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Guidance for ePortfolio Researchers: A Case Study with Implications for the ePortfolio Domain

Emily Kennelly, Debra Osborn,
Robert Reardon, and Becka Shetty
Florida State University

This study examined whether or not students using a career ePortfolio, including a matrix for identifying and reflecting on transferrable skills, enabled them to rate their skills more confidently and positively after a simulated (mock) job interview. Three groups were studied: those completing the skills matrix in the ePortfolio; those using the ePortfolio but not the skills matrix; and those not using the ePortfolio. Results of a one-way ANOVA indicated no significant score differences among groups on a self-reported skill survey. However, other findings pertained to difficulties in conducting research on the effectiveness of online career ePortfolios and suggestions for correcting such problems in the future.

Career ePortfolios are popular in higher education and are used in varied ways to encourage reflection on the meaning of life experiences, to provide a link between academic learning and outside activities, to assess student learning, and to increase students' skills in the use of technology (Clark & Eynon, 2009; Kruger, Holtzman, & Dagavarian, 2013; Peet et al., 2011). This phenomenon, connected to a massive technology infusion in education (Ayala, 2006), has been marked by claims of the usefulness of such ePortfolios (Batson, 2002; Buyarski & Landis, 2014; Fitch, Peet, Glover, & Tolman, 2008), and for enhancing student services such as academic advising (Ambrose & Ambrose, 2013). Empirical studies on student outcomes of using ePortfolios have continued to increase over time. Bryant and Chittum (2013) reported 49% of the 118 peer-reviewed articles they reviewed as empirical in nature. However, Ayala (2006) noted that fewer than 5% of over 300 articles reviewed on ePortfolios provided any data from students about their needs or concerns. Most of the articles he reviewed focused on accountability and assessment issues that are largely of concern to administrators. The present study sought to address this issue by examining the impact on career behavior of student's voluntary participation in an ePortfolio program.

Outcome studies on the use of ePortfolios with students have found positive results of enhanced major and career exploration (Buyarski & Landis, 2014). Buyarski and Landis (2014) examined 47 student ePortfolios and found that out of five learning outcomes, the mean score for major and career exploration was the highest (1.68), followed by self-assessment and awareness (1.62), and goal setting (1.33), for students enrolled in a first-year experience course. In examining pieces of authentic evidence, major and career exploration had the second highest amount (1,125), after understanding of self (1,804). According to the researchers, the majority of the authentic evidence for major and career was information-based and showed some connection to self-understanding (Buyarski & Landis, 2014). However, the mean scores for all of the learning outcomes were low (based on a four-point scale), which suggested that while the evidence was there, higher critical analysis was lacking. This could be a developmental issue, in that these were first semester students.

In other studies, Singer-Freeman, Bastone, and Skrivanek (2014) found that use of an ePortfolio increased future-oriented statements by 47 under-represented minority community college students. Eynon, Gambino, and Török (2014) reported impressive differences when comparing retention rates at three different times for students who used an ePortfolio during their first year, as compared to those who did not (90% v. 79% first year, 79% v. 60% second year, 25% v. 15% fourth year graduation rate, respectively). Pitts and Ruggirello (2012) found that growth in professional competency occurred when participants were explicitly required to demonstrate how they had experienced growth via evidence taken at baseline and post-baseline intervals. In spite of these findings, and with increasing numbers of universities and programs using ePortfolios, more student outcome research related to its use is needed (Bryant & Chittum, 2013).

A few published articles have examined student feedback about an ePortfolio system (Buzzetto-More, 2010; Janosik & Frank, 2013; Nguyen, 2013; Peacock, Murray, Scott, & Kelly, 2011). Buzzetto-More (2010) found that the majority of students (88%) who had made an ePortfolio reported that it helped them reflect on their learning, while Janosik and Frank (2013) found that graduate students reported the ePortfolio experience to be a very powerful one in which they learned a great deal about themselves. Nguyen (2013) interviewed eight students about their ePortfolio experiences, with one of the themes that emerged being that students saw previously unknown qualities in themselves, while

Peacock et al. (2011) reported that students rated their ePortfolio experience as a positive one. In another study, Gaitán (2012) found four categories that related to students' attitudes about the portfolio experience, including views about the purpose of the portfolio, amount of personal disclosure included, technical issues, and guidance or feedback from tutors.

