for the generation of theory" (Glaser & Strauss, 1967, p. 18). Due to ePortfolio user experience being contingent upon multiple variables, such as technology, assignment design, instructor attitude, and the institution's culture, we chose to use grounded theory because the conversations that emerged in discussions with participants reflected the diversity of ePortfolio experience itself. Our codes were initially developed by all three researchers watching the video recordings of the first focus groups together multiple times, during which a set of emergent codes was produced to ensure inter-rater reliability (Table 5). Once satisfied with the quality of the developed codes, the third researcher assigned these codes to the data

Table 4
Focus Group Course Information

Course	Class size	ePortfolio assignment and marks allotted	Instructor experience	Focus group *n*
First-year Women's Studies	137 (first–fourth year students)	Weekly reflections on contemporary issues, feedback provided weekly, worth 80% of final grade, students shared ePortfolio assignment with one another	Graduate student sessional instructor with no ePortfolio experience	3
First-year Accounting and Finance	397 (first year incoming students in a professional program)	End of term reflection on peer/team work, feedback provided by industry partner, voluntary (no associated grade), ePortfolios were shared between students	Instructor used ePortfolios in large first-year courses several times	8
Fourth-year Arts and Business Capstone	119 (fourth year students—majority of whom had participated in ePortfolios activities in each year of the curriculum)	Design a professional portfolio/webpage for a business throughout term, builds upon work done in previous courses, worth 20% of final grade, ePortfolios were shared between students	Instructor an experienced ePortfolio user	2

Table 5
Emergent Coding Results From Grounded Theory Analysis

Code		Definition
Feedback	Positive	Received positive feedback from instructor; useful feedback; feedback applicable to learning
	Negative	Useless feedback; not applicable to assignment or learning goals; peer feedback not helpful
Workload	Positive	Manageable workload; not stressed
	Negative	Challenging workload; time-consuming assignments
Technology	Positive	Technology perceived as beneficial; supported learning
	Negative	Technology perceived as an impediment; restrictive; better tools available
Enjoyment	Positive	Allows creativity; convenient to use; enjoyed constructing the ePortfolio
	Negative	Did not enjoy the experience; lack of enjoyment NOT a result of technology
Promoting learning	Positive	Helped develop skills; connected to course content; worth a sufficient grade; motivating
	Negative	Perceived as a necessity; something that has to be done; not connected to course content
Preparation to use ePortfolios	Positive	Expectations were clear; clear instructions; examples shown in class; support provided
	Negative	Unclear of purpose of ePortfolio; no previous experience using ePortfolio; lack of expectations; confusion as to its purpose; similar to LMS; repository
Social	Positive	Understand the benefits of sharing ePortfolios; learn from each other's work; want to show it to others
	Negative	Don't understand why it is worth sharing; would not want to share it
Authenticity	Employment	Discuss the ePortfolio in relation to potential employment
	Real-world connection	Understand the ability of the ePortfolio to connect to personal experiences or real-world application
	Will not use beyond academia	No desire to use the ePortfolio after academia

collected. As can be observed in Table 5, these codes in many ways mirror the outcomes in Table 2. Furthermore, the focus group questions that were generated were constructed with best practices in mind. Similarities between the emergent codes and the best practices are therefore to be expected, and reinforce the general nature of the C2L core survey. One exception is the instructor's role in promoting learning or preparing students to use the ePortfolio tool which, although captured in the C2L survey, was focused more on the ePortfolio itself and less on how the instructor positions the ePortfolio, which emerged often in these focus groups.

Focus Group Results

Each focus group tells a distinct story with regard to their ePortfolio experience. The students in the first-year Women's Studies course were initially weary of the ePortfolio task because the course had originally been designed for the online environment; the focus group participants struggled to understand how the ePortfolio task was relevant or necessary for use in their large, on-campus offering of the course. Negative perceptions related to their preparation to use ePortfolios and the ePortfolio's ability to promote learning dominated the discussion, with 40% of all discussion being represented by these two codes. As the course continued, the participants' opposition only grew as they became increasingly dismayed with the ePortfolio task, as well as the way in which the course was being taught. Coding of the focus groups reflected this, with 80% of all identified codes for the second focus group, and 72% for the third, being negative. It became evident that the purpose of the ePortfolio was to help students connect contemporary issues to real-world application (in the form of the ePortfolio). Unfortunately, the focus group students perceived this as being disconnected from the core content of the course and unrelated to the material presented in the course textbook. These issues were compounded by a sessional instructor who, despite her best efforts, was thrown into the course with little preparation and ability to change its structure.

In the first-year Accounting and Finance course, a different narrative emerged. Whereas the first-year Women's Studies course participants were initially skeptical, the first-year Accounting and Finance participants were confused; they had not been introduced to the ePortfolio activity prior to the first focus group meeting. As a result, 100% of the coding pertaining to their preparation to use ePortfolios was negative. By the second focus group, held mid-way through the term, the focus group students still had not been introduced to the ePortfolio task. After completing the ePortfolio

task, participants indicated in the final focus group that although aspects of the process were certainly helpful, they remained relatively unsure as to why they completed the ePortfolio, and could not see its applicability beyond this course. Interestingly, many participants were able to hypothesize the utility of the ePortfolio assignment, indicating that it could be useful for tracking development of skills over time. More than 50% of the codes pertaining to the ePortfolio promoting learning were positive in the final focus group, yet when probed to share how they developed a better understanding of the ePortfolio, they admitted that their participation in the focus group, not the course or its instructor, encouraged them to think about the ePortfolio.

The third group was comprised of students from a fourth-year Arts and Business Capstone course. As a result of ePortfolios being incorporated into the design of the Arts and Business program, these students had used them previously and came to the first focus group with an awareness of the tool (54% of coding pertaining to preparation to use ePortfolios was positive). Yet despite having an awareness of ePortfolios, they were already skeptical of them due to technological issues that emerged during their previous use (70% negative technology coding). In this course, however, students were encouraged to use whatever ePortfolio platform they preferred to complete this ePortfolio activity—a notable distinction from the vast majority of cases at the University of Waterloo, where the ePortfolio embedded in the learning management system was being used. As a result, technological hurdles that had impeded the success of participants in the previous focus groups were not an issue, and the participants in this group found the experience meaningful (82% of coding relating to the ePortfolios ability to promote learning was positive in the final focus group). This impression may also have been aided by the fact that the design of the activity itself aligned well with goals and outcomes for the Arts and Business degree program, i.e., through their eportfolios, students were expected to market themselves to future employers.

Analyzing the results across all focus groups, we can observe some distinct trends with respect to the types of codes that emerged most frequently in discussions (see Table 6). Negative comments dominated the discussion across all focus groups. In particular, the focus group participants in the first-year Women's Studies course had very negative experiences, and the resulting negative discourse was pervasive in the focus group conversations. However, as was noted above, negative comments concerning the ePortfolio experience, and especially the role of technology, dominated the open-ended responses in the C2L Core Student Survey as well, suggesting that the

Table 6
Frequency of Codes Across all Focus Groups

Codes		Tally	Percentage
Feedback	Positive	18	2%
	Negative	35	4%
Workload	Positive	23	3%
	Negative	47	6%
Technology	Positive	30	4%
	Negative	59	7%
Enjoyment	Positive	25	3%
	Negative	42	5%
Promoting Learning	Positive	97	12%
	Negative	119	15%
Preparation to use ePortfolios	Positive	54	7%
	Negative	119	15%
Social	Positive	28	3%
	Negative	47	6%
Authenticity	Employment	32	4%
	Real-world connection	24	3%
	Will not use beyond academia	15	2%
Total		814	100%

focus group conversations provided an elevated platform upon which students could relate and share their challenges, rather than be coerced into commiserating with their peers. To this extent, even when alignment did exist, numerous factors such as those discussed by the participants impeded the learning potential of the ePortfolio despite the best efforts of the instructor. This suggests that we require more in-depth understanding of the learners' and instructors' entire experience with the course, not just the ePortfolio.

Discussion

Our data highlight three facets of ePortfolio use at the University of Waterloo. First, alignment matters. When students' expectations are aligned with instructors' intended learning outcomes, and if best practices are followed, students' experiences are largely positive, as was expressed many times in the open-ended questions found in the C2L Core Student survey:

It [the ePortfolio assignment] allowed me to connect with course material and explain my thoughts in an organized visual manner. It also allowed me to view other classmates' work and opinions and see how their thoughts were similar or different to my own. (C2L Core Student Survey response)

This sentiment was common among many students, but does not represent the entire scope of ePortfolio experience. There are instances of misalignment that emerged from the data collected from the C2L Core

Student Survey. This can be seen in cases such as the aforementioned first-year Biology course, where few best practices were adhered to, and yet students found that the integrated activity was extremely rewarding and helped to improve their understanding of the course material. Second, the experiences shared in the focus groups conflicted with the obvious efforts that the corresponding instructors invested in their courses. In the case of the first-year Women's Studies course, the instructor invested generous time preparing the course and followed many of the best practices associated with ePortfolio use, yet the students were unable to look past their preconceived notions of what the course should be and were constantly inhibited by the underlying technology of the ePortfolio. The fourth-year Arts and Business Capstone course, and to a lesser degree the first-year Accounting and Finance course, both struggled to prepare or support students adequately early in their use of ePortfolios, and yet in both instances students finished the ePortfolio activity demonstrating a better understanding of themselves through reflection and application.

We would argue that the data collected by the C2L Core Student Survey focuses primarily—by design—on the construction of the ePortfolio assignment, and as a result, other variables or factors that may facilitate or impede the success of the ePortfolio are not addressed. The role that the instructor plays with regard to how he or she positions the ePortfolio activity, his or her own beliefs concerning the utility of the ePortfolio, how the activity is explained in class, and how involved the instructor is with the administration and technical

support of the ePortfolio all may play a role. The extent to which these various factors influence the ePortfolio activity, however, needs to be further researched.

Our second research question, discussing the steps that can be taken to ensure alignment of student and instructor expectations, is more difficult to answer due to the variability in what constitutes a good learning experience. As discussed in the results of the C2L Core Student Survey, when students received grades for their work, students experienced a more positive attitude towards the assignment and were more willing to go beyond what was expected of them. One focus group participant reflected that:

> My other friend in [the program], I asked if he completed [the assignment], and he said he wasn't even going to do it because it wasn't being marked . . . he saw no value in that . . . so I'm assuming that a lot of people didn't do it because of that reason. (Participant 1, Focus Group 3)

We should therefore still encourage instructors to adhere to the best practices associated with ePortfolio usage, but best practices alone cannot ensure positive experiences. When misalignment occurs and best practices are not followed, the experience can be productive and encourage learning due to other likely factors, such as how the instructor encourages the use of ePortfolios.

Our final research question concerning student and instructor orientations to ePortfolios and how they may change over time proved difficult to assess accurately. In the case of the first-year Women's Studies course, perceptions generally degraded over time; this was likely a reflection of misalignment of expectations between students and instructors, as the students believed the course would focus on course content rather than application of that content. As one participant exclaimed:

> I think my expectations were pretty high going into it because, like, recently I've gotten really interested in, like, [course content] and that kind of thing, and so I was really excited to do this and like, learning about the historical point of view and activism and all that kind of stuff. So that was really exciting. But throughout the course, I really don't think that I learned all that much about it, and if I did, it was kind of through my own research or through other people's presentations, and I don't think I will retain it for a very long time. (Participant 4, Focus Group 3)

Evidently, this learner focused on trying to remediate what she perceived to be the *correct* learning experience by neglecting the actual ePortfolio task that was intended to help synthesize course content. The technology itself also served as an impediment to positive change, resulting in frustration and continued animosity towards the tool.

In the first-year Accounting and Finance course, change could not be measured, due to the students being completely unaware of the intention of the ePortfolio until the very end of the semester. As was discussed previously, those students participating in the focus group were able to see the benefit of completing an ePortfolio, and in that respect, positive change was evident, but the majority of students in this course were left confused as to the intention of the assignment, with no opportunity to reconcile these feelings.

Finally, in the fourth-year Arts and Business capstone course, the overall experience with the ePortfolio was largely positive, but students referred back to their experience using it throughout their program, supporting arguments that innovative tools such as ePortfolios require an adaptation time to allow for the user to become accustomed to the tool. The students also spoke very positively about the instructor of the course, both due to the instructor himself and his ability to encourage learning, but also as a result of having had the same instructor in past courses and knowing how he assesses work and what he expects. Due to these variables, it remains challenging to assess the impact of the ePortfolio on a program level, speaking to the necessity for future research to concentrate on ePortfolio usage beyond the course-level in order to see the real impact and effect that ePortfolios can have.

The importance of technology also cannot be overlooked. Although there has been research conducted on the importance of the ePortfolio technology itself (e.g., Brown, 2015; Chau, & Cheng, 2010; Tzeng, 2011), much research either reports that technology did not pose an impediment (e.g., Bowman, Lowe, Sabourin, & Salomon Sweet, 2016) or chose not to discuss the technology (e.g., Chang, Tseng, Liang, & Chen, 2013; Nguyen & Ikeda, 2015; Yancey, 2015). As shown in Table 3, we determined that the ePortfolio environment's ease of use was integral to ensuring positive experiences and achieved learning outcomes, and as evidenced in our grounded theory analysis; when not addressed specifically, technology created complications for many individuals. One participant suggested:

> I kind of think of the ePortfolio as telling someone who rides a bicycle to school every day that now they have to ride a unicycle . . . Like, if I can get there, I don't need to learn how to ride a unicycle, which is more difficult anyway, just to get there. (Participant 2, Focus Group 3)

Others discussed the frustrating limitations of poor technology. For example, "While the reasoning behind

ePortfolio assignments are sound, the execution/design of the actual ePortfolio software is horrible. It is extremely counter-intuitive to use, and has very limited design potential" (C2L Core Student Survey response). If ePortfolios are to accomplish what many ePortfolio educators and researchers claim they can, technology must be given specific attention. Admittedly, this is largely dependent on the platform being used, yet with institutions investing an increasingly large sum of money on learning management systems with integrated ePortfolio technologies, many institutions likely have to work with what is available. As a result, educators must be aware of the limitations that do exist and find means by which to mitigate, rather than simply ignore them.

Limitations

The composition of our focus groups, which were limited to students in three courses from the Faculty of Arts, could be one limitation to our research. Variability between courses did exist, however, with instructor experiences, student demographics, and the weighting of the ePortfolio assignment all differing. While we had hoped to have between eight to twelve participants for each focus group, various factors limited our uptake (e.g., the lack of awareness of the ePortfolio activity), and therefore we had fewer total participants across all three focus groups.

A second limitation emerged as results were collected and misalignment was observed. As instructional developers, we are often very involved in the design of the ePortfolio activity but have little knowledge of how that design is deployed during the term. Due to our inability to observe how the instructor introduced the task or engaged the students with the ePortfolio throughout the term, we did not benefit from understanding the entire picture, and cannot accurately pinpoint why misalignment occurred. Although we have argued in the preceding discussion that numerous variables likely played a role in how the ePortfolio activity was received, more data would be beneficial to substantiate these claims.

Summary

ePortfolios, as previous research has demonstrated, can indeed be effective pedagogical strategies to support integrative and experiential learning. Alignment of expectations between students and the instructor is relevant and worthwhile to consider, and as can be expected, cases of good alignment result in beneficial ePortfolio experiences for both students and instructors—although this is not always the case. Alignment is indeed a predictor of success in ePortfolio design, and instructors should continue to strive

towards ensuring that the ePortfolio task, its associated intended learning outcomes, and relevance to the course, are aligned. Misalignment, which may be caused by such factors as unclear assignment instructions or outcomes, a lack of instructor support, or technology that supports learning, may at times detract from the ePortfolio learning experience, yet we must be equally aware that alignment and misalignment do not result unequivocally in successful or unsuccessful experiences for students.

As has been discussed, future research should begin to incorporate all aspects of the task design, with a closer analysis of what the instructor is doing before, during, and after the administration of the ePortfolio activity. Instances of misalignment, as we have explored, can likely only be understood with this approach. To this extent, longitudinal, mixed-method studies should be adopted so as to understand the complexities that arise with an educational strategy and technology like the ePortfolio. Furthermore, the role of the instructor which was mentioned previously is indeed critical to ensuring successful ePortfolio activity implementation, and must be given equal priority as adhering to best practices; we must ultimately take greater care to ensure that well thought-out, intentional ePortfolio task designs are being considered by invested instructors who fully understand the implications that arise when implementing ePortfolios.

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Changing Their Mindsets: ePortfolios Encourage Application of Concepts to the Self

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We describe the ePortfolio delivery of a mindset intervention to college students. In Study 1, 38 underrepresented ethnic minority (URM) students who were enrolled in a summer research program completed a mindset intervention as a worksheet (n = 17) or as an ePortfolio (n = 21). Students who completed ePortfolios were more likely than students who completed worksheets to demonstrate conceptual mastery, describe a shift in mindset, and describe personal grit. In Study 2, students in an introductory college course completed the mindset intervention in a graded ePortfolio (n = 54) or a graded paper (n = 56). Students in both groups reported a stronger endorsement of a growth mindset after completing the assignment and were equally likely to produce complete answers. Although students who completed papers provided more conceptual content, students who completed ePortfolios were more likely to describe themselves as having a growth mindset and displaying grit than students who completed papers. Positive effects of the ePortfolio intervention were present for both URM and non-URM students. We conclude that ePortfolios add value to assignments that are intended to evoke personal reflection and application of core concepts to the self.

Given mounting evidence linking pedagogically-aligned ePortfolio creation to outcomes that have been associated with high-impact practices, ePortfolio practice was recently added to the list of high-impact practices (Eynon & Gambino, 2017; Watson, Kuh, Rhodes, Penny Light, & Chen, 2016). When implemented well, high impact practices foster deep and integrated learning and have been found to be especially helpful for underrepresented ethnic minority (URM) students (Finley & McNair, 2013). At the core of ePortfolio practice is an emphasis on students' reflection about what they are learning and how they are learning. Watson et al. (2016) suggested that ePortfolio practice might be most effective when used as a *meta high impact practice*. That is, the ePortfolio can be used to encourage reflection on learning that takes place while students are involved in other high-impact practices. Bass (2012) saw ePortfolios as a means by which the formal curriculum can be joined with the experiential co-curriculum by infusing classes with high-impact practices. ePortfolios can enable high-impact features to be incorporated, perhaps even with stronger impact, in larger classrooms (Singer-Freeman & Bastone, 2016). Given the power of ePortfolios, psychological interventions that are delivered via ePortfolio assignments might have increased efficacy. The current work directly compares student responses to the same intervention in different delivery formats in order to isolate the unique benefits of ePortfolio practice.

ePortfolio use in higher education has become increasingly prevalent (Rhodes, Chen, Watson, & Garrison, 2014). Educators' interest in ePortfolios is driven by the belief that ePortfolios may evoke unique responses from students (Buyarski & Landis, 2014). ePortfolios have been found to promote learning and retention of core principles (Singer-Freeman & Bastone, 2016) and to encourage active learning (Yancey, 2009; Wang, 2009). Buzzetto-More (2010) found that 88% of students who created an ePortfolio believed that it encouraged them to think about what they had learned. ePortfolios also appear well-suited to helping students develop future goals and academic roadmaps (Hubert, 2013). Eynon, Gambino, and Török (2014) found that ePortfolio use correlated positively with student success indicators and helped advance and support deep thinking, integration, and personal growth. The creation of ePortfolios has been found to help students develop academic identity, future orientation, and a sense of belonging to a community of scholars (Nguyen, 2013; Singer-Freeman, Bastone, & Skrivanek, 2014, 2016).

There is some evidence that ePortfolios are more likely to evoke personal reflection than similar work completed in other formats. Jordine (2015) found that students who completed ePortfolio projects evidenced higher levels of engagement and work quality than did similar students who completed traditional projects. Bowman, Lowe, Sabourin, and Sweet (2016) found that students who created paper or electronic portfolios were aware of the benefits of documenting their development. However, students who created ePortfolios demonstrated better understanding of the assignments' connections to their learning than students who created paper portfolios. It seems that ePortfolios have the potential to focus student attention away from lower-order learning of facts and towards higher-order learning of concepts.

In sum, research findings have demonstrated that ePortfolios can support deep learning and student success when ePortfolio practice is aligned with the curriculum and includes reflective practices. However, there is also evidence that ePortfolios do not always

lead to increased reflection or deep learning. For example, Bate, Macnish, and Skinner (2016) found that medical students did not value the opportunity to create an ePortfolio that included a series of unrelated assignments that lacked reflective content. Interestingly, even when ePortfolios are intended to include reflection, not all students will engage with their work in this way without explicit support. In fact, Blakely (2016) found that only 25% of ePortfolios that were created as part of an introductory course evidenced a deep approach to learning. Thus, it is essential that students are explicitly encouraged to focus on the developmental trajectory of their learning and to build connections across the information they have learned. With appropriate pedagogies and assignments, Blakely (2016) concluded that deep approaches to learning will occur and that ePortfolios can serve as "the space and the occasion for such an examination" (p. 145). Bokser et al. (2016) suggested that adding markers to prompt specific types of metacognition and promote reflection is a best practice that should be used to ensure that students benefit fully from the creation of ePortfolios.

Reflection *is also hypothesized to be* the primary mechanism of change in brief psychological interventions *(Powers et al., 2015)*. Brief psychological interventions utilize prompts that invite metacognition as a means of fundamentally changing the way individuals view themselves and the world. Students are provided with a different way of characterizing their experiences that supports more resilient responses to future challenges. Like high impact practices, brief psychological interventions have been shown to improve students' grades, persistence, and overall well-being for long periods of time (Walton, 2014). Some schools have begun to incorporate brief psychological interventions as part of student orientation. The classroom is another environment in which interventions could be introduced successfully (Boaler, 2013). Because of their reflective nature, ePortfolios have been proposed as an ideal mechanism by which brief psychological interventions could be incorporated into large classes (Singer-Freeman & Bastone, 2016).

One powerful and widely-used brief psychological intervention is designed to change students' views of intelligence. Unfortunately, many students enter college with a fixed view of intelligence (i.e., believing that intelligence is genetically determined and unchangeable). Dweck (2006) pioneered work in which brief lessons on brain plasticity led to shifts in students' views of intelligence. When students are taught to take a growth view of intelligence (i.e., believing that intelligence will increase with effort), they become more interested in attempting difficult tasks and more likely to persist after an initial failure (Paunesku et al.,

2015). The determination to achieve long-term goals and a willingness to persevere in the face of obstacles has been termed grit (Duckworth & Gross, 2014). Duckworth, Peterson, Matthews, and Kelly (2007) have found that having grit increases individuals' success in a wide range of challenging situations. Given the strong research support for the importance of grit, it is not surprising that many interventions are currently being tested to develop grit in students. Nearly all of these interventions seek to develop both grit and a growth mindset (Snipes, Fancsali, & Stoker, 2012). This grouping reflects the related nature of these two constructs. The positive effects of a growth mindset on grit have been replicated in many domains of learning and across many groups (Boaler, 2013).

Growth interventions have been successfully implemented in psychology, biology, education, sociology, child development, and neuroscience classes (Singer-Freeman & Bastone, 2016; Snipes et al., 2012). d'Erizans and Bibbo (2014) hypothesize ePortfolio practice can itself encourage a shift toward a growth mindset. In the current work, we compare students' responses to a growth mindset intervention that was completed as part of a graded or ungraded ePortfolio, as an ungraded handwritten worksheet, or as a graded typed paper. We hypothesized that: (1) ePortfolio assignments would evoke more reflection than assignments completed in other formats; (2) growth mindset interventions would evoke reflection; (3) typed assignments would evoke more content than handwritten assignments; and (4) participation in the intervention in any format would result in a shift towards a growth mindset and expressions of grit. We explore the first three hypotheses in Study 1.

Study 1

Method

Participants. This study used a convenience sample. All participants were community college students in a summer research program at a four-year public college. The program served students who are from URM groups, have demonstrated financial need, or are first generation college students. All students complete at least one year of full-time study at a community college before attending the summer research program. Our sample included 38 students (16 students who identified as Latino, 15 African American, four Caucasian, two Asian, and one Native American). Twenty-four students were first-generation college students; 24 students were female and 14 male. The students' average age was 20.61 years ($SD = 0.48$). Students in 2015 completed a worksheet version of the intervention, and students in 2016 completed an ePortfolio version of the intervention.

Table 1
*Number of Words Produced in Response to Concepts, Reflection, and
Planning Prompts in ePortfolios and Worksheets*

Measure	Worksheet M (SD)	ePortfolio M (SD)	M
Concepts	36.65 (16.65)	91.10 (39.32)	66.74
Reflection	72.12 (25.50)	142.48 (73.05)	111.00
Planning	30.24 (15.79)	80.48 (91.25)	58.00
Total words	139.01	314.06	

Procedure and Materials

Mindset intervention. Students watched a TEDx Talk by Eduardo Briceño (2012) that defines growth and fixed mindsets and describes research findings demonstrating ways in which a growth mindset is associated with productive responses to academic challenges. The talk concludes with suggestions of ways to develop a growth mindset. In 2015, the students watched the talk together and then responded to questions on a worksheet while sitting in a large lecture hall during the first week of the program. In 2016, students watched the talk alone after the spring orientation and completed typed responses to be incorporated into their ePortfolio. Both years the assignment was ungraded but required. Students did not receive feedback on their responses to the assignment during either summer. Both groups responded to the following prompts: (1) Describe three differences in the ways individuals with fixed and growth mindsets approach learning that were described by Briceno; (2) Reflect on your own life. Do you believe you generally view intelligence as fixed? Describe some of your reactions to academic struggles. Assess the extent to which these reactions are employing a "fixed mindset voice." Propose some responses you could use that would help you to establish a growth mindset. If you prefer you can answer this question thinking about someone you know well rather than yourself; and (3) Propose a plan that would help college students rise up to meet the challenges they encounter in college by fostering a growth mindset.

ePortfolios. We introduced the program cohort to the Mahara ePortfolio system during the second day of the summer program. We suggested that ePortfolios could become students' scholarly social media pages. At the initial ePortfolio workshop students created ePortfolio pages, wrote journal entries describing their first few days in the program, and uploaded an image. Although students completed ePortfolios during both 2015 and 2016, only students from the 2016 cohort expected to include their assignments in their ePortfolios. In 2015, the initial ePortfolio workshop took place prior to the completion of the growth mindset worksheet.

Coding. The total number of words written in response to each of the three prompts was recorded. Review of initial student responses to the assignment revealed that students provided primarily conceptual responses to prompt 1 (concepts prompt), reflective responses to prompt 2 (reflection prompt), and future planning responses to prompt 3 (planning prompt). We also conducted binary qualitative coding of each assignment. Assignments were classified as including full conceptual content when students correctly and completely summarized the presented research on mindsets. Responses to the reflection prompt were classified as showing growth or fixed mindset. Students who reported that their current view of intelligence was growth were classified as having a growth mindset. Students who reported that they desired to have a growth mindset were not classified as having a growth mindset. Students who reported having a growth mindset about non-academic skills but a fixed mindset about academic skills were also not classified as having a growth mindset. We also classified whether responses were indicative of a shifting mindset. This classification was independent of the overall mindset classification. If students reported that their mindsets changed over time, they were coded as having a shifting mindset. Students who described an incomplete shift were classified as having both their initial mindset and a shifting mindset. Finally, students were classified as demonstrating grit if they described determination and substantial efforts that allowed them to overcome a difficult setback.

Results

The average number of words produced in response to the three prompts are reported as a function of assignment type in Table 1. To assess the extent to which assignment format influenced content, we calculated a mixed 2 (Format: worksheet, ePortfolio) x 3 (Content: concepts, reflection, planning) ANOVA on the number of words produced. Format varied between subjects and Content varied within subjects. We observed a main effect of Format with a large effect size, $F(1, 36) = 18.54$, $p < .001$, partial eta squared = .34, with more words produced in ePortfolios ($M = 314$)

Table 2
Percentage of Students Who Provided Complete Answers, Described a Growth Mindset, Described a Shifting Mindset, and Described Grit are Reported as a Function of Assignment Format

Measure	Worksheet	ePortfolio	χ^2
Complete answer	52.9	90.5	6.83**
Growth mindset	58.8	61.9	0.037
Shifting mindset	17.6	52.4	4.87*
Grit	11.8	57.1	8.31**

Note. *p < .05. **p < .01.

than worksheets ($M = 139$). We also observed a main effect of Content with a large effect size (Wilks' Lambda = .53, $F(2, 72) = 15.36$, $p < .001$, partial eta squared = .30). Pairwise comparisons with a Bonferroni correction revealed that students produced more words in response to the reflection prompt ($M = 111$) than the concepts ($M = 66.74$) or planning ($M = 58$), $p < .001$. We did not observe an interaction between Format and Content, $F(2, 72) = .56$.

