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# To eP or Not to eP: Electronic Portfolio Usage and Their Role in Framing Digital Identities Among Criminal Justice, Cybersecurity, and Leadership Majors.

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**ABSTRACT**

Electronic portfolios have been hailed as a useful pedological tool on numerous grounds. One commonly cited justification is that portfolios deepen student learning and help students develop a professional identity. Whether electronic portfolios are used equally across programs and the degree to which they promote digital identities across student groups remains open to question. To fill this void in the research, in this study we explore the degree to which students from three majors (cybersecurity, leadership, and criminal justice) report using electronic portfolios, with a specific focus given to the reported strengths of electronic portfolios and the way the tool shaped digital identity development.

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## Introduction

Electronic portfolios, better known as ePs, are digital collections of student work that serve various functions including but not limited to assessment, integrative learning, professional development, and showcasing student learning. Recent estimates suggest that more than half of higher education institutions in the United States use electronic portfolios to support student learning (Eynon & Gambino, 2017). This is up from a just handful of institutions using the technology two decades ago. The widespread increase in the use of electronic portfolios can be traced to versatility, empirical support, and digital growth. Regarding versatility, electronic portfolios can be developed to serve multiple purposes, for multiple audiences, and across multiple technologies. In terms of empirical support, a number of studies have shown significant value coming from the use of electronic portfolios (Eynon & Gambino, 2017; Kuh et al., 2018). While a significant amount of empirical support for electronic portfolios is present in the literature, it is perhaps the amount of digital growth over the past decade that has had the greatest role in leading to the increased use of electronic portfolios across the United States.

While electronic portfolio usage is up, and hundreds if not thousands of studies have been conducted on the pedagogical tool, there are a few areas where little research on the topic has been done. In particular, researchers have not explored the

degree to which electronic portfolios are embraced by students outside of certain disciplines. More specifically, research has focused a great deal on the use of electronic portfolios by students in business, nursing, education, engineering, and similar programs (cf. Rowley & Munday, 2018). However, few, if any, studies have explored how students from majors such as criminal justice, cybersecurity, and leadership use electronic portfolios. In addition, while research suggests that electronic portfolios should help students develop their digital identity, few studies have actually explored whether developing an electronic portfolio actually shapes how students define their digital identities.

To address these gaps in research, in this study we explore the degree to which criminal justice, cybersecurity, and leadership majors use electronic portfolios. In addition, attention is given to whether students who have developed electronic portfolios characterize their digital identities differently than those who have never developed electronic portfolios. Addressing these areas will provide important into strategies for effectively using electronic portfolios as a teaching tool.

## Review of literature

Higher education institutions are increasingly using electronic portfolios in various parts of the academic enterprise. The impetus for the growth of electronic portfolios lies in the intersection of three relatively recent systemic influences. First, technological changes have made it easier for faculty and students to archive, maintain, and use their learning products over an extended period of time. Second, increased calls from policy makers for accountability in higher education institutions have led institutions to expand their efforts to assess learning. Third, the growth of research on the utility of electronic portfolios to promote student learning has been dramatic. In fact, some have said that there is even now an "academic field" or discipline of e-portfolios (Clark, 2019). Such a claim is bolstered by the large number of researchers – both from education as well as those disciplines using electronic portfolios – who now devote their careers to studying various aspects of electronic portfolios. To fully understand the expansion of electronic portfolios and their potential to improve student learning across various disciplines, it is important to consider the history of electronic portfolios, types of electronic portfolios, and their versatility and potential impact various educational spaces.

### *History of electronic portfolios*

One can certainly envision the days when art and architecture students carried their hard copy portfolios across campus to maintain their archive that demonstrated both their growth and professional abilities (Bryant & Chittum, 2013). At a certain point, it was no longer necessary to carry around hard copies of student work. Electronic portfolios can be traced to the 1999 when the California State University teacher preparation program stopped using hard copy portfolios and began to use portfolios on CDs (Clark, 2019). Shortly thereafter, others began to explore the ability to use technological advancements to chronicle and promote learning. Ittleson, a pioneer in

electronic portfolio, suggested that electronic portfolios "began to take hold" in 2001-2002 (Clark, 2019, p.60).

Ittleson notes that the creation of an electronic portfolio action committee (ePAC) and work by the Association for Authentic, Experiential, and Evidence-Based Learning created the foundation for dramatic growth in electronic portfolios (Clark, 2019). The most significant explosion of electronic portfolio usage occurred after a group of scholars and the AACU identified the pedagogy as a "meta high impact practice." High impact practices are a range of educational strategies (e.g., learning communities, internships, undergraduate research, service learning) that have been shown to improve student learning among all groups, but particularly for disadvantaged groups. In 2008, George Kuh and his colleagues (Kuh, 2008) identified electronic portfolios as having the capacity to be joined with other high impact practices such as undergraduate research and service learning. By connecting the portfolios to other high impact practices, it is believed that a synergistic effect leads to particularly beneficial outcomes for students.