The limited literature regarding career development ePortfolios describes the features of various ePortfolio programs and documents the characteristics of student users and their expectations from ePortfolio use. For example, von Konsky and Oliver (2012) reported over 17,000 subscribers one year after introducing an *iPortfolio* at an Australian University. About half (52%) of the student users believed that there would be improvements in employability outcomes from ePortfolio use. Reardon, Lumsden, and Meyer (2005) evaluated a career ePortfolio by emailing surveys to 693 students enrolled in a variety of courses using the program. Completed surveys were obtained from 96 students, a response rate of 14%. Students were asked to indicate how they intended to use their completed career portfolio. Besides using it to complete a class assignment, the top three ways students planned to use their career portfolio included applying for a job (20%), identifying their skills (15%), or applying for graduate or professional school (12%). The two least frequent uses identified by students were applying for an internship (11%) and interview preparation (8%).

Reardon et al.'s (2005) survey also included items related to learner outcome goals. The majority of students had positive views of the career ePortfolio, and 83% strongly agreed or agreed that the ePortfolio helped them understand how their academic and professional skills related to personal career goals, 81% strongly agreed or agreed that the program helped them show evidence of skills that could apply to a variety of occupations, 83% strongly agreed or agreed that the program helped them show evidence of skills necessary to obtain and maintain employment, 85% strongly agreed or agreed that the program helped them communicate their skills to potential employers, and 80% strongly agreed or agreed that the program helped them prepare for job searching and interviewing.

Given these findings about student reactions to the online career ePortfolio programs, the current study was undertaken in an effort to learn more about the impact of one such program.

An Online Career Portfolio Program

The Career Portfolio Program (CPP; Lumsden, Garis, Reardon, Unger, & Arkin, 2001) used in this study is an ePortfolio system initiated and maintained by students. This is in contrast to the common finding reported by Ayala (2006), as cited earlier. CPP is an online tool enabling students to identify learning experiences leading to the development of desired skills, a collection point for listing students' accomplishments and skills, and a potential marketing tool for students seeking graduate school or employment. It is similar in purpose to the definition of a portfolio by Yao, Thomas, Nickens, Downing, Burkett, and Lawson (2008, p. 10): "a systematic and purposeful collection of work samples that document student achievement or progress over a period of time." Career-related ePortfolios such as the CPP offer the opportunity for students to "understand, develop, chronicle, and communicate their career attributes to others" (Garis, 2007, pp. 3-4).

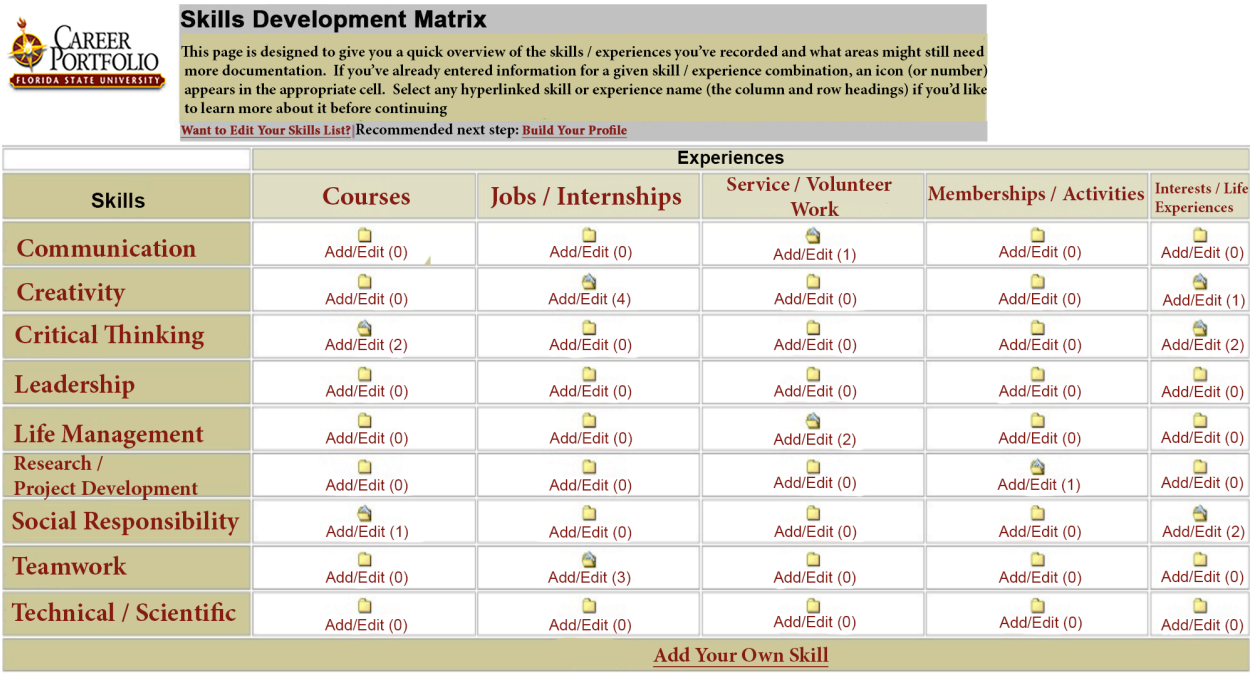
The CPP was under development for five years before its launch in April 2002 (Reardon et al., 2005), and it has been in continuous operation since then. More than 101,777 portfolios have been created in the program since it began (L. Mille, personal communication, October 20, 2015). There were four goals in developing the CPP, and this study focused on the one related to employers seeking evidence that students were ready to make effective contributions in the workplace.

