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Employer Perceptions of an Engineering Student's Electronic Portfolio

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This article examines engineering employers' perspectives on an electronic portfolio for hiring purposes. Eleven employers of engineers viewed one student's electronic portfolio (ePortfolio). To learn the potential for using ePortfolios within the hiring process, hiring managers, human resources directors, and recruiters from the engineering sector were interviewed to solicit their feedback on the ePortfolio viewed. The researcher analyzed the advantages and disadvantages associated with using an ePortfolio over that of traditional candidate screening and evaluation. Those interviewed cited specific strengths of using an ePortfolio as the ability to (a) differentiate a candidate, (b) assess potential fit and future with a company, and (c) encapsulate a candidate's traditional application materials and online media within one website. The possible drawbacks raised by the participants included (a) duplication of efforts for the candidate and employer, (b) too much information presented to the employer, and (c) the tool being unsuccessfully introduced into the hiring process, particularly during the initial screening of candidates. The culmination of the project resulted in the researcher presenting essential criteria for engineering students to include when creating ePortfolios based upon the findings from this investigation.

Purpose of the Study

Institutions within higher education are under scrutiny for inadequately preparing students for the challenges of a global economy and workforce. Employers are concerned that college graduates are lacking the 21st century skills and the necessary competencies needed to be successful upon entering the workforce (Alssid, 2014; Flores, Matkin, Burbach, Quinn, & Harding, 2012; Hart Research Associates, 2013). A gap exists between the learned skills of college graduates and employers' needs (Tugend, 2013).

In addition, under- and unemployment rates for college graduates are notable since the 2001 recession (Abel, Deitz, & Su, 2014). This is a challenge that extends beyond the United States, as Liu (2013) expressed concerns for Chinese students and Malita (2009) raised the same issue regarding European graduates. As a result, students are seeking additional ways to distinguish themselves to hiring managers.

If employers desire evidence that graduates are prepared to enter the workforce, and students wish to showcase their academic and professional attributes to those with hiring authority, educators should explore how to meet these demands (Bradley, Seidman, & Painchaud, 2012). Developing career electronic portfolios, or ePortfolios, might address both of these needs. Career ePortfolios are websites that present the highlights of students' best academic and professional work and attributes through a more comprehensive medium than a traditional résumé (Bonsignore, 2013). These websites can be made available to employers and graduate admissions committees to assess students' preparedness for positions. Joyce (2014) cited that 80% of employers surveyed admitted to viewing job seekers' profiles online before deciding if they will interview them or not. Given the likelihood that students will be searched online during the hiring process, educators should support students in making sound decisions about what they choose to share with employers on the Internet, whether via formal ePortfolios or through other online media. However, although ePortfolios could be used for students to share their best professional work online, there is little within the literature on employers' use of ePortfolios.

The primary purpose of this study was to learn how employers perceive and might utilize student ePortfolios. Although ePortfolios are gaining popularity and complement the way in which millennial students learn and communicate (Ciocco & Holtzman, 2008), it is unclear if companies are integrating this tool within their decision-making, and if they are reviewing ePortfolios, how this tool influences their judgments. Employers are seeking skilled candidates without exerting a lot of effort in the hiring process (Malita, 2009), but much is unknown if and how those with hiring responsibilities might embrace ePortfolios. Many of the studies that do discuss using ePortfolios for employability lack specifics on how employers would use the websites in their hiring process (Woodley & Sims, 2011). This study sought to uncover detailed information from hiring officials on the perceived value of using ePortfolios.

Literature Review

First introduced in the 1990s, an ePortfolio is a medium that continues to change and evolve (Lane, 2009). Electronic portfolios are an extension of hard copy portfolios, a process that combines the collection and reflection process of creating a body of work with a final product for students (Coric, Balaban, & Bubas, 2011). The complexity of the ePortfolio landscape results from the multiple ways in which the tool is

utilized both in an educational and professional setting (Hallam & Creagh, 2010). In higher education, ePortfolios are a means for students to collect, store, reflect, and present their academic, co-curricular, and professional experiences online (Barrett, 2007). When using ePortfolios, Zubizarreta (2009) added the importance of the student's process of self-examination, how this examination has been applied, and how the student's product meets the teacher's expectations. This potential for demonstrating intellectual growth and change and encouraging self-examination are core elements of the ePortfolio development process. Its flexibility is also a distinctive quality—it can be used as a classroom assignment as well as a tool for a job search—further distinguishing it from other online academic tools, such as educational video games and digital storytelling.

Kimball (2003) defined the four types of web portfolios as "working, academic, presentation, and professional" (p. 7). The working ePortfolio is the platform for students to collect and reflect on their work. This stage in the creation process is when students are developing their ideas, goals, and objectives for the site. Once this working or staging site is developed, students' ePortfolios can evolve over time into academic, professional, and/or presentation sites. According to Kimball (2003), an academic portfolio is typically tied to an educational course or program and is often used by teachers as a tool for assessment. The presentation portfolio, as Kimball (2003) defined it, is a consolidated portfolio in which only certain components of the portfolio are shared to display specific competencies or assignments, typically for a class assignment or in earning a certification. Finally, Kimball (2003) described the professional portfolio as a product used solely for professional purposes, such as a tool for seeking a job or to demonstrate proficiencies that are related to one's career. This professional portfolio, or career, presentation, showcase ePortfolio, is the type of ePortfolio that was analyzed within this study. These types of ePortfolios are intended to solicit the attention of external constituents, such as employers and graduate school admissions committees. It "is created by students to showcase their best academic work and unique attributes that may not be demonstrated on a traditional résumé or during an interview" (Bonsignore, 2013, p. 107).