### *Types of electronic portfolios*

Over time, a number of different types of electronic portfolios have been developed. These types are typically named by the specific function of the electronic portfolio. For example, the IMS Global Learning Consortium has identified the following types of electronic portfolios: assessment ePortfolios, presentation ePortfolios, learning ePortfolios, personal development ePortfolios, multiple owner ePortfolios, and working ePortfolios (Hallam & Creagh, 2010). George Kuh and his colleagues (2018) offer a simpler typology and identify three types of electronic portfolios: showcase, learning, and assessment ePortfolios.

The specific format used in an electronic portfolio will be connected to the type of portfolio (Bhattacharya & Hartnett, 2007). An electronic portfolio designed for teaching will look very different than one designed for showcase or assessment. Also, it is important to note that electronic portfolios are "more than a technology" (Kuh et al., 2018, p. 16). The technology "add[s] a longitudinal dimension to learning" (Batson et al., 2017, p. 3) and is best seen as "a process that, when done well, deepens reflection and dispositional learning, over time and across … boundaries" (Kuh et al., 2018, p. 16). The longitudinal and process-oriented dynamics are captured in the commonly used characterization of electronic portfolio development: "collect, select, reflect, connect" (Veneruso et al., 2017, p. 32).

### *Versatility of electronic portfolios*

In some ways, discussing the versatility of electronic portfolios almost sounds like an infomercial – It slices! It dices! Supporters would likely point out that electronic portfolios far out perform the Veg-O-Matic. After all, electronic portfolios have the capacity to deepen learning, assess curricula, showcase successful learning outcomes, and prepare students for their future careers. They do far more than slice and dice! Attesting to this versatility, researchers have explored a number of different strategies for using

electronic portfolios as well as the types of courses and applications for the technology.

As an illustration of the versatility of electronic portfolios, Johnson and Snyder (2020) point out at "the eportfolio can be used with any major or discipline" (p. 285). Consider the different populations the tool has been used for and the types of classes and curricula academics have targeted in electronic portfolio applications:

- General education coursework (Appling et al., 2012)
- Learning communities for first generation college students (Conefrey, 2017).
- Online courses (Bolliger & Shepherd, 2010).
- Interdisciplinary courses (Wells et al., 2018)
- Graduate courses (Bolliger & Shepherd, 2010)
- Capstone courses (Richards-Schuster & Galura, 2017).
- Internationalization efforts (Jones et al., 2017)
- Throughout the curriculum (Yancey, 2019).

Electronic portfolios promote both formal and informal learning, thereby allowing students to apply their knowledge, skills, and abilities while developing collaboration and communication skills (Bhattacharya & Hartnett, 2007). Because of this versatility, some institutions have incorporated electronic portfolio development into their general education requirements. Such a process, in theory, should help with general education assessment and promote better understanding of those competencies among all parties (students and faculty alike) (Appling et al., 2012).

### *Benefits of using electronic portfolios*

A great deal of literature shows positive results of electronic portfolios when they are implemented appropriately. These positive results include but are not limited to deeper learning, learning about digital media, improved teaching, stronger curricula, professional development, career placement, and identity formation.

It's probably safe to say that all electronic portfolio supporters cite deeper learning as one of the positive aspects resulting from the pedagogy. Four features of successful electronic portfolios promote deeper learning: students own the learning process, the longitudinal nature of portfolio development, the visibility of the portfolio, and the way that the process promotes reflection (Kuh et al., 2018). Another mechanism that drives deeper learning is the way that electronic portfolio development fosters self-regulated learning (Nguyen & Ikeda, 2015). By "owning" their learning, students are able to set the pace at which their learning occurs. Another mechanism fostering deeper learning is the way that the pedagogical tool promotes engagement (Buente et al., 2015). More specifically, students will engage with course content in ways that embrace deeper learning and they might also be engaging with communities of practice that encourage students to think differently and more broadly about the learning material. This deeper learning is evidenced by a study showing that students who completed electronic portfolios score higher on course exams than students who did not develop portfolios (Händel et al., 2020).

In addition to learning about the course material students will also develop their digital skills when creating electronic portfolios. Three domains related to digital skill building could be part of the electronic portfolio process. First, and most obviously, students will learn how to use electronic technology to either archive or showcase their work (Buente et al., 2015). Having these skills cannot be underestimated given the growing reliance on digital media. Second, developing an electronic portfolio presents instructors the opportunity to teach about digital ethics, particularly in the area of the types of digital content students can use from other websites, how to share that information (Wilson et al., 2018). Third, and equally important, learning about electronic portfolio development, particularly showcase portfolio development, gives instructors the opportunity to talk about digital safety. In particular, students can be taught about how posting certain types of information online might expose individuals to an increased risk of victimization.