The percentage of students who provided complete answers, described a growth mindset, described a shifting mindset, and described a time when they displayed grit are reported as a function of assignment format in Table 2. To determine whether the frequency of these features of students' responses varied by assignment format we calculated four chi-square tests of independence. No effect of assignment format was present for the likelihood of reporting a growth mindset, $\chi^2(1) = 0.04$. However, students completing ePortfolios were significantly more likely than students who completed worksheets to produce Complete Answers (90.5% vs. 52.95%), $\chi^2(1) = 6.83$, $p < .01$, report a Shifting Mindset (52.4% vs. 17.6%), $\chi^2(1) = 4.87$, $p < .05$, and describe a time in their lives when they displayed Grit (57.1% vs. 11.8%), $\chi^2(1) = 8.31$, $p < .01$. In every instance of a shifting mindset, the direction of change described was from a fixed mindset towards a growth mindset.

Discussion

Given students' preference for typing over writing, we hypothesized that typed assignments would evoke more content than handwritten assignments. We found support for this hypothesis. Students produced more than double the content in ePortfolios than in handwritten worksheets. Increased content was seen in response to concepts, reflection, and planning prompts. Students who completed ePortfolio assignments were also more likely than students who completed worksheets to demonstrate conceptual mastery by summarizing the talk accurately and completely. Although intriguing, the observed differences must be considered in the context of the ungraded nature of the

assignments. We assume that students would be more likely to provide complete responses to graded than ungraded worksheets. However, because brief psychological interventions are frequently presented in ungraded contexts, it is important to consider using a typed response format whenever possible. It is also not possible to determine whether students produced more content because the ePortfolio assignment was typed or because it was being included in an ePortfolio. We explored this question in Study 2.

Given the theorized mechanism of change in brief psychological interventions, we hypothesized that mindset assignments would evoke reflection. We found support for this hypothesis. In both assignment formats students produced more content in response to the reflection prompt than the concepts or planning prompts. This finding supports the possibility that brief psychological interventions influence students by causing them to reconsider their interpretations of past experiences.

Finally, given previous research on ePortfolios, we hypothesized that ePortfolio assignments would evoke more reflection than worksheets. Although students produced more content in ePortfolio assignments than worksheets and produced more reflective content than concepts or planning content in both assignment formats, we did not observe proportionately more reflective content in ePortfolios than in worksheets. We also failed to observe a difference in the proportion of students who reported that they currently had a growth mindset. However, our qualitative coding did reveal evidence supporting this hypothesis.

Students who completed ePortfolio assignments were more likely than students who completed worksheets to describe a time when they displayed grit. We also found that students who completed ePortfolio assignments were more likely than students who completed worksheets to describe a shifting mindset. The description of a shifting mindset required a detailed response. This may explain why a shifting mindset was seen less frequently in the worksheets. Nonetheless, we believe that the increased proportion of shifting mindset and grit descriptions present in the ePortfolio assignments is evidence that students responded to these assignments with higher levels of reflection. We

believe that increased references to grit in ePortfolio assignments may reflect deeper processing of the material because increased grit has been hypothesized to be associated with a growth mindset (Boaler, 2013).

As noted above, in the current study assignment format (i.e., worksheet or ePortfolio) was confounded with response mechanism (i.e., handwritten or typed). Also, because the assignments were not graded, it is difficult to determine whether the observed response patterns can be generalized to graded work. Finally, all students who participated in Study 1 would be classified as coming from at-risk groups. Thus, it is difficult to know whether these results would apply to the broader population of college students. To determine whether similar effects would be seen in response to graded assignments and alternate delivery formats, in Study 2 undergraduate students from a four-year school completed the mindset intervention as part of an academic class, in either a graded ePortfolio or a graded typed paper.

Study 2

In Study 2, we were interested in determining whether students who completed a mindset intervention as part of a graded ePortfolio would produce more content and deeper reflection than students who completed an identical intervention as a graded paper. This study was designed to replicate and expand on the work that was reported in Study 1. In Study 2, we assessed students' mindset before and after the intervention in order to investigate whether participation in the intervention would result in a shift toward a growth mindset. We compared responses to a mindset intervention by students who enrolled in the class Child Development during the fall semester in the years 2015 and 2016.

Method

The class. Child Development is offered at the four-year institution that hosts the summer program described in Study 1. It is a lower-level class that fulfills the college general education requirement for social sciences. Students complete reflective autobiographical writing that has a conceptual focus in nine assignments. All assignments are graded with rubrics, and students receive written feedback from the professor and from an undergraduate teaching assistant. Each assignment contributes 6% to students' final grade in the course. The course enrolls 60 students each semester. An expanded version of the mindset intervention described in Study 1 was included as the eighth assignment during the thirteenth week of the semester.

Participants. This study used a convenience sample. In 2015, 56 students (51 females, 4 males, 1 other) completed the mindset assignment in an ePortfolio. In 2016, 54 students (38 females, 16 males) completed the mindset assignment as a typed paper that was submitted through the Turnitin program. None of the students in Study 2 were participants in Study 1. The ePortfolio sample included 65% first-year students, 50% students who identified themselves as members of a URM group (13 who identified as African American, 12 Latino, 2 mixed) and 50% who did not identify themselves as members of a URM group (26 Caucasian, 1 Asian). The average age of students in this sample was 18.78 (SD = 1.25). The typed paper sample included 54% first-year students, 52% students who identified themselves as members of a URM group (21 Latino, 5 African American, 1 Native American, 2 other),and 48% who did not identify themselves as members of a URM group (25 Caucasians, 2 Asian). The average age of students in this sample was 18.79 (SD = 1.79).

Procedure and materials

Theory of intelligence assessment. Students completed the Theory of Intelligence Scale (Dweck, 1999) during the first and final weeks of the semester as part of a larger online survey. The scale includes statements that describe fixed views of intelligence and statements that describe growth views of intelligence. Students reported the extent to which they agreed with each statement using a 6-point Likert-type scale that ranged from 1 (*disagree strongly*) to 6 (*agree strongly*). Statements describing fixed views of intelligence were reverse coded so that higher scores reflected more of a growth view of intelligence.

Mindset assignment. In addition to the three prompts included in the Study 1 mindset assignment, students responded to three additional prompts that related the material to child development: (1) Explain how different types of praise influence children's responses to challenging tasks; (2) Look forward and describe two ways that you can help children to achieve a growth mindset; and (3) List the top three things you would like to remember about mindsets to be a better influence on the children in your life. To maintain consistency in the responses assessed in Studies 1 and 2, responses to these prompts were not analyzed in the current study.

Assignment formats. During the first week of the semester, students were introduced to the LiveText ePortfolio system in 2015 and to the Turnitin system in 2016. The instructor introduced both assignment formats using the same language. She suggested that the assignments would document students' learning and provide a permanent way to reflect on their experiences in childhood and their wishes for their future children. Students were encouraged to add images to their assignments and to share their assignments with friends and family. Prior to completing the work, students were

Table 3
Number of Words Produced in Response to Concepts, Reflection, and Planning Prompts in ePortfolios and Papers

Measure	Paper M (SD)	ePortfolio M (SD)	M
Concepts	128.77 (75.70)	93.61 (49.45)	111.51
Reflection	172.00 (84.14)	162.24 (100.11)	167.21
Planning	92.77 (55.27)	102.59 (85.91)	97.59
Total words	393.54	358.44	

provided with a grading rubric for the assignment and encouraged to check their assignments against the rubric before turning them in.

Coding. We used the same coding from Study 1 in Study 2.

Results

Students responded positively to both ePortfolio and paper assignments. In response to a survey completed during the final week of classes, more than 75% of students reported that the assignments (whether completed in ePortfolios or papers) enhanced learning, allowed an accurate assessment of learning, encouraged reflection, provided a permanent record of learning, and should be used in future classes. One student commented on the value of personal reflections as encouragement for authentic learning, saying, "I think the ePortfolios are a great way to get a student invested in the subject for more than just a grade." Another responded to a question asking about the most important things learned in the class in this way: "Connecting concepts that we learned with my own childhood . . . getting that 'aha' moment."

We initially calculated all analyses with URM status included as a between-subject variable. However, no effects of URM status were observed. Accordingly, we report analyses with URM status collapsed. The number of words produced in response to the concepts, reflection, and planning prompts are reported as a function of assignment type in Table 3. To assess the extent to which format influenced content, we calculated a mixed 2 (Format: paper, ePortfolio) x 3 (Content: concepts, reflection, planning) ANOVA on the number of words produced. Format varied between subjects, and Content varied within subjects. We did not observe a main effect of Format, $F(1, 108) = 0.89$. We did observe a main effect of Content, with a large effect size (Wilks' Lambda = .45, $F(2, 216) = 58.32$, $p < .001$, partial eta squared = .35). Pairwise comparisons with a Bonferroni correction revealed that students produced more words in response to the reflection prompt (M = 167.21) than the concepts (M = 111.51) or planning (M = 97.59) prompts, $p < .001$.

However, this main effect was qualified by an interaction between Format and Content, with a small effect size (Wilks' Lambda = .90, $F(2, 216) = 5.47$, $p < .01$, partial eta squared = .05). We explored the interaction using Tukey's HSD post hoc test (critical value = 16.83, $p < .05$). This revealed that the reflection and planning prompts evoked similar numbers of words in both formats. However, students completing papers produced more words in response to the concepts prompt ($M = 128.77$) than students completing ePortfolios ($M = 93.61$). Students completing ePortfolios produced equivalent content in response to the concepts ($M = 93.61$) and planning prompts ($M = 102.59$). However, students completing papers produced significantly more content in response to the concepts ($M = 128.77$) than the planning prompts ($M = 92.77$).

The percentage of students who provided complete answers, described a growth mindset, described a shifting mindset, and described a time when they displayed grit are reported as a function of format in Table 4. To determine whether the frequency of these qualitative features of students' responses varied by format, we calculated four chi-square tests of independence. We found that regardless of format, students were equally likely to provide complete answers, $\chi^2(1) = 0.46$, or describe a shifting mindset, $\chi^2(1) = 0.32$. However, students completing ePortfolios were significantly more likely than students completing papers to report a growth mindset (64.8% vs. 42.9%), $\chi^2(1) = 5.33$, $p < .05$, or describe a time when they displayed grit (44.4% vs. 19.6%), $\chi^2(1) = 7.80$, $p < .01$.

Pre-test and post-test theory of intelligence scores are reported as a function of assignment format in Table 5. To determine whether format influenced students' responses to the Theory of Intelligence Scale we calculated a mixed 2 (Format: paper, ePortfolio) x 2 (Theory measure: pre-test, post-test) ANOVA on theory of intelligence scores. Format varied between subjects and theory measure varied within subjects. We observed a main effect for theory measure, with a small effect size (Wilks' Lambda = .94, $F(1, 88) = 5.56$, $p < .05$, partial eta squared = .06). Students reported stronger endorsement of a growth mindset after completing the intervention ($M = 4.66$) than before completing the intervention ($M = 4.40$). We did not observe a main effect for format, $F(1, 88) = 0.05$, or an interaction between Theory measure and format, $F(1, 88) = 0.98$.

Table 4
Percentage of Students Who Provided Complete Answers, Described a Growth Mindset, Described a Shifting Mindset, and Described Grit are Reported as a Function of Assignment Format

Measure	Paper	ePortfolio	χ^2
Complete answer	91.1	94.4	0.46
Growth mindset	42.9	64.8	5.33*
Shifting mindset	44.6	50.0	0.32
Grit	19.6	44.4	7.80**

Note. *$p < .05$. **$p < .01$.

Table 5
Pre- and Post-Test Theory of Intelligence Scores are Reported as a Function of Assignment Format

Time	Paper M (SD)	ePortfolio M (SD)	M
Pre-test	4.47 (0.79)	4.31 (1.42)	4.40
Post-test	4.63 (0.92)	4.70 (1.30)	4.66
Mean	4.55	4.51	

Note. Scores ranged from 1 to 6 with higher scores indicating stronger endorsement of growth theories of intelligence.

Discussion and Conclusions

In Study 2, we determined whether students who completed a mindset assignment as part of a graded ePortfolio would produce more content and deeper reflection than students who completed an identical assignment as a graded paper. As expected, we replicated our finding from Study 1 that responses to a growth mindset intervention evoked more reflection than concepts regardless of assignment format. This supports the idea that mindset interventions work by inducing reflection and that these reflections might be the mechanism that changes how students interpret pivotal events.

In Study 2, students who completed the assignments as graded papers produced more conceptual content (as measured by word count) than students who completed the assignments as graded ePortfolios. Interestingly, students were equally likely to produce complete conceptual information regardless of assignment format. Thus, it appears that students in both groups fully explained the evidence supporting the value of a growth mindset; however, the students who created ePortfolio assignments presented the information more concisely than the students who prepared more traditional academic papers. Students produced similar amounts of content in response to the reflection and future planning prompts regardless of assignment format. Taken together, these results may support the idea that ePortfolio practice encourages students to focus more on reflection and planning than on reporting. It also appears likely that a typed response format encourages more detailed responses than handwritten worksheets. It should be noted that amounts of content were similar in the ungraded ePortfolio assignments created in Study 1 and the graded ePortfolio assignments created in Study 2. Thus, it appears that typing is more likely than grading to encourage increased effort.

It is not surprising that in the rubric-graded assignments used in Study 2, the vast majority of students provided all required information. However, students who were writing for an ePortfolio may have invested less energy into expanding the conceptual part of the assignment if they viewed the other parts of the assignment as more central or interesting. The public nature of ePortfolios may encourage reflection and discourage detailed reporting. Conversely, students who viewed the assignment as an academic paper may have written more words in response to the concepts prompt to make the assignment seem more like a traditional academic paper. This interpretation is supported by feedback that the instructor received from the group who completed the assignment as a typed paper. Several students in this group reported that they did not like the mindset assignment because they felt that the TEDx Talk (Briceño, 2012) lacked sufficient detail to support a full paper. One student found a transcript of the talk to be sure to include all relevant details. Another student suggested that in future years, a journal article should be assigned along with the TEDx Talk. No student raised concerns about the limited available information when the assignment was presented in an ePortfolio format.

We replicated our finding from Study 1 that students who created ePortfolios were more likely to describe a time when they displayed personal grit than students who completed the assignment in another format. Because increased grit has been hypothesized to be an outcome associated with a growth mindset (Boaler, 2013), we believe that increased references to grit may reflect deeper processing. Study 2 failed to replicate the finding that a higher proportion of students reported a shifting mindset in ePortfolios than in another format. It appears that the difference observed in Study 1 may have been driven by the fact that a very small proportion of students who completed worksheets described a shifting mindset (11.8%). Because the description of a shifting mindset requires a detailed response, it seems likely that students who completed worksheets did not write enough to describe a shift.

In Study 2, we found that students who completed ePortfolio assignments were more likely than students who completed papers to describe a growth mindset (a difference that was not observed in Study 1). Interestingly, the proportion of students who described themselves as having a growth mindset was similar among the students who completed ePortfolio assignments in Study 1 (61.9%) and Study 2 (64.8%). However, the proportion of students who reported a growth mindset in typed papers was substantially lower (42.9%). Perhaps students who were preparing papers viewed the mindset assignment as primarily an academic task and were therefore less likely to endorse the perspective that was recommended in the TEDx Talk. In contrast, students writing for ePortfolios may have viewed the assignment as an opportunity for personal growth and therefore were more likely to adopt a growth view of intelligence. Despite the observed differences in students' descriptions of their mindsets, we observed increases in endorsements of statements reflecting a growth mindset, regardless of assignment format. Thus, it appears that all students were positively influenced by the completion of the mindset assignment.

There were some limitations to the current work. Because we relied on convenience samples, there may have been uncontrolled differences between the comparison groups. In future work, random assignment to condition would allow a stronger test of the hypotheses explored in the current work. Additionally, we hypothesize that the delivery of the mindset intervention will be strengthened by the use of ePortfolios. However, the expected outcomes of increased persistence, retention, and academic success are not possible to assess at present. In future work we will examine the full effects of the intervention on these outcome variables.

In conclusion, the results of these two studies support the claim that ePortfolio practice encourages the application of concepts to the self (Eynon et al., 2014; Nguyen, 2013; Singer-Freeman et al., 2014, 2016). ePortfolios evoked proportionately more reflection than concepts or planning. These positive effects of ePortfolio delivery were present for both URM and non-URM students. ePortfolios appear to be a promising format for the delivery of brief psychological interventions and other assignments that rely on reflection.

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LEADing the Way with ePortfolios in a First-Generation Learning Community

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Although an increasing number of first-generation students are beginning tertiary education, many are not completing their degrees. In an attempt to improve retention and graduation rates, learning communities responsive to the unique needs of first-generation students are becoming more common. This paper explores the implementation of ePortfolios in first-year writing courses in one such learning community, the LEAD Scholars Program. The research, which employed thematic analysis of student ePortfolios in a qualitative case study, suggests that ePortfolios operate synergistically with other high-impact practices to amplify the persistence and success of first-generation students and prepare them for their roles as engaged citizens and leaders in an increasingly technologically-connected society. The broader significance of this research derives from the importance of discovering how to improve the effectiveness of programs to retain and graduate first-generation students.

Although first-generation students make up an increasingly large segment of the high-school population, they are still underrepresented in tertiary education. In particular, they are very much underrepresented in four-year colleges and universities, tending to enroll in two-year institutions. Moreover, even if these non-traditional students enroll, they are less likely than their peers to graduate. As universities seek to increase diversity and inclusion, they are striving to attract this under-represented sub-population. Low admission and retention rates matter to all of us, not only in the interests of equity, but also out of self-interest; we need the talents of these capable students. To attract and retain these underrepresented students, many universities have created learning community (LC) models to support them as they make the transition from high school to what can seem a very unfamiliar and unforgiving college environment. This paper reports on one such highly successful LC for first-generation students at a regional university in the west and explores the role of ePortfolios in working synergistically with the other high-impact practices (HIPs) that students experience to realize this success.

First-Generation College Students

As no consensus exists on how to define first-generation college students, numbers stated for this demographic vary widely, depending on which definition is used. Definitions typically revolve around parents' education level; some also include socio-economic indicators from the Pell Institute and the National Center for Education Statistics. Recent research using data from the Education Longitudinal Study of 2002 found that if *first-generation* is understood as meaning that neither parent had ever attended college, only 22% were defined as first-generation, while including students with one parent who had some tertiary education increased the

percentage to 77% (Toutkoushian, Stollberg, & Slaton, 2015). Whether first-generation students are defined as having no parent with any college education or only one parent with some college education but no degree, studies provide evidence of significant differences in retention and graduation rates (Smith, 2015). For example, a 2011 report from UCLA's Higher Education Research Institute on graduation rates at four-year institutions using 2004 data, which defined first-generation students as "students for whom neither parent has attended college" (DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011, p. 9), found that 27.4% of first-generation students completed their degree after four years, whereas 42.1% of students whose parents had college experience did, and found that this difference remained constant after six years.

When first-generation students attend university, they often find the environment uncomfortable because they lack cultural capital and are unfamiliar with social norms (Bourdieu, 1986). Issues contributing to their discomfort include: internalization of negative stereotypes, poorer academic preparedness, less access to information about colleges and funding opportunities, ongoing financial concerns, culture shock, low self-esteem, and less well-developed study and time-management skills (Banks-Santilli, 2014; Engle & Tinto, 2008; Irlbeck, Adams, Akers, Burris, & Jones, 2014; Lawless, 2009; Nichols & Islas, 2016; Pascarella, Pierson, & Wolniak, 2004; Paulsen & Griswold, 2009; Perna, 2015; Wilbur & Roscigno, 2016). As the list above suggests, problems faced by non-traditional students are both external and internal. Consequently, an increase in the enrollment of first-generation students will not insure a corresponding increase in graduation rates unless institutions are sensitive to the challenges they face. If they are admitted but given insufficient assistance with both academic and social integration, they are at risk of failing to graduate. As Engstrom and Tinto (2008)

cautioned, "Access without support is not opportunity" (p. 50). First-generation students are more likely to engage more fully with academic and social aspects of campus life when colleges and universities offer a variety of initiatives to support their adjustment and learning; however, further compounding their potential problems, underrepresented students are less likely to use on-campus student support systems (Gonzales, Brammer, & Sawilowsky, 2015; Storlie, Mostade, & Duenyas, 2016).

Learning Communities and Other High Impact Practices

To ease the transition from high school to college and mitigate the issues mentioned above, LC models have been widely implemented. Much like definitions of *first-generation*, definitions of *learning communities* vary, but a commonly accepted definition is a group of people who meet regularly, share common academic goals, and embody a culture of learning (Bielaczyc & Collins, 1999). A four-year multi-institutional study of 19 effective LCs found that low-income students in LCs were nearly 10% more likely to persist than those who were not (Engstrom & Tinto, 2008). This finding is consistent with an action research study of a first-generation LC at Wayne State University, a large, public research institution with an undergraduate population of more than 17,500 students and a total student population of over 27,000. Gonzales et al. (2015) noted that the LC was especially helpful for first-generation Latino/a students because it supported both their social and academic integration: "A sense of collectivity, belonging, and *familia* was created that now carries these students well beyond their first year at WSU" (p. 236). They reported that over the course of their study, retention rates gradually increased, from 57.5% in 2006 to 85% in 2012 .

LCs are also an example of a high-impact practice (HIP), a term used to describe activities and experiences that have been identified as promoting student engagement and success. Although steadily growing, as of 2016 the 11 HIPs listed by the Association of American Colleges and Universities are (a) LCs, (b) first-year seminars and experiences, (c) common intellectual experiences, (d) writing-intensive courses, (e) collaborative assignments and projects, (f) undergraduate research, (g) diversity or global learning, (h) service learning or community-based learning, (i) internships, (j) capstones and projects, and (k) ePortfolios (Kuh, 2008; Watson, Kuh, Rhodes, Light, & Chen, 2016). Research suggests that HIPs are particularly helpful for first-year students, and for first-generation students, even more so (Brown, Roediger, & McDaniel, 2014; Finley & McNair, 2013; Huber & Hutchings, 2004; Hubert, Pickavance, & Hyberger,

2015; Kinzie, Gonyea, Shoup, & Kuh, 2008; Kuh, 2008; Kuh, O'Donnell, & Reed, 2013; Rahoi-Gilchrest, Olcott, & Elcombe, 2009; Tukibayeva & Gonyea, 2014; Watson & Pecchioni, 2011). As Tukibayeva and Gonyea (2014) noted, HIPs help students "reflect on their understandings, reconcile new ideas with old ones, and integrate learning from one setting to be useful in other settings" (p. 31).

Context of the Study

The goals of the LC discussed in this case study have much in common with those listed above. Founded in 1851, Santa Clara University (SCU) is a private, Catholic university, which during the period of study had an undergraduate enrollment of 5,385 and a full-time and part-time graduate enrollment of 3,296. Desiring to create an inclusive and diverse community, SCU prioritizes improved access, retention, and graduation rates of non-traditional students by offering scholarships and financial aid to enable underrepresented students to participate more fully in campus life. Offered to students who have been admitted and whose college application indicates that neither of their parents completed a four-year degree, the Leadership, Excellence, and Academic Development Scholars Program (LEAD) is SCU's LC for first-generation students (Santa Clara University, 2017). Top-down commitment to LCs is important because, without administrative-level support, resulting in coordinated, well-funded, efforts focused on the shared goal of improving student success, these models are less likely to prove consistently effective over time. The current program enrolls about 60 students each year, with about 4% of first-year students and 50% of the first-generation students being in that cohort. Whereas nationwide, fewer than 10% of first-generation college students graduate within six years, the average four-year graduation rate for eight LEAD scholar cohorts from 2007-2014 was 81.8%, and the first-year retention rate was 97.7% (Dancer, 2015).

Foundational to this LC is "LEAD Week," a one-week program that introduces students to academic and campus life at SCU. During the week preceding the formal start of the quarter, participants begin a first-year composition course and take an ungraded elective course, such as business or engineering. LEAD Scholars also engage in team-building activities to foster community and interact with faculty, staff, peer-educators and peer-mentors, who help ease their transition into campus life. During their first year, LEAD Scholars continue with the two-course LEAD first-year composition sequence and participate in a two-quarter LEAD seminar, which focuses on study skills required for academic success. During their subsequent years at SCU, LEAD

Scholars are required to participate in at least three LEAD activities per year, most of which are designed to ensure that students familiarize themselves with university resources and support systems, as well as explore leadership and career development opportunities. In other words, the LEAD Scholars Program responds to the needs identified by Irlbeck et al. (2014): "The cultural capital that tends to be lacking in first generation college students can be compensated for by relationships developed with faculty and other university personnel, because these relationships help provide important information, perspectives, values, and socialization skills" (p. 162).

Also important to the success of SCU's LEAD Scholars program is the cumulative effect of students' engagement in HIPs, which has been shown to deepen learning, increase student engagement, and promote retention of first-year students in general, and first-generation students in particular. In addition to the LEAD-specific HIPs (learning communities, first-year seminars and experiences, common intellectual experiences, and collaborative assignments and projects), LEAD Scholars, along with all SCU undergraduates, are required to participate in the LC of their residence, writing intensive courses, community-based learning, and learning related to diversity and global engagement as part of the Core Curriculum (i.e., general education). In addition, they may voluntarily engage in internships, capstone projects, and undergraduate research with faculty mentors.

First-Year Composition in a Learning Community

All SCU undergraduates complete a two-course first-year composition sequence called Critical Thinking and Writing (CTW) as part of their Foundations Core Curriculum requirements. The LEAD CTW sequences have the same learning goals and objectives as all other CTW sequences, but have a smaller enrollment cap and faculty who work as a team to develop shared assignments. The learning goals of CTW, a writing-intensive course, are critical thinking, complexity, and communication. At the end of the course, students are expected to have mastered four learning objectives:

- read and write with a critical point of view that displays depth of thought and is mindful of the rhetorical situation;
- write essays that contain well-supported, arguable theses and that demonstrate personal engagement and clear purpose;
- reflect on and/or analyze the rhetorical differences, both constraints and possibilities, of different modes of presentation;

- reflect on the writing process as a mode of thinking and learning that can be generalized across a range of writing and thinking tasks.

Although all LEAD faculty work together to design the LEAD CTW syllabus, which is focused on the topic "education and identity," specific reading and writing assignments may vary across the four sections. All sections included an ePortfolio assignment, and typical assignment prompts were, "Create an ePortfolio that demonstrates your development this quarter as a critical reader," or "Make an argument about the most important habits and strategies you rely upon as reader/writer, as well as provide evidence that illustrates these habits and strategies." While all instructors had their students begin their ePortfolios early in the quarter, the class time allocated for work on the ePortfolios, technical assistance provided, and choice of platform varied. In all cases, students were instructed to include an introduction to their site and a reflective essay to make the case that they had met the course learning objectives. Faculty suggested that students include a variety of artifacts, such as rough and final drafts of essays, annotations, discussion posts, and notes on their texts or critical reading logs (CRLs) to support their claims about their learning. All students were required to submit an ePortfolio, worth 15-20% of the final grade, by the end of their first quarter on campus.

At SCU, interest in ePortfolios began in 2009 in the context of a revised core curriculum, which required students to study a theme in one of 24 Pathways from a number of disciplinary perspectives, creating their own "pathway" to promote integrative and intentional learning. In order for students to collect samples of their course work over time that would help them to write a final reflective essay on their chosen Pathway theme, starting with the class of 2013 members of the Core Curriculum Committee explored the use of ePortfolios for submission and assessment. Around this time, faculty were also piloting new learning management systems and an iPad program for the LEAD Scholars. When decisions about the learning management system and ePortfolios were finalized, the logical next step was to substitute ePortfolios for the paper portfolios LEAD instructors had used in the past to assess CTW course work.

Viewed as the digital successors of print portfolios, ePortfolios have been an option since the mid-1990s, and recent years have seen a rise of adoption, accompanied by more platform choices and improved ease of usage (Bass, 2014; Batson, 2015; Cambridge, 2007; Eynon, Gambino, & Török, 2014; Gambino, 2014; Jenson & Treuer, 2014; Kahn, 2014). Instructors can include ePortfolios in a variety of pedagogical paradigms, from instruction-centered to learner-focused (Conefrey, 2016). As well as uploading traditional alphabetic essays, students can incorporate blogs, videos, photos, audio texts, music, and links to other

digital media from within their site or the internet. A potentially transformative affordance of the digital portfolio, when compared to print portfolios, is the flexible space for students to reflect on their own learning, not only during the course but also in subsequent courses and even beyond their academic careers (Bolger, Rowland, Reuning-Hummel, & Codner, 2011; Cambridge, 2008; Chen & Black, 2010; Huber & Hutchings, 2004; Kahn, 2012; Singer-Freeman, Bastone, & Skrivanek, 2014, 2016). Commenting on the move from print-based to digital portfolios in her seminal chapter, Yancey (2004) asserted that the different "intellectual and affective opportunities" (p. 23) that they offer equate to a difference in "kind rather than degree" (p. 27).