The career ePortfolio used in this study included a skills matrix (Figure 1) component in which students were required to reflect on their life experiences, jobs, internships, club memberships, and service as a way to learn specific skills. The skills matrix required students to provide and reflect on concrete examples of how they gained skills in the areas of Communication, Creativity, Critical Thinking, Leadership, Life Management, Research/Project Development, Social Responsibility, Teamwork, and Technical/Scientific. Participating in this type of reflection on generic work skills was believed to be effective preparation for interviewing.

An ePortfolio contest program for students was initiated in 2003 to identify ePortfolios that were exceptionally well done, to increase marketing of the program on the campus, and to involve employers, advisors, and other staff in judging the qualities of ePortfolios submitted to the contest. We wanted to use high quality ePortfolios in this study, so we contacted students entering the contest in the preceding two years and solicited their research participation.

More specifically, the idea was that students using the career ePortfolio would know how and be able to communicate and market workforce skills to potential employers or graduate schools in a mock interview. We were unable to identify a prior study examining this issue, so we designed a study examining the extent to which students believed the CPP helped them conceptualize strategies for acquiring and documenting general skills obtained from educational experiences within and outside of the curriculum (Reardon & Hartley, 2007). In the process of introducing the online career ePortfolio to potential users, students often ask

Figure 1
Skills Matrix



Skills Development Matrix

This page is designed to give you a quick overview of the skills / experiences you've recorded and what areas might still need more documentation. If you've already entered information for a given skill / experience combination, an icon (or number) appears in the appropriate cell. Select any hyperlinked skill or experience name (the column and row headings) if you'd like to learn more about it before continuing

Want to Edit Your Skills List? | Recommended next step: Build Your Profile

	Experiences				
Skills	**Courses**	**Jobs / Internships**	**Service / Volunteer Work**	**Memberships / Activities**	**Interests / Life Experiences**
Communication	Add/Edit (0)	Add/Edit (0)	Add/Edit (1)	Add/Edit (0)	Add/Edit (0)
Creativity	Add/Edit (0)	Add/Edit (4)	Add/Edit (0)	Add/Edit (0)	Add/Edit (1)
Critical Thinking	Add/Edit (2)	Add/Edit (0)	Add/Edit (0)	Add/Edit (0)	Add/Edit (2)
Leadership	Add/Edit (0)	Add/Edit (0)	Add/Edit (0)	Add/Edit (0)	Add/Edit (0)
Life Management	Add/Edit (0)	Add/Edit (0)	Add/Edit (2)	Add/Edit (0)	Add/Edit (0)
Research / Project Development	Add/Edit (0)	Add/Edit (0)	Add/Edit (0)	Add/Edit (1)	Add/Edit (0)
Social Responsibility	Add/Edit (1)	Add/Edit (0)	Add/Edit (0)	Add/Edit (0)	Add/Edit (2)
Teamwork	Add/Edit (0)	Add/Edit (3)	Add/Edit (0)	Add/Edit (0)	Add/Edit (0)
Technical / Scientific	Add/Edit (0)	Add/Edit (0)	Add/Edit (0)	Add/Edit (0)	Add/Edit (0)

Add Your Own Skill

about the benefit of completing it and we believed that the results of this study would help answer that question.