Improved teaching also results from using electronic portfolios. Specifically, electronic portfolios provide instructors a tool that they can add to their pedagogical tool kit (Buyarski et al., 2017). One author team indicates that integrating the tool into courses has the potential to transform teaching for instructors (Reynolds & Patton, 2015). Note also that faculty who develop their own electronic portfolios will engage in deep learning about their own activities. Such a process, then, would help to improve what they are doing in their courses (Caldwell et al., 2017).

It has also been shown that electronic portfolios, when used as assessment tools, can lead to stronger curricula. On one level, when built into the assessment fabric and used in accreditation efforts, institutions will use electronic portfolios to assess learning and engage in continuous improvement process designed to both demonstrate and improve learning. Such processes help to promote change in the department (Buente et al., 2015) and across the institution (Ring & Ramirez, 2012). In the words of Batson and his co-authors (2015), electronic portfolios "result in a more episodic overall curriculum" (p. 2).

Regarding professional development, electronic portfolios help students learn skills that can help them in their careers (Brown & Thoroughman, 2017). Skills students learn from developing electronic portfolios include communication skills, critical thinking skills, writing skills, and other "soft" skills that employers across virtually all fields rank as important. In addition, electronic portfolios allow students to demonstrate their credentials related to technology as well as those specifically related to the careers they are seeking (Challis, 2005).

Somewhat related to professional development, electronic portfolios could also impact career placement. Indeed, some evidence suggests that electronic portfolios make it easier for employers to select new employees (Ambrose et al., 2017). As an illustration, one study found that students who were exposed to electronic portfolio pedagogy did better in mock job interviews than those who were not exposed to the teaching tool (Ring et al., 2017). Researchers have identified certain artifacts or additions to electronic portfolios that might increase the students' likelihood of being hired. For example, one research team found that adding videos of the student engaging in a professional activity potentially helped distinguish the student from other job applicants (Hartwick & Mason, 2014). Another research team concluded that electronic

portfolios appear to have "a promising future … in the job search process" (Leahy & Filiatrault, 2017, p. 221).

A final benefit of electronic portfolio development is that the process helps to develop a professional identity (Graves & Epstein, 2011) and a digital identity (Jones & Leverenz, 2017). The professional identity developed by students gives them the ability to "display a narrative significant to potential employers" (Graves & Epstein, 2011, p. 346). This professional narrative does not just happen out of the blue. One study found that "students' use of electronic portfolios transitions from archive to self portrait [and] the electronic portfolio emerged as a vehicle through which identity is negotiated and constructed" (Bennett et al., 2016, p. 107).

Claims of identity formation make sense when considering how students develop electronic portfolios. The very act of self-reflection, which is required in electronic portfolio development, requires students to think about their identities. By engaging in self-reflection, "students are able to construct a view of their learning that is integrated, personal, and relevant to their lives" (Buyarski et al., 2017, p. 7). Research supports such an outcome with one student concluding that electronic portfolio development "encourages the application of concepts to the self" (Singer-Freeman & Bastone, 2017, p. 68). Others have also suggested that electronic portfolios help students develop a "sense of self" (Munday et al., 2017).

### *Digital identity and electronic portfolios*

Previous research shows how the development of electronic portfolios is beneficial towards student's identity development, professional development and professional identity. Because electronic portfolios are created and exist in the digital world, it is natural to explore the connection between electronic portfolios and digital identities. General speaking, digital identity has been characterized as being "a part of a person's online presence" (Costa & Torres, 2011, p. 49). One second author team defines digital identity as "a composite of images that individuals present, share, and promote for themselves in the digital domain" (Dalton & Crosby, 2013, p. 1). A third author team offers that a digital identity is "the persona an individual presents across all the digital communities that he/she is represented in" (Williams et al., 2012, p. 106). Another author team defines the phrase as a way to utilize "digital technology in relation to people's experiences of their own identity and the identity as shaped by others in the cyberspace" (p. 3176).

In some ways, digital identities are shaped by presentations of self and interpretations of other individuals' presentations of self in digital spaces (Costa & Torres, 2011; Castaneda & Camacho, 2011). Young people born after the social media revolution now use social network as a space to build their identities (Camacho et al., 2012). To some, digital spaces provide opportunities not just to build identity, but to change identities and alter presentations of self. Costa and Torres (2011), for example, suggest that young people use the internet to renegotiate their digital identity but also as a way to construct new social lives and social realities.