Purposes of ePortfolios

Thus there is a wide range of purposes for students' ePortfolios. The sites run the gamut from being used for student learning, reflecting, and assessing educational outcomes to presenting and showcasing students' final work (Barrett, 2007). There is an abundance of studies on using portfolios and ePortfolios as effective tools for student reflection and assessment (Barrett, 2007; Cambridge, 2010; Jafari & Kaufman, 2006; Penny Light, Chen, & Ittelson, 2012). While reflection and assessment are certainly essential components for ePortfolios in enhancing and tracking students' educational development and metacognitive understanding of their learning, the audience of students' ePortfolios is also an important aspect of the overall process. The present study focused on career ePortfolios that are created with the intent to enhance students' competitiveness when entering the workforce. There is little in the literature that addresses how employers use ePortfolios as a component of their recruitment and selection of candidates (Ward & Moser, 2008).

Career ePortfolios Within the Workforce

Perhaps the most extensive work in the field of career ePortfolios was produced by the team members of the Australian ePortfolio Project (Hallam & Creagh, 2010; Hallam et al., 2008). While examining ePortfolio practice within institutions of higher education in Australia, they studied whether an ePortfolio would be a desirable tool for employment and career development. The findings from their two studies indicated interest in using ePortfolios for learning, and also as a tool for entering the workforce and professional development (Hallam & Creagh, 2010).

It seems that when ePortfolios are made available to hiring managers, they will be reviewed (Brammer, 2007; Ward & Moser, 2008). For instance, Woodley and Sims (2011) reported that of the four students they surveyed who showed their ePortfolios to current or prospective employers, three of the four students received positive feedback. Brammer (2007) interviewed four managers, and found that they all had viewed applicants' portfolios in the past, and three of the four had factored the portfolio into their selection and hiring process. Christmann and Dahn (2006) argued that requiring an ePortfolio submission for job searches would enable companies to communicate to failed candidates where in the process they were unsuccessful, and to place candidates in positions that were an appropriate fit with their skills and interests. Ward and Moser (2008) took their study a bit further by surveying 5,310 employers on their experience with ePortfolios, receiving a 13% response rate. They found that overall, the current usage of ePortfolios by employers was low, but those interviewed expressed an interest in using this medium in their hiring process. Yu (2012) conducted a study in which 10 human resources managers from companies in Taiwan were interviewed regarding their familiarity with ePortfolios and their perceived usefulness of the tool. Six of the 10 managers had never heard of ePortfolios, but once introduced to the resource, all viewed the tool favorably (Yu, 2012).

Career ePortfolios Within Teacher Education

The majority of the research studies pertaining to career ePortfolios are within the field of teacher education. Portfolios within the teaching profession are demonstrations of educators' "personal practical knowledge" (Craig, 2002, p. 133), so are often used by job candidates when applying for teaching positions as evidence of their work with students and in the field. For instance, Strawhecker, Messersmith, and Balcom (2007) surveyed 37 principals from K-12 schools in one Midwestern state on the pros and cons of portfolio use in hiring teachers. The top four benefits listed in order of importance were the "opportunity to view actual artifacts, comprehensive look, candidate's organizational skills, and convenience" (Strawhecker et al., 2007, p. 67). Lack of time to review portfolios was named as the most significant limitation. Boody (2009) interviewed 15 higher education representatives from the Midwest Association of Colleges and Employers who were involved with student hiring in the field of education. Boody (2009) concluded that although employers were open to viewing portfolios when presented, there was not a specific process in place for viewing them.

A total of 168 school administrators and teachers were surveyed by Whitworth, Deering, Hardy, and Jones (2011) to learn how they might use ePortfolios more generally within their hiring process. Time was again cited as the significant barrier to portfolio usage within their hiring practice, and as a result, the researchers suggested student teachers develop streamlined ePortfolios that meet the specific purposes that those with hiring authority are seeking. Temple, Allan, and Temple (2003) conducted a focus group in which educators were asked to view physical education students' ePortfolios. The researchers found that ePortfolios were viewed as a desirable employment tool, particularly for candidates who have been short-listed, but the material would need to be condensed for the employer. These findings were comparable to Painter and Wetzel (2005) who conducted a similar ePortfolio study on the hiring process for teachers.

Hartwick and Mason (2014) explored how videos included within applicants' ePortfolios might be used in the hiring process. The researchers interviewed 15 school principals, and asked them to comment on student teachers' self-introduction videos that were uploaded to their ePortfolios. They found that 14 of the 15 principals interviewed stated they would use the videos within their hiring process (Hartwick & Mason, 2014). Some of Hartwick and Mason's (2014) interview questions were utilized for the present study (see Appendix).

Need for Study

In efforts to contribute further to the field, the purpose of this study was to analyze employers' perceptions of career ePortfolios. The following research question and two sub-questions were intended to elicit answers on how the use of a student's ePortfolio might affect employers' hiring processes within the field of engineering.

- Research question: What are the advantages and disadvantages of an ePortfolio over that of traditional candidate employment screening and evaluation methods?
    - Sub-question A: In what ways are ePortfolios potentially of value to employers of engineering students in the assessment of an applicant during the hiring process?
    - Sub-question B: What information do employers of engineering students find useful and expect to find in an ePortfolio?

Fowler's ePortfolio Study

The aforementioned research questions drew from Fowler's (2012) doctoral study on ePortfolios—another contribution to the field of career ePortfolios. Fowler (2012) interviewed 12 employers from the manufacturing and services sectors to investigate whether ePortfolios were advantageous to their pre-employment screening process. Fowler's (2012) study was twofold: (a) he investigated whether manufacturing and services sector employers found ePortfolios helpful to their hiring process, and (b) he developed ePortfolio templates to be utilized for individuals interested in employment within the manufacturing and nursing disciplines (Fowler, 2012). He found these representatives would utilize ePortfolios if the content and information they desired from candidates were included within the sites. The employers interviewed believed if the ePortfolios included relevant information for their hiring needs, using ePortfolios would save them time and money within their hiring processes. The study also revealed that employers felt ePortfolios provided more depth and a more accurate representation of candidates.

