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Lift Every Voice: ePortfolios for Creating and Integrating

Terrel L. Rhodes

Association of American Colleges and Universities

Adapted from the 2018 Batson Lecture delivered at the annual meeting of the Association for Authentic, Experiential, and Evidence-Based Learning (AAEEBL) at Capilano University in Vancouver, British Columbia, this editorial challenges readers to think closely about the value and purpose of ePortfolios in higher education and posits a rationale for why ePortfolios are more important than ever for our students, our institutions, and our democratic society.

In summer 2018, the Annual Meeting of the ePortfolio professionals' Association for Authentic, Experiential, and Evidence-Based Learning (AAEEBL), focused on practices and sessions encouraging attendees to explore the ways ePortfolios bridge learning from one context to another; the connective tissue and sinews that bind together powerful student learning for success in our institutions, in careers, and in life. The Association of American Colleges and Universities (AAC&U) calls this *liberal learning* to collectively describe essential learning outcomes all learners need for success and the integration of these learning outcomes across the student's chosen field of specialized study, their choice of institution or program, and their lives within and without the formal academy.

Here, the focus is on ePortfolio's role in promoting liberal learning and the work in which that community is engaged; to engage in thinking about why we encourage utilization of ePortfolios, what is the work we do, and where we are in this landscape?

Why ePortfolios?

In common media parlance and among policy-makers as well as many academics, the "Why?" often is connected to the student's first job and salary (i.e., employment and employability) or to reporting for state or accreditation accountability. But why "e" portfolios?

ePortfolios place the focus on learning and allow for multiple ways in which to present and enact learning in formal and informal classrooms, in life outside the academy, and for learning brought to the academy and learning that grows within the academy. ePortfolios involve educators and learners in a shared dance of give and take. The point of ePortfolio is to engage educators and learners in a process of advancing learning; learning that is not for a grade on a test or paper or performance—albeit that purpose is important and motivating—but for learning that is integrated into one's identity and being so that it has a shelf life for years and lifetimes.

ePortfolios are a means to break out of pervasive structures we have inherited and acquiesced to that require us to organize our work within fiefdoms of

departments, programs, institutions, wealth, race, gender, identities—in short, to separate ourselves, to emphasize difference, to unbundle learning.

ePortfolios allow learning to be re-bundled. Indeed, ePortfolios as a pedagogy (when done well) require users to connect their learning, to reflect on their learning, and to intentionally engage with their learning as it is happening.

ePortfolios also allow for a dynamic, sustainable record of learning through ongoing engagement and utilization, an ability to constantly document and experiment, and develop learning through active engagement with exploration of learning as it is happening that prompts integration and connection for higher order aspects of learning—the very types of cognitive, emotional, and relational activities that have made recognition of ePortfolios as a high impact practice—not only enhancing learning but also student retention, graduation, and equity. In short, ePortfolios serve a purpose of helping, in actively inviting, learners to create (a) their own identities as learners and as people, (b) their own agency as an active influencer and creator of learning, and (c) as a person who is an educated participant in creating not only their own world but the global environment they share.

ePortfolio pedagogy is not a panacea; yet, it is a powerful approach integral to our mission of enhancing learning—so what does this mean for what we do?

What is the ePortfolio Work We Do?

ePortfolios are not a thing, although we often speak of them in such manner. They are variously, a pedagogy, a curriculum, and a way of thinking, of knowing, and a mindset. Borrowing from Helen Chen's (2011) *folio thinking*, ePortfolios are a unique way of conceiving and defining education. It is no longer a boxed set of knowledge for faculty to deliver but an ecology of educators and learners and environments. Borrowing from Kathleen Yancey (2019), ePortfolios are a curriculum, not in the constrained sense of a set of courses one takes starting with x and progressing to y, but as the term was originally used to represent: a course, a disciplined path of studying, intentionally

developed to learn and to educate, to develop as a person, and to liberate the mind.

The starting question for ePortfolios is not which ePortfolio technology to adopt; it must be, “What learning do we need?” The “what we need” is not what “we” the faculty/educator need exclusively. The curriculum requires room for the learner to also have voice and intentionality to achieve learning. Increasingly, concerns about technology and the growing role of artificial intelligence (AI), data collection profiling every move we make, and the frequent lack of control individuals have over their own digital identities further challenge technological solutions to educational issues. ePortfolios, however, are premised on personal control and curation of information, narrative, and presentation. The challenge higher education confronts is not so much making technology or AI more human but making better humans as users of technology.