Case Study Approach

This study examined, from the point of view of the students, the influence of ePortfolios in first-year composition that were designed for a first-generation LC, using a case study approach, a qualitative form of inquiry well-suited for studying a complex issue with many variables within its context (Stake, 1995; Yin, 2014). This versatile approach, which is not assigned to any particular ontological, epistemological, or methodological framework, works well with my orientation to research, which is rooted in a constructivist, interpretivist paradigm. The assumption that the researcher and the object of research are linked, so that the findings are created as the research proceeds, is based on a relativist ontology and a transactional and subjectivist epistemology. Within this constructivist view of reality, which assumes that there can be multiple credible interpretations of the same experience, my goal was to gain a deeper understanding from the LEAD Scholars' perspective (Denzin & Lincoln, 1994; Lincoln & Guba, 1985, 2013).

Following from this constructivist, interpretivist orientation, my initial research question was quite broad: What is the role of ePortfolios in the LEAD CTW? However, after familiarizing myself with the data, my research questions became more specific: (1) Do ePortfolios make a difference in progress toward learning objectives for the course and/or toward objectives of the LEAD Scholars Program? (2) How do ePortfolios interact with the other HIPs practiced in the LC? (3) What is the role of reflection in the ePortfolios? (4) What do students' reflections reveal about their transition to college? As most SCU students meet the learning outcomes of CTW without difficulty, I was less interested in assessing students' progress objectively and more interested in students' perceptions of their progress. The ongoing use of ePortfolios in the LEAD CTW is noteworthy and unusual because despite administrative level support for the adoption of

ePortfolios (and their implementation in a wide array of programs across campus, encompassing arts, sciences, business, and engineering), the total number of faculty using them regularly in other CTW sequences is low. Aside from my research interest, as one of the few other instructors who also assign ePortfolios in first-year writing courses, I was interested in understanding how they were used by other instructors in order to improve my own pedagogy.

Method

To carry out this research study, I obtained IRB approval and contacted all students in the 2015-2016 LEAD Scholars Program, inviting them to share their published ePortfolios with me. Fifteen students (representing all four sections) signed consent letters granting me access to their ePortfolios. The contents and appearance of the ePortfolios varied enormously from one student to another across the four LEAD CTW sections, depending on the ePortfolio prompt given and the platform chosen. As expected given the essay prompts, most ePortfolios comprised, to a large extent, students' use of rhetorical strategies and supporting evidence in the form of digital samples of their assignments and other multimedia artifacts to make a persuasive argument for improvement. Those students who were assigned a progress ePortfolio charted a trajectory that demonstrated increasing levels of complexity in their cognitive development, while those assigned a process ePortfolio described increasing levels of self-regulated learning and development of learning heuristics. Although the level of writing, overall design quality, and technical expertise varied from one ePortfolio to the next, each of the ePortfolios that I coded enacted complex decision making about which multimedia artifacts would best support the digital presence that students wanted to project to multiple and varied audiences and that showcased their developing presentation literacy skills.

I used thematic analysis, a qualitative method that works well within many different theoretical frameworks, for analyzing students' ePortfolios (Braun & Clarke, 2006; Clarke & Braun, 2013). After immersing myself in the data and noting any initial observations, I coded the ePortfolios for patterns and collated the codes to create candidate themes. After this, I coded and recoded data excerpts in an iterative process until all the data had been coded and I had more confidence in possible themes, and finally, I collated all the coded data for each theme. Next, I reviewed, defined, and named the themes. As part of the process of reviewing the themes, I contacted the students' instructors with questions about the assignments in order to deepen my understanding of the context of the writing that students had produced in their ePortfolios. Instructors generously shared syllabi, assignments, and readings that students had

mentioned. By waiting to acquire this additional information until after I had identified nascent themes, I was able to combine an inductive, data-driven, approach with a deductive, theory-driven analysis, which was consistent with my constructivist, interpretivist approach, in which data collection and data analysis generally proceed together, with the findings based on evidence and reasonable interpretations. Within the framework of this qualitative approach, I propose that the soundness of these findings be assessed based on whether they offer a coherent and convincing narrative account and whether they are useful in redirecting practice, what might be called a practical and dialogic validity (Blakeslee, Cole, & Conefrey, 2011).

Results

Students' ePortfolios suggested that they were integrating learning from their first-year writing course, their LC, and the other HIPs that they were experiencing. Together, these HIPs appeared to deepen students' learning, encourage self-efficacy, and promote valuable 21st century digital literacy skills. The four themes that emerged from students' curation of texts and reflection on their learning contribute to a convincing and compelling narrative account of the ways in which ePortfolios interact synergistically with other HIPs to augment the overall positive impact of the LEAD LC. The four themes are: (1) literacy skills, (2) self-regulation strategies, (3) academic and social integration, and (4) 21st century skills.

Theme 1: Literacy Skills

Many students complained that as a result of typical high-school writing assignments, they had little experience with reading and writing other than remembering and restating information. Since CTW required more cognitively complex tasks, they found the assignments daunting. The impressive progress that they described in their reflective essays, from lower to higher-order thinking, was reminiscent of Bloom's Taxonomy of Learning Domains (Bloom, 1956). Early in her reflective essay, one student wrote:

My annotations were similar to my high school annotations where I would highlight quotes and write down nonsense just to fill the space and make it seem like I did work. Like in my Bartholomae and Petrosky annotations I wrote, "Looking at reading through your personal lens" as a comment for the quote, "working from passages or examples but filtering them through your own personal predispositions" (Bartholomae 2). I paraphrased—I didn't look for a deeper connection to the contents of the passages, which meant I was still a "passive reader," as Bartholomae and Petrosky would put it.

Later in the same essay, she notes how she began to transfer what she had learned from Bartholomae and Petrosky's text to other reading assignments to become herself what they termed a "strong reader" (Bartholomae & Petrosky, 2011):

The first step was getting my annotations up to par. I got my best advice from Bartholomae and Petrosky when they stated, "we'd like you to imagine that you are in a position to speak back, to say something of your own in turn" (Bartholomae 2), so that's what I did.

Her reflection finished with an insightful comment on the irony that the reading she had used to "showcase how bad I was at the beginning of the year" ended up being crucial to her development as a critical thinker.

Consistent with research findings, some students expressed difficulty in evaluating their own literacy (Ambrose, Bridges, Dipietro, Lovett, & Norman, 2010; Dunning, Johnson, Ehrlinger, & Kruger, 2003). This was especially true for those students who believed that the grades of "intangible subjects" were "subjective" and improvements "hard to measure." One male wrote:

With subject areas such as math it can be easy to measure since it can be shown through the advance towards more challenging and stimulating problems . . . One class that is specifically difficult to judge personally is english [*sic*] or language arts.

In an attempt to appear more objective in assessing his progress, this student utilized the features of the ePortfolio to make learning visible by providing specific exhibits to compare and contrast. The following excerpt illustrates the rhetorical solution he adopted to make his learning appear more concrete and quantifiable:

One of the first readings with annotations that I did was by Bartholomae and Petrosky, which you can find by clicking the link to "Annotations" which is in the menu bar in between "Reflective Essay" and "CRLs." If instead of looking at the authors' writing, you look at my annotations, it is clear that my thoughts were not very developed at the time. I simply regurgitate information and point it out directly next to the text that I am copying from . . . Luckily, my ability to make my own thoughts coherent is something that progressed as I got better at both reading critically and annotating.

First, he seized on the tangibility of his annotations, and then he directed the reader to click on a series of hyperlinks to compare and contrast different examples of annotations, to make the case that the later ones were

superior to the earlier ones insofar as they evidenced more critical thinking.

Theme 2: Self-Regulation Strategies

Students whose assignment prompt required them to make an argument about their self-regulation strategies wrote about having to overcome high school habits of excessive highlighting and inefficient reading and note-taking skills, which impacted their CTW class, as well as other classes: "Since I did not know how to read smart, I had a habit of reading every single word of the reading assigned, which would take me too long. This would happen in my psychology and biology classes, which negatively affected me." Others noted that they could no longer continue former study habits of socializing and writing assignments the night before, and that they had needed to learn both how to balance social life and school work and where to find spaces conducive to studying: "It took me some time to realize I had to set time to do homework alone or in an environment where I could not get distracted, such as in the library." Above and below her text, the student used the affordances of the ePortfolio to support her claims with photographic evidence portraying her surrounded by friends, appearing distracted, and then working alone in the library.

A further distraction that students addressed frequently was music, reflecting on genres and styles that were or were not favorable to studying. Some noted how music, people, and space interacted to make a productive or non-productive learning environment. For example, one student, who had left her parents behind in the Philippines and was living with relatives, illustrated her ePortfolio page titled "Writing Environment" with photographs depicting herself sleeping surrounded by books, reading with friends, and studying in a room surrounded by young children. She wrote, "Music plays a very significant role in my writing process because listening to music is my way of 'isolating' myself to be able to think critically." At the bottom of the page was a photo with a YouTube link to a sample of the kind of instrumental music that she listened to, which she made available to the viewer.

Another student organized her whole ePortfolio around an epiphanic (Denzin, 1989) moment when she had realized that she needed to rethink a self-regulation strategy that had worked successfully for her since starting her formal education. By exploring a series of hyperlinks, the viewer learned that what sounded like good advice had a surprisingly disastrous effect on the student's college writing. Each click led to pages with illustrations, photos, and also screen-captures of her assignments, with feedback from her instructor before the viewer arrived at a page where her grandfather's advice was revealed: "Don't wait 'till [*sic*] the last minute to get something done. Just do it right away and finish it!" Viewers who wondered how this advice could be so problematic and continued to click various links reached a page with a graphic of a stick figure staring at a screen and an arrow (indicating that three hours had passed) pointing to a blank screen to illustrate the point when the student finally realized that she could not write a complex essay without thorough planning and changed the way she went about her writing. Other pages, with photos and screen-captures of the student's work in her composition and her biology courses, explored how her discovery of steps to help her get from a blank screen to a completed assignment led to better work and improved grades as the student reflected on how she could integrate this epiphany into other aspects of her life:

> Though this change in my writing style might seem simple for some, this change did more to me than just improve my grade . . . My change in writing style opened my eyes to more change and thus more improvements in my life.

Theme 3: Academic and Social Integration

Many first-generation students arrive at college with low self-esteem despite having been admitted under the same stringent criteria as more traditional students. LEAD scholars described attending academically-poor high-schools and experiencing financially-deprived backgrounds, which led to their arriving on campus feeling under-prepared. Although the purpose of the ePortfolio assignment was for students to provide evidence of their meeting the CTW course goals and learning outcomes, equally important for their growth as scholars was their use of the reflections to help them integrate their knowledge and transfer their self-regulation strategies across disciplinary boundaries. Students' ePortfolios suggested that by the end of their first quarter in the LEAD LC, their self-efficacy and self-esteem had improved and they felt more confident about their academic prospects:

> At the beginning of the quarter, I doubted my abilities as a reader and writer in college; I wasn't sure whether I would be able meet the expectations of work required for SCU. I was ready to give up . . . Now, nearing the end of my first quarter at SCU, I am ready to say that I have exceeded my expectations on my ability as not only a critical thinker, but also a college student.

Often, new students are reluctant to seek help from their instructors or staff in student services when they are struggling academically, and this is especially true of first-generation students, who often lack social and cultural capital and become used to relying on themselves. One student who wrote, "I had previously

turned to myself to solve any problems I had," described reaching out as the writing assignments became ever more complex and used italicized words to link to photographs of the different support systems that she mentioned:

> I soon found out that asking for help was normal and expected in order to be successful. When I made this realization I turned to different people. My *professor* was the first person I sought out when I had trouble understanding the prompt, or when I needed help developing my ideas for the topic. I also turned to *friends* and my *writing group* when I needed further clarification on the prompt, or if I wanted to see if my writing was on the right track, I visited the *campus writing center*.

Other students who had immigrated to the United States as children described the initial difficulties that they had experienced because neither they nor their close family members spoke English well:

> English as my second language also caused a barrier for me. Many times, I found myself thinking in Spanish. As a result, I had minimal knowledge of English sayings, thus causing awkward wording in my sentences in unsuccessful attempts of translating Spanish to English.

Some who were recent immigrants also acknowledged their difficulties coping with a foreign culture. This was especially true of students who had been sent by their parents to live with relatives. Articulating her difficulties in switching from writing in Tagalog to English and being placed in a remedial English class against her wishes in high school, one student from the Philippines wrote about her pride in her progress:

> Looking back, I feel proud of myself because I never would have thought that I am capable of writing about three major essays (five to six pages), one collaborative paper, and be able to read a book and many articles within a couple of weeks . . . The first quarter of my college career has been quite the experience. I have met many new friends, have taken classes that were interesting, and found a community that will aid me in achieving my goals . . . The past ten weeks have taught me more than I have ever learned in the past. This quarter was the foundation for the next four years, and I can confidently say that I am ready to tackle whatever life throws at me next

Students' reflections in their ePortfolios reveal the complex interactions of their HIPs, which supported the learning outcomes of their first-year writing course and the learning goals of their LC and their other HIPs. To succeed, LEAD scholars must believe in themselves as capable scholars and come to feel that they fit into the SCU campus culture. If they are admitted but not given the support they need, they may not persist with their degrees. Just as students' literacy could be seen to follow Bloom's Taxonomy (Bloom, 1956), their integration into the campus community could be said to follow Maslow's hierarchy, insofar as students' lower-level needs had to be met before they could aspire to higher-level ones (Maslow, 1943).

Theme 4: 21st Century Skills

While the benefits of reflection and integration can be realized by assigning a paper portfolio, the digital format enables a richer account of students' learning and additional benefits. For the researcher, however, writing about digital portfolios is more challenging than writing about their paper predecessors. Whereas a text-based portfolio is typically read linearly by scanning the table of contents, reading the reflection, and then checking the included writing samples and other print-based artifacts for more details, engagement with digital media is more complex and cumbersome to navigate. Does one read it, view it, or use it? Does one discuss readers, viewers, or users? How do we describe students' roles? Are they authors, builders, or creators? Another difficulty for the researcher is how to construct or weave together a text-based, linear narrative to account for the non-linear structure of a digital portfolio, with its internal and external links to multiple artifacts. As content can be accessed in a variety of sequences, leading to many possible paths, writing about order is problematic. While a Home or Welcome page might be considered the "first" page, there is often no obvious route to viewing additional pages, requiring that students provide their audience with directions if there is a specific order in which they would like their content to be considered and processed.

For students also, moving from paper to pixels provides added challenges. In addition to re-conceptualizing audience as broader than their instructor, they must make choices about identity management and the presentation of self. Because the self in the ePortfolio is dispersed throughout the entirety of the digital environment and in a reciprocal relationship with the viewer, students have to think carefully about which artifacts to include and where to

Figure 1
Student ePortfolio
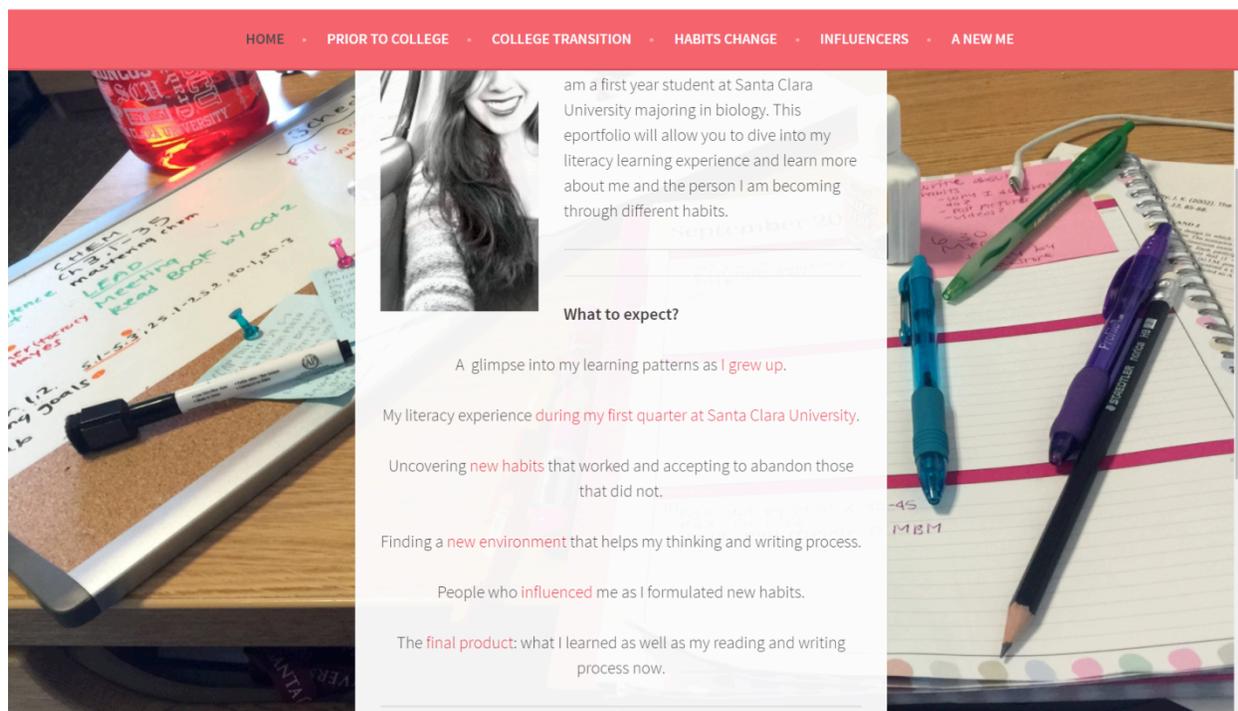
include them as they structure their site to create their digital presence. This attention to audience, a process that Ramírez (2011) likens to performing, led her to claim that ePortfolios have "an inherent ability to function as a performance space, a kind of theatre in which the self is both rehearsed and presented to an audience" (p. 1). With these challenges come opportunities. Adding to the familiar mantra of "collect, select, and reflect," what the "e" brings to portfolios is the ability to "connect," as students can communicate with whomever, whenever, wherever, on a variety of platforms on many devices, with a wealth of texts, graphics, videos, photos, music, and other digital media. Along the way, they are developing valuable media literacy skills: how to use digital communication tools to communicate with different audiences. As Gallagher and Poklop (2014) noted, "The ability to craft compositions that successfully negotiate multiple audiences' needs and expectations is a critical twenty-first century skill" (p. 7).

In building their portfolios in a digital format, the learning curve for some LEAD students was steep, such as for the student who wrote, "During this course, I started to learn how to use my first laptop ever, unsure of how to use a device that most of the other students at SCU considered a staple in their academic lives." However, despite varying levels of prior digital expertise, all students collected samples of their papers, uploaded them, and made decisions about which photographs and music to include as they envisioned their audiences and judged how best to weave everything together into a coherent and cohesive persuasive narrative that was attentive to audience.

An example of an ePortfolio that portrayed the development of an academic identity effectively and was particularly attentive to audience was assigned the overall title, "Evolving and Adapting: Creating New Literacy Habits" (see Figure 1). Throughout the student's site, images, color, font choice, and style cohesion across pages were used effectively to reinforce her rhetorical goal. As well as displaying her understanding of visual rhetoric, her ePortfolio revealed effective self-presentation and identity management. Each page focused on a different aspect of her growth into an effective writer and scholar, and at relevant points she addressed the audience with a "navigation

tip" and explanations of the material presented. Evident in the content of her pages was her awareness of what an appropriate persona for an academic audience was, possibly in contrast to her digital presence on other forms of social media. Her Homepage opened with a self-introduction juxtaposed to a "selfie" (which is obscured here to protect her privacy), and she indicated that she was a "first year student at Santa Clara University majoring in biology." She offered a brief overview of her site with embedded links to the pages, which could also be reached by clicking on the tabs below her site title, and her calendar was attractively framed on a background featuring a table with notebooks, pens, and other images connoting study and projecting an academic, scholarly identity. Other pages included additional photos of her study habits, and time-lapse videos (accompanied by embedded music) of her working alone or with others. Throughout the additional pages of her ePortfolio, she displayed attention to visual rhetoric, audience, tone, and other aspects of presentation literacy as she created/composed an appropriate digital presence.

Many in the LEAD LC will not have had role models for how a "college student" should present him or herself, and some might still be struggling to imagine themselves as the kinds of persons who obtain college degrees. Although the student above wrote, "Coming to college was a culture shock," her ePortfolio suggested that over the course of the quarter, with support from the LEAD LC and her other HIPs, she was successful in "evolving and adapting." As other researchers have noted, ePortfolios can help students "make meaning from specific learning experiences and connections to other experiences, within and beyond the course" (Eynon et al., 2014, p. 104) to create "a more intentional and purposeful sense of self" (p. 101).

Another example of an ePortfolio whose author seemed particularly attentive to both the requirements of the assignment and reaching a potentially broader online audience was the student who organized her ePortfolio around the epiphanic (Denzin, 1989) moment when she had realized that she needed to rethink her prior self-regulation of beginning assignments promptly without prior planning. Like an author at the start of a mystery novel, the student built suspense into her Home Page, as she introduced herself and directed viewers to click on hyperlinks in a specific sequence to discover what words had been passed down to her from her grandfather that could have had such a profoundly negative impact on her college writing. Throughout the pages of her ePortfolio, this student attempted to hold the audience's interest as she set the tone with effective page layout, color, graphics, font, and other elements of visual rhetoric in order to weave a cohesive tale of failure and success. Other ePortfolios, while less

dramatic, appeared attentive to audiences inside and outside the classroom.

Most students, although focusing on their instructors as their primary audience, also displayed awareness of secondary audiences, such as the one who wrote: "An e-Portfolio is a platform from which individuals can share their work with either the public or those who are associated with Santa Clara University," or the student who included under his homepage the following headings: "What is CTW?" and "What is an e-Portfolio?" These headings gesture towards an external audience because the student's instructor, classmates, and others at SCU could be presumed to know this information already. Most also displayed an awareness that since the ePortfolio was non-linear, a page entitled "How to Navigate this Site" could be helpful in directing the viewer's gaze in a particular sequence if this were beneficial in developing the student's narrative.

Other students explicitly invited audience feedback, as suggested by the following comment: "Thank you so much for reading! Would you like to share your ePortfolio with me? To share yours, please comment on the link *here*. You may also add your feedback or ask questions there." Students were also aware of multiple audiences and multiple purposes insofar as some chose to share their work with me, someone who had contacted them by SCU e-mail and identified herself as a colleague of their instructors. Those who responded expressed pleasure that I had reached out to them and offered to provide me with additional information. According to LEAD faculty and staff, some students also shared their ePortfolios with friends and family overseas.

However, not all students were equally successful in wrestling with the complexity of the digital environment. Some of this challenge was apparent when students struggled to navigate the tension of being both subject and object of their own writing, such as the student who switched from the use of "we" to refer to both himself and his classmates, and himself and the audience: "Documenting the way I read would normally be a very difficult task, but luckily we have been using annotations," and then later, "If instead of looking at the author's writing, we *click* on my annotations." As others have noted, students do not always make successful decisions, and sometimes there is confusion about audience and appropriate voice in their ePortfolios (Benander & Refaei, 2016; Gallagher & Poklop, 2014).

Discussion

All ePortfolios appeared to display evidence of engagement with and progress in meeting the first-year composition learning outcomes noted earlier. However,

the benefit of the ePortfolio assignment went beyond assessment purposes. Each of the ePortfolios that I coded evidenced students' literacy and metacognitive development in terms of choices about which materials to include, the logic of organization, and the overall rhetoric of presentation. The act of reflecting, which is central to their ePortfolios, allowed and encouraged them to integrate various aspects of their learning in this course, other courses, and other HIPs, especially their LC, and to view themselves as successful scholars who engaged more fully with the campus community. As the themes identified show, the process of collecting, selecting, and reflecting enabled students to trace a journey from a perception of deficit in academic preparedness to self-efficacy, a newfound belief in their ability to succeed

While many of these benefits might have been possible with non-digital portfolios, the extra affordances of the digital environment included the possibility of connecting with authentic audiences, providing opportunities for identity rehearsal and reinvention, and increasing confidence with multimedia and digital communication. Despite having no prior experience with ePortfolios and little knowledge, if any, of web design, students managed to think analytically in virtual and print-based spaces to build effective digital portfolios that demonstrated to themselves and others that they had the academic knowledge and study strategies, as well as sufficient familiarity with social norms, to view themselves as belonging to an academic community. The digital format facilitated the collaborative nature of constructing meaning and enabled students to work through issues of audience and identity to create an effective academic persona. By creating an ePortfolio in their first quarter, students were mastering their CTW learning outcomes and familiarizing themselves with an educational technology that may be used in advanced classes in their major, as well as starting down a path to becoming self-directed learners with a deep understanding of their own best learning practices. In building their sites, students also accrued multimedia digital literacy skills that will empower them in their academic career and beyond.

My study suggests that ePortfolios, which have recently been declared the eleventh high-impact practice, operated synergistically with the other high-impact practices that students engaged in as part of their learning community to accentuate the exemplary qualities of SCU's LEAD Scholar Program. This finding of amplification is consistent with research noted earlier that found that the greater the number of experiences, the stronger the effect in promoting an increased sense of self-confidence, resilience, and self-esteem, and also with the finding that multiple HIPs are particularly valuable for first-year students in promoting retention and persistence. It also supports the

contention that ePortfolios might be considered a "meta-HIP" (Watson et al., 2016) or "the one HIP to rule them all" (Hubert et al., 2015).

Conclusion

This case study, which has sought to understand the roles of ePortfolios in a first-generation student LC, suggests that they go beyond serving as a convenient tool to showcase, access, and assess student work to one that helps students integrate their learning across disciplinary boundaries and consolidate their academic identity. In addition, the digital aspect of the portfolios enables students to tell and retell their stories in multiple, non-linear ways to multiple audiences for multiple purposes and to acquire valuable 21st century skills. The only limit is their imagination. "Space to Think," the title used by one of the students in the LEAD LC community, appears to be particularly apt. ePortfolios offer students space and a place to reflect on and integrate their learning, rehearse their presentation of self, imagine and reimagine potential personas and audiences, and connect with others online. The significance for first-generation students is that they can revise their initial narratives of deficit to ones of self-efficacy, where they can envision themselves becoming the kind of persons who have college degrees and succeed at SCU and beyond, or as one student titled her page, "Far from what I once was, but not yet where I'm going to be." In conclusion, this study suggests that ePortfolios function synergistically to amplify and augment other HIPs to make the LEAD Scholars Program even more successful in retaining first-generation students, preparing them for their roles as engaged citizens and leaders in an increasingly technological and global society, while also encouraging them to transform themselves and their world.

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An Embedded ePortfolio in a Master's Degree: Is It Working?

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ePortfolios are embedded into several degree programs at Charles Sturt University in Australia to maximize the value of ePortfolio purposes for students working in or towards a profession. ePortfolio design has been embedded into a Master of Education curriculum for five years. Graduates of this degree program are classroom teachers, and some have leadership positions in education. The aim of this article is to report findings of a research project investigating continued use of the Master of Education ePortfolio processes; it ascertains whether the ePortfolio capstone task was an effective means for students to: draw together key elements of their study within the Masters program; and to reflect and identify changes in philosophy, thinking, or practice in professional work. Finally, the project studies whether recognizing the skills they used to create the ePortfolio encouraged the students to use those skills with their peers and colleagues or in teaching situations. The research took a Case Study approach, collecting graduate interviews and capstone ePortfolios. Analysis provided details about effective aspects and processes that embedded the ePortfolio into the higher degree program. ePortfolio curriculum and design require considerable planning if academic educators are to support the use of ePortfolios in Higher Education.

Several degree programs at Charles Sturt University (CSU) in Australia include embedded ePortfolios. ePortfolios for the purposes of reflection, development, showcase, and assessment have been valuable in individual courses; however, several program directors have understood the value of collecting evidence of learning over time and have embedded progressive and purposeful stages in curriculum design through ePortfolio in order to scaffold and steer students to optimally present themselves to their professional peers during the transition from student to graduate. CSU, a "National University for the Professions" (CSU, 2012, p. 3) with campuses located mostly in rural New South Wales, has a strong online presence for distance and blended learning. The research project that is the topic of this article relates to the profession of Education, within the university's Faculty of Arts and Education. ePortfolio learning design has been embedded into a Master of Education curriculum since 2011 by specifically introducing a reflective and assessment ePortfolio into the beginning of the program and returning at the conclusion of the program with a capstone reflection and development ePortfolio. The curriculum in the program provides advanced skills for already accredited teachers. All students need an undergraduate Education degree as a requirement for enrollment. Therefore, students entering this master's degree program are usually classroom teachers, and some have leadership positions as professional educators.