The present study explored some of the questions raised by Fowler (2012), but focused on an entirely separate field—the engineering employment sector. In addition, Fowler's (2012) study focused on ePortfolio usage within the pre-screening process for employment. The present study focused on the potential of using ePortfolios in all stages of the candidate screening and evaluation process.

Methodology

Participants for Study

To address the research questions raised within this qualitative study, the researcher interviewed engineers, or those with experience in hiring engineers, to garner their feedback regarding an engineering student's ePortfolio. Once IRB was obtained, the participants were selected through purposeful, criterion-based case selection sampling and snowball sampling (Patton, 2015). Eleven participants were interviewed: eight participants were career engineers with hiring experience and three were human resources professionals and specialists who recruit and hire engineers. Because this study examined the potential of using ePortfolios in all stages of the candidate employment screening and evaluation process, it was necessary to interview participants who represented each stage of the hiring process—from recruitment to the final interview of the candidate.

Many of the participants represented large oil and gas companies. Other fields represented included chemical engineering, civil engineering, computer engineering, exploration and production, and electricity and natural gas (Table 1). The age span of the participants was 34-60 years of age, and a broad spectrum of ethnicities was represented. The participants in this study were largely unaware of what ePortfolios were regarding career purposes. Only one participant in the study actually discussed past experiences using the tool. The other participants answered the interview questions based upon the *potential* of using ePortfolios for their hiring purposes.

Engineering Student's ePortfolio

Each participant in this study viewed the same engineering student's ePortfolio. This ePortfolio was chosen because it was an example of a career ePortfolio (Bonsignore, 2013), the type of ePortfolio for the present study. The student built the site with the intention of an employer or graduate admissions committee reviewing his finest academic work and distinctive professional attributes that were too robust to share within a résumé and too detailed to discuss during an interview. This engineering student's ePortfolio was also an example of a university student's ePortfolio within the field of electrical and computer engineering. Garnering feedback on this ePortfolio may be helpful to college students and administrators associated with collegiate ePortfolio programs.

The engineering student originally built the website as an undergraduate in the field of electrical and computer engineering. He enrolled in an ePortfolio course for undergraduates, which assists students in developing their academic portfolios for graduate school and the work force. He then updated the website when he graduated with his master's degree in electrical and computer engineering. Overall, the website looked professional and included artifacts pertaining to the field of electrical and computer engineering.

The engineering student's ePortfolio for the present study included the following structure:

- "Welcome" web page: included student's academic bio, overview of the ePortfolio, professional photos, a LinkedIn profile, and contact information;
  - an "About Me" web page (included photos of the engineering student playing sports, and attending sports and music events) and a "Contact Me" page were located under the "Welcome" tab;
- "Academics" web page: included student's major and minor, grade point average, and university logo;
  - a "Curriculum" page, "Relevant Courses" page, and "Academic Projects" page were located under the "Academics" tab, which provided detailed information on the courses the student has taken and descriptions and photos of the projects he conducted within the courses;
- "Undergraduate Research" web page: included an introduction on the importance of undergraduate research to the student, a brief synopsis of the research conducted, and the faculty mentor's name and department; the student included a separate webpage for each of the three research programs he participated in, and a webpage on a national conference he presented at under this tab; two separate research posters were included within this section and photos were featured from a national conference;
- "Professional" web page: served as a landing page for three additional pages:
  - "Honors & Awards," "Leadership," and "Résumé," which each included a page with a listing of awards and achievements, photos and information on leadership activities as an undergraduate, and an embedded and linked version of a PDF of his résumé;
- "Other" web page: featured professional photos of student; and
- "Sitemap" web page: included a sitemap for student's ePortfolio.

Table 1
Participant Chart for Years of Hiring Experience, Field(s), and Size of Company

Participant	Professional background	Hiring experience in years	Field(s)	Size
1	Engineer with hiring experience	9-11	Oil and gas	Large
2	Engineer with hiring experience	>15	Civil	Medium
3	Engineer with hiring experience	>15	Oil and gas, petroleum, software	Small
4	Engineer with hiring experience	9-11	Chemical, electrical, industrial, mechanical	Large
5	Engineer with hiring experience	9-11	Oil and gas, chemical	Large
6	Engineer with hiring experience	>15	Oil and gas	Large
7	Engineer with hiring experience	3-5	Oil and gas	Large
8	Engineer with hiring experience	12-14	Computer	Large
9	HR professional who hires engineers	>15	Exploration and production	Small
10	HR professional who hires engineers	>15	Electricity and natural gas	Large
11	Specialist who recruits engineers	12-14	Oil and gas, petroleum	Large

Data Collection and Analysis

The researcher conducted semi-structured interviews with the 11 employers to garner their feedback on the engineering student's ePortfolio website. In advance of the interview, the researcher emailed each participant the specific hyperlink to view the student's ePortfolio. Participants were asked to review the ePortfolio prior to the scheduled interview time. The employers were not planning to actually interview this student for a position; this review of the ePortfolio was an exercise to learn how the participants perceived the ePortfolio and might use it in their hiring of an entry-level engineer. During the actual interview, the participants were asked questions regarding the ePortfolio they previously viewed. Many of the interview questions for this study were based upon the semi-structured interview questions of Fowler (2012) and Hartwick and Mason (2014).

All of the interviews were audio-recorded, and copious observational notes were taken during the interviews. The process of coding and analyzing the interviews resulted in identifying common themes and insights derived from the participants' responses to ePortfolios. It was an active analysis of raising questions about the data, and then developing categories and concepts through systematically organizing and analyzing the data (Corbin & Strauss, 2015; Strauss & Corbin, 1990). Through triangulation, Creswell's (2003) guidelines for interpreting and analyzing data within qualitative studies were used as a means to cross reference the coding and understanding of the data. The software program Dedoose was used to record and store data, identify the codes and concepts, code the transcripts, and interpret, analyze, and depict the data.