Young people spent a significant amount of the daily lives connected to the electronic world (Dalton & Crosby, 2103; Stoller, 2013). Time spent in the digital world by

this age group is typically spent using social media outlets such as Instagram, Snapchat, LinkedIn, Twitter, and others. Some have noted that social media use has been normalized as a way for individuals to brand themselves, sharing both their strengths and vulnerabilities (Stoller, 2013) It appears that sharing positive aspects of oneself is more common. Goldman et al. (2008) argue that young people promote images of themselves that is deemed the most attractive to others in the virtual space. According to Alvesson et al. (2008), the internet allows for young people to use their online identity to portray and display themselves in way that they have also wanted to do so. In some ways, individuals have more control over their digital identities than they have over other types of identities. In other ways, digital identities cannot be separated from professional and social identities.

Connecting this professional identity to the digital world, electronic portfolio development is believed to give students the ability to connect their digital identities to their professional identities. Taking this even further, some have argued that electronic portfolios could be used to help students to go beyond a digital identity and build a personal brand that might "[include] a mission and vision statement, a brand statement, and tagline, clearly distinguishing one's brand from one's identity" (Jones & Leverenz, 2017, p. 68).

### *The current study*

While the literature shows positive results stemming from electronic portfolio usage, two gaps exist in the literature. First, it is not clear the degree to which different types of academic majors use electronic portfolios. Second, the precise connection between electronic portfolio development and formation of a digital identity is not yet well understood. This study addresses these gaps by exploring how three different types of academic majors (e.g., criminal justice, leadership, and cybersecurity) use electronic portfolios at one university and a specific focus is given to whether electronic portfolio usage is connected to digital identity. With these gaps in mind, this study addresses three general research questions:

1. How do criminal justice, cybersecurity, and leadership students compare in their usage of electronic portfolios?
2. How does the usage of electronic portfolios relate to how students define their digital identities?
3. How do ePortfolios impact students' perceptions of their digital identity?

Some may wonder about the utility of comparing electronic portfolio usage across student groups. As Bryant and Chittum (2013) point out, electronic portfolio studies rarely include comparisons or control groups allowing for comparisons between those using electronic portfolios and those not using them. By comparing across major groups, we will be able to dissect the impact of electronic portfolio usage at the program level. As well, focusing on the consequences of electronic portfolio development will provide valuable insight about the teaching tool for these academic programs, as well as others (see Bryant & Chittum, 2013).

### *Methods*

To determine students' ePortfolio usage and its impact on their digital identity, a web-based survey was developed and distributed to students in the targeted majors and enrolled in a southeastern university. Questions ranged from how students utilized their ePortfolio, to their perceptions of its effectiveness, helpfulness and impact. Additionally, the Rosenberg Self-Esteem Scale (Rosenberg, 1979) was adapted to evaluate the impact of ePortfolio on student's perceptions of their digital identity. The Rosenberg scale was used because of its longstanding versatility. It has been cited more than 1,000 times and has been used to explore connections between self-esteem and social media (Ahmed et al., 2021; Andreassen et al., 2017; Raymer, 2015). It was revised for the purpose of this study to include the word digital identity throughout the ten-item scale in an effort to ask respondents to think about their digital selves rather than their traditional sense of self. Respondents were not given a definition of digital identity but were afforded the opportunity to define the construct in ways that made sense to them.

The survey was administered at two different time periods: October 9, 2019 through November 4, 2019 and January 15 through March 6, 2020. E-mail invitations to complete the survey were sent to students during these two time periods. The invitations included links allowing students to complete the surveys electronically. Two different time periods were used to increase response rates and give students the opportunity to complete the survey at different points during two semesters. All currently enrolled students majoring in criminal justice, cybersecurity, or leadership were invited to complete the survey. Follow-up invitations to complete the survey were sent two to three weeks after the initial invitations. Professors teaching in these disciplines were also asked to share the survey invitation with their classes. Because non-majors may have been taking the classes, some of the respondents were "other" majors. Our estimated response rate was 10.78%. While the response rate was lower than we hoped it would be, and certainly a limitation of our study, enough responses were provided to address the research questions. The survey strategy was approved by the institution's review board. No incentives were provided for survey completion.

Table 1 displays the university population and survey respondents' demographic information. The majority of respondents were female (49%), white (52%), classified as seniors (42%), and (32%) were between 20-25 years old. Nearly one-third of the respondents were cybersecurity majors, one-fourth were criminal justice majors, just over 10% were leadership majors, and about one-fourth were "other majors." Respondents' demographics were comparable to the population except for race. Those who reported their race was white were over represented in the results.