Folio thinking recognizes the reality of what the futurists point out—knowledge is doubling every two years or even more rapidly. There is no way the curriculum, especially as we have instantiated it in higher education currently, can deliver that knowledge to our learners. What we need is a concerted, intentional shift by educators to forefront the preparation of learners who are well-equipped with the skills and abilities to make sense out of knowledge and information, to make meaning of and with their knowledge for themselves and others.

How Did We Get Here?

ePortfolios have been around for decades. Because I am an assessment advocate, I include assessment as central to why we do anything around learning and its centrality to ePortfolio adoption. It is distressing that higher education institutions so often lead with justification of ePortfolios for assessment purposes, typically couched in terms of accreditation and accountability reporting. This justification resulted early in assessment being presented as an either/or (i.e., assessment of learning as compliance versus assessment for learning improvement)—a false dichotomy, as is so often the case with our penchant to frame our work as oppositions. Just as ePortfolio technology has evolved, assessment methodology and tools (e.g., the VALUE rubrics and the VALUE Institute¹) have also developed to more intentionally

and robustly provide externally confirmed valid and reliable evidence of quality learning applicable to all students, and as measurement of learning at higher order levels necessary for learners to be better equipped to recognize and respond to complex, unscripted issues permeating modern society and life.

Educause has tracked the growth of ePortfolios to a point where well over half of U.S. schools appear to have ePortfolios in use on their campuses. Less systematic surveys following the designation of ePortfolios as a High Impact Practice (HIPs) reflect a modest uptick in ePortfolio usage on U.S. campuses. The hoped-for universal adoption broadly across higher education has simply not occurred as anticipated. However, steady growth does seem to continue apace and right now ePortfolios are the best pedagogy we have to address learning integration and pedagogical improvement.

Where Are We?

Given this picture—incomplete and cursory as it is—where is the ePortfolio community of practice and higher education as a part of the social structures expected to educate people for the future? In a better place than we have been. The need for forceful narratives has never been more urgent. ePortfolios are particularly well-positioned to provide the systematic, visual, tangible evidence of needed quality learning to challenge fleeting, often reductionist, popular sound bites about how higher education is failing.

The ePortfolio community (and some accreditors) are stepping up to demand institutional attention to the quality of student learning discussed above. Yet there is substantial evidence that what higher educators currently are doing is not achieving the learning needed for learner or institutional success. There is ample evidence that HIPs enhance deep learning; that unbundled, disconnected curricula truly limit learning quality; that viewing learners as deficit-bringers rather than asset-bringers undermines learning; that even to argue that finding out about the quality of learning takes too much time, and then to act as if continuing to do what we do and ignore this research is okay. This is no longer acceptable.

How do we make the case that higher education is not about preparing learners for the career of a lifetime but rather to prepare them for a lifetime of careers? Why should we believe that if we keep doing what we have been doing, it will result in something better or different?

Higher education educators are about making humans better through developing and instilling deep learning skills and abilities practiced at higher order levels of complexity. Learning is relational and social in its creation and practice over time. As such it requires responsibilities as a learner and as an educator. Learning is not passive, it is not a one-off enterprise, it

¹ “VALUE” stands for AAC&U’s Valid Assessment of Learning in Undergraduate Education rubric initiative. The VALUE Institute is a nationwide effort to invite institutions to use VALUE rubrics for external validation of the quality of their students’ work <http://valueinstituteassessment.org>

is not solitary. Learning is iterative: it is work, it is questioning, and—at its best—it is integrative and energizing. It is not only educators who often struggle with these concepts of learning, many of our students—including the students we refer to as those who come to us most privileged on traditional measures of achievement—resist a shared notion of engaged learning, identity creation, and equity.

In short, the authors in this volume, as well as the ePortfolio community writ large, are being looked to to make the difference. You are the ones already engaged in whatever way you have chosen or been delegated to realize the distinct possibility that higher education can utilize ePortfolios as an effective approach to quality learning in order to lift up the voices of all student learners and to bridge learning in higher education from elementary and secondary education to graduate education and to employment and civic life. Now is not the time to be distracted by excuses nor the arguments for why ePortfolios are imperfect and cannot become reality for our students. This is exactly the time to stand up for the necessity of folio learning for our students, our institutions, and our democratic society.