Confirming Validity of Study

Numerous measures were taken by the researcher to confirm the validity of the study. To begin with, an engineering professor, who is also a professional engineer, reviewed the interview questions before the study commenced, and confirmed the questions were likely to solicit the information the study was designed to investigate. Next, a pilot or feasibility study was conducted to identify any potential barriers or pitfalls within the design of the research project. The director of the university's engineering career center was also consulted several times throughout the research process to validate the findings. Finally, since this was a doctoral study, the chairperson on the dissertation committee also assessed the data collection and analysis process.

Findings

Overall, the engineering student's ePortfolio was well received by the employers. Most participants saw value in the tool's potential, and would consider using the website within their hiring process. Regarding general characteristics of the ePortfolio, participants liked the ability to easily access information and navigate through the site. They also liked the portability and convenience of the ePortfolio. For example, one employer noted, "Overall, it's still a very beneficial product and I think one that is very worthwhile for the student" (Participant #4).

Strengths of Using ePortfolios

The participants expressed specific strengths of using an ePortfolio. These attributes included providing employers with the ability to (a) differentiate a candidate, b) assess potential fit and future with a company, and (c)

encapsulate a candidate's traditional application materials and online media within one website.

Differentiate a candidate. Since the ePortfolio extends beyond the traditional résumé, it offers more information to the employer. Therefore, participants felt using an ePortfolio could change the way candidates are evaluated since it allows applicants to better differentiate themselves. For instance, if the ePortfolio is of a high caliber, it might be the deciding factor that leads to an interview. One employer indicated, "If you're putting together an ePortfolio, that sort of implies resourcefulness because you're separating yourself from the norm" (Participant #7).

The participants appreciated that the ePortfolio allowed them to learn as much as they chose to discover about the candidate. Phrases such as "dig," "go deeper," and "deep dive" were repeatedly mentioned. They could go below the surface—dig in a little more—and learn additional information about the candidate from the ePortfolio. More specifically, employers might differentiate an applicant through an ePortfolio by learning more about their well roundedness, online brand, initiative, written and oral communication skills, and professional recommendations.

Potential fit and future. Several participants shared that they are looking for the right fit for the long-term when hiring applicants. These employers were interested in a candidate's ability to grow and develop as an individual. It is often the soft skills that differentiate one applicant from another. They believed ePortfolios enable an employer to learn more about a candidate's personality and background, creativity and thought process, ability to work effectively within a team, and adaptability and ability to cross train. Most participants' favorite page within the ePortfolio was the student's About Me profile. They liked the personalized nature of the content because it could address the candidate's potential fit within the organization. This section within the website served as an invitation to get to know the engineering student. For instance, an employer shared that, "For me, the About Me section is very interesting because a lot of times we have information with the student on a résumé on one page, but then we want to get more" (Participant #5).

In addition, most of the participants rated the Academic Projects webpage as among the most impactful aspects of the ePortfolio. They appreciated seeing pictures and diagrams of the work the student had completed. This provides evidence of what students have created, how they can potentially contribute to an organization, and if they can work collaboratively. In this way, the ePortfolio can be used as evidence of students' individuality and a demonstration of their creativity and thought process.

Encapsulate application materials and online media within one website. The employers appreciated the candidate's ability to use an ePortfolio to encapsulate traditional application materials, such as combining the résumé, cover letter, and basic biographical information with a variety of online media and profiles. Using the ePortfolio to screen digitally a candidate's skills and attributes through keyword searches and conducting electronic queries was also noted. Many participants used the phrase "one-stop shop" when referring to the ePortfolio.

In addition, most participants mentioned LinkedIn during the interview process. Participants use this professional social media site, which supports over 500 million users, as a tool for networking and learning more about a candidate. Several participants suggested that students coordinate their résumés, LinkedIn pages, and ePortfolios, so the messaging of all three media is consistent and readily available to employers.

Drawbacks of Using ePortfolios

The engineering student's ePortfolio was generally well received. Nevertheless, participants' noted consistent drawbacks to using the tool. The participants believed introducing ePortfolios could result in a (a) duplication of efforts for the candidate and employer, (b) too much information presented to the employer, and (c) the tool being unsuccessfully introduced into the hiring process, particularly during the initial screening of candidates.

Duplication of efforts for candidate and employer. Participants raised concerns regarding a duplication of efforts for the candidate and possibly the employer. Companies, especially large-sized organizations, often have stringent application processes the candidate must complete. Typically candidates applying for positions are not required to submit ePortfolios, and this could mean additional work for the recruiter as well. In addition, many employers and candidates are already using LinkedIn as a tool for screening and networking during the hiring process. One of the participants said,

> I like the [ePortfolio] concept because it's a one-stop shop and it's very user friendly; you can click and see whatever you like very easily. It seems like there's a little bit of duplication with something like LinkedIn, and then also it might require the student to do extra work because every company has a different hiring process. (Participant #5)

To address these concerns, it was suggested candidates integrate their ePortfolios within their LinkedIn accounts, with the knowledge that many professional recruiters use LinkedIn rather than ePortfolios to search for talent.

Too much information presented to employers. When asked about potential drawbacks, some employers were concerned with applicants presenting

too much information. This could result in information overload for the employer. It could also introduce potential biases within the hiring process. Some participants acknowledged the tenuous balance between the professional and personal components within an ePortfolio. There was a concern of the biases that could arise by sharing personal information.