## Findings

Table 2 shows how students characterized their digital identities using items adapted from Rosenberg's Self-Esteem scale and questions about the use of electronic portfolios. Overall, the majority of respondents were confident about their digital identity and secure with what it shows about themselves. Respondents agreed their digital identity *shows a number of good qualities* (87%), makes them feel like a *person of*

**Table 1.** Demographics of population and respondents.*

| | Population | | Respondents | |
|---|---|---|---|---|
| | Frequency | % | Frequency | % |
| Gender | | | | |
| Female | 676 | 50.04 | 71 | 48.97 |
| Male | 671 | 49.89 | 62 | 42.76 |
| Not Reported | 1 | 0.07 | 12 | 8.28 |
| Race | | | | |
| African-American | 501 | 37.25 | 38 | 26.20 |
| Asian | 53 | 3.94 | 12 | 8.28 |
| Hispanic | 115 | 8.55 | 8 | 5.52 |
| Native American | 5 | 0.37 | 0 | 0.0 |
| Native Hawaiian / Pacific Islander | 3 | 0.22 | 0 | 0.0 |
| Non-Resident Alien | 8 | 0.59 | 0 | 0.0 |
| Two or More Races | 111 | 8.25 | 11 | 7.59 |
| Unknown | 30 | 2.23 | 0 | 0.0 |
| White | 519 | 38.59 | 76 | 52.41 |
| Major** | | | | |
| Criminal Justice | | | 37 | 25.52 |
| Cybersecurity | | | 47 | 32.41 |
| Leadership | | | 16 | 11.03 |
| Other | | | 34 | 23.45 |
| Not Reported | | | 11 | 7.59 |
| Student Level | | | | |
| First-year Student | 106 | 7.88 | 13 | 8.97 |
| Sophomores | 238 | 17.70 | 12 | 8.28 |
| Juniors | 411 | 30.56 | 41 | 28.28 |
| Seniors | 590 | 43.87 | 61 | 42.07 |
| Other | 0 | 0.00 | 8 | 5.52 |
| Not Reported | 0 | 0.00 | 10 | 6.90 |
| Age | | | | |
| Under 20 | 151 | 11.23 | 19 | 13.10 |
| 20-25 | 810 | 60.22 | 75 | 51.72 |
| 26-30 | 182 | 13.53 | 11 | 7.59 |
| 31-35 | 74 | 5.50 | 8 | 5.52 |
| 36-40 | 46 | 3.42 | 5 | 3.45 |
| over 40 | 82 | 6.10 | 17 | 11.72 |
| Not Reported | 0 | 0.00 | 10 | 6.90 |

*Percentages may not equal 100% due to rounding.
**Because we targeted students enrolled in courses in the three majors, it does not make sense to compare them to the university population.

*worth* (78%), and shows that they have *a positive attitude* towards themselves (91%). Furthermore, respondents disagreed that their digital identify *shows they are not good at all* (93%), makes them *feel useless at times* (90%), and their digital identity suggests they are a failure (91%). Respondents reported they disagreed that they *give little thought to* (their) *digital identify* when thinking about their career (70%) and they agreed they *worry about* (their) *digital identity and how* (they) *might look to others* (61%).

Half of the respondents (n = 72) had created an electronic portfolio (eP) for a course in their academic programs. These respondents were asked their thoughts about how their eP helped them with various situations. The results were mixed. When asked if *developing an eP helped* (them) *learn about topics in* (their) *major*, 50% agreed (18% strongly agreed) and 50% disagreed (20% strongly disagreed). Furthermore, 53% of respondents who created an eP agreed the *eP helped them see connections between* (their) *courses* and 41% *found the eP process was a waste of time.*

**Table 2.** Perceptions about digital identities and electronic portfolios.

| Statements | Strongly Agree | Agree | Disagree | Strongly Disagree |
|---|---|---|---|---|
| I am confident that I will find a job in my field as soon as I graduate. | 42 (29.6) | 71 (40.0) | 26 (17.6) | 4 (2.8) |
| I worry about my digital identity and how I might look to others online. | 24 (16.8) | 61 (42.7) | 39 (27.3) | 19 (13.3) |
| When thinking about my future career, I give little thought to my digital identity. | 14 (9.8) | 30 (21.0) | 57 (39.9) | 42 (29.4) |
| I think my digital identity shows that I am no good at all. | 1 (.7) | 9 (6.3) | 79 (54.9) | 55 (38.2) |
| I feel that my digital identity shows that I have a number of good qualities. | 30 (21.0) | 94 (65.7) | 17 (11.9) | 2 (1.4) |
| My digital identity shows I am able to do things as well as most other people. | 25 (17.5) | 96 (67.6) | 16 (11.3) | 3 (3.5) |
| Based on my digital identity, I feel I do not have much to be proud of. | 2 (1.4) | 18 (12.5) | 71 (49.3) | 53 (36.8) |
| My digital identity certainly makes me feel useless at times. | 2 (1.4) | 14 (9.8) | 71 (49.7) | 56 (39.2) |
| My digital identity makes me feel that I'm a person of worth, at least equal to others. | 23 (16.1) | 89 (62.2) | 25 (17.5) | 6 (4.2) |
| I wish I could show more respect for myself in my digital identity. | 4 (2.8) | 36 (25.2) | 60 (42.0) | 43 (29.7) |
| All in all, I am worried that my digital identity suggests that I'm a failure. | 1 (.7) | 13 (9.0) | 55 (38.2) | 75 (52.1) |
| Developing an ePortfolio helped me learn about topics in my major. | 11 (18.0) | 19 (31.1) | 19 (31.1) | 12 (19.7) |
| My ePortfolio will help me find a job in the future. | 10 (16.4) | 25 (41.0) | 18 (29.5) | 8 (13.1) |
| Developing an ePortfolio helped me see connections between my courses. | 9 (14.8) | 23 (37.7) | 19 (31.1) | 10 (16.4) |
| Creating an ePortfolio was easier than I expected. | 9 (14.8) | 23 (37.7) | 19 (31.1) | 10 (16.4) |
| I found the ePortfolio process to be a waste a time. | 4 (6.6) | 21 (34.4) | 23 (37.7) | 13 (21.3) |
| I plan to update my ePortfolio in the future. | 16 (26.2) | 28 (45.9) | 11 (18.0) | 6 (9.8) |
| I looked at sample ePortfolios to help me figure out how to create my own. | 14 (23.0) | 33 (54.1) | 10 (16.4) | 4 (6.6) |
| I'm not comfortable sharing my ePortfolio with others. | 3 (4.9) | 14 (23.9) | 34 (55.7) | 10 (16.4) |
| It would have been helpful to use ePortfolios more in my first or second year of college. | 19 (32.8) | 18 (31.0) | 17 (29.3) | 4 (6.9) |