The Present Study

This exploratory study examined students in three groups. Group A (n = 18) completed an online career ePortfolio including the skills matrix. Group B (n = 40) engaged the ePortfolio but did not complete the skills matrix. Group C (n = 60) did not use the ePortfolio before participating in the mock interview. The study was designed to assess whether students completing an online career ePortfolio and the skills matrix (Group A) would report more positive self-ratings of skills in a mock interview situation than students not completing the skills matrix (Group B) or the ePortfolio (Group C). We expected that ePortfolio students using the skills matrix would report a better sense of self-awareness and confidence in their answers and their qualities and skills. Student self-reported ratings were used to examine differences in responses between the three groups.

Mock Interviewing

The career center began offering mock interviews in 2002 with one-on-one simulated job interviews that were video recorded, which allowed students the opportunity to practice their interview skills and then receive feedback on their performance. Students were encouraged to provide qualitative and quantitative examples of their skills as often as possible when interviewing. The mock interview focused on how well students knew themselves and their past experiences, how well they knew the industry they hoped to enter, and how well they could articulate that information. One-on-one, panel, telephone, and Skype mock interviews were offered to allow students the opportunity to enhance their interview skills in the area of their choice. Trained mock interview mentors (MIMs) interviewed, provided feedback, and assisted students in improving their interview skills. Students completed an application to participate in a mock interview by submitting a resume and cover letter. During the mock interview, MIMs asked questions that were based on the students' career situation (e.g., seeking a job, internship, or graduate school program).

A highlight of this experience is that mock interviews are video recorded and provided in DVD format to students at the conclusion of their mock interview to facilitate ongoing self-evaluation and reflection. Additionally, students who participated in mock interviews had the opportunity to interview with an employer during a designated Professional Development Week, providing a more realistic mock interview experience for some. Over 3,000 mock interviews have been conducted in the career center over the past decade, and more than 100 mock interview mentors have been trained by career center staff.

Method

The present study included three groups of students. Group A used the career ePortfolio skills matrix and engaged with the career ePortfolio before participating in a mock interview; Group B used the career ePortfolio (but not the skills matrix) before participating in a mock interview; and Group C did not use either the ePortfolio or the skills matrix before participating in a mock interview. This study was focused on the following three questions:

- Do students completing the skills matrix of an online career ePortfolio rate themselves more highly on a skills survey than those who did not use the skills matrix of the career ePortfolio? (A > B)
- Do students completing the skills matrix of an online career ePortfolio rate themselves more highly on a skills survey than those who did not use the career ePortfolio? (A > C)
- Do students completing some portions of an online career ePortfolio, not including the skills matrix, rate themselves more highly on a skills survey than those who did not use the career ePortfolio? (B > C)

Participants

The first group of students participating in an ePortfolio contest (n = 93) were recruited for participation in the study by e-mail invitations. A second group of students in this study (n = 172, 40 male) were not recruited but had simply signed up for mock interviews during the semester.

The 93 students participating in the mock interviews had competed (within 2 years of the study) in the online career ePortfolio contest so we judged that they had produced high quality ePortfolios. These students were encouraged to take part in a mock interview by registering for one of the 300 appointment slots available over the course of nine weeks. The students were informed that a drawing would be held every 3 weeks and $50 gift cards for local businesses, vendors, and services such as iTunes would be awarded. Students signing up for and participating in a mock interview would have their name added to the drawing. However, students did not respond to this invitation to participate in the mock interview program. We found that only two students of 93 participating in the ePortfolio contest signed up for and completed a mock interview.

As a result, we examined how many of the remaining 172 students participating in mock interviews had prior experience with the ePortfolio program, even though they had not participated in the ePortfolio contest. Including these students in the study would enable us to compare outcome measures for those who had prior ePortfolio experience with the skills matrix and those who had none. As a result of this analysis, we found that 65 of the 172 students participating in mock interviews had some level of prior experience in the career ePortfolio program but only 16 of these students had actually used the skills matrix portion of the ePortfolio program that was a focal point of our study. These 16 students were added to the two in the ePortfolio contest for a total of 18 students participating in mock interviews with prior career ePortfolio skills matrix experience. This became Group A in our study.

We re-examined the records of the 172 students participating in the mock interviews and found that 40 had some ePortfolio experience but did not use the skills matrix part of the ePortfolio. This became Group B in our study.