Unsuccessful introduction into hiring process. Most participants expressed their reliance on the résumé, and its intrinsic value to the initial step of their hiring process. Employers often depend on their industry's standards of the résumé as their first step because it is typically a single page in length, and thus can be reviewed in less than two minutes. Employers in the present study could receive 100-800 résumés for one job opening. Recruiters and hiring managers must decipher quickly whether a candidate has the skills and qualifications for the open position. The majority of the participants agreed they would always begin their process with a résumé.

Probable Uses for ePortfolios

Although the participants interviewed expressed both pros and cons to using an ePortfolio as an additional tool for hiring, there was a consensus among the participants that the ePortfolio has the potential to change the way a candidate is evaluated. The prevailing viewpoint of the participants was that since the ePortfolio provides more detailed information than a traditional résumé, if done well it would likely distinguish the candidate among other applicants. The participants in the present study shared their thoughts on (a) when and how in the hiring process they might use the ePortfolio, (b) how ePortfolios might affect the timing of their hiring processes, and (c) the time they spent viewing the engineering student's ePortfolio.

When and how in the hiring process ePortfolios would be used. This exercise of reviewing ePortfolios was not a part of the participants' existing hiring practice. Some employers shared information on how they currently conduct their job searches, but others did not. However, given that the 11 employers represented different companies, the particulars of their hiring practices would likely all differ. Be that as it may, many participants mentioned that recruiters often start the hiring process by quickly reviewing résumés, narrowing the pool, and then making their recommendations to the hiring managers. The hiring managers then conduct a more comprehensive evaluation of the remaining candidates, selecting those who will be interviewed.

When the participants were asked if they would review or use the student's ePortfolio in their hiring process, they all stated they would. Overall, most employers felt the ePortfolio would make a difference in how the candidate was evaluated once the applicant got through the initial screening process, provided the ePortfolio was done well. It was viewed as a helpful step before the actual conversation with the applicant, and some saw its value after the in-person interview as an additional resource. For example, one participant noted, "If you're down to that shortlist, I could see this being a great tool" (Participant #6). Another said, "Where this will be extremely valuable, I think, is the deep dive if I'm going to make a consideration of one or two people" (Participant #3).

The prevailing viewpoint of the participants was to use the ePortfolio before and after the interview stage. The participants were divided, however, in regard to using ePortfolios for the pre-screening process. Approximately half of the participants would use it for pre-screening, and the other half would not. Some employers felt the ePortfolio could be used in other ways, such as a reference during the interview, a resource when future positions become available, and as a tool for a supervisor to review once someone has landed an internship, or before an employee's first day of work, in efforts to build a rapport with a new hire. Some participants believed the ePortfolio would add value when hiring an intern, but others did not.

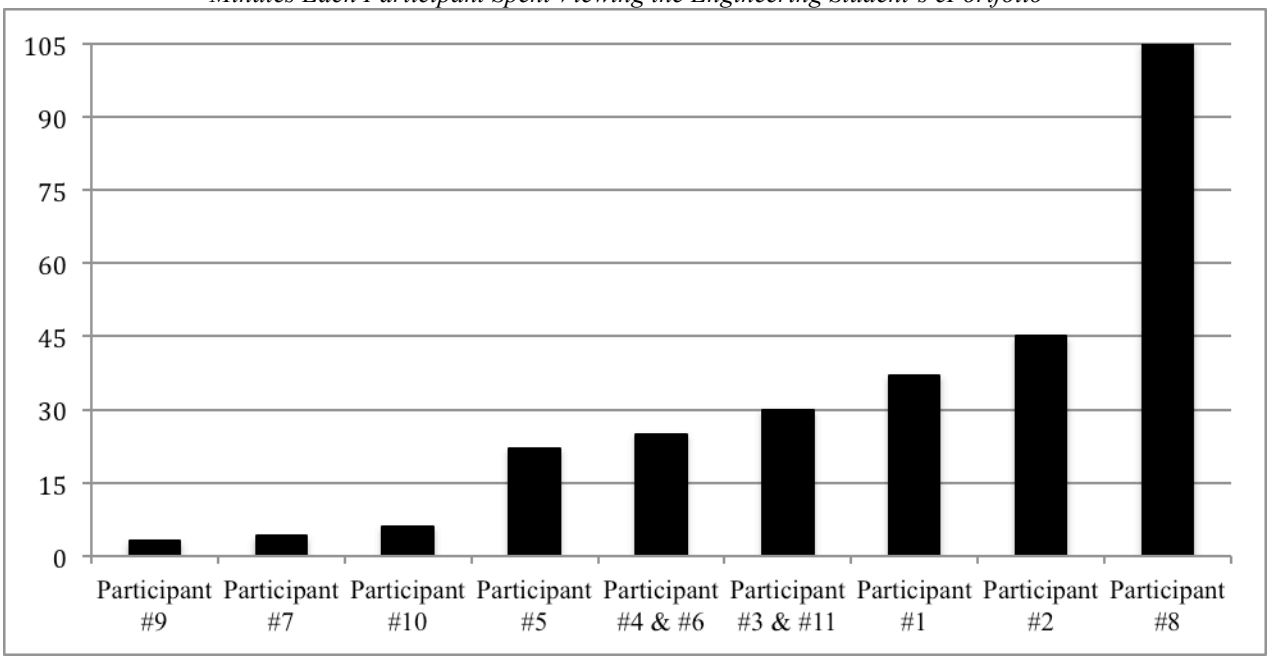
How ePortfolios affect timing within hiring process. The employers were conflicted as to whether implementing an ePortfolio into the hiring process would save time or not. Most of the participants open to using the ePortfolio in pre-screening believed the tool would need to be officially adopted by the organization and fully integrated into the company's hiring process to be effective and time efficient. Others believed the implementation would add time, but felt better decisions would be made as a result. A few participants believed utilizing ePortfolios would ultimately save time in the later stages of the hiring process, once the candidate pool is narrowed. In this scenario, the ePortfolio could be used as a resource guide instead of conducting additional screenings. One participant in the study had actually used ePortfolios in all stages of the hiring process, and felt it saved time overall.