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Assessing the Feasibility and Acceptability of ePortfolios in an Inclusive, Graduate-Level Interdisciplinary Training Program

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While the use of electronic portfolios has been thoroughly explored in undergraduate and discipline-specific graduate programs, less research has been conducted among interdisciplinary adult learners. This case study explores the feasibility and acceptability of ePortfolios across two years of implementation in an inclusive, graduate-level interdisciplinary training program. After initial implementation with cohort one, focus groups revealed the need for ongoing accountability and support, the importance of transparency and clarity, challenges related to buy-in, and unanticipated tensions between the personal and professional role of the ePortfolio. Between implementation years one and two, improvements were made to the ePortfolio process based on trainee feedback. Following implementation with cohort two, these changes and trainee perceptions of the ePortfolio process were assessed with open-ended surveys. Cohort two also identified personal challenges related to technology and endorsed the importance of accountability and support; however, they also identified a much greater appreciation for the ePortfolio as a new technology and the ways it helped them document, reflect on, and integrate their training experiences into their identity. These results indicate that the ePortfolio is a promising technology in interdisciplinary settings for integrative learning and holds potential for program assessment; however, accountability, support, and transparent communication are needed to realize its full potential.

The changing landscape of American health care requires collaboration to provide quality patient-centered care in an ever-changing world. The World Health Organization (WHO, 2010), the National Academies of Science (Institute of Medicine, 2015), and discipline-specific educational associations (Interprofessional Education Collaborative Expert Panel, 2011) all recognize and promote the value of interdisciplinary training and collaborative approaches to providing patient-centered care and improving population health. Despite these endorsements, interdisciplinary training remains difficult to evaluate, particularly when compared to traditional discipline-specific training programs. For example, interdisciplinary trainees bring their own discipline-specific competencies to inter-professional education in addition to a range of experiences. Furthermore, interdisciplinary trainees enter training programs with varying baseline knowledge, attitudes, and skills, which further complicates the ability to measure the value of inter-professional education.

Within the broader world of general undergraduate education, ePortfolios are promoted as a tool to assist students in tracking their learning and progress during their education (Peet et al., 2011; Watson, Kuh, Rhodes, Light, & Chen, 2016) and for program assessment (Ring, Waugaman, Brackett, & Jackson, 2015). Certain discipline-specific training programs also use ePortfolios at both the undergraduate and graduate levels (Lin, 2008; Vachon et al., 2018; Vance, Burford, Shapiro, & Price, 2017). ePortfolios have recently gained popularity throughout many interdisciplinary U.S. Maternal & Child Health Bureau-

funded training programs and have been recognized as an emerging technology that complements such interdisciplinary training experiences (Wasko, Kiefer-O'Donnell, & Van Den Berg, 2015).

As both a product and a process (Barrett, 2011), ePortfolios can be helpful in assessing learner progress, development, and competency (Penny Light, Chen, & Ittelson, 2011); useful in facilitating integrated reflection (Wang, 2009); and a convenient way to showcase an individual's work, products, and experiences. As a learning tool (i.e., the process), ePortfolios have been used to promote reflective thinking and identity development among graduate students in diverse disciplines including engineering and science (Svyantek, Kajfez, & McNair, 2015), school counseling and school psychology (Wakimoto & Lewis, 2014), and nursing (Meek, Riner, Pesut, Runshe, & Allam, 2013). ePortfolio construction can help students reflect on their learning experiences and accomplishments while connecting those experiences to their competency development (Wakimoto & Lewis, 2014), which can result in improved reflective thinking (Meek et al., 2013). Students have credited ePortfolios for helping them identify areas for future development and think critically about how to portray themselves and their work to others (Svyantek et al., 2015).

In addition to their potential for aiding learning, ePortfolios have also been marketed to learners as a vehicle to showcase their skills, abilities, and competencies to others including university faculty, potential employers, or even the public (i.e., a product). ePortfolios have been frequently used as an evaluation

tool in academic programs to assess student outcomes and to determine if programs are effectively meeting the needs of their learners (Crowell & Calamidas, 2016; Richards-Schuster, Ruffolo, Nicoll, Distelrath, & Galura, 2014). As a student-centered learning approach, ePortfolios also have the potential to provide more authentic assessment of learner outcomes than traditional evaluation methods (Richards-Schuster et al., 2014). Because of these benefits and the versatility of ePortfolio technologies, the Georgia Leadership Education in Neurodevelopmental Disabilities (GaLEND) interdisciplinary training program adopted the ePortfolio as an individualized learning technology to help trainees integrate and document their learning and mastery of the Maternal and Child Health (MCH) competencies during their training year and to aid in program evaluation.