Procedures

Each mock interview was approximately one hour in length, including 20 minutes of interviewing and 20 minutes of feedback and discussion between the student and the MIM. All survey data from students and MIMs were collected after each mock interview.

After viewing the interview video and receiving feedback from the MIM, students completed a five-minute survey including questions about demographic information, the interview experience, and the interviewer. In addition, students responded to survey items judged relevant to the development and use of transferrable workforce skills (e.g., “I felt confident when communicating my workforce skills,” and “I articulated my skills well”)

We used Likert-type self-ratings to measure whether students levels of reported self-confidence and self-awareness during the interview. After all mock interviews had been concluded, we recorded and compared responses on the student self-ratings from Group A, Group B, and Group C in order to examine possible differences among the three groups.

Instrumentation

Students completed a self-reported skills survey about their mock interview experience using a 5-point Likert scale (1 = *strongly agree*, 5 = *strongly disagree*). To evaluate the impact of a student’s ability to communicate their skills in a simulated job interview, we reviewed five survey items most closely related to skill development. These items were developed based on components of the skills matrix in the career. The

Cronbach's alpha for the five items was .80 but, because it was not less than .70, we were unable to examine results for individual items.

The items were created by the research team to help students reflect on their effectiveness in communicating these skills at the end of their mock interviews. The five items used in this study include the following:

- I identified that I possess important workforce skills;
- I felt confident when communicating my workforce skills;
- I used specific and concrete examples when discussing my skills;
- I articulated my skills well;
- I have taken the steps to develop workforce skills.

The skills matrix required that students provide and reflect on concrete examples of how they gained skills in the areas of communication, creativity, critical thinking, leadership, life management, research/project development, social responsibility, teamwork, and technical/scientific.

Data Analysis

A one-way ANOVA was conducted to compare survey means among the three groups (ePortfolio plus skills matrix, ePortfolio only, or no ePortfolio).

Results

Table 1 presents the means and standard deviations of the self-reported skills survey totals and individual items. The ANOVA results revealed a nonsignificant effect among the three groups on the self-reported survey results of skills, $F(3, 115) = 0.054$, $p = .95$. Thus, the answer to each of our research questions was negative. Specifically, students completing the skills matrix of an online career ePortfolio did not rate themselves more highly on providing specific and quantifiable examples of their skills during a mock interview than those who did not use the skills matrix of the career ePortfolio (A > B). Nor did students completing the skills matrix of an online career ePortfolio rate themselves more highly on providing specific and quantifiable examples of their skills during a mock interview than those who did not use the career ePortfolio (A > C). Finally, students completing some portions of an online career ePortfolio, not including the skills matrix, also did not rate themselves more highly on providing provide specific and quantifiable examples of their skills during a mock interview than those who did not use the career ePortfolio (B > C).

Discussion

In this section, we discuss the findings from the analysis of students' self-reported use of workforce skills following a mock interview, an analysis of the procedures used in the study that contributed to the findings, followed by limitations of the study, implications for practitioners, and suggestions for future research.

Use of Self-Reported Skills across Three Groups

Examining the student self-ratings across the three groups revealed that students using the ePortfolio skills matrix (Group A) did not differ in their self-reported ratings on a skills survey from students not using the ePortfolio skills matrix (Group B) and students not using the ePortfolio (Group C). These findings were surprising, given previous research (Buyarski & Landis, 2014; Buzzetto-More, 2010; Singer-Freeman et al., 2014) that indicated positive outcomes from engaging in e-Portfolio use.

There may be several reasons for our findings. Perhaps students in Group C not using the ePortfolio may simply have felt more confident and satisfied with their workforce skills than those in Groups A and B who had either used the ePortfolio skills matrix or engaged in the ePortfolio without the skills matrix. The self-ratings were completed immediately after the mock interview experience, which included 20 minutes of constructive feedback from the MIMs, which might have positively influenced these ratings. A second possibility is that students in Groups A and B may have become more confident with their skills during the mock interview and thus rated themselves highly on the survey. This finding, along with the other comparisons across the three groups in terms of self-reported skills merits further study to gain a better understanding of what might have influenced these self-ratings and why there was no significant differentiation among the groups.

Limitations of Study Procedures

In introducing this study, we noted the apparent difficulties in documenting the impact of ePortfolios on student behavior (Ayala, 2006; Bryant & Chittum, 2013; Reardon et al., 2005). An important outcome of the present study is an increased understanding of these difficulties as outlined below.