Time spent viewing the engineering student's ePortfolio. Participants were asked how long they spent viewing the engineering student's ePortfolio. The time varied greatly among the participants; the average among the 11 participants was 30 minutes. Figure 1 depicts each participant's total time spent viewing the ePortfolio.

Recommendations for ePortfolio Design

During the interview process, the participants suggested tips and guidelines for students when creating ePortfolios. To begin with, the "less is more" sentiment was embraced by those interviewed; keep the ePortfolio clean and concise. The consensus was that if you make recruiters' life easier, they will be more apt to

Figure 1
Minutes Each Participant Spent Viewing the Engineering Student's ePortfolio



use the ePortfolio and the candidate will fare better. For instance, the Home Page should be kept simple to immediately provide pertinent information to employers, such as offering a brief bio on the candidate and making the résumé readily available. Next, students should develop an ePortfolio that takes full advantage of the online medium. Those creating ePortfolios should hyperlink information, upload video and audio files, and insert artifacts that are engaging. Students were encouraged to ask professionals from their industry to review and critique their sites before entering the job market. Asking employers to view an ePortfolio could be a way for students to build a rapport with employers, as well as to determine if their ePortfolios are appropriate.

Given the inherently personal nature of the ePortfolio, balancing professional with personal information, can prove challenging for students (Svyantek, Kajfez, & McNair, 2015). Students must find the fine line between sharing personal information and showcasing too much. To address this issue, employers suggested that if students are going to upload pictures, the photos should be professional because the images will say a lot about them. Participants also dissuaded students from linking their personal social media sites to their ePortfolios. Additional pitfalls mentioned for ePortfolio developers to avoid included web pages that are under construction or not yet developed, broken hyperlinks, and acronyms that would be unclear to an employer. Full-length documents should not be uploaded; instead consolidate the artifact to one to two pages.

Sharing the ePortfolio With Employers

Students should provide links to their ePortfolios on their résumés. The link could be under the student's name or in a line on the bottom stating, "Visit my ePortfolio" or "This is my ePortfolio." This additional line might replace the References section, and lead people to the ePortfolio's About Me page. The ePortfolio link should be easy to access, so a short URL or web address was recommended. A quick response (QR) code directing to the ePortfolio could also be added to a résumé. A QR code is a barcode that users can scan using their smartphones, and it will direct them to a corresponding website. The ePortfolio link could be included in a cover letter, embedded on a LinkedIn page, or printed on business cards. If it is a digital cover letter, the candidate should hyperlink the ePortfolio address for ease of access.

Comparing Study's Findings with Fowler (2012) and Hartwick and Mason (2014)

The results from this study both compared and contrasted with Fowler's (2012) results. In both the present study and in Fowler's (2012) study, the employers agreed that ePortfolios provided more depth and breadth of information. In the present study,

however, the engineering employers disagreed with Fowler's (2012) participants that ePortfolios would save time and money in the hiring process. In addition, there were similarities in the findings between the Hartwick and Mason (2014) study and the present study. The ePortfolios were perceived as valuable in regards to their convenience, accessibility, and portability, and videos were well received. The majority of Hartwick and Mason's (2014) participants would use the ePortfolio prior to an interview and following an interview as compared to an initial screening tool; these were the same results as the present study. The amount of time it would take to view ePortfolios was perceived as a barrier in reviewing candidates' websites within both studies.

Essential Criteria for Engineering Students' ePortfolios

There were particular components the employers of engineers found useful, and would like to review within an engineering student's ePortfolio. While not every participant expressed an interest in each of the items, these components are representative of themes and subthemes that predominantly emerged within this study. These elements include (a) an executive summary; (b) an accessible résumé; (c) an About Me page; (d) academic and professional experiences and projects; (e) research, leadership, and service information; and (f) references. As a result, the researcher recommends the following essential criteria for an engineering student developing an ePortfolio:

- Home Page: should include an executive summary of the student, such as the student's name, major, university, contact information, additional relevant academic information, and any other professional and academic websites or social media sites;
- Résumé: should be easy to find, access and print;
- About: should include a personal bio on student that may or may not include photos;
- Academic Experience and Projects: should provide evidence of student's work in courses and scholastic work outside the classroom; might include images, presentations, diagrams, charts, and audio and video files;
- Professional Experience and Projects: should provide evidence of student's work for a company or internship; might include images, presentations, diagrams, charts, and audio and video files;
- Research: should include a description of research (if applicable for student); might include research posters, images, presentations, diagrams, charts, and audio and video files;
- Leadership: should provide evidence of leadership experiences both on and off campus (if applicable for student); might include images, presentations, diagrams, charts, and audio and video files;
- Service and/or Teamwork: should provide evidence of service and/or group experiences both on and off campus (if applicable for student); might include images, presentations, diagrams, charts, and audio and video files; and
- References: should include quotes or letters from professors and employers.

These guidelines were developed through coding and analyzing the participants' feedback within the present study. The criteria were also determined based upon the artifacts the participants mentioned wanting to view within an ePortfolio. These recommendations are also supported in part by Fowler's (2012) findings and Hartwick and Mason's (2014) findings. Also, these guidelines are in accordance with the ePortfolio pedagogy practices of Turns, Sattler, Eliot, Kilgore, and Mobrand (2012), who encourage students to create ePortfolios that are "experience-based" (p. 3) and include artifacts from their coursework and research. Figure 2 depicts an example of what an engineering student's ePortfolio might resemble if using the criteria recommended by the researcher.