In the existing master's degree, all students undertake a compulsory first year course entitled Education as a Profession in the 21st Century, which expects students to "reflect on their new understandings and learnings through the lens of their own contexts, experiences, and beliefs . . . [and to] use ICTs and digital technologies to support learning . . . in the preparation of an ongoing ePortfolio"

(Laughlin, Major, Munday, & Tinkler, 2011). Students then choose courses from a number of specializations before completing a final capstone course titled Reflecting on Education as a Profession in the 21st Century, which completes the ePortfolio with "substantial reflection . . . [including] the changes . . . within their practices" (Munday, 2012). The higher degree program takes two years to complete.

ePortfolios take considerable effort and time by their academic creators, and need careful learning design by curriculum architects. However, the final or progressive outcome yields positive changes in thinking and practice, because ePortfolios can have different purposes within a degree program: they enable the creator to demonstrate development of professional skills; to provide evidence of reflective practice; to showcase exemplary work; and to provide a well-designed web-based document for assessment.

The main aim of this article is to report on findings of research that investigated whether the outcomes and skills learned in a Master of Education ePortfolio led practicing teachers to continue using the skills, and whether they used ePortfolio processes, techniques, and skills in the classroom with young children or in their professional workplace.

Theoretical Framework

The embedded ePortfolio in the MEd program is based on Constructivist theories of learning (Dewey, 1965; Ernest, 1995; Honebein, 1996; Jonassen, 1994; Lebow, 1993; Piaget, 1971; Vygotsky, 1978; Wilson & Cole, 1991). Xamani (2013) described this way of learning as enabling

students to construct knowledge, integrate it, and transfer it to new situations, taking their prior

knowledge and experience as a basis, and to benefit not only from interaction and collaboration with their teachers and peers, but from a wide range of resources to develop their critical thinking, among other key competencies. (p. 3)

Since the students are already in the field or profession of education when they enter the Master's degree program they have a wealth of experiences from which to draw as they embark on their higher degree studies. The online degree program aims to enable the sharing of expertise and experience through synchronous and asynchronous engagement with educational leaders and peers. CSU prides itself on its leadership in online learning in Australia and has created an Online Learning Model, which strives to increase student engagement (CSU, 2017). Students are given reflective opportunities throughout the master's degree (Schön, 1987), and are asked particularly to reflect on the way they see themselves as professional practitioners as they enter and conclude the program, in order to critically demonstrate the development of their skills and knowledge throughout the learning process. Students also measure themselves according to professional standards in order to demonstrate that "as professionals, teachers need to engage in reflective practice to critically think about their skills and knowledge . . . and become an active member of learning communities to meet their professional needs" (Australian Institute for Teaching and School Leadership, 2014).

ePortfolios: Context at CSU

At CSU, Education ePortfolios were initially introduced as collections of work in single courses where the academic teacher understood the value of students providing evidence of their learning along with the reflection of a meta-narrative (Keppell & Munday, 2010). To maximize the value of electronic portfolios and their different purposes, they have been embedded in education degree programs where developmental assessment and reflective skills can be showcased at various strategic points of the degree, climaxing at the conclusion with employability or promotion of higher knowledge as the goal.

In 2010 a national review of ePortfolio use by Australian university students described the extent to which ePortfolios were being used in universities as "patchy" (Hallam & Creagh, 2010, p. 186). In the intervening years, there has been a more consolidated uptake of ePortfolios purposefully designed within higher degree programs, with researchers paying more attention to the opinions of students regarding their value in university programs (Birks, Hartin, Woods, Emmanuel, & Hitchins, 2016).

The design of the embedded ePortfolio in the Master of Education degree was intended to enhance students' skills in the online space and in a dedicated ePortfolio environment. CSU uses Pebble Pad® as its ePortfolio environment, and students are able to use reflective and documentary tools within the environment as well as collect artifacts of their learning. The embedded ePortfolio tasks in the aforementioned program enabled students to acquire and enhance several skills as they are required to demonstrate the requirements for reflective practitioners "who have the skills and attitudes that are needed to meet the demands of professional audit, appraisal, and professional revalidation" (Cotterill, McDonald, Drummond, & Hammond, 2005). Graduands of the program needed to consider how to design an engaging web presence with a convincing narrative around their personal learning; demonstrate their abilities as reflective practitioners; provide evidence of development of learning and skills from the beginning of the master's degree program; and, showcase best examples of their practice in the capstone assessment submission.

The design of the learning materials in the master's degree had positive and altruistic motives, so it was important to undertake evaluative research to ascertain whether the assumptions underlying the learning design were valid. Course designers assume that students will understand and recognize that they have gained new skills through the creation of the ePortfolio, and there is an expectation that students, through their understanding of the value of these skills, will transfer that knowledge and understanding to children or peers with whom they work in their professional careers. However, as a study conducted in the University of Mississippi (Cummings, Forgette, Goldberg, Krueger, & Myatt, n.d.) reported as a main finding, that ePortfolios "serve as a condition for the transfer of learning" (p. 1), rather than an assured outcome. Therefore, it was important to investigate whether the intended progression of outcomes were occurring in this higher degree program.

The Research Participants

In order to enroll in the Master of Education (MEd) degree, prospective students must have an undergraduate degree in education. Many research participants who completed the MEd with CSU reported they had completed their undergraduate study some time before enrolling in the higher degree program, and many had been classroom teachers or professional educators for at least several years. The MEd has been designed and created for online learning, which means that student cohorts consisted of Australians working nationally and overseas and

Table 1

Number of Students Graduating From the Master of Education Program Over the Past Five Years

	2012	2013	2014	2015	2016
No. of students	122	111	106	148	96

international students or residents from countries other than Australia.

Several participants were already leaders in the profession of education, whilst others aspired to be leaders or had recently been promoted to a leadership position and expected the higher degree program to assist with development of their leadership capabilities. Many students said that they felt they had reached a point in their profession where they needed to know more about learning, and since the Master's degree catered for knowledge specializations, many were keen to learn more about a specific aspect of knowing, such as Literacy, ICT, and Educational Research.

ePortfolios: Context in Previous Research

Many studies of the effectiveness of ePortfolios in Higher Education degrees are currently in progress; however, some findings are already apparent, and early studies have highlighted the need for sustained technical support to make both academic teachers and students capable of managing the virtual nature of the online environment competently (Allan & Cleland, 2012). Curriculum designers and employers have perceived portfolios from the view of early hard-copy versions used to showcase their work, but ePortfolios are more complex in nature. The provision of online Personal Learning Spaces means that students can collect a variety of file formats and provide convincing narratives around the artifacts of their learning (Matthews-DeNatale, 2014). At the same time, Higher Education institutions are expected to assist their graduates to be more competitive in over-subscribed professions, and accrediting agencies are moving to accept electronic portfolios of evidence to allow entry to professional status or as proof of higher abilities for leadership positions (Mayowski, 2014).

The issues cited above were uppermost in the minds of the designers of the embedded ePortfolio in the CSU Master of Education degree. The choice of Pebble Pad as an ePortfolio environment gave the users a suite of tools and flexibility of design for web-based assessment tasks. Pebble Pad have continued to improve the intuitive nature of their online environment and have provided graduates with ongoing access to their artifacts and creations beyond graduation, thereby enhancing the possibility of evidence of skills developed over time for professional practitioners.

The assessment tasks within the MEd program supported students in reflecting deeply on their values and beliefs about education and learning, and enabled the collection of various types of evidence through file-types more conducive to the online space, such as images, audio, and video. The flexible nature of the forms of evidence and the ePortfolio environment meant students could purpose and re-purpose artifacts of learning for different viewers or assessors. For example, the viewers of the graduating capstone portfolios might be academic assessors as well as potential employers, accrediting bodies that judge leadership potential, or peers and colleagues who could benefit from shared understanding of the graduate's learning.

Method

The research is a single case study because ePortfolios created by these master's level students "are simply less amenable to more superficial measures and tests (or indeed any substantive form of quantification)" (Willis, 2014, para. 14). The case is a single-case study in which graduate interviews and their capstone ePortfolios are the units of analysis (Yin, 2014). Graduates of the Master of Education program were chosen for the case study because after completion of their degree, they were in a position to give objective reflection when responding to interview questions and could discuss the contents, design, and construction of the ePortfolio. Denscombe (2007) reminded us that case studies can be used for theory-testing and it was important to ascertain whether the ePortfolio capstone task was an effective means for students to do a number of things: draw together key elements of their study within the master's program; provide them the opportunity to reflect and identify changes in philosophy, thinking, or practice in their professional work and, ultimately, whether recognizing the skills they used to create the ePortfolio encouraged them to use those skills with their peers, colleagues or in teaching situations. For this research, all graduating students from the past five years of the master's degree program were sent emails in the year following their graduation, inviting them to participate in the study and have their ePortfolio analyzed; they were also invited to express interest in having a (virtual) meeting and interview, with the ePortfolio as the topic of discussion. Table 1 shows the numbers of students graduating from the Master of Education program for each of the past five years.

From all the invitations, 105 graduates responded and agreed to provide their ePortfolios for the study,

including those who were interviewed. The ePortfolios included embedded images, linked photographs, and videos, and were very rich sources of data due to their reflective nature and collections of evidence of developed skills. Thirty interviews were conducted by Skype or by telephone, 10 in 2012 and 2013, five in 2014 and 2015, after which interview data-saturation was deemed to have been reached (Daly et al., 2007, p. 47)—no further "thickness" of interview data was required due to the "richness" of the ePortfolios themselves (Fusch & Ness, 2015, p. 1409). An equal number of males and females were interviewed, which reflected the general enrolment in the degree program.

Langan-Fox, Armstrong, Balvin, and Anglim (2002) tell us that "self-regulatory processes are critical determinants of performance and of the development of competencies . . . components of self–regulation include self-monitoring and self-evaluation" (p. 109). The capstone ePortfolios provided a wealth of information in this regard as students were asked to reflect on changes in their abilities as professional educators after engaging with specified learning in an almost personally devised higher degree program of study. Personal recognition that they had acquired the specific skills of ePortfolio production at the time they were creating them were not included in the reflections for the capstone ePortfolio. Some of these skills were "organization, collecting and classifying of evidence; utilization of tools and reflection *on* and *in* discipline specific knowledge, learning and tasks; higher order thinking such as synthesis and evaluation of learning" (Rowley & Munday, 2014, p. 83). It was therefore deemed appropriate by the researcher to ask graduates to be interviewed and consider questions that re-reflected on their learning, particularly in regard to the ePortfolio.

The interviews were conducted using the methodology employed in the LEX (Learner Experience of e-Learning) project (Mayes, 2006), because this method captures the "affective, social and cognitive aspects of the student experience" (p. 4) and uses "the idea of 'interview plus,' where an artifact is used to initiate and guide the dialogue" (p. 8). The artifact in this research study was the capstone ePortfolio of the graduates being interviewed.

Since the higher degree program is conducted wholly in an online space, the students are dispersed and located anywhere in Australia or overseas, so the interviews were conducted via telephone or Skype, and arranged to suit the time zone of the interviewee. The interviews were conducted with consenting participants from graduating cohorts between 2012 and 2015. There has been academic discussion regarding how many interviews are enough for a qualitative study (Baker & Edwards, n.d.; Guest, Bunce, & Johnson, 2006), and there are varied views. In the case of this research study, it was deemed that the number should be

"practical to conduct within [the] given time and financial constraint," whilst "any more . . . would have produced too much data to analyse adequately within the given time frames" (Shah, n.d.). Therefore, 30 interviews from the assenting participants were deemed sufficient to provide a reasonable cross-section with regard to age, position, gender, and nationality; in addition, as mentioned above, saturation point had been reached by the time 30 people had been interviewed. All ePortfolios were collected from graduates who agreed to allow them to be collected for analysis, including the 30 participants who were interviewed. The interviews were semi-structured, with the same questions asked at the beginning of the interview, followed by unstructured questions regarding their individual and specific experiences. The set interview questions are included in the Appendix.

The data was coded and analyzed using qualitative content analysis with a summative approach (Hsieh & Shannon, 2005). Structural and Emotional coding were used because while there were specific interview questions with regard to the participants' self perceptions of skills and transfers of skills, it also seemed important to code for emotional words and responses due to the investment of time and effort the ePortfolio required of a student as a capstone assessment before graduating the program of study (MacQueen, McLellan, Kay & Milstein, 1998; Saldana, 2013). In this article, results from the interview questions will be discussed and examples provided in the next section as a way of presenting the outcomes of qualitative research (Burnard, Gill, Stewart, Treasure, & Chadwick, 2008).

Results and Discussion

Preliminary findings of the study (Munday, 2014) showed that the ePortfolio processes used in the master's degree program were highly successful and that many of the graduates were using their learned skills in their professional work as classroom teachers and leaders of education. After coding the interview transcripts and analyzing the emergent themes, the recurrent themes were grouped and clarified as shown in the following paragraphs: (1) ePortfolios lead to better teaching outcomes; (2) ePortfolio skills are frequently transferred to classroom practice; (3) ePortfolios encourage the use of learner-centered technologies in teaching practice; (4) ePortfolios enhance metacognition by pinpointing moments of change; (5) ePortfolios convince and inspire others when shared; and (6) ePortfolios enable deeper explanations of "self" and development over time.

ePortfolios Lead to Better Teaching Outcomes

The interviewees consistently reported that they recognized the skills of ePortfolio and continued to use

them in their professional work: "It's good to have access and be able to look at different things along the way, of challenging how I think, and then I've used that to challenge how other people think" (Graduate C Interview, 2013). As part of the assessed ePortfolio, reflective questions were given that required students to consider their learning and the impact of that learning. The reflections were deep and thoughtful, with clear evidence of impact:

> The formal learning in which I have been engaged in throughout the Masters program has strongly influenced my teaching practice and my personal growth. It is with awe that I reflect on all these changes that have impacted on me [*sic*] thus far, yet look forward to engaging in further informal learning as I continue to implement and evolve as a teacher and learner. (Graduate A41 ePortfolio, 2014)

The tools, or collection of reflective tools, within the ePortfolio environment were noted as providing potential for the students of graduates. For example, one student said, "The realization that the use of [this] technology can be used as a tool to . . . augment what learning looks like . . . and redefine the learning experience, potential engagement and skill development possible for my students" (Graduate V Interview, 2015). This finding is in agreement with Foti and Ring (2008), who reported that students' experiences are augmented in a revolutionary way by the new tools of technology and ePortfolio environments.

ePortfolio Skills are Frequently Transferred to Classroom Practice

Parkes, Dredger, and Hicks (2013) have highlighted the need to help students understand the nature and purpose of the ePortfolio, which meant the interviewees were being asked to re-reflect not only on their learning but also on the ePortfolio itself, and to recognize and explain the needed abilities to create, arrange, and narrate the outcomes, as well as consider whether these skills were explicitly being taught in their current classrooms or teaching environments.

One interviewee who had been teaching in several international schools in Europe, and at different grade levels, noted:

> They all use Google docs . . . I'm teaching Grade Three at the moment . . . they all have their own Blogs and they gather evidence throughout the year of their learning journey and at the beginning of the year they set goals for themselves and they have to provide evidence digitally, like a digital portfolio type of thing that they use to show their learning

throughout the year and then they reflect on that and then what is really powerful is that the community like parents or people in the classroom or anyone could go on and they write comments and reflect on it. So yeah for sure . . . a big part of the school and of the classroom. (Graduate D Interview, 2013)

This participant has clearly recognized the metacognitive processes and their value in children's learning. Other participants were able to reflect on this aspect of their learning and to understand that the transfer came not only from products but also from understanding the processes and skills. For instance, one student wrote, "It requires knowledge of yourself as an educator and your beliefs. The educator's role is to prepare students for lifelong learning and give them the relevant skills to participate in society" (Graduate W82 ePortfolio, 2015).

ePortfolios Encourage the Use of Learner-Centered Technologies in Teaching Practice

This case study was qualitative research; however, all of the interviewed graduates were able to provide meta-reflections on the skills of ePortfolio and articulate to what extent the skills were being used in their current professional practice. The meta-reflections in this case agree with Walton, Gardner, and Aleksejuniene's (2016) definition and discussion, in which meta-reflections consider previous reflections and the participant is able to give an indication of a change in understanding or experience. Walton et al. (2016) also found that only half the students in their study "thought that the time spent on the ePortfolio reflections was appropriate and worthwhile" (p. 125). Of the 30 interviewees in this study, only four made a reference to the extra time needed to complete the capstone ePortfolio, and those four also made a point of stating that they were fairly new to online study when they commenced the higher degree program and were still in the process of becoming confident in the use of technological skills. For instance,

> My goal was to improve my leadership and I think that technology is a tool, and I use it for a tool that improves what I do as a leader . . . Technology is not necessarily, is part of it but not a major component. (Graduate T Interview, 2013)

The other participants were very positive about technology tools and an online platform for ePortfolios and other spaces for higher order thinking and adapting of traditional practices. For example, one student noted,

> My perspectives have changed now because of my recent experiences of teaching and guiding my

colleagues . . . I have been challenging myself and others to teach by evolving traditional instructional strategies which embrace technologies and engage students in active learning. (Graduate T9 ePortfolio, 2013)

ePortfolios Enhance Metacognition by Pinpointing Moments of Change

The requirements of the capstone ePortfolio included reflecting on learning over the period of the master's degree and identification of specific milestones of learning that produced change. Change in these examples is as described by Carson, McClam, Frank, and Hannum (2014), "in practice, change in competence of practice, change in identity, change in behavior, change in ideas, and change in the meaning-making process" (p. 75). Two student quotations highlight this. First, one student noted,

One particular reading stands out . . . opened my eyes to the way in which change is approached . . . From this I have taken it upon myself to . . . try and see situations from differing perspectives . . . in day to day conversations with staff and students alike. (Graduate S93 ePortfolio, 2015)

A second student wrote,

To begin to describe my learning would be to say that I have experienced significant changes to my understanding of leadership. One of the defining moments in my learning was understanding the difference between management and leadership whilst completing the Mapping the Field of Education . . . Reflecting on this was transforming because I decided to move into curriculum management as opposed to a principal position. (Graduate M12 ePortfolio, 2015)

These two quotations demonstrate the ePortfolio's reflective capacity for making thinking visible with regard to the recognition of milestones in learning (Johnsen, 2012). Reflecting in this metacognitive way helps the ePortfolio creator consider their internal feelings and their own ideas, leading to a change in the "sense of self" (Rowley & Munday, 2014, p. 79). Another student noted, "I reflect back on the idealistic perceptions I had of teaching, myself and the students at the commencement of the Masters program, and recognize the significant journey on which I have travelled, intellectually, emotionally and intrinsically" (Graduate W82 ePortfolio, 2015).

ePortfolios Convince and Inspire Others When Shared

The ability to re-design and re-create versions of ePortfolios for different audiences is one of the advantages of an electronic portfolio in comparison to a hard copy version. Eynon, Gambino, and Török (2014) found that well-designed ePortfolios shared with authentic audiences "help deepen faculty, staff, and institutional learning" (p. 108). During the interviews, the participants were asked if they had an opportunity at any point to share their ePortfolio with people other than the academic assessors in the master's degree. For instance, one student said,

Linking it to a leadership theory or a strategy if you like and I found that being able to demonstrate improvement in that and then showing it [the ePortfolio] with those links . . . rather than just be rabbiting on about you know I've done all these things. I think it shows what a difference that's made to me as a leader and ultimately the school outcomes. (Graduate A Interview, 2012)

Similarly, another student explained, "I share my learning with staff and encourage them to pursue professional growth as well as try new practices" (Graduate J102 ePortfolio, 2015). A third student noted,

Maintaining my own reflective blog is an important step in the reflective process, but I think it is also equally important to share your own knowledge (and reflective process) with others. The Internet is a fantastic tool for the 21st century teacher. (Graduate L91 ePortfolio, 2015)

Whilst in the master's degree program the students engage in dialogues about topics and challenges in discussion boards and are encouraged to share the artifacts and evidence of learning with their peers. Those who engage fully with these opportunities attest to the benefits of collaborative comment and criticism in enhancing the quality of their work, and as Chau and Cheng (2010) observed, they are "active agents involved in constructing knowledge, refining their understanding, and learning socially through sharing with peers and teachers" (p. 933).

Whilst several participants agreed they shared their ePortfolios with others, all students were required to address key professional standards in the capstone assessment portfolio. Submitting such reflection and evidence to academic assessors and receiving feedback on this material strengthened the students' abilities to present convincing arguments to accrediting bodies and promotional boards. One student noted,

It is by looking at the Teacher Standards, as prescribed by the UK government, that I can truly reflect on my journey through the MEd program . . . . Throughout my Masters journey I have grown significantly in my knowledge of, and experience with, educational information technology. I have matured in my understanding of educational theory and feel I can now demonstrate this knowledge in a far more constructive and skilled way. (Graduate B83 ePortfolio, 2015)

ePortfolios Enable Deeper Explanations of "Self" and Development Over Time

An unexpected outcome that was observed by the author once students began to submit their capstone ePortfolios at the completion of the master's degree was the power of metaphoric or symbolic images to assist students to give deep explanations about themselves as professional teachers, both at the beginning of the degree program, and then regarding the changes over time within the capstone. This has been a topic of discussion and further research since the depth of reflective explanation has been impressive (Munday & Rowley, 2017; Rowley & Munday, 2014).

In the commencing course in the master's degree, students are required to find or create an image as a metaphor or symbol of themselves as a professional educator in the 21st century; in the capstone course, students are asked to re-reflect on the first image and, if necessary, to provide another that is more appropriate after their subsequent learning. No student remains content with the initial image, and they can describe deeply the changes in themselves that the images illustrate. For example, one student wrote,

As I've transitioned through the Masters program, it has become apparent that my thinking and learning have evolved significantly, resulting in me needing to select a new image as a metaphor for myself, the teacher, learner and evolving individual. I have experienced some defining moments . . . and have evolved my way of thinking about teaching and learning in such a way that my teaching practice will be forever transformed and progressive. (Graduate A95 ePortfolio, 2015)

As another example, a second student wrote,

As I approach the end of my master's journey, a new metaphor that represents this learning journey is a symbol of a leaf-shaped butterfly. Symbols of butterflies often represent freedom and emancipation—here I use it as a metaphor to represent the skills, knowledge, and expertise that has

been gained and the confidence to now spread my wings and go forth. (Graduate B83 ePortfolio, 2015).

Brandes and Boskic (2002) undertook a study of the written metaphors students used in ePortfolios. They concluded their report with an encouragement to "educators to use metaphors and hypertexts, as well as other ways, to enhance deeper reflection that shapes ePortfolios so that they are not just the compilation of artifacts, but occasions for learning" (p. 10).

Implications of the Study

The CSU Master of Education is currently undergoing its cyclical review process. The ePortfolio will be further embedded into the curriculum design in the revised version. There are two main reasons for further embedment: the success of the existing ePortfolio; and new, updated criteria for practicing teachers in Australia, who need to provide specific evidence of expertise and knowledge of classroom teaching abilities. Even though the MEd attracts international students, the requirements will need to be addressed, and so professional standards will be more stringently adhered to in the capstone submission.

Research into the embedding of ePortfolios into higher degree programs shows that purposeful planning in curriculum design is the most effective way to use ePortfolio processes, skills and purposes (Rowley, 2017). The recognition that ePortfolios are much more complex in nature than an electronic resume is being endorsed by the number of Higher Education Institutions that realize the benefits of students collecting evidence of learning from the very first moment they enter a degree program and of expending academic time and expertise on their careful and integrated design.

The danger with overprescribing the contents of an ePortfolio by an institution or accrediting body is that it may become an online list of items to be checked off, rather than a complex reflective and developmental narrative that provides personal and professional insight. Devlin-Scherer, Martinelli, and Sardone (2006) explained that the product will provide shallow or missing work unless the learning design is supported and "tied back in to the original teaching objective" (p. 401). Therefore, investment in good curriculum and learning design to enable students to demonstrate a change in their development is essential, and regular review and evaluation of courses and assessments needs to be undertaken.

Conclusion

ePortfolio curriculum and design require considerable planning, and students are asked to dedicate time and effort to learn how to manipulate artifacts and narrative to present

a convincing and effective professional portfolio. If academic educators are to support the use of ePortfolios in Higher Education, it is important to research and collect data to demonstrate the value of the time and effort from the academic teachers' design, as well as students', in creating them. In this study, it has been shown that a carefully designed, embedded ePortfolio in a Master of Education program can support a number of positive, and in many cases, transformative learning experiences, including: (a) reflective practice in ePortfolios leading to better teaching outcomes in classroom practice; (b) the skills learned through creating an ePortfolio being transferred to use in the classroom and taught to students in learning environments; (c) the online technologies of ePortfolio having the potential to change teaching practice in both the online and classrooms; (d) the reflective nature of ePortfolios enabling the creator to identify moments of change in their personal and professional thinking and learning; (e) the ability to share an ePortfolio with different audiences offering opportunities for shared learning and understanding; and (f) the use of metaphors and other images enabling deeper reflection in the creation of individual narratives for personal and professional "selves."

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Appendix
Interview Schedule

1. In looking at your ePortfolio, can you tell me anything about the way(s) you went about designing or structuring it?

2. You have included an image as a metaphor. Can you tell me how you came to decide on that image? (If the image from the beginning ePortfolio has been included, a question about contrast can be used to follow-up). (If the ePortfolio has other images some questions or comments may be asked).

3. How did you feel about putting together your ePortfolio for **assessment**, at the end of your Master's degree?

4. Can you talk about the ePortfolio, and the tools in the ePortfolio environment, as effective or not, for **reflective** practice?

5. Were you able to demonstrate that you'd **developed** in skills and knowledge in the ePortfolio? (Look at the relevant sections and ask them to comment).

6. Was the ePortfolio a vehicle for you to **showcase** your best work? What kinds of evidence did you provide?

7. Have you shared your ePortfolio with anyone other than the academic assessor for the Master's degree? Have you re-used any other parts of the ePortfolio, or your collected artifacts, since submitting the ePortfolio?

8. The creation of the ePortfolio took a lot of work: what skills did you need to use, or learn, in order to fulfil the assessment requirement?

9. The skills you've identified (name them)—do you use these regularly in your professional teaching?

10. (If affirmative to the last question) Do you teach the use of these skills in the learning spaces in your professional teaching?

11. Do you teach these skills through the implementation of an ePortfolio?

ePortfolio Assessment as Faculty Development: Gathering Reliable Data and Increasing Faculty Confidence

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An ePortfolio Assessment Institute (AI) structured as a faculty development opportunity was undertaken to increase faculty confidence in teaching and assessing ePortfolios and to collect reliable data about student performance on four learning outcomes associated with an institution-wide ePortfolio initiative. Faculty raters participated in the two-day AI and received more than a day of training to use a summative rubric consistently. Faculty were asked to rate their own confidence in teaching and scoring each of the outcomes before coming to the AI and at the end of the AI. Generalizability-theory was used to estimate rater pair consistency. After establishing that the data were reliable, we analyzed the data to reveal a wide range in performance across ePortfolios. The survey of faculty showed statistically significant improvement in confidence across both teaching and evaluating for all outcomes. The study thus demonstrates that structuring an AI as a professional development activity increases faculty confidence in teaching and assessing outcomes related to ePortfolios. The study also demonstrates that ePortfolio initiatives can be successfully assessed even if commercial platforms that standardize and privilege assessment are not used and the ePortfolios themselves remain in the control of students rather than the institution.

ePortfolios have recently been named by the American Association of Colleges and Universities (AAC&U) as a high-impact practice (HIP) because of the substantial evidence that they have an impact on student learning across a number of domains (Watson, Kuh, Rhodes, Light, & Chen 2016). For example, Buzzetto-More (2010) demonstrated that ePortfolios allow students to synthesize their learning experiences, connect their course work to real world practices, consider what evidence demonstrates their skills and abilities, and compose reflective descriptions that build metacognition. As Watson et al. (2016) point out, however, "the keys to employing ePortfolios as a HIP are effective implementation and integration" (p. 67). Professional development activities that support faculty as they integrate ePortfolios into the curriculum are essential to both implementation and integration (Eynon & Gambino, 2016).