Treatment variable. Because we wanted students to engage in the ePortfolio and skills matrix experiences in a natural way (i.e., the way they would engage with the portfolio if not in a study), we did not specify which sections students had to complete or how thorough they had to be in completing each section. We also did not put parameters on who could be included in the study. It is possible that some students were completing the portfolio as a class assignment, while others were using

it to prepare for upcoming job interviews. Thus, it is difficult to judge whether participants were internally or externally motivated.

Our strategy to address these problems was to use participation in the career ePortfolio contest that provided detailed requirements for participation (e.g., enter information under at least four skill headings and three experience categories; total of 12 entries), create at least two profile sections (e.g., goals, objectives) that introduce your ePortfolio, upload a copy of your resume or curriculum vitae, enter at least two references, and upload at least three examples of your work. Additional contest instructions directed students to customize the ePortfolio towards personal career goals or a job objective. However, our effort to specify the ePortfolio treatment variable was undermined by the lack of participation by former contest participants in the mock interviews (only two of 93 contest participants engaged in mock interviews). Additionally, of 172 students participating in the mock interviews, only 18 had used the skills matrix portion of the online career ePortfolio and 40 had some ePortfolio experience; however, we do not know how much, how long, or how often they used it. As a result, we are not able to specify fully the use of the skills matrix of the ePortfolio in this study.

Dual treatment interventions. The mock interview itself provided students with opportunities to document and clarify their transferrable skills because the MIM interviewers asked the students questions about workforce skills. In this way, the mock interviews confounded the possible impact of the ePortfolio skills matrix treatment. Moreover, the MIMs provided feedback to students immediately after the interview which was generally positive and suggestive of ways to improve interview behavior. Although MIMs were trained to provide constructive feedback, it is possible that some offered very positive feedback to students and lacked the real world interviewing experience to evaluate fully the interviewees' strengths and weaknesses. Students completed self-ratings of their skills after getting this feedback from the MIMs, and this may have enhanced positive views of their workforce skills. For example, 168 of 172 (98%) of the students participating in mock interviews reported feeling more confident about their interview skills after participation. This probably had an impact on student self-ratings of the skills survey.

Student self-ratings. Inspection of Table 1 shows that students were very positive about their identification, confidence, and communication of workforce skills following the mock interview. They strongly agreed with all five items. This lack of variability in student self-ratings reduced the likelihood of finding differences in the student self-ratings across the three groups. The students' self-ratings of their skills following the mock interview experience were overwhelmingly positive. To combat this halo effect, a four-item form for student ratings might be used rather than a five-item form. The positive wording of the five items might also be varied in order to elicit more varied student responses.

Sample characteristics. The sample in this study was overwhelmingly female, 77%. Moreover, 53% of the students indicated that the mock interview was part of a class assignment, although 48% indicated they were preparing for a scheduled interview (internship 45%, full-time job 35%, graduate school 8%, or other 10%). It is unclear how these sample demographic characteristics might have affected the results of this study.

Implications for Practitioners

Despite our findings, we believe that the ePortfolio offers many positive outcomes for students (Buyarski & Landis, 2014; Buzzetto-More, 2010; Singer-Freeman et al., 2014). We were surprised by how few of our ePortfolio contest participants took the next step to engage in the mock interviews. Perhaps having a stronger marketing campaign that demonstrated how activities can combine to create a powerful job search campaign would have increased participation. Perhaps it was the ease of completing the ePortfolio, which could be completed anytime and anywhere, in contrast to the mock interviews that required extra effort such as scheduling and attending a face-to-face appointment with a MIM. Perhaps having an online opportunity for mock interviewing with flexible scheduling would have also increased participation. Understanding the reasons why students choose to engage or not to engage in a given activity can inform career service providers as they create, advertise, and deliver services.

A second implication would be on clearly instructing students how to complete the portfolio and skills matrix, emphasizing how a more complete profile would provide them with more specific examples and artifacts to share with employers when they interview. Making the case of how this would likely increase their confidence when speaking with employers in interviews might result in more involvement with completing an ePortfolio. Having specific examples of a poorly constructed portfolio or skills matrix as well as outstanding examples, and having employer comments related to both, might also increase awareness and a desire to participate fully.