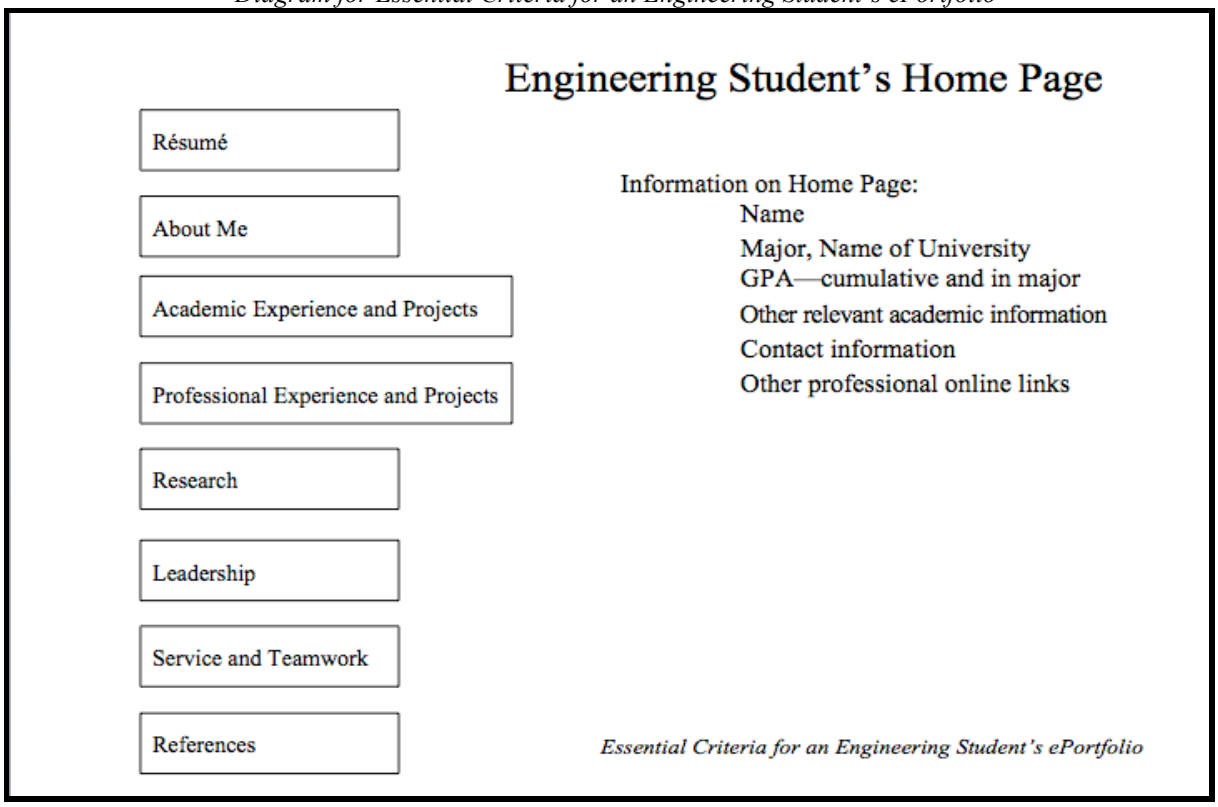
Implications of Study

There is no question that hiring trends—particularly recruiting practices—are becoming increasingly digitally driven. By way of example, LinkedIn grew from 37 million subscribers in 2009 to over 450 million subscribers in 2016 (Statista, 2016). Within the present study, the majority of the participants referenced LinkedIn in some capacity. Clearly employers rely on the Internet in their hiring practices. As a result, it is imperative that students are aware of how to best present themselves digitally when seeking employment, as well as the implications and the problems that can arise due to their online profile.

Recognizing Inherently Personal Nature of ePortfolios

Given that an overarching theme among participants was that an ePortfolio enabled them to better differentiate a candidate and helped assess potential fit and future with a company, developing a professional ePortfolio could be advantageous for students entering the job market. For instance, one participant stated, "An ePortfolio allows us a better view into a candidate than the conventional methods" (Participant #4). The participants in the present study

Figure 2
Diagram for Essential Criteria for an Engineering Student's ePortfolio



expressed an interest in learning about a student's academic and professional experiences. A standard résumé or application is typically not going to provide evidence of detailed activities, communication skills, the ability to work within a team, and the critical thinking skills that employers are seeking.

Nevertheless, an expressed disadvantage to using an ePortfolio was the increased amount of content presented to the employer. Some employers were concerned that showcasing this additional information could lead to biases and subjectivities toward the candidate that could affect the ethics of the hiring process. Therefore, the findings from this study are essentially "a double-edged sword" for students. Given the inherently personal nature of the tool, students should be aware that it does expose them to potential biases. Students should closely consider if they wish to develop an ePortfolio, and if so, what and how much they choose to share. On the other hand, it is a platform for students to share their narrative and explain perceived problems in their application materials. For instance, a student may have a lower GPA as compared to other candidates. The reason could be a challenging first year in college or life circumstances beyond their control. Due to the personal nature of an ePortfolio, students have an opportunity to explain how changing majors, or taking time off of school and then returning, enabled them to get back on the right track.

One-Stop Shop for Employers

Another dominant theme was that the ePortfolio encapsulates a candidate's traditional application materials and online media within one website. This demonstrates how ePortfolios are viewed as qualitatively different than traditional paper portfolios. As a digital medium, they offer possibilities for easier accessibility, flexibility, and convenience. This one-stop shop for employers was valued as a potential portal for students to house their résumés, LinkedIn pages, and ePortfolios within a central location. For this reason, students should take inventory of their online media, seeking to integrate their multiple digital presences. The résumé should include a link to the LinkedIn profile and ePortfolio. LinkedIn subscribers can embed or link to their ePortfolios in the Summary section of their LinkedIn profile. For the ePortfolio, the LinkedIn account and online résumé should be easily accessible on the Home Page of the website.