Georgia LEND Program

The GaLEND interdisciplinary training programs brings together professionals, graduate students, disability advocates, family members, and people with disabilities (i.e., *self-advocates*) to engage in didactic coursework and targeted training experiences related to the care and support of children with neurodevelopmental disabilities and their families. Trainees meet in class between three and six hours each week and are responsible for completing additional program requirements that take place outside the classroom. This graduate-level, non-credit bearing training program seeks to develop leaders who will make lasting change and impact on the lives of individuals with disabilities and their families. While GaLEND course content and experiences are graduate-level, trainees vary in their past educational experiences. Some trainees have completed graduate-level programs or are in the process of such programs, while other trainees have lower levels of educational attainment (i.e., undergraduate degrees, high school diplomas, or high school certificates of completion.)

GaLEND takes a holistic view of trainees and acknowledges the potential for both personal and professional growth during the training year. The program is designed to be a transformational learning experience that helps trainees grow both personally and professionally, regardless of discipline. As trainees have a variety of disciplinary and educational backgrounds, evaluating the program's impact on trainees' knowledge, attitudes, and skills in their daily lives in a systematic way can be challenging. Furthermore, because trainees come from such diverse backgrounds, and have diverse daily demands, it is crucial that GaLEND faculty and staff assist trainees in integrating their GaLEND experiences into their daily lives and their personal and professional roles. To accommodate the diversity of learners and to

standardize assessment, the GaLEND program adopted a program-wide emphasis on reflection and integrative learning, choosing to use journaling and ePortfolios to aid trainees in curriculum integration and for program evaluation purposes.

While some international researchers have examined ePortfolio use in interdisciplinary contexts (Fu, Huang, Yang, & Huang, 2012; Mănuță, Alexandru, & Gavrițaș, 2009), and general undergraduate research could be considered interdisciplinary in nature, little formal research has documented the technology among adult interdisciplinary learners stateside (Bryant, Rust, Fox-Horton, & Johnson, 2017; Karsten et al., 2015). Evaluation of the GaLEND ePortfolio initiative has yielded valuable process data highlighting the use of this emerging technology with an interdisciplinary group of diverse adult learners.

ePortfolios in GaLEND

The purpose of the GaLEND ePortfolio is to assist trainees in integrating the Maternal and Child Health (MCH) leadership competencies learned in GaLEND into their personal and professional identities. Previously, the program required trainees to compile binder portfolios cataloging their training year; however, poor compliance and questions about the relevance of binder portfolios prompted the program to transition to an electronic portfolio. After researching several potential platforms, including platforms affiliated with learning management systems and free-standing programs, program staff chose to develop and implement a pilot ePortfolio using Edublog, which is a WordPress-based educational blogging system. This platform allowed the program to pilot its ePortfolio initiative using an existing technology that was already licensed at the university. Furthermore, this platform allows trainees to transition their Edublog to a free Wordpress.com site after completion of the training program to facilitate continued use.

To encourage compliance and buy-in, the ePortfolio was designed to be versatile. It is competency-based, which lends itself to assessment; however, its main purposes during initial implementation were as a "process" and as a "product" (Barrett, 2011). The ePortfolio was designed to facilitate meaningful reflection for trainees and to assist them with integrating the GaLEND curriculum and learning experiences into their identities (process). It was also designed with the capacity for showcase as an attempt to make the "product" aspect of the portfolio appealing to a wide variety of trainees including graduate students entering the job market or family or self-advocate trainees who may use the portfolio as a platform to share their skills and experiences with others.