The majority of respondents thought their *eP will help* (them) *find a job in the future* (57%), *creating an eP was easier than* (they) *expected* (53%), an eP *would have been helpful* in their first or second year of college (63%), and plan updating their eP in the future (72%).

A series of cross tabulations were conducted to determine whether major was related to perspectives about digital identities and the digital identity items modified from the Rosenberg self-esteem scale. Table 3 includes the results. Just one significant finding was found. Specifically, leadership majors were less likely than the other majors to be agree/strongly agree that they were satisfied with their digital identify. Half of the leadership majors were satisfied with their digital identities. In contrast, 84% of the other majors were satisfied with their digital identities (Fisher's Exact Test = .004).

In addition, we cross-tabulated whether or not respondents had created an ePortfolio by demographics and other student related variables including major. Table 4 shows that creation of ePortfolios was unrelated to sex, race, age, year in school,

**Table 3.** Major by agree/strongly agree about perspectives related to digital identity and digital identity items from Rosenberg's scale.

| Statements | Cybersecurity | Criminal Justice | Leadership | Other |
|---|---|---|---|---|
| Perspectives Related to Digital Identity | | | | |
| I am confident that I will find a job in my field as soon as I graduate. | 39 (84.8) | 25 (69.4) | 14 (87.5) | 29 (89.3) |
| I worry about my digital identity and how I might look to others online. | 30 (63.8) | 19 (52.8) | 10 (52.5) | 20 (58.8) |
| When thinking about my future career, I give little thought to my digital identity. | 14 (29.8) | 10 (27.8) | 7 (43.8) | 10 (29.4) |
| Modified Items from Rosenberg's Self-Esteem Scale | | | | |
| On the whole, I am satisfied with my digital identity.** | 38 (80.9) | 33 (89.2) | 8 (50.0) | 28 (82.4) |
| I think my digital identity shows that I am no good at all. | 4 (8.5) | 2 (5.4) | 2 (12.5) | 1 (2.9) |
| I feel that my digital identity shows that I have a number of good qualities. | 39 (83.0) | 32 (88.9) | 14 (87.5) | 41 (91.2) |
| My digital identity shows I am able to do things as well as most other people. | 43 (91.5) | 32 (86.5) | 11 (73.3) | 27 (79.4) |
| Based on my digital identity, I feel I do not have much to be proud of. | 6 (12.8) | 5 (13.5) | 3 (18.8) | 4 (11.8) |
| My digital identity certainly makes me feel useless at times. | 5 (10.6) | 5 (13.5) | 3 (18.8) | 3 (5.9) |
| My digital identity makes me feel that I'm a person of worth, at least equal to others. | 34 (72.3) | 29 (78.4) | 15 (93.8) | 27 (78.4) |
| I wish I could show more respect for myself in my digital identity. | 15 (31.9) | 11 (29.7) | 4 (25.0) | 8 (23.5) |
| All in all, I am worried that my digital identity suggests that I'm a failure. | 4 (8.5) | 6 (16.2) | 1 (6.3) | 2 (5.9) |
| My digital identity shows I have a positive attitude towards myself. | 40 (85.1) | 32 (88.9) | 15 (93.8) | 32 (94.7) |