Integrating multiple online profiles addresses many of the disadvantages raised by employers within the present study. A central online clearinghouse enables employers to view as much or as little as they choose about an applicant. It also allows them the leisure to use the tools whenever in the process they see fit—as a pre-screening tool; before, during, or after an interview; or once hired, as a way to get to know the candidate prior to beginning the position.

Whether the online résumé, LinkedIn page, or ePortfolio serves as the hub, all the spokes must be aligned. It is important that the messaging is consistent among platforms and that the facts remain up-to-date. Managing this information may be laborious. Doing so, however, will increase the likelihood that employers will view the information and will receive a consistent message. Given how many jobs people typically work throughout their lifetime, it is prudent for those seeking employment to emphasize the competencies and skills honed through numerous professional positions within their ePortfolios (Chen, 2009). Having a comprehensive and consistent online presence is an ideal way to showcase the broad range of talents and experiences young professionals acquire in the early stages of their careers.

Teaching Best Practices in Creating and Managing Online Presences

Providing students with an additional digital tool for employment can assist them in entering the job market. Nevertheless, students must be aware of the potential for bias by employers when sharing personal photos and information online. Teaching students about ePortfolios presents an ideal opportunity to converse on these subjectivities. Educators can engage students through in-class discussions and analyses of case studies, and then empower students by allowing them to decide how they will present themselves online. Even if an academic department decides not to offer an ePortfolio program to students, educating students on how to create and manage online presences is important. Many graduating seniors and recent college graduates will have a LinkedIn account, and even more will have other social media sites and online presences live on the web for employers potentially to access. Teaching college students about best practices on the web and recognizing the potential for bias will assist them when entering the job market.

Incorporating ePortfolios Into the Hiring Process

If incorporating an ePortfolio component into the application process, companies need to consider when and how they would like to use the medium. The participants for the present study were divided as to when they would use the ePortfolio, for what purpose, and how it might affect the timing of their overall hiring process. The implications of these findings implore organizations to invite everyone who participates in the hiring of applicants to be involved in the decision-making process on the use of ePortfolios. All the stakeholders should invest ample time and energy when determining if ePortfolios should be adopted. If implemented into the hiring process, employers should consider which components of the ePortfolio should be required, how applicants should submit ePortfolios, and when and how in the process they should be adopted.

Limitations of the Study

There were limitations within the scope and design of this qualitative study. This was a narrow case study pertaining to the field of engineering; the observations and interviews collected were not representative of all individuals within the engineering sector. Recognizing that the engineering sector as a whole is incredibly broad and diverse, future inquiries would benefit from focusing on one particular field, such as mechanical engineering or computer engineering, as well studying similar sized companies with shared missions. Other limitations include the participants' affiliation with the university in which the study took place, the one engineering student's ePortfolio the subjects reviewed, and the employers' limited past experiences with ePortfolios. In addition, this exercise of reviewing ePortfolios was outside of their actual hiring practice. Also, the employers provided feedback on an ePortfolio for a student they were not actually considering for a position within their firms. These limitations were taken into account when analyzing the findings for the study.

Potential Future Studies

These findings have paved the way for additional inquiries in the field. Future analyses might include testing the researcher's essential criteria for students building ePortfolios. Continuing studies might also entail conducting a similar analysis on a different employment sector or with another audience, such as members of graduate admissions committees. This type of inquiry would also benefit from collaborating with researchers in the field of career services to advance the work. Finally, performing a comparative study on LinkedIn and ePortfolios would be insightful.

Conclusion

This qualitative analysis on ePortfolios was an invitation for the researcher to interact with employers by stepping outside the classroom and off campus, and connect with the greater collegiate community. It is crucial these types of inquiries continue to take place to

enhance communication and understanding among educators and employers. These avenues for inquiry help establish mutual understanding and build networks for all parties committed to improving the education and career readiness of college graduates. If students are concerned about an uncertain future upon graduation, and employers are skeptical about their preparedness for the workforce, creating opportunities to dialogue and collaborate is critical for understanding and future success.

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Appendix
Interview Questions

Interview Questions
1. Please share with me some information about your company and your role at your company.
2. Which pages or sections were most interesting to you?
3. Which pages or sections were least interesting to you?
4. What do you consider to be the strengths of an ePortfolio?
5. What do you consider to be the drawbacks of an ePortfolio?
6. What aspects of the ePortfolio would be MOST helpful to your decision-making process?
7. What aspects of the ePortfolio would be LEAST helpful to your decision-making process?
8. Could you better determine the skills of a job applicant who has an ePortfolio compared to traditional candidate screening methods?
Probe: In which ways can you better determine these skills?
9. Do you believe an ePortfolio would make a difference in how candidates are evaluated?
Probe: How would it make a difference?
10. What elements would you like to see in an ePortfolio? Please describe them.
11. Do you think an ePortfolio offers enough components to represent an applicant effectively?
If not, what would you include?
12. Do you have any suggestions for improving and/or streamlining the ePortfolio?
13. What guidance would you provide applicants to help them make the ideal ePortfolio? Please give some examples.
14.How should a candidate notify you of the existence of an ePortfolio?
15. Would you use this ePortfolio, or parts of it, in the hiring process? Yes No If so, how?
16. If you would use the ePortfolio, or parts of it, would you use it in any of the following ways?
i. An initial screening device
ii. Just prior to an interview
iii. Following an interview
iv. And/or in another way
17. If you would not use the ePortfolio, why not?
18. If you would not use the ePortfolio, can you see a way in which you might use an ePortfolio in the future? Consider both modifications to the ePortfolio and changes in the way you might approach hiring in the future.
19. Approximately how much time is spent currently reviewing a candidate's application materials?
20. How would introducing an ePortfolio into the process affect the time spent in reviewing a candidate's application materials?
21. Approximately how long did you spend viewing the ePortfolio?