To facilitate ease of use and reduce technological barriers, each trainee is provided a pre-populated Edublog site at the beginning of their training year. The visual aspects of the site are customizable, and trainees may include any information they wish as long as specific core components are included. The ePortfolio provides space for trainees to include artifacts that are traditionally part of showcase portfolios including (a) professional philosophy and goals, (b) CV/resume, and (c) products (e.g., papers, posters, speeches, videos). In addition to these elements, the ePortfolio includes a series of program-specific prompts asking the trainee to describe and reflect on his or her experiences (via written text, video, or audio) during the training program and to upload relevant links, photos, or documents related to the experiences. During their training year, trainees are also required to submit separate monthly reflections to the university's learning management system, detailing their perceptions of program activities and self-reported changes in knowledge, attitudes, beliefs, skills, and perceptions. These journal questions were designed to encourage trainees to reflect on the ways that they are integrating their GaLEND experience into their lives, both personally and professionally, and trainees are encouraged to use their reflections as possible content for their ePortfolios.

This descriptive case study outlines the use of ePortfolios as an instructional technology to promote integrated learning and as a source of program evaluation data in an inclusive, non-credit bearing interdisciplinary leadership training program. Using process evaluation data, focus groups, and open-ended surveys, we assessed the acceptability and feasibility of ePortfolio implementation in the GaLEND program, which can inform ePortfolio implementation efforts in similar non-traditional settings and training programs.

Methods

Implementation and data analysis occurred in two phases. Phase 1 documented the initial implementation and evaluation of ePortfolios with a cohort of trainees in an inclusive interdisciplinary training program using focus group methodology. Following initial implementation, improvements were made to the ePortfolio process based on Phase 1 data. In Phase 2, a new cohort of trainees constructed ePortfolios and completed open-ended surveys to evaluate the ePortfolio process during implementation year two. Between the first and second phases, GaLEND program staff transitioned all of their evaluation data collection from focus group discussions to paper surveys for feasibility purposes and to increase the ease of data analysis.

This study was approved by the university's institutional review board for human subject research.

At the beginning of each training year, trainees choose whether or not they consent for the program to use their evaluation data for research purposes. All data presented in this study were obtained from trainees who consented to have their data evaluated for research and dissemination purposes. In Phase 1, 16 trainees (94%) chose to participate in the research study while 22 trainees (100%) in Phase 2 chose to participate in the study.

Phase 1: Evaluating Initial Implementation

Phase 1 participants. Cohort 1 included 16 trainees from a variety of disciplines including speech-language pathology, public health, nutrition, medicine, psychology, social work, physical therapy, and youth advocacy. The cohort also included participants who identified either as an individual with a disability or a family member of an individual with a disability. Cohort 1 was also primarily female (81.3%) and identified as 63% White and 38% Black or Asian.

Phase 1 data collection and analysis. At the end of the first year's implementation, available trainees participated in one of two audio-recorded focus groups. These focus groups were part of regularly-scheduled program activities; as a result, no formal recruitment occurred. Trainees were sorted into focus groups based on their identity as either a family trainee ($n = 4$) or a non-family trainee ($n = 12$) to understand differential perceptions of the ePortfolio process. Using a seven-question interview protocol, researchers asked trainees about their impressions of the ePortfolio process, its challenges, its value, its helpfulness for reflection, post-program use of the ePortfolio, and areas for ePortfolio improvement within the training program (Appendix).

Focus groups ranged from 18 minutes for non-family trainees to 22 minutes for family trainees. A research assistant transcribed the focus group audio verbatim. The lead researcher coded each focus group using a general inductive approach, creating a codebook with accompanying definitions in Nvivo 11. A second researcher coded the focus group transcriptions using the codebook in Nvivo 11. Percentage agreement ranged from 89.8-100%. Researchers reviewed coding agreement, clarified discrepancies, and collapsed codes as needed. Relevant themes and subthemes were then identified and synthesized.

Phase 2: Evaluating Improvements and Subsequent Implementation

Phase 2 participants. Cohort 2 consisted of 22 trainees. Disciplines in Cohort 2 included speech-language pathology, psychology, occupational and physical therapy, nursing, public health, social work, and nutrition, as well as individuals who identified as self-advocates or family advocates. Cohort 2 was also

primarily female (86.4%), and 64% identified as White, while 36% identified as Black or Asian.

Phase 2 data collection and analysis. Following the second year's implementation, 14 trainees completed paper-and-pencil, open-ended surveys during the last training session of the year as part of their regularly-scheduled program activities. These surveys included the same seven questions asked of trainees in the previous year's focus groups. A research assistant transcribed survey responses into an electronic format. Utilizing the codebook generated in Phase 1, the primary and secondary researchers independently coded relevant excerpts for themes in Nvivo 11. Percentage agreement ranged from 77.7-100%. Researchers reviewed initial coding agreement, resolved discrepancies, and collapsed codes when necessary. These codes were then synthesized to determine major themes and subthemes.