** $p<.01$.

**Table 4.** Demographic and difference by major in eportfolio development.

| | | % Developed ePortfolio | |
|---|---|---|---|
| Gender | Female | 46.8 | |
| | Male | 43.7 | |
| Race/Ethnicity | White | 47.1 | |
| | AA/Black | 41.9 | |
| | Other | 48.4 | |
| Age | <20 | 57.9 | |
| | 20-25 | 40 | |
| | 26+ | 48.8 | |
| Year in School | Fresh/Soph | 56 | |
| | Junior | 39 | |
| | Senior | 45 | |
| Course Delivery | On-campus | 46.9 | |
| | Online | 45.5 | |
| | Equal mix | 48.5 | |
| Major | Cyber Security | 63.3 | ** |
| | Criminal Justice | 26.2 | |
| | Leader | 62.5 | |
| | Other | 29.6 | |

** $p < .01$.

and how the majority of their course were delivered (on-campus, online, or a mixture of both). Development of ePortfolios did vary, however, by major. Criminal justice majors were significantly less likely to have developed ePortfolios (26.2%), than cyber security (63.3%), or Leadership majors (62.5%).

**Table 5.** Perceptions about electronic portfolios by majors.

| Statements | Cybersecurity (n = 30) | Criminal Justice (n = 8) | Leadership (n = 10) | Other (n = 12) |
|---|---|---|---|---|
| Developing an ePortfolio helped me learn about topics in my major. | 12 (40.0) | 4 (50.0) | 5 (50) | 8 (66.7) |
| My ePortfolio will help me find a job in the future. | 19 (63.3) | 4 (50.0) | 6 (60.0) | 6 (50.0) |
| Developing an ePortfolio helped me see connections between my courses. | 16 (53.5) | 3 (37.5) | 4 (40.0) | 9 (75.0) |
| Creating an ePortfolio was easier than I expected.* | 20 (66.7) | 8 (100.0) | 4 (40.0) | 11 (91.7) |
| I plan to update my ePortfolio in the future. | 25 (83.3) | 6 (75.0) | 5 (50.0) | 7 (58.3) |
| I looked at sample ePortfolios to help me figure out how to create my own. | 23 (76.7) | 8 (100.0) | 8 (80.0) | 7 (58.3) |
| I'm not comfortable sharing my ePortfolio with others. | 9 (30.0) | 1 (12.5) | 4 (40.0 | 2 (16.7) |
| It would have been helpful to use ePortfolios more in my first or second year of college. | 20 (66.7) | 3 (37.5) | 6 (60.0) | 8 (66.7) |

*$p < .01$.

Subsequent cross tabulations were conducted to determine whether major was related to perceptions about electronic portfolios. Results comparing major to perceptions about ePortfolios are included in Table 5. For the most part, student major had no impact on students' perceptions about ePortfolios. Just one difference was found. Specifically, comparing all majors to leadership majors, we found that leadership majors were less likely to describe the ePortfolio as being easier to create than other students (Fisher's exact test $< .05$). Just forty percent of leadership majors completing an ePortfolio agreed/strongly agreed with the statement. In contrast, 78% of non-leadership majors agreed that creating the ePortfolio was easier than they expected.

Cross tabulations were conducted to examine the connections between electronic portfolios and digital identities. These analyses involved exploring the relationship between each item in Table 3 and each item in Table 5. The findings suggest that developing an ePortfolio is not related to the items measuring digital identity. To further explore the creation of digital self-identities, factor analysis was used to create a scale and two subscales using the modified items from Rosenberg's self-esteem scale. The analyses led to the development of a digital self-confidence subscale, a digital self-deprecation subscale, and an overall digital self-esteem scale. Cronbach's alpha showed strong internal consistency for self-confidence (.818), self-deprecation (.804) and the total 10 item digital self-esteem scale (.796). Scores for the scale and subscales were analyzed across a number of demographic variables and variables relevant for students. The three scales were not statistically related to sex, race or age of the respondent. Nor were any of the three scales related to year in the program (freshman/first year, sophomore, junior, senior) or whether most of the course work was done on campus, online, or a mixture of on-campus and online classes. In addition, the mean scores for each scale were comparable between those who developed an electronic portfolio and those who did not.

## Discussion

In this study, we explored the different perspectives regarding the usage of electronic portfolios among cybersecurity, leadership, criminal justice, and other majors. In

general, the students had positive digital identities. While half of the majors reported developing ePortfolios, we found mixed findings regarding student perceptions about ePortfolios, the versatility of the tool, and its impact on digital identity. Although the findings are somewhat mixed, they ultimately point to the value of ePortfolios and the need for future research on the versatility of ePortfolios and their ability to impact digital identities.

To begin, students' perceptions about ePortfolios were not as positive as we had anticipated. That only half of the students said the ePortfolios helped them see connections between their courses suggests that we have not implemented ePortfolios to their full potential. The fact that more than forty percent of the students indicated the process was a waste of time also raises some concerns. At the same time, the fact that a sizable portion of the sample plans to update their ePortfolios (72%) and the majority agreed that their ePortfolios will help them get jobs (57%) suggests that students found value in the teaching tool.