Because the process of creating an ePortfolio can have an impact on students, our public, higher-research activity, land-grant university enrolling a total of 28,000 students in undergraduate, professional, and graduate programs chose ePortfolios as the Quality Enhancement Plan (QEP) for our Southern Association of Colleges and Schools Commission On Colleges (SACSCOC) reaffirmation in 2013. Because we knew the importance of faculty involvement in implementing ePortfolio thinking throughout the curriculum, we designed our ePortfolio Project (hereafter Project) to include significant attention to faculty development and support (Bhika, Francis, & Miller, 2013; Hoekstra & Crocker, 2015) through a Faculty Cohort, essentially creating a Faculty Learning Community (FLC), a structure that has been shown to have a positive impact on student learning (Herman & Crowley, 2014; Jetton, Cancienne, & Greever, 2008; Smith et al., 2008) and on

faculty (Cox, 2013; Cox & Richlin, 2004; Nadelson, 2016; Wagner et al., 2015).

From the beginning, our vision has been to provide students and faculty alike with a rich learning opportunity. For students, ePortfolios create an occasion to reflect on curricular and co-curricular experiences, discover common threads throughout those experiences, and articulate the meaning and significance of those experiences to themselves and professional audiences in a holistic way. Creating this kind of ePortfolio allows students to practice the higher order thinking of synthesis and evaluation (Peet et al., 2011). For faculty, ePortfolio implementation invites consideration of what students from their program should be able to showcase, where the skills they expect students to demonstrate are taught, where students receive feedback that guides and redirects them, and where individual courses overlap and connect to contribute to the educational experience. Structured to encourage such reflection and collective conversation by faculty, an ePortfolio initiative creates an opportunity for faculty to reconsider programmatic priorities and values and then to reexamine the curriculum to discern the extent to which it aligns with and supports those priorities and values. For instance, if faculty members determine that they want graduates from their program to demonstrate an ability to communicate to different kinds of audiences, then faculty are forced to consider where in the curriculum they are teaching students to do such work and giving them opportunities to practice before expecting masterful performances. ePortfolios are both a process and a product, and we believe that the reflective work that happens throughout the process of both creating

ePortfolios and implementing ePortfolio thinking is valuable, whether or not external audiences look at the ePortfolio-as-product.

Many universities that have begun ePortfolio initiatives use ePortfolios as an assessment tool (e.g., see the descriptions at http://c2l.mcnrc.org/category/campus-stories/outcomes-assessment-stories/). Because their focus is on other learning outcomes—often those of general education or required for professional certification—ePortfolio initiatives that focus on assessment usually ask that students include similar documents, limit the design decisions that ePortfolios can invite, and may give less attention to the value-added experience of composing the ePortfolio or the curricular and pedagogical adjustments that ePortfolios can require of faculty. Such assessment-driven ePortfolios can be seen by students and faculty as bureaucratic requirements rather than opportunities for additional learning. Assessment-driven ePortfolios are typically "owned" by the institution so that they remain stable over time, and if students want to use their work for an external audience as they seek post-graduation employment or entry into advanced studies, they must often construct a separate ePortfolio that can remain in their own control. Though ePortfolios can have the additional benefit of exposing students to issues of professional identity, conventions expected by different professional audiences, and issues of visual, technical, and ethical literacy, they do so best when the ePortfolio is framed as a vehicle for representing themselves and their learning experiences to a professional but external audience. But professional identity, audience expectations, and the ethical literacy at play in crafting an integrated and professional representation are complicated issues which are more difficult to manage when assessment is privileged over individual choices because the difficult decisions students need to make are too often stripped away in the name of stability or consistency of assessment data.

In choosing outward-facing, integrative, professional ePortfolios as our institution's QEP, we opted for:

- privileging student choice and ownership over ease of assessment;
- using free platforms rather than expensive ones that claim backend assessment functionality but limit individual choices;
- encouraging the creation of unique professional identities instead of requiring standard templates that promise to make evaluation more consistent;
- inviting faculty in all disciplines to think through the messiness of teaching both visual literacy and the ethical considerations introduced when digital technology is made public whether or not they think of their discipline as visual or requiring advanced technical skills; and

- asking faculty and students alike to reconsider what they think about effective communication and critical thinking when the audience is both public and professional but not necessarily academic.

We admit that ePortfolios created as professional but personal websites controlled by individual students raise difficulties for institutions needing to assess these sites as evidence of student learning. In choosing to privilege student learning and student ownership, we also chose to grapple with those assessment challenges as additional opportunities for faculty development and engagement. We do not regret the choices we made, and in other contexts we have provided evidence that our Project has supported both effective implementation and integration into the curriculum (Bartlett, Stuart, Owensby, & Davis, 2016). We believed initially that faculty in the disciplines would be able to evaluate their students' ePortfolios using their own deep understanding of disciplinary expectations and their familiarity with the careers their students pursued. We assumed that faculty would generate assessment data for our Project by including in their evaluations the learning outcomes we had identified as most connected to the choices students would make in creating an outward-facing, integrative, professional ePortfolio, namely: critical thinking through reflection, visual literacy, technical competency, and effective communication. But as our Project developed, we recognized that the assessment data we were able to collect from departments were problematic. This article describes how we reorganized our assessment of student ePortfolios through an ePortfolio Assessment Institute (AI) in order to generate both reliable data about student performance and as another opportunity for faculty development. We report on the evidence of our success in achieving both these goals despite the challenges of student control, individuality, and the lack of consistency caused by privileging learning over assessment. We detail here how we prepared for and organized the AI, created and then trained faculty to use a summative rubric, and produced data about student performance that are reliable. In short, we demonstrate that it is not only quite possible to assess ePortfolios and the learning objectives associated with ePortfolio projects without having a platform do it for you, but that the activity of assessment can further faculty engagement, thinking, and confidence in teaching and evaluating ePortfolios.

Background

In this section, we outline the institutional context for our Project, the work done to revise an initial rubric for assessing the four learning outcomes associated with

our Project, and the difficulties with our assessment data that led to the creation of the ePortfolio AI.

Institutional Context

Our Project was selected to be the university's QEP in part because it built on a university-wide writing initiative that began in 2010. The writing initiative was the result of a faculty task force charged with investigating more than 10 years of National Survey of Student Engagement (NSSE) data in which students consistently reported having fewer writing assignments than their peers at comparable institutions. After two years of comprehensive work, the task force recommended creating an Office of University Writing (OUW) that would help faculty embed significant writing experiences in every undergraduate major and offer students support through an expanded writing center. Departments created writing plans to integrate writing into existing courses and submitted those plans for review and approval by a faculty committee. In reviewing these plans, it became clear that many programs were asking students to complete multimodal writing assignments, synthesize learning experiences in capstone-type courses, and in some cases, create a personal website or portfolio. Unfortunately, little infrastructure existed to support faculty and departments in these efforts. Our Project thus aimed to:

- build on existing efforts;
- expand the ways that the writing initiative had already begun to address the institutional concern that more attention to communication skills was necessary; and
- provide additional support for faculty as they embedded ePortfolios and the reflective writing such personal websites require throughout the curriculum.

We chose to focus our Project on integrative, outward-facing, professional ePortfolios that students would complete by the time of graduation, but because of the diversity of programs in our institution, we built in structures that would let programs use ePortfolios in a variety of ways. Some programs join our Project as they begin to think about whether ePortfolios would be useful to their students and their curricular objectives. Other programs join when they have already decided to require students to complete a senior ePortfolio. Programs also join with different numbers of faculty involved in integrating ePortfolio thinking into the curriculum, guiding students in producing ePortfolios, or assessing the results. Our Project is opt-in, and students who want to complete an ePortfolio but who are enrolled in a major that has not joined our Project, have the support of the OUW—which serves as the

administrative home for the Project and offers programs for faculty and students—as well as the Career Center, the Writing Center, and the Media and Digital Resources Lab.

Student Learning Outcomes (SLOs)

In developing our Project, we drew on examples from other institutions and the research conducted by the Inter/National Coalition for Electronic Portfolio Research (ncepr.org). Because we were committed to using ePortfolios as an additional learning experience rather than as a tool to measure learning experiences that happened elsewhere, we identified outcomes that would happen as a result of creating an ePortfolio and settled on four student learning outcomes: (1) critical thinking through reflection, (2) visual literacy, (3) technical competence, and (4) effective communication. For our on-site SACSCOC visit we prepared an initial rubric for these outcomes modeled loosely on the AAC&U's Valid Assessment of Learning in Undergraduate Education (VALUE) rubrics (see AAC&U, 2017). This initial rubric was treated as a beginning point and programs that joined our Project were actively encouraged to make it more specific to their needs or expand it to include additional items. As our Project grew and faculty learned more about the kind of thinking ePortfolios encourage, our outcomes began to have more specific elements. When faculty engaged in conversations about the examples students produced, we began to distinguish not only the different outcomes and the elements within those outcomes, but different levels of performance, as well. Effective communication, for example, initially seemed to mean everything and too often relied on the reader understanding the content of specific documents or artifacts students included rather than on effective communication across the entire ePortfolio. Over time, effective communication began to reference more regularly the consistency of choices for a chosen audience and the creation of a coherent story that provided evidence via the artifacts chosen to support claims made by the student author about their experiences and skills. Critical thinking through reflection likewise narrowed to refer not to every choice the student made, but only to the way in which reflective thinking was made visible in the contextual prose students wrote for the artifacts they included.

Revising the Project Rubric

As our Project grew, it became clear that programs in our faculty cohort were handling assessment in very different ways. We thus undertook a systematic process to observe program-level assessment of ePortfolios, including talking with faculty responsible for assessing ePortfolios and

reviewing program modifications to the initial ePortfolio rubric. We noted that assessment practices within a program became more sophisticated as student work improved, as more faculty became familiar with ePortfolio practices, and as these faculty members had more opportunities to develop a shared culture of expectations. We used what we learned about program-level assessment practices in two different ways: first, we created opportunities for faculty to share what they were doing with other members of the faculty cohort; and second, we began to revise the initial rubric to better reflect developing expectations and deeper levels of understanding.

The initial rubric was also used by a faculty committee to recognize exemplary student work for an annual ePortfolio award, but we could see the possibilities and limitations of that initial rubric in this context, as well. On the one hand, the initial rubric created a framework for faculty from different disciplines to evaluate student work, discuss their expectations and judgments, and decide which students to recognize. On the other hand, the committee members needed training, practice, and discussion in order to use the rubric consistently. With changes in committee membership each year, a training process would help individuals understand the outcomes and apply the performance criteria to ePortfolios from very different disciplines, setting aside their own disciplinary expectations and content knowledge to concentrate on the performance across the ePortfolio. Like the faculty working to evaluate ePortfolios in programs, the awards committee was developing more refined expectations for student work, expectations that the original rubric did not always or consistently reflect.

The revised rubric, now referred to as the formative rubric (see Appendix A), went through multiple iterations during the summer of 2015 and was repeatedly tested on existing student ePortfolios. The formative rubric was also circulated among members of the faculty cohort and committee members. We asked faculty to try the rubric on student ePortfolios they had access to or on the ones we made available in a gallery on our Project website. We used the feedback to reshape both the substance of the rubric and the way it was designed, crafting the formative rubric as both a teaching tool and an evaluative instrument. The newly revised and redesigned formative rubric was launched in the fall of 2015, with faculty discussions and workshops focused on explaining the revisions, but not systematically training faculty to use it for consistent assessment.

At the same time, we were rethinking the way in which we were collecting assessment data from programs. Because assessment was being done so differently across different programs, we were uncertain that the data provided to us by programs were reliable or consistent enough to guide decisions at the university-level or to serve as adequate evidence in our mid-cycle

report to SACSCOC. In crafting the formative rubric as a teaching tool, we had included language about ePortfolio creation processes and eliminated specific behavioral anchors tied to features that could be observed directly in the ePortfolio. We worried that these choices would make the formative rubric harder to use for the purpose of consistent assessment.

In preparing for the AI, we conducted a test-day with 10 faculty and four student ePortfolios. Our goal for the test-day was both to refine the training process we would use at the AI and to test the effectiveness of the formative rubric when used by multiple raters. Sure enough, scores from the test-day did not achieve inter-rater reliability. Based on faculty feedback, we concluded that the lack of behavioral anchors in the rubric and the nine levels of performance included in the formative rubric were contributing to the lack of consistency in scores. Recognizing that a different rubric was needed to produce reliable assessment data, we undertook another rubric revision to resolve these problems and created what we now refer to as the summative rubric (see Appendix B).

Based on the outcomes and descriptors outlined in the formative rubric, we created an initial draft of the summative rubric, with only four levels of performance and observable behavioral anchors for each element. In multiple sessions during early spring of 2015, a team of four to five individuals from the OUW collaborated to draft and test iterations of the summative rubric using existing student ePortfolios. Before each session, members of the team would individually rate student ePortfolios and highlight sections of the rubric that needed more work. Each time the team met, scores were shared and the rubric was discussed and collectively revised. Conversations during these sessions included differing interpretations of meaning at specific points in the rubric, missing or incorrect language in descriptors, and individual perceptions of student work and how these impacted the evaluation scores. These discussions were also considered in relation to the test-day training session and the training planned for the AI; we knew we would need examples that would elicit rich discussion of the rubric and allow faculty to practice recognizing specific elements of the outcomes in various ePortfolios. Once the revisions of the summative rubric were complete, the team tested it on multiple ePortfolios until inter-rater reliability was achieved across ePortfolios from a variety of disciplines. Finally, the summative rubric and the planned training process was tested in April of 2016 with the Awards Committee.

Collecting Reliable Data

In addition to the problems created by a rubric that was less-than-ideal for consistency in assessment, our

processes for collecting the data that resulted from program-level evaluations of student ePortfolios were fraught with difficulties. For example:

- Though some programs had faculty collaborate to assess student work, faculty in other programs did not always agree on how (or whether) to use the rubric;
- Not all programs conducted training in using the rubric, and even where they did, not all faculty participated in these norming exercises to ensure that the rubric was being used consistently across different faculty raters;
- Programs did not submit the evaluation data in the same format; sometimes grades were submitted rather than rubric-guided scores;
- Faculty in administrative positions often assumed responsibility for assembling the data from their program and reporting it to the OUW, but changes in these department-level leadership positions meant that there was confusion about what data were needed and how these requests for data were different from other institutionally-required assessment reports;
- As our Project grew, the numbers of programs that needed to be asked for data on a regular basis also grew, but with a predictable range of positive and negative responses.

Taken together, these logistical problems created gaps in our data and a growing reluctance to trust the data as reliable indicators of student performance. We determined that an AI would be an alternative way of collecting direct evidence of student performance on our four outcomes that could resolve these difficulties. We enlisted the expertise of the Director of Academic Program Assessment to help us design the AI, modeled after similar AIs used for other purposes.

Method

Our AI was designed as a two-day faculty development event held after graduation in May 2016. Because we planned to publish the results, we sought and received Institutional Review Board (IRB) approval to recruit faculty whose programs were already participating in our Faculty Cohort and students who we believed would have created an ePortfolio since the beginning of our Project. An email invitation with a consent document was sent to selected Faculty Cohort, members chosen to reflect the diversity of disciplines participating in our Project. The faculty members who received the original email were asked to nominate another faculty member from their department whom they would like to have as their partner, preferably someone who was not already deeply involved in our

Project. These new nominees then received an invitation to join the AI in which the other person from their department who had agreed to participate was named. We thought this approach would lessen potential personality clashes because faculty would have a voice in identifying a colleague with whom they would feel comfortable and whom they felt was likely to be interested in knowing more about our Project. We aimed to deepen participation across the programs by including faculty who had not already been active in the Faculty Cohort and we wanted to see if the level of engagement of the faculty and their familiarity with our Project influenced their scores. However, we saw this first AI as merely laying the ground work for potential studies more carefully focused on faculty and their level of engagement with professional development activities connected to our Project.

Faculty participants were compensated $1,000 for completing both days of the AI. A total of 34 participants served as raters for the AI, most from programs already in the Faculty Cohort. To fill in last minute withdrawals and strengthen collaborations with other units responsible for faculty development and assessment, we included a total of five professional staff members from the OUW, including two who were responsible for leading the training, two from the Center for Teaching and Learning, and one from the Office of Academic Assessment.

To solicit student ePortfolios, we compiled a contact list of university students who met one or more of the following conditions:

- graduated between August 2012-May 2016 from a program that had joined the faculty cohort;
- attended workshops related to our Project;
- received a nomination for an ePortfolio award;
- held a leadership position as an ePortfolio Ambassador; and
- served as a writing center tutor trained to help others with ePortfolios.

A total of 705 students were contacted through their student email addresses and invited to participate. The email (Appendix C) included a link to a survey that served as the electronic consent. The survey (Appendix D) asked students to select which existing demographic data—such as major, grade point average (GPA), transfer and first generation status, scores from the American College Testing or Scholastic Assessment Test (ACT/SAT), ethnicity, gender, etc.—they were willing to have us access. The survey also asked students how they had used their ePortfolios, and when they had completed it, and allowed them to provide one or more Uniform Resource Locators (URL) if they were willing to allow us to use their ePortfolio in the AI. To

encourage participation in the study, student participants were eligible to pick up a promotional item valued at less than $5 from the OUW. In addition, each student who completed the survey link in the email was entered into a random drawing to receive a $50 Amazon gift card. A total of 79 students responded and completed the survey (11.2% response rate), with 61 students providing a URL to their ePortfolio and consenting to have it used at the AI. We identified several factors that could have led more students to answer the survey than were willing to provide us with a URL. First, students would have needed to maintain their ePortfolio after graduation, or at least remembered the URL they had used. Second, some students would have started ePortfolios in courses, but not all would necessarily have finished them. Finally, even though students had nothing at risk in how their ePortfolios were evaluated, we suspect that students need a certain level of pride in and confidence that their ePortfolios were good in order to give faculty access to them.

Before arriving at the AI, faculty raters were asked to complete a survey (see Appendix E) indicating their confidence in teaching and evaluating each of the four learning outcomes associated with our Project. The survey was designed on a 5-point Likert scale (1 = *not confident at all*, 5 = *highly confident*). At the end of the AI, raters were asked to complete the survey again, answering these same questions and providing feedback about the training and the overall experience. Faculty raters had not seen the summative rubric until they arrived at the AI, though those who had been participating in the faculty cohort had seen the formative rubric.

Because we had some faculty raters who were new to our Project and to ePortfolios, the training process included an overview of the learning outcomes associated with our Project. The purpose of the training exercises was to elicit discussion of features we had learned would create difficulties for at least some raters and to develop a common understanding of the elements within each outcome and the differences in performance represented by the rubric. The schedule for the AI is included as Appendix F. Other training components on the first day included:

- writing and discussion of the assumptions and experiences individuals have of ePortfolios to move faculty raters to set disciplinary expectations or personal preferences aside and rely on the language of the rubric;
- individual and small group work on key terms in the rubric to ensure that everyone was familiar with the rubric and had thought about the language used across the different levels of performance;
- guided practice in using the rubric with a single ePortfolio with time to read through the

ePortfolio before scoring one outcome at a time. Key points for each outcome were identified and participants were encouraged to share their interpretations and the rationale for the scores they gave;
- individual practice with an ePortfolio with raters having 30 minutes to read and score and then 50 minutes for the whole group to compare scores and discuss so that elements of the outcomes and performance levels became clearer and typical issues of difference were considered; and
- a wrap-up exercise that asked participants to consider how they might use anything that had happened in their first day in their own programs or courses.

The second day of training began with a brief discussion to answer any questions participants had and a norming session where a single ePortfolio was scored by all raters. This ePortfolio had also been scored in advance by the AI organizers and so was used as a control that would serve as an anchor score for comparative purposes in analysis. In this norming session, raters were reminded that they were allowed to give half points on the 4-point scale. Once the scoring was completed, all scores across all elements of the rubric were within one point on this norming sample.

Throughout the training process, we emphasized returning to the language of the rubric, grounding judgments in the rubric rather than in individual preferences or disciplinary expectations. For example, we were especially careful to talk about the difference in a student's statements of religious faith and the consistency and judgment in making such statements for the intended audience. The emphasis on interpretation and reading practices was confusing at first to some faculty, especially those from science, technology, engineering, or mathematics (STEM) disciplines that rely on quantitative data and who assumed that scoring with a rubric would not involve interpretations of either the rubric language or the students' choices.

Because we are interested in the learning that happens as students create an ePortfolio, we encouraged raters to see the ePortfolio holistically and to check on artifacts included in the ePortfolio only to the degree that they provided evidence to support claims or matched reflective contextualizing. We also prioritized reading the ePortfolio holistically because our experience suggested that few readers—employers or faculty—spend time with each artifact. We regularly asked faculty to set aside their disciplinary practices or assumptions to consider ePortfolios that were outside their discipline as capable of demonstrating the elements on the rubric. This was especially difficult in

the case of visual literacy, since we have many programs that are related to the visual arts or design, including studio arts, architecture, graphic and industrial design, apparel design, and interior design. Raters in these design-related disciplines are accustomed to looking for particular visual features and have strong opinions about what constitutes "good" design. On the other hand, raters who are not in design-related disciplines too often assume that students in their disciplines have nothing visual to include and little need to attend to design choices. Such faculty raters either ignore design choices or are overly impressed with any visual content.

Finally, we asked raters to see the topmost performance level as aspirational and use it only for truly exceptional performances. During the training we modeled negotiating different scores, which would be a part of the adjudication process at the end of the individual scoring, by having raters who scored above or below the majority of participants explain their thinking. We let raters change their scores both during the training and during the adjudication process, but we did not require them to do so. During the training process, however, all raters could see the collected scores during the discussion and the entire group could see where we were scoring consistently and where we were not. During the adjudication process, however, teams could see only their own scores and did not have any information about how their scores matched or differed from those of other teams.

Following the rubric training, each rater was provided with eight scoring sheets (Appendix G) that matched the summative rubric. Each scoring sheet contained a unique URL for the ePortfolios the rater would be assessing during the AI. Laptop computers were provided for raters to access the ePortfolios. Raters were asked to work independently to score eight ePortfolios. As noted above, 61 students provided a URL to their ePortfolio, consenting to have it scored at the AI. Each of these ePortfolios was scored by at least two teams of raters at the AI, creating at least four scores for each ePortfolio. When distributing the ePortfolios, we aimed to lessen the interference of disciplinary knowledge and to eliminate bias from knowledge that raters might have of students outside the ePortfolio. Therefore, we assigned ePortfolios to raters who were not in the same department or a closely aligned discipline. Before the scoring began, we also asked raters to identify any student they knew personally from whatever context and then reassigned those ePortfolios to a different rater. Raters were reminded that ePortfolios could have been created at different points in the student's career and under different conditions. Therefore, the raters were to evaluate the evidence of the four learning outcomes associated with our Project rather than the potential of

the student or the limits imposed by the conditions of creation. Raters were encouraged to take notes during the evaluation of each ePortfolio that might be useful to them during the adjudication with their team member. As raters completed their scoring of each individual ePortfolio, they were asked to submit the scoring sheet. We believed immediate submission would lessen the temptation to score by comparing ePortfolios rather than by relying on the rubric. A lunch break was provided, but raters were asked not to talk about any of the ePortfolios they had scored in order to lessen the chance that comments would influence raters who were yet to score that ePortfolio.

At the end of the scoring session, scoring sheets were returned to the teams, and they were asked to adjudicate any differences, but to concentrate on elements where their scores were more than one point apart. The adjudication process afforded each pair of raters the chance to discuss why each ePortfolio received the score it was given, and to connect those scores to specific language in the rubric. The primary goal of the adjudication process was to determine why the ePortfolio received different scores from each rater, and then move toward consensus about what the rubric means. It was not our explicit intention to have raters change their scores, but rather to determine whhether the raters missed something, deviated from the rubric, or became convinced that their interpretation the rubric or the ePortfolio was incorrect.

A debrief discussion at the end of the second day served as the wrap-up and was framed as helping the organizers to plan the next AI and create follow-up programs for Faculty Cohort members. Following our IRB approved protocol, any notes faculty had made, all scoring materials, and the list of ePortfolios assigned to each rater were collected, and URLs were erased from the laptop computers raters had used. The statistical analysis on the data from the surveys completed by the raters, as well as the student ePortfolio scores supplied by the raters, was conducted through the use of Statistical Package for the Social Sciences (SPSS). Statistical Analysis System (SAS) was used to conduct G-score analysis on the reliability of the paired raters.

Results

Reliability

We began our analysis by exploring whether the data provided by rater teams were reliable. In other words, were the scores given by raters a reflection of consistent use of the summative rubric? Generalizability theory was used to determine G-coefficients for each rater team. These coefficients are reliability estimates, ranging from 0-1, with higher estimates reflecting greater reliability. Typically, 0.70 is

Figure 1
G-Coefficients for Paired Teams Based on all ePortfolios Scored by the Team
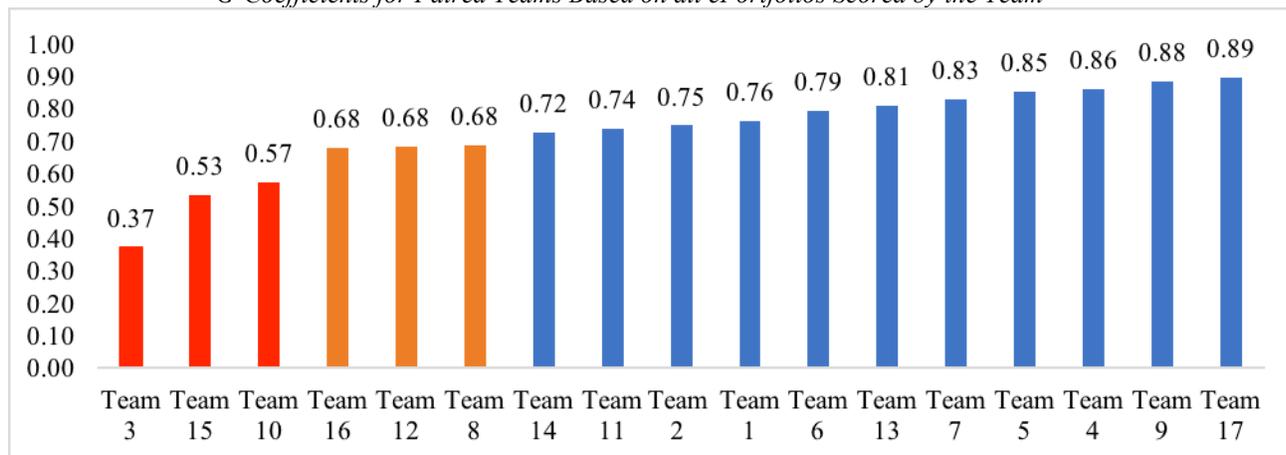

Table 1
Comparison of Means Using all Scores To Only Scores From Most Reliable Teams

Rubric element	*All data*	*Most reliable teams*
Critical thinking through reflection		
A. Artifacts	2.52	2.55
B. Arrangement	2.37	2.43
C. Reflective writing	2.21	2.31
Visual literacy		
D. Visual elements	2.38	2.34
E. Design choices	2.33	2.38
Technical competency		
F. Navigation	2.62	2.66
G. Attention to technical details	2.63	2.61
H. Ethical literacy	2.13	2.16
Effective communication		
I. Coherent message for intended audience	2.48	2.51
Overall average	2.41	2.44

Note. The scale is 1 = *beginner*, 2 = *developing*, 3 = *mature*, and 4 = *professional*.

a general cut-off for acceptable reliability. Figure 1 shows the G-coefficients for each paired team, based on all of the ePortfolios they rated. Eleven of the 17 teams had a G-coefficient greater than 0.70, three teams were very close to 0.70 (i.e., 0.68), and three teams had less consistent scoring patterns.

Given that some of our teams were more reliable than others and that all ePortfolios were scored by more than one team, we needed to make a decision about whether to base future analysis on the average score of all teams that scored a particular ePortfolio or to use only the scores from the more reliable team. To determine whether shifting procedures would make a difference in the scores, we did a comparison of the different means across each element on the rubric. Since some ePortfolios were scored by the same two teams and others were scored by

randomized teams, we separated the data for each ePortfolio and chose only the scores provided by the teams with the highest G-score. The scores from the most reliable teams were then averaged to determine the mean for each element. Table 1 shows the mean scores for each element, first by using the scores of all raters who scored each ePortfolio and then by looking at only the scores from the most reliable team who scored each ePortfolio. Our analysis shows the means from the most reliable teams for most elements is only slightly higher than the means from all of the raters.