Results

Phase 1

In both focus groups, trainees were asked questions about their past use of ePortfolios and their potential future use of the technology. Only one trainee expressed past experience using an electronic portfolio. When asked whether they planned to use their ePortfolios in the future, trainees in both groups largely said they definitely would not or were undecided. Trainees in both groups, however, expressed that the ePortfolio had been helpful for both documentation and reflection more than for integrating the training program into their professional identities. In addition to these descriptive findings, five major themes emerged from the focus group data: (a) personal challenges, (b) accountability and support, (c) buy-in challenges, (d) personal/professional tensions, and (e) positive attributes.

Personal challenges. Trainees in both focus groups expressed personal challenges related to the ePortfolio process. Trainees whose primary identity was outside the university noted the challenge of using unfamiliar university systems, while others described the ePortfolio as "academic" in nature. Regardless of university ties, several trainees mentioned that the ePortfolio technology was challenging at first. One trainee said, "The fact that it was embedded in the university system, that was completely foreign to me—that was probably the biggest stumbling block to get me started." Another noted,

I fully believe that [the program] values the family voice, but yet sometimes I felt like I was floundering in the midst of academic requirements that I wasn't accustomed to. So having some type of, not just talking amongst ourselves, because a little more guidance earlier on would have been helpful for me.

A third trainee explained, "It's too many places, too many things and it's not logical in how you . . . if you're not familiar with technology . . . it's not the easiest in order to navigate."

Accountability and support. Technology struggles highlighted the importance of accountability and support, which was another major theme identified in the focus groups. Trainees in both focus groups mentioned an appreciation for the accountability and support that was provided during the pilot year but expressed a desire for more frequent check-ins, a user guide, and more accountability. Trainees also suggested the value of in-class working sessions where they could learn by doing. One trainee said,

And [program staff] made comments that I still have. . . The comments that she made helped a lot. Even one of them we didn't agree at first, but then I would explain it to her. So the support that she gave was, even to me, beneficial because I might've had it in a place she didn't expect it, but then she told me where I needed to put it so that I could be in sync with everybody else.

A second trainee explained,

I think most of us forgot it. If it was more of a component along the way of reminding us and showing us the basics, coming back to it a month later, "Do you have any questions? Have you tried it?" Like, we had monthly journals—maybe, monthly ePortfolio assignment to, kind of, keep you on track would have been helpful.

Buy-in challenges. Besides personal challenges, several trainees expressed reservations about the new technology, indicating that buy-in was weak. For example, trainees expressed that the ePortfolio was not their preferred mechanism for documenting and sharing experiences. Others felt the ePortfolio was "just one more assignment" and was redundant with other program components. Very few trainees mentioned the ePortfolio with a sense of ownership. Challenges to buy-in were further complicated by perceptions that the process lacked clarity; trainees in both focus groups expressed a lack of understanding about the purpose of the ePortfolio. For example, one trainee noted,

It wasn't difficult to do or anything for me, but I didn't really see the point and why it was made for us to do. I wouldn't show that to a future employer, and, I don't know, it just kind of seems like an extra add on for us.

Similarly, another said,

I think too, maybe I missed it or maybe the point of it is through this process and learning about—I

didn't really understand the point of it from the beginning or what the goals were for it. It just seemed like a place where I can put all the things I've done in LEND and, kind of, upload them there. But if were turning them in through other venues, I didn't really see how this was—the point of it or what I was supposed to gain from it aside from learning the new technology.

Personal/professional tensions. A lack of understanding about the ePortfolio's purpose appeared to contribute to privacy concerns. The GaLEND ePortfolio was designed to allow trainees the freedom and flexibility to use it for reflection or showcase purposes while also providing a vehicle for faculty assessment. Throughout the year, program staff encouraged trainees to use their journal reflection responses as potential content for their ePortfolios. However, in both focus groups, many trainees expressed privacy concerns and a tension between using the ePortfolio for reflection versus showcase purposes. On trainee explained,

I think we, kind of, had to choose within between making the portfolio either professional or deeply personal because you can't have it both ways really, and I think most people chose to use personal stuff for it because that's part of our right. It's not something we would've shown.