Suggestions for Further Research

Through the process of conducting this research, we came to realize several opportunities for strengthening future studies such as this one. First, in conducting research on the effectiveness of career

Table 1
Student Self-Ratings After the Mock Interview

Item	Group A: Portfolio Skills Matrix (n = 18)		Group B: Portfolio Only (n = 40)		Group C: No Portfolio (n = 60)	
	M	*SD*	*M*	*SD*	*M*	*SD*
I identified that I possess important workforce skills	1.61	0.61	1.53	0.60	1.52	0.70
I felt confident when communicating my workforce skills	1.78	0.81	1.65	0.74	1.65	0.78
I used specific and concrete examples when discussing my skills	1.71	0.83	1.73	0.78	1.93	0.94
I articulated my skills well	1.72	0.83	1.88	0.76	1.88	0.76
I have taken the steps to develop workforce skills	1.78	0.65	1.60	0.60	1.40	0.53
Total survey	8.61	2.97	8.38	2.62	8.38	2.77

ePortfolios, we recommend ensuring that the goals of the ePortfolio are reflected in the outcome measures. This particular ePortfolio system features the identification, development, and reflection on generic workforce skills, and the measure used in this study focused on five of those skills.

Second, where possible, including controls of the treatment variable would allow for a more powerful comparison among groups. The design of the present study addressed the specification of the treatment variable (ePortfolio use) through the requirements of the ePortfolio skills contest, but the lack of participation in the data collection (mock interviews) by ePortfolio users thwarted this strategy. In addition, gaining more information about the participants, such as student motivation for engaging in the ePortfolio would allow for more group selectivity (i.e., those engaging in the portfolio for extra credit might be excluded from the study). For example, were students participating in mock interviews asked to explain how their generic work skills had been identified and potentially transferred to a job situation?

Third, while self-reports are important in evaluating an activity, moving beyond self-report to objective external reviews would strengthen future studies. In the present study, MIMS may have felt compelled to share feedback with each participant in a positive light, whereas an external reviewer of the participants' responses who was not providing feedback might have rated the answers to specific questions less positively. In addition, using pre-post studies when evaluating the effect of an intervention would also strengthen the research design.

Conclusion

Although self-ratings of interview skills across the three groups of students in this study revealed nonsignificant differences, it is believed that continued research in this area might show the impact of using an online career ePortfolio on these ratings. Although difficulties in conducting research on the effectiveness of online career ePortfolios were encountered in this study, suggestions for future studies were discussed with implications for improving research in this area.

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EMILY KENNELLY is Senior Assistant Director of Career Advising and Counseling at the Florida State University Career Center, a National Certified Counselor (NCC), Approved Clinical Supervisor (ACS), Distance Credentialed Counselor (DCC), and Certified Professional Résumé Writer (CPRW). She trains and supervises professional career practitioners, graduate students, and doctoral level career counselors-in-training. She received her M.S./Ed.S in Counseling and Human Systems with an emphasis in Career Counseling from Florida State University in 2011.

DEB OSBORN is an Associate Professor in the Educational Psychology and Learning Systems department at Florida State University (FSU), and a Nationally Certified Counselor. She is a Fellow of the National Career Development Association (NCDA) and American Counseling Association (ACA), Past President of the NCDA and Florida CDA, and currently serves on the

NCDA/ACA boards as a governing representative. She received her PhD in Counseling and School Psychology from FSU in 1998. Her program of research includes: (a) the design/use of technology in counseling, (b) innovation and effectiveness in counselor education; and (c) the design/use of assessments in career services.

ROBERT C. REARDON held full-time counseling and teaching positions at Florida State University from 1966 to 2007. He is now Professor Emeritus in the Department of Educational Psychology and Learning Systems and Senior Research Associate in the Career Center at FSU. Reardon has published more than 120 articles in professional journals, focusing on the research and development of innovative career interventions for college students and adults, and featuring the use of educational and occupational information. He received the Eminent Career Award from the National Career Development Association in 2003.

REBECCA SHETTY is the Assistant Director of the Emory Integrity Project at Emory University. She graduated with her master's in higher education from Florida State University and is a current student in the Counseling and Student Personnel Services doctoral program at the University of Georgia. Her work experience includes leadership education and development, advising student organizations, student programming, and orientation. She is responsible for promoting integrity and ethical leadership among the undergraduate population at Emory. She collaborates with a partners to develop curriculum, programs, and events that encourage ethical development and the exploration of integrity throughout Emory Campus Life.