Faculty Confidence

We turn now to the question of whether the AI itself had an impact on the faculty who participated in terms of

their confidence in evaluating or teaching each of the outcomes associated with our Project. Our pre and post surveys asked faculty simply to indicate their level of confidence in teaching and assessing the four student learning outcomes using a 5-point Likert-type scale. Figure 2 below shows the means for each question. Because the assumption of normality was violated and the data were not distributed in a typical bell-curve, the use of a t test would be inappropriate. Instead, a Wilcoxon signed-rank test (the nonparametric equivalent of a t test) was conducted. The Wilcoxon signed-rank test showed that the results of the post-survey were significantly different from the pre-survey ($Z = -2.533$, $p = 0.010$) and indicate a significantly higher level of faculty confidence in teaching and assessing the four student learning outcomes. The mean scores on the pre/post survey revealed an average increase of 0.69 across all questions. In addition, we noted that every participant except one, a member of the least reliable team, had a higher level of confidence after the AI than before it began on every outcome and for both teaching and assessing. That one participant scored their

confidence level prior to the AI as a 5 for every item, leaving no room for improvement on our scale.

In addition, we invited faculty to provide other feedback in an open-ended question. Comments indicated that participants felt the AI was helpful to them as they considered teaching elements of ePortfolios in their own courses and evaluating the ePortfolios created by students in their programs. We found no significant difference in the increased confidence of faculty who had been participating in the faculty cohort for some time and those who were new to our Project. We therefore concluded that the increased confidence is likely attributed to the AI itself and that the AI functioned as an effective professional development opportunity for those who participated regardless of their prior experience with ePortfolios.

Discussion and Conclusion

Though the structure of our Project has focused on student learning as students create integrative, outward-facing, professional ePortfolios to represent themselves

Figure 2
Pre-Post Confidence Comparisons
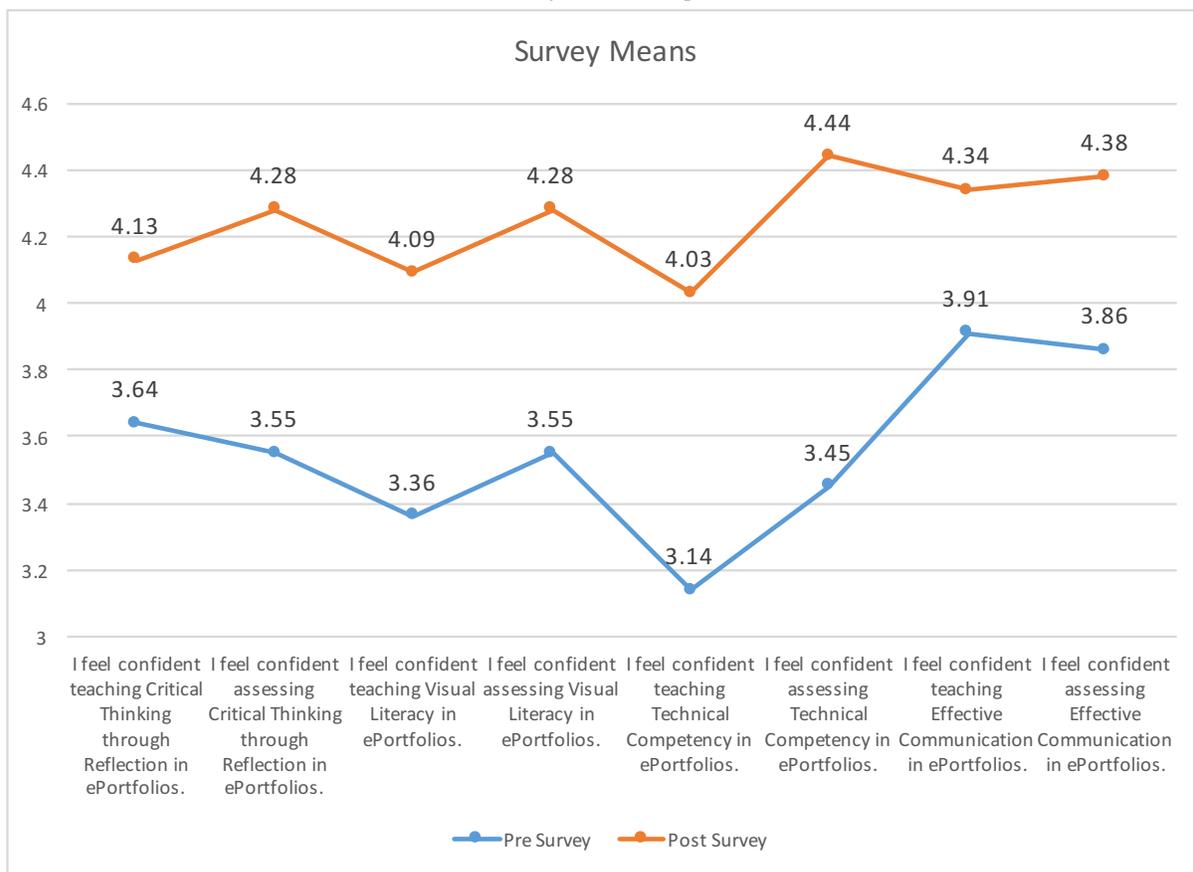
and their learning to an external audience, our decision to allow students to use a variety of platforms and maintain control of their own ePortfolios has created some challenging assessment issues. Our learning outcomes have remained consistent, but our ability to articulate what is involved in each of those outcomes and how those outcomes are made visible in ePortfolios has evolved and deepened as our Project has matured. We have seen faculty and students come to understand the possibilities of ePortfolios in more sophisticated ways as they create ePortfolios or integrate ePortfolio thinking into courses. In essence, both faculty and students change their understanding of, and their expectations for, the four learning outcomes by doing ePortfolios. Though we had an original rubric that included behavioral anchors, we would not have been able to create the formative or summative rubric earlier; we simply did not know enough until we all had gained more experience. Creating a formative rubric that serves as a teaching tool but that is less effective for collecting consistent assessment data was an important step in developing the kind of language necessary for a summative rubric and gave us specific examples of where readers can have difficulties evaluating student performance in ePortfolios. These examples were essential to the training we provided for faculty raters during the AI. Creating a summative rubric with four levels of performance and clear behavioral anchors for each element and each level of performance was necessary to generate reliable assessment data. Inviting faculty to participate in an ePortfolio AI and training them to use the summative rubric to score a variety of ePortfolios outside their own disciplines accomplished two important goals for our Project: (1) we were able to gather reliable assessment scores for each of the learning outcomes; and (2) we increased faculty participants' confidence in teaching and evaluating those outcomes.

We conclude from our analysis of G-coefficients that most of the raters were able to use the rubric consistently to score the ePortfolios they were assigned. Some teams were harsher or more lenient than others, but all but one of the teams achieved a reliability estimate near or above 0.70. We eliminated the one team (Team 3) that did not achieve reliability from all analysis. When comparing whether to use an average of all remaining teams who scored a particular ePortfolio or to average only the scores from the most reliable team that scored each ePortfolio, we determined that it would be better to use only the scores from the most reliable team, essentially eliminating the scores from the other two less reliable team members. We plan to continue the analysis of our data to better understand the relationship between such factors as GPA, test scores, involvement in our Project and scores assigned

by raters at the AI. As we continue to analyze our data and consider the scores in relation to the survey answers students provided about their use of their ePortfolios and the demographic data they consented for us to access and compare, we will use only the scores from the most reliable team in each case.

Our analysis of sources of error suggests that our training was effective enough to produce reliable data and that we can trust the scores that remain to be reasonable indicators of student performance. When we repeat the AI with new student ePortfolios, we will be able to compare those scores, assuming those scores also prove to be reliable, to see if students are improving across the four learning outcomes associated with the our Project. We will repeat the AI in May 2018 with student ePortfolios created between May 1, 2016 and May 1, 2018. We then plan to do a comparative analysis to determine the extent of improvement in the quality of student ePortfolios over time. We recognize, however, that students who created ePortfolios at the beginning of our Project were likely to have been highly motivated and that as more students produce ePortfolios, we may see a larger range of performances. Likewise, those students who maintain their ePortfolios after graduation and the initial job search may be more likely to grant us access than those who abandon their ePortfolios, further skewing the range of performances away from a normal distribution. We are interested in conducting follow-up interviews with students who participated in this study to see if we can uncover the factors that motivate students to create and maintain an ePortfolio or to grant us permission to use it for assessment of our Project. Finally, we are interested in related studies focused on faculty, including how they use the experience of participating in the AI in their own teaching.

Assessment is not the focus of our Project, but we believe we have established that reliable assessment data can be generated without asking students to utilize a standard platform or follow a rigid set of requirements about what artifacts to include as they integrate their experiences and present themselves to an external audience. The question of whether such institutional initiatives have any impact on faculty is also at least partially addressed in the data we have collected here, demonstrating that faculty confidence can be increased by structuring assessment activities as opportunities for faculty learning.

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Appendix A
Formative Rubric

ePORTFOLIO PROJECT
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Auburn ePortfolio Rubric

EFFECTIVE COMMUNICATION	These skills are rarely present and when attempted they are of poor quality.	The presence of these skills is variable and when present the quality of these skills is inconsistent.	These skills are consistently present and demonstrate mastery through high quality work.
The ePortfolio demonstrates strong and consistent communication skills	NOVICE	DEVELOPING	PROFESSIONAL

Message:
- The central message of the ePortfolio is consistently clear
- Artifacts have been carefully selected to support a central message and consistently function as evidence that supports the claims made in the ePortfolio

1　2　3　4　5　6　7　8　9 →

Audience and purpose:
- The number and kinds of artifacts are well selected and demonstrate careful attention to audience and disciplinary expectations

1　2　3　4　5　6　7　8　9 →

Revision and editing:
All components of the ePortfolio show consistent attention to conventions and proofreading:
- Artifacts have been revised to demonstrate mastery
- Where unrevised artifacts are included, they have been purposefully selected to exhibit growth and their presence is explained

1　2　3　4　5　6　7　8　9 →

Score or level for this student outcome:

TECHNICAL COMPETENCY	These skills are rarely present and when attempted they are of poor quality.	The presence of these skills is variable and when present the quality of these skills is inconsistent.	These skills are consistently present and demonstrate mastery through high quality work.
The author uses technical features to enrich the delivery of the message	NOVICE	DEVELOPING	PROFESSIONAL

Navigation and user experience:
Navigation is thoughtful and intuitive, adds to user experience, and demonstrates the ability to think about the user's needs:
- Navigation guides the user within the ePortfolio, connecting artifacts and experiences across pages or relevant details
- Components of the ePortfolio are clearly labeled and easily used
- Information like resumes and contact information is easily located

1　2　3　4　5　6　7　8　9 →

Intentional use of technology:
Technical features of the site:
- Effectively reinforce the central message
- Convey a consistent professional identity to the intended audience
- Demonstrate a thoughtful application of technical features (slide shows, scroll bars, hyperlinks, animation, etc.)

1　2　3　4　5　6　7　8　9 →

Attention to technical details:
Attention has been given to ensure that technical features work as intended and support the professional identity. Possible examples include:
- Photos and graphics are of high quality with attention paid to size, resolution, and color
- Artifacts that utilize video or sound are well edited and of good quality
- Care has been taken to ensure the entire site works in different browsers and devices
- Links are active and well labeled and artifacts are easily accessed
- Strategies for making the ePortfolio accessible to different users have been utilized effectively

1　2　3　4　5　6　7　8　9 →

Ethical literacy:
There is clear consideration of intellectual property and fair use:
- When another's work is used, credit is given with correct formatting
- There is reference to personal authorship and ownership of materials
- There is consistent and appropriate use of others' likeness, work, and/or images
The content of the ePortfolio itself reflects an awareness of the public nature of the internet:
- Careful consideration of privacy issues is evident
- Anonymous individuals are not treated as objects in service of the author's message

1　2　3　4　5　6　7　8　9 →

Score or level for this student outcome:

VISUAL LITERACY	These skills are rarely present and when attempted they are of poor quality.	The presence of these skills is variable and when present the quality of these skills is inconsistent.	These skills are consistently present and demonstrate mastery through high quality work.
The ePortfolio uses visual elements to enhance the effectiveness of the site	NOVICE	DEVELOPING	PROFESSIONAL

Message in visual elements:
The author has utilized visual features to further develop elements of the ePortfolio and enhance the overall impact. Possible examples include:
- To enhance text descriptions of experiences
- To convey a message not immediately evident
- As a new way to represent meaning or insight
- To integrate experiences, explanations, and demonstrate connections
- To connect an overall message to individual artifacts

1 2 3 4 5 6 7 8 9

Intentional use of visual elements:
The author demonstrates the ability to evaluate effectiveness both within visual elements and across the site itself, demonstrating:
- Consideration of how the audience will interpret the elements themselves
- Consistent formatting from page to page
- Layout uses white space, alignment, and placement to appropriately organize content
- Headings, subheadings, and paragraphs contribute to easy identification of elements and readability
- Background and text color are aesthetically pleasing, consistent across the site, and contribute to easy scanning
- Images and icons explain the relationships between these visual elements and the artifacts they accompany

1 2 3 4 5 6 7 8 9

Difference from social media:
The visual elements demonstrate:
- An overall professional identity reflecting careful consideration of purpose and audience that differentiates the ePortfolio from a social media site
- A consistent understanding of how visual elements contribute to the audience's interpretation of the author's professional identity

1 2 3 4 5 6 7 8 9

Score or level for this student outcome:

CRITICAL THINKING THROUGH REFLECTION	These skills are rarely present and when attempted they are of poor quality.	The presence of these skills is variable and when present the quality of these skills is inconsistent.	These skills are consistently present and demonstrate mastery through high quality work.
The ePortfolio demonstrates critical thinking through reflection across a variety of elements	NOVICE	DEVELOPING	PROFESSIONAL

Selection of artifacts:
The selected artifacts in the ePortfolio demonstrate the result of an evaluative process because they:
- Represent various experiences both in and out of class in a coherent way
- Analyze the selected artifacts to demonstrate an intended meaning
- Demonstrate the ability to examine how the artifacts contribute to the overall message of the ePortfolio
- Successfully demonstrate the ability to curate a collection of artifacts that creates a clear sense of identity, purpose, and audience

1 2 3 4 5 6 7 8 9

Arrangement:
The organization of the ePortfolio:
- Demonstrates careful arrangement of artifacts to draw meaningful connections across experiences
- Represents an analytic process to determine placement of experiences based on significance and the order is consistent and effective

1 2 3 4 5 6 7 8 9

Reflective writing:
The writing throughout the ePortfolio:
- Reinforces the central message of the ePortfolio
- Justifies the presence of artifacts by explaining why they are included
- Explains the relationship between experiences and their visual representations
- Critically examines experiences, perceptions, interpretations, and identity
- Demonstrates a professional identity that simultaneously integrates past experiences and projects into the future

1 2 3 4 5 6 7 8 9

Score or level for this student outcome:

Appendix B
Summative Rubric

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Summative ePortfolio Rubric

ePortfolios can take many forms, but for the purpose of assessing the outcomes associated with this project, we expect an ePortfolio to tell a coherent story about the student's learning experiences both in and out of classes, synthesize and present those experiences for a general, external, professional audience. ePortfolios of this kind provide evidence of skills and interests through a curated selection of artifacts and craft in the process a professional identity.

	Critical Thinking Through Reflection			
	Critical Thinking Through Reflection focuses on evidence of critical thinking (analysis, synthesis, evaluation, creation) as it exists in within artifacts, arrangement, and reflective writing and across the ePortfolio as a whole.			
	Beginner: 1	**Developing: 2**	**Mature: 3**	**Professional: 4**
A: Artifacts	Included artifacts show little connection to the overarching story or the story itself is missing. Artifacts are not contextualized so their meaning is supplied more by the viewer than the author. There is little variety of skills, experiences, and learning represented and not enough evidence to support the claims being made. Most artifacts are of the same kind or from the same kind of experience (for example course papers or images of design work).	Some artifacts contribute to the story being told, but some may not. The story is present, but limited and individual artifacts have little contextual information to support their inclusion. There is some variety of skills, experiences, and learning represented. While the overarching story is not supported by all of the artifacts, there are some moments where artifacts do substantiate the claims.	Most artifacts provide evidence of the story being told and most support the claims being made. Artifacts are contextualized so that the reason for their inclusion is almost always clear. The artifacts provided demonstrate a variety of skills, experiences, and learning across a range of courses or co-curricular experiences.	Artifacts provide strong evidence of the story being told and claims being made. Artifacts are well contextualized so that their presence in support of a message is clear throughout. The artifacts provided demonstrate a variety of skills, experiences, and learning and draw from a wide range of experiences both in and out of formal courses.
B: Arrangement	Arrangement is overly simplistic, for example organized by the course or level or presented as a simple gallery or list. There is no evidence of synthesis of learning and the arrangement of artifacts makes the overarching story confusing.	Arrangement is mostly logical though predictable. Some items may be misplaced, disconnected, or underdeveloped. There is limited evidence of synthesis in learning so that the overarching story is vague or in places confusing. The reader has to do too much of the work to interpret the connections.	Arrangement usually reinforces the story and the ePortfolio almost always functions as a curated collection of evidence. There is some evidence of synthesis of learning experiences through the use of repeated themes, links within the ePortfolio, or other motifs that are not overly cliched.	Arrangement consistently reinforces the story. The ePortfolio functions as a carefully curated collection of evidence intentionally assembled to demonstrate synthesis of, and sophisticated thinking about, various learning experiences. The story is clear and nuanced.
C: Reflective Writing	Reflective writing is limited to description. Where attempts to go beyond description occur, they seem simplistic, formulaic, or cliched. The writing is often repetitious and may have numerous errors at the sentence level.	Reflective writing is present and occasionally includes more than description by connecting artifacts together, saying why an experience was important, or connecting lived experience to other sources of knowledge. The writing is almost always correct, but does not fully construct a coherent individual identity.	Reflections often make connections, explains importance, or project into the future, but not consistently so. Where the writing indicates critical thinking, it does so by making connections to specific artifacts and to the story being told across the ePortfolio as a whole. The writing is generally correct and constructs a sense of individual identity, though at times it is overdone or repititious.	Reflections are insightful and work together to consistently synthesize learning experiences and demonstrate critical thinking about the meaning and application of these experiences without being overdone or repetitious. Across the whole ePortfolio the writing constructs a sophisticated and nuanced identity.

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Summative ePortfolio Rubric

	Visual Literacy			
	Visual Literacy focuses on how the author uses visual elements to provide evidence, construct deeper meaning, and support and enhance the message of the ePortfolio. "Visual elements" refer to any non-text elements such as boxes, icons, buttons, or photographs.			
	Beginner: 1	**Developing: 2**	**Mature: 3**	**Professional: 4**
D: Visual Elements	Visual elements *decorate* the ePortfolio without attention to how they function. They do not support the message or help create identity.	Visual elements *illustrate* the message but inconsistently or visual elements exist mostly because they are artifacts of design or artistic creation. *In either case*, visual elements do not consistently contribute to the message or identity.	Visual elements function to illustrate the message or provide evidence of experiences or skills, *and* almost always sync together with the text to provide additional meaning and craft an identity maintained throughout the ePortfolio.	Visual elements are used both to illustrate and provide evidence, *but always* with attention to syncing the image and the text and to constructing an appropriate identity. The visual elements included are unique, creative, sophisticated, and convey another layer of the meaning without functioning simply as artifacts.
E: Design choices	Design choices like color, font, space, and layout are haphazard and distract from the message and identity.	Design choices are often appropriate, but some choices of color, font, space, or layout are ineffective in supporting the message or distract from the identity being created.	Design choices are consistently appropriate, support the message, and aid in the construction of identity. Some of these choices are sophisticated, original, or creative.	Design choices are consistently appropriate, support the message, and aid in the creation of identity. These choices are consistently sophisticated and original/creative.

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Summative ePortfolio Rubric

Technical Competency
Technical Competency focuses on the application of technical elements that should enhance the way information is conveyed to an audience, differentiating an ePortfolio from other products (social media sites, blogs, commercial websites) to construct identity. "Navigation" refers to the way the site is set up to let users move through the site and within individual pages. "Technical details" include features like slide shows, scroll bars, hyperlinks, quality or size of graphics, etc.

	Beginner: 1	Developing: 2	Mature: 3	Professional: 4
F: Navigation	Navigation in the ePortfolio is confusing or awkward suggesting little consideration of user experience or limited technical skill.	Navigation is not always consistent or intuitive. There are repetitions in navigation that do not enhance the user's experience or navigation choices that make the user's experience more difficult.	Navigation is thoughtful and facilitates the user's experience, but isn't consistently sophisticated or effective.	Navigation is thoughtful, supports the story being told, and is original/creative even if a template has been used. Navigation within the ePortfolio is sophisticated and improves the user's experience.
G: Attention to Technical Details	Major technical issues detract from the effectiveness of the ePortfolio.	Minor technical issues occur, but these generally do not interfere with the effectiveness of the ePortfolio. Some features are inappropriate or do not contribute to the message or the construction of identity.	No technical issues are detected with the ePortfolio. It is clear how to use the technical features of the ePortfolio. The features used are mostly appropriate and usually contribute to the message and construction of identity.	No technical issues are detected, the features used are appropriate and consistently contribute to the message and identity.
H: Ethical Literacy	Choices in both texts and images are ethically problematic demonstrating little awareness of the public nature of ePortfolios or the necessity for respecting others in this public format. Citations are missing.	Choices in either texts or images are ethically problematic. Questions arise about fair use, ownership, or appropriateness because of the lack of credits or or their inconsistency.	Choices in either texts or images are mostly respectful of others and generally demonstrate an awareness of the public nature of ePortfolios. Credits and acknowledgement exist but are not consistent across the ePortfolio or are not well-handled.	Choices in texts and images consistently respect others and demonstrate awareness of the public nature of ePortfolios. No questions arise about fair use, ownership, or appropriateness because credits and acknowledgements are well-handled throughout the ePortfolio.

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Summative ePortfolio Rubric

Effective Communication			
Effective Communication is focused on the message of the overall ePortfolio rather than individual components.			
Beginner: 1	**Developing: 2**	**Mature: 3**	**Professional: 4**
The textual and visual elements do not work in unison to construct a consistent identity and central message. The purpose of the ePortfolio as a whole is unclear or overtly clunky (I want a job) or the reader has to do too much of the work to supply that message.	Some elements of the ePortfolio as a whole obscure the message or create confusion about the purpose or the author's identity. There are several moments of public disclosure that do not serve to support the author's message or contribute positively to the construction of identity.	The ePortfolio as a whole is almost always effective in both its message and the construction of identity. Most elements work well together so that the reader is drawn in and feels engaged in learning more about the author and his or her experiences, but there are some points where the pieces do not all work together to demonstrate sophistication in the message or construction of identity.	There is a coherent and effective message being told by the ePortfolio as a whole and an identity is consistently and effectively constructed because all elements work together and demonstrate sophistication and originality/creativity.

(Left row label: I. Coherent Message for Intended Audience)

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Appendix C
E-mail Invitations

Dear [student name],

As you know, Auburn University began an ePortfolio Project in 2012. We understand that you might have completed an ePortfolio during your time at Auburn. We are planning an Assessment Institute to have faculty members learn to evaluate ePortfolios and will publish the results of this assessment as part of a research study. We would like to use your ePortfolio in this Assessment Institute. *If you agree to respond to the attached survey, which includes the opportunity to provide the URL of your ePortfolio, you will be entered into a drawing for a $50 Amazon gift card. All participants are also invited to come to the Office of University Writing (3436 RBD Library) to select a promotional item.*

Additional details of our study are provided below. Please read this consent information carefully and **if you agree, follow the link to the survey provided at the end of this information.**

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

INFORMED CONSENT
for a Research Study titled
"ePortfolio Assessment and Faculty Development"

You are invited to participate in a longitudinal research study to measure the improvement of student produced integrative, outward-facing, professional ePortfolios. The study will invite faculty members from the ePortfolio Project Faculty Cohort to attend an ePortfolio Assessment Institute where they will be trained to use the Project rubric and then read and score student ePortfolios from a variety of disciplines.

The study is being conducted by Dr. Margaret J. Marshall, Director of University Writing in conjunction with Dr. Lesley Bartlett, Assistant Director of University Writing, and Dr. Megan Good, Director of Academic Assessment. You were selected as a possible participant because you are or were a student at Auburn who we believe produced an ePortfolio.

What will be involved if you participate? If you decide to participate in this research study, you will answer a few questions about the experience of creating an ePortfolio and your use of that ePortfolio. You may also provide us with the URL of your ePortfolio(s) for use during the Assessment Institute. We will not be able to make changes to your ePortfolio(s). If you give us permission to use your ePortfolio, it may be used in future Assessment Institutes for comparative purposes.
You will also have the opportunity to give us separate permissions to:

- access your demographic information (major, GPA, gender, race, transfer status, first generation status, ACT/SAT, date(s) of changes in major) from the Office of Institutional Research (OIR)
- quote from your ePortfolio or use screen shots of sections of your ePortfolio that could be captured without revealing your identity or revealing the URL to others
- contact you at a later date for a short follow-up interview about your ePortfolio use

Are there any risks or discomforts? The risks associated with letting us use your ePortfolio are breach of confidentiality and potential for psychological or social discomfort because faculty participating in the Assessment Institute will see your entire ePortfolio.

Steps we will take to minimize these risks:

- We will ask faculty participants to sign an agreement that they will not share the URL to your ePortfolio with anyone and will not talk about the ePortfolios they assessed with anyone outside the Assessment Institute.
- The Institute will be designed so that no faculty members from your major or minor are asked to read and score your ePortfolio.
- If you give us permission to capture screen shots, we will ensure that your identity is not revealed and the screen shots do not include pictures of you or other identifying information.
- Any demographic information you agree to let us access will be kept separate from your name and ePortfolio and will not be seen or used by faculty during the Assessment Institute.

Are there any benefits to yourself or others? If you participate in this study, your ePortfolio will be used to gather assessment data that will serve to improve the ePortfolio Project and student learning at Auburn.

Will you receive compensation for participating? As outlined above, you will be entered in a drawing with other participants to win a $50Amazon gift card. Only one gift card will be awarded each time we conduct an Assessment Institute. Your chances of winning depend on the number of participants but we estimate that number to be 1 in 200. All participants are also invited come to the Office of University Writing at 3436 RBD Library to select a promotional item of your choice.

Are there any costs? There are no costs to you associated with this study other than the time you will spend responding to the survey. The survey should take you no more than 15 minutes.

If you change your mind about participating, you can withdraw at any time during the study by closing your browser. If you decide to withdraw at a later date, you may contact Dr. Margaret Marshall at mjm0030@auburn.edu or at 334-844-7574. Your participation is completely voluntary. If at any time you choose to withdraw, all information and records of your participation will be deleted. Your decision about whether to participate or to stop participating will have no impact on your future relations with Auburn University, the ePortfolio Project, or the Office of University Writing.

Your privacy will be protected. Any information obtained in connection with this study will remain confidential. Information obtained through your participation may be reported to faculty and administrative decision makers at Auburn and/or presented at conferences or published in scholarly journals but you will not be personally identified.

If you have questions about this study, please contact Dr. Margaret J. Marshall at mmarshall@auburn.edu or 344-844-7474. You may print a copy of this document to keep.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY.

IF YOU ARE WILLING TO PARTICIPATE IN THE SURVEY, ACCESSING IT WILL SERVE AS YOUR CONSENT TO PARTICIPATE. WHEN COMPLETING THE SURVEY, YOU WILL HAVE OPPORTUNITIES TO CONSENT TO THE LEVELS OF INVOLVEMENT OUTLINED ABOVE.

Link to Survey

_____   11-16-2015
Primary Investigator   Date

Margaret J. Marshall
Printed Name

Decline to participate to be removed from the contact list

Appendix D
Student Survey

Student ePortfolio AI Research Survey

Q1 I agree that I am at least 19 years old and want to participate in this research study.
❍ No
❍ Yes

Q2 Thank you for taking the time to help the ePortfolio Project! If you complete this survey, you will be entered to win a $50 Amazon gift certificate. Your chances of winning are 1 in 200. Please stop by the Office of University Writing in the RBD Library to pick up a promotional item of your choice!

Q3 You may withdraw from this study at any time by contacting ██████████████ at ██████████████████ or by phoning her at ████████████. If you wish to withdraw during this survey, you may do so by closing your browser without hitting the submit button at the end of this survey and any answers that you have provided will be eliminated from the study.

Q4 Please enter your first and last name below.
    First Name
    Last Name

Q5 We are interested in how students use or plan to use ePortfolios when they transition to graduate school or professional careers.