Another said,

I think it would actually be more effective, because we do so much sharing and so much deeply personal stuff through LEND, that I honestly think it might have been more effective if the ePortfolios had been staged in such a way that they were specifically professional.

Positive attributes. Despite personal challenges and issues related to buy-in, trainees identified several positive aspects of the ePortfolio. They appreciated the opportunity to learn a new technology and endorsed the ePortfolio's visual appeal, its structure, and the freedom of expression that the medium allowed. Furthermore, several trainees reported the technology had been a successful tool for documentation and reflection. For instance, one trainee noted,

For me, because I'm not in the field providing service right now, mine was more self-reflective. I know that it helped me a lot. Because since I had my child, I did not think about what I was going through or how I was going to navigate and how that impacted my life and what I wanted to do from here. It helped me.

Another trainee said, "It was a great place to capture my thoughts and something, like, in my biography...I was able to document how LEND has impacted my work, and I think it was a good place to do that." A third explained, "It was also more for my use. It helped me, kind of, organize the whole experience personally."

Phase 2

Between implementation during the first and second years, program staff executed several changes to improve the ePortfolio process, particularly in response to the technology challenges identified by cohort one. Staff created a comprehensive user guide, which included pictures, videos, and links to the Edublog support site. In response to feedback from Cohort 1 and the literature, staff ensured that all non-university trainees had access to university systems prior to the ePortfolio introduction and instruction. They also scheduled and delivered more frequent ePortfolio working sessions to allow trainees to learn by doing (Wakimoto & Lewis, 2014). These sessions incorporated peer support as a major component; program staff enlisted the help of peer supporters who were most comfortable with the ePortfolio technology to provide additional technical assistance alongside program staff.

In addition to these technical assistance changes, program staff attempted to be clearer and more transparent in their communication about the ePortfolio to create buy-in from trainees. To reduce feelings of redundancy, certain program artifacts were shifted completely to the ePortfolio and were no longer required as a journal submission in the learning management system. To ease the personal and professional tensions identified by the first cohort, program staff explicitly educated trainees on the three potential purposes for ePortfolios (i.e., reflection, showcase, and assessment) but highlighted the GaLEND ePortfolio as a vehicle for professional development more than for personal reflection. At the end of the second year, Cohort 2's open-ended survey responses indicated areas where designed changes improved the ePortfolio process and also revealed areas for continued growth.

Compared to Cohort 1, more trainees in Cohort 2 indicated previous use of ePortfolios for undergraduate programs, graduate school, faculty promotion, or artistic purposes. Trainees in Cohort 2 were mixed in their willingness to use their ePortfolio beyond the GaLEND program, however. Roughly half of surveyed trainees ($n = 6$) indicated they would not or probably would not use their ePortfolio beyond the GaLEND program. The remaining trainees indicated a desire to share their ePortfolios with coworkers, family, and

friends, while some said they would like to continue to develop their ePortfolios for professional purposes. Survey responses revealed some similar themes to those expressed by Cohort 1; however, the ePortfolio was better received by Cohort 2 overall. Five themes emerged from the data: (a) personal challenges; (b) appreciation for new technology; (c) accountability and support; (d) personal/professional tensions; (e) and documentation, reflection, and integration.

Personal challenges. As a whole, the second cohort of trainees expressed much less resistance to the ePortfolio compared to Cohort 1, and their perception of the ePortfolio process appeared to be more positive. Some trainees did express resistance and stated they initially felt the process would be “tiresome and cumbersome” and “a lot of work.” Several trainees also expressed frustration with the “time-consuming nature of the ePortfolio.” Besides time, the most frequently noted challenges were related to the technology of the ePortfolio system, with non-university trainees indicating additional challenges related to accessing university systems. One trainee noted, “My initial impression was that it was going to be an overwhelming component! Technology can sometimes be stressful to me, but the tutorials during class were helpful.” A second said, “Start up was hard because it took a while to get [university] access so I started behind the curve.”

Appreciation for new technology. While challenges with technology were an issue for some trainees, roughly half of the trainees’ survey responses revealed they were initially attracted to the ePortfolio concept. Some expressed excitement about the opportunity to learn a new technology. Trainees in Cohort 2 seemed to understand how a digital platform could showcase their work to others and be a useful professional development tool in the future. For instance, one trainee stated, “I was not surprised since we all live in a digital age that people often post/make work-related stuff via social media or LinkedIn.” A second said, “I felt that it would be an important skill to develop.” Another remarked, “I am so happy that I became more proficient with the platform. I think it has a huge potential to highlight my work.”