Consider also that we found very few differences across majors when considering student perceptions about electronic portfolios. While researchers often want to find differences in variables when conducting analyses, the absence of differences, in this context, actually seems to point to the versatility of electronic portfolios. More specifically, if we found a large number of differences in the way that electronic portfolios impacted students, then the implication would be that the teaching tool may not be able to be applied equally across students. The fact that students held consistent attitudes suggests that ePortfolios should have utility in a wide range of majors.

Finding no relationship between electronic portfolio development and digital identity was unexpected. Given the large body of research showing connections between electronic portfolios and digital identity formation (Bennett et al., 2016; Jones & Leverenz, 2017; Rowley & Munday, 2014), we suspect that either our measure or research strategy was not the best way to examine connections between the portfolio development process and the subsequent identity formation outcomes. To be sure, identity in and of itself is a complicated topic and different types of identity exist. Digital identity is equally complex. An examination of digital identity formation might require more qualitative types of strategies or measures specifically designed to measure the topic. Put simply, adapting a robust self-esteem measure potentially fails to fully capture all elements of the digital identity.

Another possible reason for not finding a relationship between digital identities and electronic portfolio development lies in the instruction provided by faculty. It is plausible that faculty have not stressed the value of identity formulation and electronic portfolios to our students. As one author teams writes, "Instructors should make it explicit to students how identity formation and the transition to becoming independent learners are central to career development" (Ambrose et al., 2017, p. 60). The underlying implication is that if instructors are not doing this, then they may not be seeing the strongest possible impact of electronic portfolios.

There were some differences between majors that warrant consideration. For example, leadership majors (who tend to be degree completers) were less likely to be satisfied with their digital identities and less likely to indicate that the ePortfolios were easier create than they expected. Other scholars have noted that students may find

ePortfolios hard to use at first, but with support and mentoring, those obstacles can be overcome (Gordon, 2017). Some researchers have noted that students will need to be trained about digital technology and will also need guidance on the types of artifacts to be included when they develop ePortfolios (Hartwick & Mason, 2014). One author team suggests using technology acceptance model as strategy to get student buy-in (Shroff et al., 2011). Our research calls into question a "one-size-fits all" approach to helping students with their ePortfolios and suggests that certain types of students might need more help than others in developing their portfolios.

The finding that cybersecurity and leadership students were more likely to report developing ePortfolios warrants brief consideration. Note that very few criminal justice majors reported creating ePortfolios – less than one-fourth, in fact. In contrast, more than two-thirds of the leadership majors and cybersecurity majors reported developing electronic portfolios. The obvious reason for the difference lies in curriculum development decisions and not student decisions. Specifically, the cybersecurity and leadership programs include courses that require electronic portfolios while the criminal justice program does not. The implication is simple – if you want students to develop electronic portfolios, the simplest way to do so is to require electronic portfolios in courses. A study focused on cybersecurity high impact practices and using the same dataset used in this study concluded the following about the different electronic portfolio usage rates among majors: "Students and faculty will not voluntarily embrace or produce ePortfolios … Instead, programmatic decisions requiring their use are helpful in promoting the development and use of ePortfolios" (Payne et al., 2020).

This study is not without limitations. To begin, our focus was on a select group of majors related to the authors' areas of expertise. Because we found some, albeit minor, differences between majors, caution is warranted in assuming our results would apply to other majors. In addition, we did not actually measure learning outcomes. Instead, we measured perceptions about electronic portfolios and digital identities. The negative perspectives students held towards ePortfolios should not be seen as something that lowers the value of the pedogogical tool. After all, students don't "like" a lot of things that professors ask them to do. By themselves, preferences may not provide an accurate picture about the success of ePortfolios. At the same time, understanding these perceptions is helpful in building ePortfolio strategies that encourage students to embrace rather than dismiss the tool outright. In addition, the small sample size, especially for certain types of majors, warrants concern. Finally, by allowing students to construct their own definitions of digital identity, our findings may have inaccurately measured what is actually meant by the construct.

Despite these limitations, or perhaps because of them, a number of questions surface for future studies. To begin, researchers should more fully explore whether other types of majors hold comparable attitudes towards ePortfolios and whether digital identities varies across those groups. While our findings point to the versatility/consistency of ePortfolios across academic programs, additional research is needed on this topic. Further, as other researchers have noted, there is a lack of research examining the ability of electronic portfolios to actually demonstrate student success. Studies focused on "how" students learn when developing ePortfolios, rather than simply focusing on "whether" they learn are needed. In addition, researchers should explore

whether individuals actually think about their digital identities and, if so, how they conceptualize the construct. Finally, additional research on the connection between digital identities and electronic portfolio development is needed. Through such research, better understanding about the critical role that ePortfolios have in shaping learning and identity formulation will be forthcoming.

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