	Please select your response below.				
	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
The process of creating an ePortfolio helped me think about what I wanted to do after graduation. (1)	O	O	O	O	O
I used or plan to use my ePortfolio while looking for a job or applying to graduate school. (2)	O	O	O	O	O
Creating an ePortfolio helped me see connections among my experiences. (3)	O	O	O	O	O
Creating an ePortfolio helped me explain my interests and skills. (4)	O	O	O	O	O
I have evidence my ePortfolio helped me secure a position or admission to a graduate program. (5)	O	O	O	O	O

Q6 What is the evidence your ePortfolio helped you secure a position or admission to a graduate program?

Q7 I give the ePortfolio Project permission to use my ePortfolio(s) for the purposes described.   Your identity will be visible to the faculty scoring your ePortfolio, but steps are in place to ensure that your participation is confidential.
❍   No
❍   Yes

Q8 How many ePortfolios do you currently have?
❍   One
❍   Two
❍   Three

Q9 Please provide your ePortfolio link below.
      My ePortfolio URL:
      Approximate date of completion:
      Approximate date of last update:

Q10 Please provide your second ePortfolio link below.
      My ePortfolio URL:
      Approximate date of completion:
      Approximate date of last update:

Q11 Please provide your third ePortfolio link below.
    My ePortfolio URL:
    Approximate date of completion:
    Approximate date of last update:

Q12 I give the ePortfolio Project permission to access the following demographic data from the Office of Institutional Research for the duration of this study only and in compliance with all FERPA regulations. The ePortfolio Project will keep your data stored separately from your name and ePortfolio URL. Anonymized data will be kept indefinitely.

	Yes (1)	No (2)
Major (2)	O	O
GPA (3)	O	O
Gender (4)	O	O
Race (5)	O	O
Transfer Status (6)	O	O
First Generation Status (7)	O	O
ACT/SAT Score (8)	O	O
Date of any changes in major (9)	O	O

Q13 I give the ePortfolio Project permission to use anonymized parts of my ePortfolio for publications or conferences. The ePortfolio Project will only use quotes or anonymous screenshots in publications or presentations. Privacy settings on your ePortfolio will not be changed and steps will be taken to ensure that quotes or anonymous screenshots will not permit your ePortfolio to be found through common search engines if your privacy settings have prohibited public access.

❍ No
❍ Yes

Q14 The ePortfolio Project is interested in following up with students to find out about how students use ePortfolios after leaving Auburn. Please indicate if we may contact you later to ask follow up questions.
❍ No
❍ Yes

Q15 I would like to be notified of any publications or reports using these survey results.
❍ No
❍ Yes

Appendix E
Pre/Post Faculty Confidence Survey

One goal of the Assessment Institute is to foster a deeper understanding of the four student learning outcomes for the ePortfolio Project. We are interested in seeing how your understanding changes as a result of participating in the institute. Please respond to the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)
I feel confident teaching Critical Thinking through Reflection in ePortfolios. (1)	O	O	O	O	O
I feel confident assessing Critical Thinking through Reflection in ePortfolios. (2)	O	O	O	O	O
I feel confident teaching Visual Literacy in ePortfolios. (3)	O	O	O	O	O
I feel confident assessing Visual Literacy in ePortfolios. (4)	O	O	O	O	O
I feel confident teaching Technical Competency in ePortfolios. (5)	O	O	O	O	O
I feel confident assessing Technical Competency in ePortfolios. (6)	O	O	O	O	O
I feel confident teaching Effective Communication in ePortfolios. (7)	O	O	O	O	O
I feel confident assessing Effective Communication in ePortfolios. (8)	O	O	O	O	O

ePortfolio Assessment Institute
Auburn University

DAY 1 Tuesday, May 10th

8:00 – 8:15   arrive, coffee, settle in

8:15 – 8:45   introductions and details

8:45 -- 9:30   overview of ePortfolio Project with examples

9:30   break

9:45 – 11:30   understanding the summative rubric

11:30 – 12:30   lunch

12:30 – 3:20   training with the rubric

3:20   break

3:30 - 4:50   norming session

5:00   collection of all materials and leave

DAY 2 Wednesday, May 11th

8:00 - 8:15   arrive, coffee, questions from yesterday

8:20 – 9:30   norming session

9:30 – 2:00   scoring your packet

11:30   lunch will be out; take your lunch and other breaks as you wish

2:00-3:20   adjudication/discussion with your scoring partner

3:20   break

3:30-4:50   debrief on the experience of the Assessment Institute

5:00   collection of all materials and leave

Appendix G
Scoring sheet

ePORTFOLIO PROJECT
LEARN IT. LIVE IT. SHARE IT.

SCORER:				URL					
	Critical Thinking Through Reflection			Visual Literacy		Technical Competency			Effective Communication
	a	b	c	d	e	f	g	h	i
EP									

Notes on ePortfolio	

Adjudication Notes	

SCORES AFTER ADJUDICATION

	Critical Thinking Through Reflection			Visual Literacy		Technical Competency			Effective Communication
	a	b	c	d	e	f	g	h	i
EP									

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Employers' Perceptions of the Benefits of Employment Electronic Portfolios

Ronda L. Leahy and Ariana Filiatrault
University of Wisconsin-La Crosse

The purpose of this study was to examine employers' perceptions of the effectiveness of employment electronic portfolios (ePortfolios) when evaluating potential job candidates. For the purpose of this study, ePortfolios were defined as a collection of electronic files that demonstrates one's qualifications, abilities, and experiences that are applicable to the workplace. Eighty-five recruiters completed a survey about their perceptions of the use of ePortfolios. Independent sample t tests were conducted on two groups based on length of recruiting experience and length of employment. Recruiters with less than two years of recruiting experience were significantly more likely to visit ePortfolio links on students' cover letters or e-mail signatures than recruiters with three or more years of experience recruiting. In addition, 85 percent (72/85) of recruiters reported that if students followed up with them via e-mail with a link to a relevant part of their ePortfolio, they would visit the link. Overall, recruiters had moderately favorable perceptions of the use of ePortfolios in the job search process.

With increasingly rapid technological development, today's job market is becoming more competitive and complex (McCabe, 2017). Traditionally, employers review paper resumes to understand each applicant's relevant skills. However, recent trends have suggested that paper resumes and portfolios are gradually becoming less popular as a tool for college graduates to obtain their first job (Mirrer, 2010; Willis & Wilkie, 2009). This rapid expansion elicits a new way for college graduates to stand out in an increasingly digital world.

The current study examined whether or not employers perceive employment electronic portfolios (i.e., ePortfolios) as beneficial for job applicants. For the purpose of this study, *ePortfolios* are defined as a collection of electronic files that demonstrates one's qualifications, abilities, and experiences that are applicable to the workplace. Although students acquire numerous work-related skills through higher education courses, many struggle to identify and verbalize these skills while applying for professional careers or graduate school (Whitfield, 2011). ePortfolios not only allow potential employers to see the applicants' skills, but they allow applicants to better understand how to talk successfully about their abilities during an interview.

Researchers have outlined the benefit of a well-prepared ePortfolio during the employment process (Okoro, Washington, & Cardon, 2011; Woodbury, Addams, & Neal, 2009). Woodbury et al. (2009) stated that ePortfolios "may be the hammer that nails down a successful interview" (p. 13). While students are often able to submit electronic versions of their resume, this study examined whether employers believe an applicant's ePortfolio is beneficial in the application process. In an educational setting, students may become more comfortable creating ePortfolios; however, employers may not have as much experience reviewing ePortfolios as applicant have in creating them.

Okoro et al. (2011) argued that, although ePortfolios are still in their very early stages, with time, they have the ability to replace the traditional resume and portfolio. ePortfolios may be perceived differently by employers based on their level of comfort with technology. Due to the novelty of ePortfolios, very little research has been done to understand employers' perceptions about ePortfolios. Because most ePortfolio research has been done in an educational setting, we do not know how recruiters use students' ePortfolios in their decision-making. The purpose of this study was to survey employers' perceptions of the effectiveness of ePortfolios when evaluating potential job candidates.

Review of Literature

Schawbel (2011) predicted that within 10 years, resumes will be replaced by various online communication sources, such as the ePortfolio. Similarly, a large body of research exists surrounding the importance of maintaining a positive online presence in an increasingly digital job market (McCabe, 2017; Mirrer, 2010; Worley, 2011). Yancey (2001) stated that ePortfolios have the potential to connect "college curriculum and the world beyond college" (p. 19). Although such literature recognizes the potential of an ePortfolio, few studies have been designed to understand how beneficial employers perceive ePortfolios.

Kennelly, Osborn, Reardon, and Shetty (2016) conducted a series of mock interviews and evaluated them through a skills matrix. This matrix determined students' abilities to recognize and outline their transferable skills through the creation and implementation of their ePortfolios. While they were unable to find consistent results on whether or not ePortfolios were helpful in the identification of transferable skills during the interviewing process, they provided suggestions for future researchers. "Moving

beyond self-report to objective external reviews would strengthen further studies" (Kennelly et al., 2016, p. 123). Employers are external reviewers of ePortfolios. Therefore, this study went beyond students' self-ratings on efficacy of ePortfolios in examining transferable skills. This study focused on the perceptions of recruiters and employers, rather than those of students.

In another study of ePortfolios in the college classroom, Willis and Wilkie (2009) concluded that ePortfolios "provide visual integration of students' knowledge, skills, and capabilities as a unique showcase to prospective employers; such portfolios also provide evidence of students' progressive development during their college careers" (p. 79). In a study of both employers and students, Blair and Godsall (2006) discovered that only 56% of hiring managers said they would expect to use ePortfolios in the future. However, this finding was largely due to the novelty of digital communication and inexperience with ePortfolios. Blair and Godsall found that 75% of employers stated that their reason for not using ePortfolios was that they were unfamiliar with ePortfolios. Length of recruiting experience may be a factor in the acceptance of ePortfolios. Millennial recruiters may be more comfortable using ePortfolios because they have grown up using technology, whereas employers who have been recruiting for 10 or more years may have a process that works and not perceive any benefits of applicants' ePortfolios. While Blair and Godsall (2006) uncovered these perceptions in 2006, in the current research, we attempted to understand further whether or not employers are open to viewing prospective job candidates' ePortfolios in the current employment environment.

Last, very few studies have been done to examine strictly the perceptions of employers and recruiters regarding ePortfolios (Ambrose, 2013; Yu, 2011). Yu (2011) interviewed 10 human resource managers from 10 different companies. Out of those 10, only four of the managers had previously heard of ePortfolios. Knowledge or lack thereof may affect employers' perceptions of the benefit of ePortfolios. Although not commonly seen by hiring managers, there was a high and consistent level of interest in the development and advancement of ePortfolios (Yu, 2011). These results encourage future research and suggest a high potential for universities that plan to promote the use of ePortfolios as a tool for post-college job placement. However, characteristics of recruiters also need to be examined. Because Blair and Godsall (2006) found that employers were not familiar with ePortfolios, we need to examine how willing employers are to use ePortfolios. Employers' total years of employment may affect how willing they are to change what they review in the application process.

Finally, Ambrose (2013) conducted a focus group with 11 recruiters and found that eight out of 11 employers agreed or strongly agreed that an ePortfolio of student work would be a valuable tool for recruiting.

Because this research was published seven years after the work of Blair and Godsall (2006), there may be more significant changes in employers' perceptions about the use of ePortfolios. The current research expanded on Ambrose's (2013) study by evaluating a larger pool of recruiters in order to predict more accurately employers' opinions of ePortfolios.

Hypothesis

Based on the relative newness of ePortfolios, recruiters' years of experience may be a significant factor in their perceptions of ePortfolios. Perhaps recruiters with fewer years of experience may be (a) younger in age and more comfortable navigating digital resources such as the ePortfolio, or (b) more willing to try different recruitment strategies to gain additional information about job candidates. Therefore, the following hypothesis is posited:

H1: Recruiters with fewer years of experience will have more favorable perceptions of ePortfolios.

Method

The current study partially replicated Ambrose (2013) by surveying recruiters about their perceptions of employment ePortfolios. While Ambrose conducted a qualitative study using a focus group with 11 recruiters, this study used a quantitative survey to collect data.

Participants

Surveys were completed by 85 recruiters garnered through two methods of data collection. There were 37 recruiters at two career fairs held at a Midwestern, comprehensive university who completed hard copy surveys during the career fair. In addition, 48 recruiters completed the same survey online, which was shared through social media sites and e-mail. Length of time subjects had been recruiting ranged from three months to 22 years, with a mean of 4.19 years. Total years of employment in all positions were labeled as length of employment. Length of employment ranged from one year to 43 years, with a mean of 11.73 years. National, regional, and local employers were surveyed. Some of the organizations recruiters represented were CenturyLink, Enterprise, Fastenal, Foot Locker, Hormel, Manpower, Skyward, Target, Quad Graphics, and Walmart.

Measure

Recruiters completed a survey about employment ePortfolios using a 5-point Likert scale (1 = *strongly agree*, 5 = *strongly disagree*). Survey questions also

included items related to other perceptions of ePortfolios, including an overall rating of the importance of ePortfolios in recruitment (see Appendix). The seven Likert scale items were created based on results reported by Ambrose (2013) and produced a Cronbach's alpha of .81.

Sampling Procedures

Recruiters at the career fairs were approached when they did not have students at their tables. They were asked if they would be willing to complete a hard copy survey about their perceptions of ePortfolios. The researchers noted the companies who completed the survey in order to avoid duplication. Subjects were also recruited using social media and direct e-mailing. Qualtrics was used to create and distribute the online survey. Participation online was entirely voluntary, and subjects remained completely anonymous.

Research Design

Independent sample *t* tests were conducted on two groups based on length of recruiting experience and length of employment. Groups were created based on frequencies of responses, trying to create similar sample sizes in each group. Therefore, there were different cut off points for length of recruiting experience and total length of employment. Length of recruiting experience was divided into two groups—fewer years recruiting (two years or fewer, $n = 47$) and more years recruiting (three years or more, $n = 38$). Length of employment was also divided into two groups—fewer years employed (nine or fewer, $n = 51$) and more years employed (10 or more, $n = 34$).

Results

The hypothesis stated that recruiters with fewer years of experience will have more favorable perceptions of ePortfolios. Table 1 represents the means and standard deviations of ePortfolio survey items based on length of recruiting experience. A *t* test was run to see if there was a difference between how long recruiters had been recruiting and their likelihood of visiting students' ePortfolio links (see Table 1). Recruiters with fewer than two years of recruiting experience were significantly more likely to visit ePortfolio links on students' cover letters or e-mail signatures than recruiters with three or more years of experience recruiting.

Table 2 represents the means and standard deviations of ePortfolio survey items based on length of employment. A *t* test was run to see if there was a difference between how long recruiters had been employed and their likelihood of visiting students'

ePortfolio links (see Table 2). Recruiters with nine or fewer years of employment were significantly more likely to visit ePortfolio links on students' cover letters or e-mail signatures than recruiters with 10 or more years of employment. A *t* test was run to see if there was a difference between years of employment and if recruiters would visit students' ePortfolio links on the top of their resume (see Table 2). Recruiters with nine or fewer years of employment were significantly more likely to visit ePortfolio links on the top of students' resumes than recruiters with 10 or more years of employment.

Frequencies and percentages of all recruiters' "strongly agree" and "agree" responses were examined across all questions. The results are presented in order of preference:

- 85% (72/85) of recruiters reported that, if students followed up with them via e-mail with a link to a relevant part of their ePortfolio, they would visit the link;
- 73% (62/85) of recruiters reported that, if students had a link to their ePortfolio on their e-mail signature or cover letter, they would visit it;
- 72% (61/85) of recruiters reported that, if students put a link to their ePortfolio on the top of their resume, they would visit it;
- 71% (60/85) of recruiters reported that ePortfolios would be a valuable tool for their company's recruiting; and
- 69% (59/85) of recruiters reported that, if students offered to show them a relevant part of their ePortfolio during a job fair via a tablet, they would be interested.

Finally, recruiters were asked to rate the importance of ePortfolios in recruitment from 1 (*not at all important*) to 10 (*extremely important*). The mean of all participants for importance of ePortfolios in recruitment was 6.05. Recruiters with two years or fewer of recruiting experience reported a mean of 6.30 ($SD = 2.08$), while recruiters with three or more years of recruiting experience reported a mean of 5.74 ($SD = 1.96$). Those who were employed for nine years or fewer reported a mean of 6.45 ($SD = 1.94$), and those with 10 years or more of employment reported a mean of 5.44 ($SD = 2.05$) for importance of ePortfolios in recruitment.

Discussion

The hypothesis predicted that recruiters with fewer years of experience would have more favorable perceptions of ePortfolios. Overall, recruiters had moderately favorable perceptions of the use of ePortfolios in the job search process. This study supports a qualitative version of Ambrose's (2013)

Table 1
Descriptives Using t *test for Equality of Means Based on Years of Recruiting Experience*

Item	Two years or fewer of recruiting experience (*n* = 47) *M* (*SD*)	Three years or fewer of recruiting experience (*n* = 38) *M* (*SD*)	*t*	*df*
If students followed up with me via e-mail with a link to a relevant part of the ePortfolio, I would visit it.	1.51 (0.72)	1.92 (1.05)	ns	–
If students offered to show me a relevant part of their ePortfolio during a job fair via a tablet, I would be interested.	2.00 (1.02)	2.37 (1.13)	ns	–
If students put a link to their ePortfolio on the top of their resume, I would visit it.	1.87 (0.95)	2.16 (1.10)	ns	–
If students had a link to their ePortfolio on their e-mail signature or cover letter, I would visit it.	1.77 (0.69)	2.32 (1.16)	-2.69**	83

Note. ns = not significant; in the survey, 1 = *strongly agree*, 2 = *agree*, 3 = *undecided*, 4 = *disagree*, 5 = *strongly disagree*.
** $p < .001$.

Table 2
Descriptives Using t *test for Equality of Means Based on Years of Employment*

Item	Nine years or fewer of employment (*n* = 51) *M* (*SD*)	10 years or more of employment (*n* = 34) *M* (*SD*)	*t*	*df*
If students followed up with me via e-mail with a link to a relevant part of the ePortfolio, I would visit it.	1.47 (0.73)	2.03 (1.02)	ns	–
If students offered to show me a relevant part of their ePortfolio during a job fair via a tablet, I would be interested.	2.04 (1.03)	2.35 (1.13)	ns	–
If students put a link to their ePortfolio on the top of their resume, I would visit it.	1.96 (0.89)	2.06 (1.21)	-0.43*	83
If students had a link to their ePortfolio on their e-mail signature or cover letter, I would visit it.	1.90 (0.83)	2.18 (1.14)	-1.28**	83

Note. ns = not significant; in the survey, 1 = *strongly agree*, 2 = *agree*, 3 = *undecided*, 4 = *disagree*, 5 = *strongly disagree*.
** $p < .005$.
* $p < .05$.

study pertaining to employer perceptions of ePortfolios. In this study, 85% of surveyed recruiters reported that if students followed up with them via e-mail with a link to a relevant part of their ePortfolio, they would visit the link. These findings confirm the previously suggested potential of ePortfolios from the crucial point of view of the employer.

This study aimed to understand not only employers' perceptions of ePortfolios, but also the factors that may contribute to their willingness to utilize them. We predicted that recruiters with fewer years of experience may be more comfortable navigating digital resources such as ePortfolios. Because of this divide, organizations may need to train their more seasoned

recruiters to help them understand the benefits of ePortfolios in the recruitment process.

As shown in Tables 1 and 2, results indicated that recruiters with fewer years of experience were significantly more willing to visit ePortfolio links on students' cover letter, resume, or e-mail signature than recruiters with more years of experience. These findings contribute to the idea that recruiters with fewer years of experience have more favorable perceptions of ePortfolios. This research fills a gap in existing ePortfolio research by examining strictly the perceptions of employers and recruiters in regard to their years of experience. Although this study provided relevant and positive conclusions about ePortfolios, there were some limitations and implications for future research.

Limitations and Future Research

Although this study incorporated the perspectives of 85 different recruiters, it would be beneficial for future researchers to study more employers. We chose to split groups as evenly as possible based on the mean years of experience. These data could have been analyzed differently. After reviewing the hypothesis and findings, it is apparent that inferences were made based on years of experience. These inferences may have led to inaccurate assumptions by correlating recruiters' years of experience with their age. In addition, comfort with technology was presumed based on age. However, this was not asked in the survey. Future research should ask questions about an employer's age and perceptions of technology in order to account for potential generational differences. Additionally, in order to obtain employers' perceptions about ePortfolios, future researchers could provide links to students' ePortfolios and get specific feedback about content and layout.

Conclusion

This study provided empirical data about employers' perceptions of ePortfolios. The results indicated that overall, regardless of years of experience, recruiters had a moderately positive impression of the use of ePortfolios. While ePortfolios are still relatively new in recruitment, employers have expressed a high level of interest, indicating a promising future for the use of ePortfolios in the job search process (Yu, 2011). As employers and applicants begin to adopt this job-search tool, ePortfolios have the potential to change the way we view application methods. Although the use of ePortfolios in the job search is relatively new, in the final open-ended question of the survey, one employer highlighted how ePortfolios can be used as a tool in the employment process:

In my current role I hardly see ePortfolios from candidates. However, if a candidate did send me a link to the ePortfolio prior to their interview, I would definitely look at it. As a job seeker, you want to do everything you can to get to the interview stage. The ePortfolio, along with a strong resume and references, could be used as a great reason for an employer to bring you in and interview you. If used effectively, I believe it could be a useful tool.

Based on the results of this study, educators may wish to encourage their students to use ePortfolios in the job search process on their cover letters, resumes and e-mail signatures.

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ARIANA FILIATRAULT co-authored this paper as an undergraduate student at the University of Wisconsin-La Crosse. She graduated in May 2017.

Appendix
Survey About Employment ePortfolios

Directions: Please answer the following questions.

How long have you recruited potential employees?

Including your current and previous employment, how long have you been employed?

Please circle your level of agreement with the following statements:

1) Electronic portfolios are useful to communicate applicants' skills necessary to succeed in our organization.

   Strongly agree   Agree   Undecided   Disagree   Strongly disagree

2) Electronic portfolios (ePortfolios) would be a valuable tool for our company's recruiting.

   Strongly agree   Agree   Undecided   Disagree   Strongly disagree

3) If students followed up with me via e-mail with a link to a relevant part of their ePortfolio, I would visit it.

   Strongly agree   Agree   Undecided   Disagree   Strongly disagree

4) If students offered to show me a relevant part of their ePortfolio during a job fair via tablet (e.g., iPad), I would be interested.

   Strongly agree   Agree   Undecided   Disagree   Strongly disagree

5) If students put a link to their ePortfolio on the top of their resume, I would visit it.

   Strongly agree   Agree   Undecided   Disagree   Strongly disagree

6) If students had a link to their ePortfolio on their e-mail signature or cover letter, I would visit it.

   Strongly agree   Agree   Undecided   Disagree   Strongly disagree

7) I use the internet to examine potential recruits' digital footprint.

   Strongly agree   Agree   Undecided   Disagree   Strongly disagree

8)   When is the best time for students to introduce their ePortfolios?
        A.   An e-mail preview prior to the interview
        B.   During the interview
        C.   An e-mail follow-up after the interview
        D.   Other (please explain).

9) Rate the importance of ePortfolios in recruitment.
              1   2   3   4   5   6   7   8   9   10
           Not at all   Extremely
           Important   important

10) Is there anything else you would like to add that would be helpful for college students to know about recruitment at Career Fairs?

The Value of Career ePortfolios on Job Applicant Performance: Using Data to Determine Effectiveness

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This research project investigated how the development of an ePortfolio, combined with ePortfolio pedagogies, impacted the interview performance of undergraduate students as they prepared to enter the job market. Participants were students in the Health Sciences and Biosystems Engineering programs at Clemson University, enrolled in ePortfolio-developing capstone or internship classes in the 2014-2015 or 2015-2016 academic years. Participants were randomly assigned to complete mock interviews after engaging in different interventions, such as cover letter and resume development and ePortfolio pedagogy. A one-way ANOVA revealed that students demonstrated statistically significant higher quality interview skills after engaging in ePortfolio pedagogy mentoring sessions, compared to students who received limited or no interventions. ePortfolios created in 2014, without the study's ePortfolio pedagogy training, were compared against the portfolios from this research project. T-test analysis revealed statistically significant improvements in overall ePortfolio quality in the courses utilizing the study's ePortfolio pedagogy.

In the current job market, applicants are looking for any advantage that sets them apart from others. Colleges and universities around the country are recommending that students develop a web or paper-based career portfolio that showcases their experiences and skills most relevant to specific jobs/industries. Research on the effectiveness of this practice is diverse with varied findings. Lievens (2014) posited that, in this era of job scarcity, an ePortfolio could lead to better worker-to-job matches, increased worker mobility, and reduced unemployment levels. Throughout their use in academia and elsewhere, an element of reflection has been considered standard practice with ePortfolios, described by Wolf and Dietz (1998) as a "structured collection of teacher and learner work created across diverse contexts over time, framed by reflection and enriched through collaboration that has as its ultimate aim the advancement of teacher and student learning" (p. 13).

Literature Review

Employer Perceptions of Using Career Portfolios in the Job Search

Historically, career portfolios have been a primary component of application materials in arts and architecture-related fields. In the 1980s, paper portfolios were introduced within teacher education job portfolios searches (Lyons, 1998), and since that time, researchers and practitioners have noted their use as a learning tool in teacher education undergraduate programs (Barton & Collins, 1993; Loughran & Corrigan, 1995; Ring & Foti, 2006). The introduction of ePortfolios into higher education, specifically in teacher education programs, has provided a space for researchers to understand the value or ePortfolios, as

well as their usefulness in the job search process. There has been much written about the advantages and disadvantages of ePortfolios in the hiring process, when combined with resumes, references, letters of recommendation, and transcripts, with some studies noting value (Association of American Colleges and Universities, 2013; Brammer, 2007; Theel & Tallerico, 2004), while others reporting hiring practitioners' indifference toward portfolios (Ward & Moser, 2008; Whitworth, Deering, Hardy, & Jones, 2011; Yu, 2012).

The Association of American Colleges and Universities (2013) surveyed 318 employers whose organizations consisted of at least 25 employees and reported 25% or more of new hires from two and four-year colleges and universities. The study found that more than 80% of survey respondents considered ePortfolios useful when they demonstrated that applicants had the knowledge and skills necessary for success within their companies. ePortfolios were also considered useful in summarizing and demonstrating a candidate's accomplishments in key skill and knowledge areas (e.g., effective communication, knowledge in their field, applied skills, evidence-based reasoning, and ethical decision-making).

Ward and Moser (2008) conducted a study surveying 5,310 employers on their use of ePortfolios in the recruitment and selection process. Although they found limited use of ePortfolios across their sample, higher use was present among the fields of education, health care, and social services. The reasons for the limited use, at an overwhelming 75%, were that employers were unfamiliar with ePortfolios. With that said, however, 56% of survey participants noted that they planned to use ePortfolios in future hiring, which led Ward and Moser to point out that colleges and universities should communicate to recruiters how time-

saving and cost-effective ePortfolios can be in terms of accessibility, storage, and qualification matching.

Paper and electronic portfolios have been beneficial for disciplines such as teacher education; however, hiring officials reported mixed feelings about their efficacy in identifying qualified applicants. Ndoye, Ritzhaupt, and Parker (2012) surveyed principals throughout southeastern United States (*n* = 78) and noted that they were more likely to use portfolios during the interview process or during the initial screening of candidates. While they appreciated that portfolios contained information about the candidates and showcased artifacts that demonstrated evidence of accomplishment, they found portfolios to be time-consuming to review and lacked a connection to classroom practice.

Whitworth et al. (2011) surveyed education faculty and school administrators on the effectiveness of including an ePortfolio in teacher candidate applications and found that they were valued during the hiring process, but not as highly as other factors. Moreover, they also pointed out that hiring professionals had limited time to review ePortfolios. Administrators noted, however, that portfolios demonstrated what a teacher candidate had accomplished in the classroom. In addition, they noted that new teachers used portfolios as a means of self-reflection in developing a model of their work.

Although the opinions regarding the use of ePortfolios in the hiring process are mixed, the shift toward online job applications has provided an avenue for the use of an ePortfolio to supplement an electronic application. Furthermore, the career ePortfolio could be a viable concept in light of careers becoming increasingly without boundaries, with more complex and multifaceted career progression across organizations, sectors, and regions (DeFillippi & Arthur, 1996; Gunz, Evans, & Jalland, 2000). Several studies (Brammer, 2007; Fowler, 2012; Theel & Tallerico, 2004) found that ePortfolios served a key role in illustrating applicant credentials. Fowler (2012) conducted a case study to determine if manufacturing and services sector employers found value in the use of an ePortfolio in the hiring process, and developed an ePortfolio template that could be used within career and technical education. Results showed that when hiring-supervisors viewed electronic portfolios containing detailed information relevant to the position advertised, they were able to determine more efficiently that their future hires had the skills necessary for success in their organizations. The findings also suggested that electronic portfolios provided greater depth of information and deeper connections across information, thus saving the staff time and contributing to a stronger final interview.

The use of ePortfolios in fields outside of education has been slower to catch on, and much of the research conducted in other disciplines focuses more on the processes involved in the construction of ePortfolios and the pedagogy behind them than on their use in the job search process. Reflection and critical analysis are fundamental to the development of an ePortfolio, and these activities facilitate self-assessment and identity development (Cambridge, 2010; Garis, 2007; Nguyen, 2013). Svyantek, Kajfez, and McNair (2015) concluded that the development of an ePortfolio that incorporates both reflective and integrative thinking could help alleviate the disconnect that engineering students have between their graduate academic experiences and their intended careers. Specifically, reflecting on and writing about experiences and accomplishments over time and addressing multiple identities helped students to recognize both their strengths and weaknesses. Moreover, they argued, activities such as ePortfolio development can enhance these experiences by providing students with opportunities to envision professional identities and to begin balancing their values and goals across the roles of researcher and teacher. These types of reflective activities may even help them improve the quality of their work as graduate students and faculty and examine productive ways to achieve work-life balance (Syvantek et al., 2015).

In their study on the use of ePortfolios with medical school students, Ross, MacLachlan, and Cleland (2009) suggested that, despite the increasing popularity of ePortfolios in medical education, there may be a culture in medicine that does not support reflective thinking. They contended that the introduction and support of ePortfolios and ePortfolio pedagogy could help change the attitudes students have toward reflection in general.

A study on identity construction and the use of ePortfolios in music and writing programs by Bennett, Rowley, Dunbar-Hall, Hitchcock, and Blom (2016) revealed three major conclusions:

> First, as students' ePortfolios are developed, they quickly transition from being an archive to being a fluid self-portrait. Second, ePortfolios represent vehicles through which identity can be negotiated and constructed. Third, the very process of developing an ePortfolio prompts students to adopt future-oriented thinking. (p. 118)

This lends further credence to the belief that the value of an ePortfolio lies in the process of development through which learners create their professional identities, which they are then better able to convey in the interview process.

### Study Justification—Area of Inquiry

Although Whitworth et al. (2011) claimed that ePortfolios were not the most effective means of

Table 1
Mock Interview Treatment Interventions

Group	Participants	Intervention	Period when mock interviews were completed
1	25%	None	At beginning of semester
2	25%	Career focused training on developing a resume and cover letter	After career focused training and revision of resume
3	50%	Career focused training. Training on ePortfolio technology and collecting and selecting work. ePortfolio pedagogical training on collection and critical reflection	After career focused training and ePortfolio pedagogical training and revision of ePortfolio

Note. All students submitted ePortfolios to the ePortfolio Program administrators for further review at the end of the semester.

Figure 1
Intervention and Data Collection Process
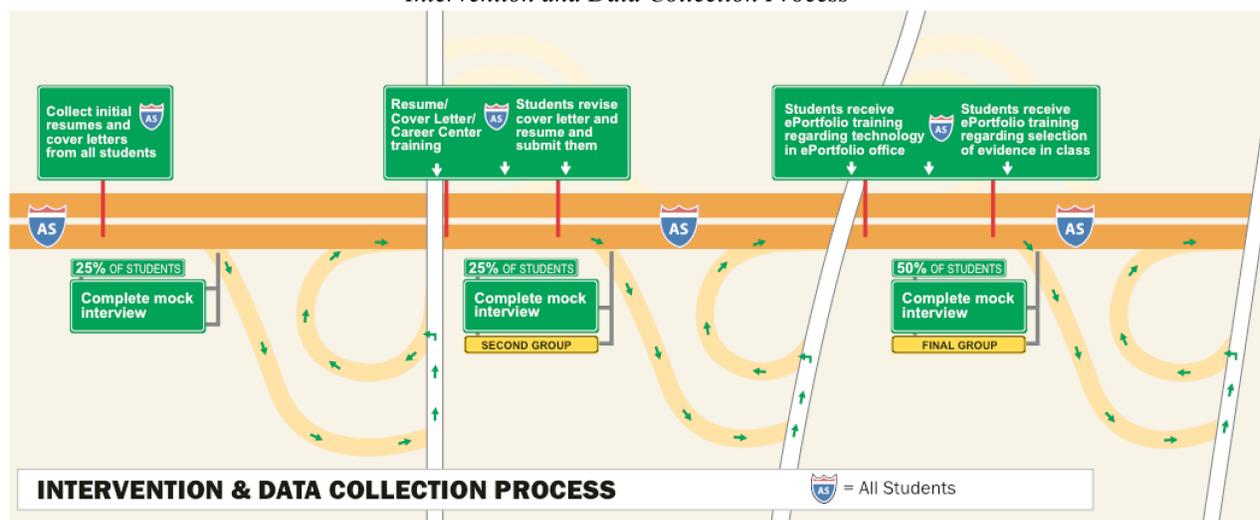
identifying and recruiting teacher candidates, they concluded that

> teacher applicants may derive more value from portfolios than those who are involved in hiring teachers. Respondents in their study recognized the value of portfolios in helping prospective teachers reflect on their abilities and skills and anticipate and organize answers to possible interview questions. (p. 102)

Minimal research currently exists that supports this finding and sheds light on the degree to which students learn and develop throughout the construction and utilization of a career ePortfolio. The current body of literature has revealed disciplinary trends regarding which types of programs actively encourage undergraduates to complete career ePortfolios and the degree to which employers value the information contained in those portfolios. However, a gap exists in the literature regarding the impact an ePortfolio has on student development.

This research provides quantitative data illustrating how students improve in their career development as a result of developing an integrated, reflective ePortfolio. Two research questions guided this study:

1. When students take part in a targeted portfolio development program, what is that program's impact on the overall quality of the career portfolios produced by participating students, compared to the portfolios produced without the program?

2. In what ways does the development of an ePortfolio, when accompanied by targeted ePortfolio development sessions, impact the interview performance of students completing their undergraduate degrees and entering the job market?

Methods

Subjects and Procedure

To determine how creating an ePortfolio impacted a student's ability to perform in a job interview, data was compared that had been collected from a series of mock interviews from 52 students enrolled in either a HLTH 4190 Health Science Internship Preparation Program course or BE 4740 Biosystems Engineering Design/Project Management at Clemson University. The students in this study were selected because they were required to submit an ePortfolio as an assignment in these courses. The students were also equivalent to one another in terms of their educational experience at Clemson and their professional backgrounds and aspirations.

Participants were separated randomly into three groups, where Group 1, the control group ($n = 12$), did not receive any career preparation training prior to doing a mock interview, and Group 2 ($n = 12$) received training on how to write an effective cover letter and resume prior to their mock interviews. Health sciences students received the training from their professor, who also included interviewing techniques, while the biosystems engineering students attended a workshop conducted by the Career Center. Group 3 ($n = 28$) received specialized ePortfolio pedagogical instruction from administrators from Clemson University's ePortfolio Program, in addition to the career-focused training prior to their mock interviews. Table 1 provides a more detailed representation of the research design of the project, identifying the interventions and the points in the semester when they occurred, while Figure 1 provides a graphic

depicting the intervention and data collection process.

The ePortfolio pedagogical instructions focused on helping students select appropriate artifacts, articulate why these artifacts were selected, and analyze their work as a whole to contextualize how it contributed to their professional identity. The sessions also emphasized critical thinking and reflection on the elements in their portfolios. This instruction was modeled after Kolb's (1984) experiential learning theory model, which defines learning as "the process whereby knowledge is created through the transformation of experience, and knowledge results from the combination of grasping and transforming experience" (p. 41).

Prior to their one-on-one sessions, students received instruction on web portfolio technology using WIX online webpage development software and were asked to complete a draft of their portfolios before participating in these sessions. Using their resumes, academic records, and extracurricular activities as a starting point, students were asked to write draft reflections on the potential artifacts to be placed in their portfolio using a "What?", "So what?", "Now what?" model (Table 2) designed to help them connect past experiences with present understanding and future use or action.

Students were asked to apply these questions not only to course-related assignments, but also to work and internship experiences and extracurricular activities. Each individual artifact placed in students' portfolios was scrutinized in these sessions, using the written reflections as the basis for the ensuing conversations. Not surprisingly, students did a great job of answering the "what" question, but struggled with the "so what" or "now what" questions. The goal of this exercise was to have students reflect on the "hard learning" situated within their major courses of study, as well as to explore the development of their "soft" or "transferable skills" such as teamwork, communication, and leadership (Princeton Career Services, 2017). We hoped that students, by formally exploring and reflecting on these skills, would have a better sense of how to answer questions related to these topics in an interview setting.

Table 2
What, So What, Now What With Guiding Questions

Reflective category	Guiding questions
What?	What did I do? What was the assigned task?
So what?	What did I learn from this experience? What was the importance and/or significance of my discovery learning?
Now what?	How can I use the learning in the future? What am I prepared and equipped to do as a result of this learning experience?

An ePortfolio administrator who is also a member of the research team scored each of the mock interviews from both disciplines using a detailed interview quality rubric (Appendix A) designed in collaboration with faculty in the disciplines participating in this study and the career center staff. As career development experiences were investigated to determine how they impacted a student's ability to articulate his or her skills and experiences in an interview, it was predicted that there would be a progressive and positive difference in overall mock interview scores as students advanced through the various training opportunities, with the highest scores achieved by the students who participated in the one-on-one ePortfolio pedagogy training.

As a course requirement, students in HLTH 4190 create and add to an ePortfolio. To determine the impact that the one-on-one ePortfolio pedagogical training had on students' overall ePortfolios, the research team evaluated the 2015 health sciences ePortfolios in the study ($n = 29$) against those created a year prior in the same course ($n = 45$), taught by the same faculty member with technology training from the University Information Technology unit, but without the one-on-one ePortfolio pedagogy training. Again, in collaboration with the health sciences course instructor, the research team developed a detailed ePortfolio scoring rubric (Appendix B) and scored each of the 2014 and 2015 portfolios accordingly. Three students from the original 2014 roster deleted their online portfolio content prior to the research team's 2015 evaluation, and those items were removed from the overall dataset.

Data Analysis

To determine the difference in the quality of the ePortfolios, independent two sample *t*-tests were conducted to test for differences between students who produced an ePortfolio for the 2014 spring semester and students who produced portfolios during the 2015 treatment semester. In the second portion of the research project, to determine the differences between how each career treatment group in both disciplines performed in their mock interviews, a one-way ANOVA was used. Our baseline control group (Group 1) participated in mock interviews at the beginning of the semester, prior to any career development interventions. Group 2 completed the interviews after receiving career focused training on resume and cover letter development, with the health science students receiving additional interviewing technique instruction from their instructor; Group 3 completed the interviews after participating in the aforementioned career-focused training and ePortfolio pedagogical instruction.

Results

ePortfolio Comparisons

A quality ePortfolio, as determined by the research team, contains six primary components: high quality structure and navigation, correct grammar, in-depth reflection, integration of content, quality of content, and collaboration. The researchers also assigned an overall holistic score on the quality of the portfolio being evaluated. To answer the first research question (When students take part in a targeted portfolio development program, what is that program's impact on the overall quality of the career portfolios produced by participating students, compared to the portfolios produced without the program?), the relationship between ePortfolio pedagogical training and ePortfolio quality was examined. We determined that, across the board, there was an improvement in ePortfolio quality in the 2015 students for all rubric evaluation components, compared to the 2014 students who did not receive the study's targeted ePortfolio pedagogical instruction. Table 3 illustrates the average descriptive scores for each rubric component for each class of students. The results of an independent means *t* test, conducted through SPSS and as illustrated in Table 3, indicated that there was a statistically significant difference between the two groups of students related to the structure and navigation of the sites ($t[82] = 6.61$, $p = .000$, $d = 1.20$), their grammar ($t[82] = 2.99$, $p = .004$, $d = .57$), the holistic scores ($t[72.57] = 2.60$, $p = .01$, $d = .48$), and the overall summative total ePortfolio scores ($t[82] = 3.22$, $p = .002$, $d = 1.29$). It is important to note that the ePortfolio rubric scores were not normally distributed for each cohort, as assessed by Shapiro-Wilk's test ($p > .05$); however, we determined that these data were robust enough to proceed, given the relatively equal cohort group sizes. The assumption of variances was violated for the holistic score of the rubric, as assessed by Levene's test for equality of variances, and in that instance we provided the results from a Satterthwaite approximation.

Mock Interview Performance, Given Career Development Interventions

To answer the second research question (In what ways does the development of an ePortfolio, accompanied by targeted ePortfolio development sessions, impact the interview performance of students completing their undergraduate degrees and entering the job market?), we conducted descriptive statistics and one-way ANOVA analyses of our student mock interview data. To serve as the basis of our interview evaluation rubric, we determined that a student completing a high quality mock interview must be able

Table 3
*Results of T-test and Descriptive Statistics for ePortfolio Rubric Evaluation and
Comparison Results of 2014 and 2015 HLTH 4190 Students*

	2014 HLTH 4190 Student portfolios			2015 HLTH 4190 Student portfolios			95% CI for Mean difference	t	df
	M	*SD*	*N*	*M*	*SD*	*n*			
Structure and navigation	2.16	0.67	45	3.15	0.71	39	0.70, 1.30	6.61***	82
Grammar	2.38	0.78	45	2.87	0.73	39	0.16, 0.83	2.99**	82
Reflection	1.91	0.67	45	2.15	0.87	39	-0.09, 0.58	1.44	82
Integration	1.91	0.70	45	2.23	0.78	39	-0.001, 0.64	1.98	82
Content	2.33	0.83	45	2.49	0.91	39	-0.22, 0.53	0.81	82
Collaboration	1.40	0.58	45	1.56	0.72	39	-0.12, 0.45	1.16	82
Holistic score	1.93	0.62	45	2.33	0.77	39	0.09, 0.71	2.59**	72.57
Total score	12.09	3.32	45	14.46	3.42	39	0.91, 3.83	3.22***	82

Note: For the holistic score of the rubric, a Satterthwaite approximation was employed due to unequal group variances.
***$p < .001$. **$p < .01$. *$p < .05$.

Table 4
*Descriptive Statistics for Mock Interview Rubric Evaluation, Comparing Control Group,
Career-Focused Intervention, and ePortfolio Pedagogy Intervention*

	Control group 1 (Group 1)				Career-focused intervention (Group 2)				Career-focused and ePortfolio pedagogy interventions (Group 3)			
	M	*SD*	*n*	95% CI	*M*	*SD*	*n*	95% CI	*M*	*SD*	*n*	95% CI
Interview skills and techniques	1.58	0.51	12	1.26, 1.91	1.83	0.72	12	1.38, 2.29	2.50	0.64	28	2.25, 2.75
Personal attributes	2.25	0.13	12	1.96, 2.53	2.17	0.39	12	1.92, 2.41	2.71	0.46	28	2.54, 2.89
General attitude	2.33	0.49	12	2.02, 2.65	2.58	0.51	12	2.25, 2.91	2.46	0.58	28	2.24, 2.69
Self-promotion ability	1.75	0.45	12	1.46, 2.04	1.75	0.45	12	1.46, 2.04	2.00	0.52	28	1.85, 2.15
Response quality	1.92	0.79	12	1.41, 2.42	1.92	0.67	12	1.49, 2.34	2.68	0.48	28	2.49, 2.86
Total score	9.83	1.75	12	8.72, 10.94	10.25	1.71	12	9.16, 11.34	12.57	1.66	28	11.93, 13.22

to demonstrate several competencies: interview skills and techniques, personal attributes, general attitude, a self-promoting ability, and response quality. Those competencies served as the components of the mock interview evaluation rubric (see Appendix B).

Table 4 reveals the descriptive data of the mock interview rubric components, comparing across the three student groups. What was clear from that data was that, overall, with each progressive level of treatment the average interview score improved. When we examined the rubric competencies themselves, we discovered that this same trend emerged for almost all of the individual mock interview rubric areas, as the

majority of scores either progressively improved or, on rare occasion, stayed the same.

For the most part, students completing the mock interview after participating in the ePortfolio pedagogical training (Group 3) demonstrated improved interview skills, conveyed engaging personalities, engaged in specific self-promotion, and provided adequately-timed responses to interview questions than Groups 1 and 2. However, Group 2 exhibited a more positive attitude than both Groups 1 and 3. In addition, Group 1 conveyed more engaging personalities than Group 2. One possible explanation for these findings could be related to the timing of the interviews, in that

Table 5
One-Way ANOVA of Mock Interview Scores by Career Treatment Groups

Rubric components		df	SS	MS	F	p
	Between groups	2	8.47	4.24	10.60	< 0.001*
Interview skills and techniques	Within groups	49	19.58	0.40		
	Total	51	28.06			
	Between groups	2	3.35	1.68	8.52	0.001*
Personal attributes	Within groups	49	9.63	0.20		
	Total	51	12.981			
	Between groups	2	0.38	0.19	0.63	0.536
General attitude	Within groups	49	14.55	0.30		
	Total	51	14.92			
	Between groups	2	2.79	1.39	6.09	0.004*
Self-promotion ability	Within groups	49	11.21	0.23		
	Total	51	14.00			
	Between groups	2	7.50	3.75	10.25	< 0.001*
Response quality	Within groups	49	17.94	0.37		
	Total	51	25.44			
	Between groups	2	83.75	41.87	14.58	< 0.001*
Total score	Within groups	49	140.77	2.87		
	Total	51	224.52			

the earlier in the semester the students did the interviews, the better their attitudes overall. Student interest and enthusiasm for this project may have waned as they progressed throughout the semester, leading to lower quality attitudes and personal attributes.

Unpacking Interview Improvements

To determine if the differences in interview skill improvements in the career instruction and ePortfolio groups were statistically significant, one-way ANOVA analyses were completed. Table 5 summarizes those results. The ANOVA we calculated first revealed a significant main effect for students' interview skills and techniques (F[2, 23.65] = 12.01, p = .0001, *partial* $\eta2$ = .30), personal attributes (F[2, 24.07] = 8.73, p = .001, *partial* $\eta2$ = .26), self-promotion ability (F[2, 24.13] = 6.02, p = .008, *partial* $\eta2$ = .20), response quality (F[2, 19.22] = 9.40, p = .001, *partial* $\eta2$ = .30), and their overall total score of all rubric components (F[2, 22.69] = 14.00, p = .0001, *partial* $\eta2$ = .38).

Since the homogeneity of variances was violated in these data, a Games-Howell post hoc analysis (see Table 6) revealed that the group who received ePortfolio pedagogy (Group 3) significantly outperformed both the control group (Group 1) and the group who received career-focused instruction (Group 2) in all rubric areas, with significant main effects. In addition, no statistically significant differences were found in interview scores between the control group

and the group who received career-focused instruction for any of these rubric components.

Taken together, these one-way ANOVA results suggest that ePortfolio instruction had a unique, positive effect on students' abilities to convey verbal and nonverbal information appropriately, to express engaging personalities, to participate in specific self-promotion, and to provide adequately timed responses to interview questions.

Discussion

The results of this study support the hypothesis that participating in ePortfolio pedagogical sessions positively affects students' performance in mock interviews in both the health sciences and bioengineering disciplines. After participating in these sessions, students developed a higher-quality ePortfolio overall than those who did not, based on the 2014 and 2015 health sciences comparisons. Moreover, after participating in one-on-one ePortfolio consultations, students from both disciplines were better able to articulate what they know and how they know it during the mock interviews, suggesting both a need for, and a benefit of, providing students ePortfolio pedagogical training based on the levels of career development interventions that they were given during the semester. It is also important to note that our research suggests that when career readiness training is combined with ePortfolio pedagogical training the overall effectiveness

Table 6
Games-Howell Comparisons for Treatment Groups on Rubric Components with Significant Main Effects

Rubric component	Comparisons	Mean difference	Std. error	95% CI for mean difference
Interview Skills and Techniques	Group 3 treatment vs. Group 1	0.92***	0.19	0.44, 1.39
	Group 3 vs. Group 2 treatment	0.67*	0.24	0.06, 1.28
	Group 2 vs. Group 1	0.25	0.26	-0.40, 0.90
Personal Attributes	Group 3 vs. Group 1	0.46*	0.16	0.07, 0.86
	Group 3 vs. Group 2	0.55*	0.14**	0.19, 0.90
	Group 2 vs. Group 1	-0.08	0.17	-0.52, 0.35
Self-Promotion Ability	Group 3 vs. Group1	0.46*	0.16	0.06, 0.87
	Group 3 vs. Group 2	0.46*	0.16	0.06, 0.87
	Group 2 vs. Group 1	0.00	0.18	-0.46, 0.46
Response Quality	Group 3 vs. Group 1	0.76*	0.25	0.12, 1.40
	Group 3 vs. Group 2	0.76**	0.21	0.21, 1.31
	Group 2 vs. Group 1	0.00	0.30	-0.75, 0.75
Total Score	Group 3 vs. Group 1	2.73***	0.60	1.23, 4.24
	Group 3 vs. Group 2	2.32**	0.60	0.84, 3.80
	Group 2 vs. Group 1	0.42	0.71	-1.36, 2.19

Note. *** $p<.001$, ** $p<.01$, * $p<.05$.

of the career center training increases. Furthermore, as Watson, Kuh, Rhodes, Penny-Light, and Chen (2016) pointed out, there is both a need and an opportunity to create closer connections between a student's formal records and credentials and actual evidence of learning.

Implications for Practitioners

The conclusions that we draw from this study suggest there is value in the *process* of developing an ePortfolio, particularly when ePortfolio pedagogies are applied. Another conclusion drawn from this study is that engaging students in purposeful and iterative self-reflective dialogue centered on evidence collected in ePortfolios positively improves their abilities to communicate their accomplishments in mock interviews, which could translate to actual interview settings. Furthermore, upon graduation, students with ePortfolios have the physical evidence of knowledge and self-reflection skills to form cohesive professional identities. This study provides evidence that supports the use of ePortfolios at the programmatic or institutional level for rising upper-class students who are reflecting upon their undergraduate experiences as they seek internships and full-time positions after graduation. That evidence can be helpful for ePortfolio administrators, career services directors/staff, and individual academic program coordinators/faculty.

Implications for Future Research

One implication from this study pertains to the scalability of the pedagogical training. The success of

this project was influenced by the inclusion of the ePortfolio pedagogy described earlier. Although the campus career center was enthusiastic about the results, they pointed out that most college and university career centers are not equipped to provide the one-on-one mentoring described in this paper. Moreover, prior experience with faculty suggests that they, by and large, are also unable to provide this support because of the time involved. Future expanded research on this topic could incorporate different approaches to the pedagogical instruction. For example, does replicating the one-on-one pedagogical training in a workshop setting, where the professor will pose questions to the class designed to engage students in deeper reflection and connection-making, yield the same benefits as the approach described in this paper? Another method for future research relates to the use of technology to scaffold students in the ePortfolio process, building prompts into an ePortfolio system that help students think through and answer the "what?", "so what?", and "now what?" questions, which could possibly address the scalability concerns posed by the career center.

Limitations

One possible limitation to this study pertains to the timing of the mock interviews. The fact that the ePortfolio pedagogy-related interviews (Group 3) took place at the end of the academic semester, compared to the other groups who completed their interviews at the start and the middle of the semester, respectively, may account, in a limited sense, for the higher scores, since

students may have learned and grown more in various aspects in those few weeks. It may also account for why Group 2 had a lower personal attributes score than Group 1 and why the Group 3 had a lower average general attitude score than Group 2, since they may have experienced an end of semester fatigue or malaise.

An additional limitation is the possibility of reviewer bias, since a member of the research team scored the mock interviews and it is possible that knowledge of which students received the additional training may have influenced the scores. This was an intentional action on the part of the research team to ensure consistency and comparability with the mock interview data collected for the health sciences students. Future studies will allow for this bias through a blind review of both the mock interview videos and student portfolios.

Concluding Implications

As (Fowler, 2012) pointed out, "a chasm exists in the literature between the use of the electronic portfolio for educational assessment and the job search" (p. 200). This research attempts to bridge the gap by shedding light on the benefits that the development of an ePortfolio has for students entering the job market. The data collected in this study confirm our initial predictions that engaging students in purposeful and iterative dialogue centered on the evidence collected in their ePortfolios positively influences their ability to communicate their accomplishments to a potential employer. Moreover, the opportunity to present this information in digital format makes the previously unseen visible to students and employers alike. We hope that this research encourages colleges and universities to support students in the development of career portfolios thus providing their students physical evidence of knowledge gained throughout their undergraduate experiences upon graduation. In addition, the development of an ePortfolio allows students to engage in the process of self-reflection and continuous professional identity development.

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Appendix A

Mock Interview Evaluation Rubric

Measure	3	2	1
Interview skills/techniques	Student follows instructions and look at the camera. Language and grammar is appropriate. Does not use "um" or "and". Speaks at the right speed.	Student follows instructions and looks at the camera. Language and grammar are adequate. Says "um" or "and" a few times, but not enough to disrupt the interview. Speaks a little too fast or too slow.	Student looks at the floor or ceiling when speaking. Grammar and language are not appropriate. Say "um" or "and" too many times. Speak too fast or too slow.
Personal attributes	Student is confident and poised during interview; right volume used, humor, correct grammar.	Student is somewhat nervous, some lapses in eye contact; speaks too loudly or softly.	Student is overbearing, overaggressive, egotistical; or shy, reserved, and/or overly nervous.
General attitude	Student is interested and enthusiastic about the interview.	Student seems interested but could be better prepared.	Student has lack of interest and enthusiasm is passive and indifferent; or student is overly enthusiastic.
Self-promoting	Student answers questions with reference to strengths, skills and abilities and how these will contribute to the position.	Student answers a few questions with some reference to personal strengths, skills and abilities.	Student answers questions in generalities with no reference to personal strengths, skills and abilities.
Responses	Student gives well-constructed, confident responses that are genuine and give specific examples.	Student gives well-constructed responses, but sounds rehearsed or unsure.	Student answers with "yes" or "no" and fails to elaborate or explain; or gives unfocused, long-winded responses .

Appendix B

Portfolio Evaluation Rubric

Measure	4	3	2	1
Structure navigation	Organization of the portfolio is logical and easy to follow relationships among portfolio elements are evidenced by workable hyperlinks and navigation elements (3 pts); Has no missing graphics and graphic files are appropriate format and load quickly (1 pt).	Organization of the portfolio is logical and easy to follow (1pt); Most of the elements are evidenced by workable hyperlinks and navigation elements. Has no missing graphics and graphic files are appropriate format and load quickly.	Organization of the portfolio is confusing; There are substantial problems with hyperlinks and navigation elements. Has missing graphics and graphic files are incorrect format and take time to load.	There are a significant number of missing and/or broken hyperlinks and/or graphics. Content is missing.
Grammar, spelling, and mechanics	Writer follows all guidelines for spelling, grammar, usage, mechanics, etc. Sentences are strong and have a varied structure (0 errors).	Sentences, for the most part, are strong and have varied structure. Writer follows most guidelines, but some sentences are unclear, uneven, or contain errors (May contain 1-2 errors).	Simplistic writing style following some guidelines, but sentences may contain multiple errors and are difficult to understand (1-3 errors).	Writer has difficulty following guidelines; most sentences contain numerous errors and cannot be understood (5 or more errors).
Reflection	Portfolio contains evaluation of strengths and weaknesses and lessons learned.	Portfolio contains limited evaluation of strengths and weaknesses.	Portfolio contains shallow introspection without strengths and weaknesses or a statement of learning.	Descriptive but not reflective statements.
Integration	Portfolio contains multiple pieces of evidence to demonstrate a range of content with extensive connections made across.	Portfolio contains multiple pieces of evidence to demonstrate a range of content with limited connections made across.	Portfolio contains single pieces of evidence within each section of that demonstrate a range of content with limited connections made across.	Portfolio has not connections across sections or within the entire portfolio.
Content	Portfolio has multiple pieces of evidence to demonstrate a range of content with depth of reflection and analysis.	Portfolio has multiple pieces of evidence with limited reflection.	Portfolio contains a single piece of evidence within each category with no reflection.	Portfolio contains no academic or professional evidence.
Collaboration	Portfolio includes a group project and provides an analysis of group interaction and must include student's individual role in project.	Portfolio includes a group project and provides a shallow analysis of group interaction. Portfolio may include a student's individual role in the project.	Portfolio includes a group project with no analysis of group interaction.	Portfolio does not include information about a group project.