Accountability and support. Trainees in Cohort 2 indicated appreciation for the user manual and dedicated class time provided for ePortfolio instruction. As with Cohort 1, the importance of accountability and support was overwhelmingly endorsed by the second cohort’s survey responses. Trainees indicated an appreciation for the existing support but provided suggestions for ways program staff could better support trainees during the ePortfolio process including goals and deadlines. Several trainees indicated a desire for longer or more frequent working sessions to facilitate completion and suggested that sessions focused on

learning by doing would provide opportunities for practice and skill acquisition. For instance, a trainee said, “The support and resources were there, I just needed to dive in and work hands on with the website.” A second trainee remarked, “I think it would have been easier to have a full 3-hour class session devoted to it, to deal with a lot of the technical difficulties.” Another stated, “Group work sessions—during class time encourage us to work on it on a more regular basis so we do not forget what we learned, so we could perhaps have monthly goals and deadlines.”

Personal/professional tensions. There were a number of sub-themes identified in Cohort 1’s feedback of the ePortfolio process that were largely absent in the Cohort 2’s survey responses. For example, very few trainees indicated a need for more clarity or transparency on the ePortfolio purpose and process, and no trainees mentioned privacy concerns. Rather than describing the ePortfolio as “redundant” to other program components, a couple of trainees indicated the helpfulness of using their journal reflections for the portfolio, which was in line with the program’s intention. The theme of personal/professional tension remained, however, with some trainees identifying challenges in creating a product that accurately conveyed their experience in the training program. One trainee remarked that compared to her past use of ePortfolios, the GaLEND ePortfolio “was much more personal.” Another said, “The journals were helpful in filling in the content.” A third trainee explained, “I had a hard time taking all my thoughts and reflections and experiences and putting them into an organized product. I struggled to really make my experiences come across as meaningful as they were in real life.”

Documentation, reflection, and integration. Ultimately, Cohort 2 endorsed the ePortfolio as a valuable tool for documentation, integration, and reflection of their GaLEND year. Several trainees identified the ePortfolio as a central location to compile and organize their work from GaLEND “in a thoughtful way.” Beyond documentation, however, several trainees articulated how the ePortfolio helped them reflect on their GaLEND experiences and integrate these experiences into their professional identities. For example, one of the trainees said, “It helped me connect my past and current educational and professional experiences together in cohesive ways.” Another explained, “[It helped me] thoughtfully expand on the various experiences, people met, projects engaged in, how any perspectives formed and changed over the last year.” A trainee also explained, “It’s caused me to spend more time reflecting about my experiences and how I want to communicate to others about them.” Similarly, a fourth trainee remarked, “I had to spend a lot of time thinking about the most important experiences I had and try to make sense of how they were important to my growth.”

Discussion

This two-phase study evaluated the acceptability and feasibility of ePortfolios in a non-credit bearing, graduate-level interdisciplinary training program. Program staff designed the GaLEND ePortfolio to be “all things to all people” to support trainee buy-in and appeal to a diverse group of learners. This included being flexible enough to accommodate those who wanted to use it for professional showcase purposes while also providing a space for all trainees to use the technology as a reflective tool. Our study revealed, however, that this purposeful design was not clearly communicated or well-understood by trainees in the pilot implementation year.

Following the pilot year, trainees in cohort one expressed several concerns related to privacy and personal/professional tensions, indicating a need for more clearly defined parameters to ensure trainees understood the ePortfolio’s purpose, its audience, and its potential. In her piece “Balancing the Two Faces of ePortfolios,” Helen Barrett (2011) acknowledged the two primary purposes for ePortfolios: learning/reflection and showcase/accountability. Reynolds and Patton (2012) have also suggested the ePortfolio serve as both a learning and assessment tool. Our findings confirm these dual purposes but illustrate the tensions that can arise when programs attempt to use ePortfolios for both purposes. Trainee perceptions related to privacy demonstrated a need for improved communication and transparency.

Trainees also expressed a reluctance to fully display their learning transformation on their ePortfolios due to concerns about the end audience. While GaLEND encouraged both personal and professional growth, these types of tensions are not unique to the GaLEND program. Many educational programs have a goal of transformational learning in which learners are exposed to content, acquire new knowledge, and engage in new experiences which could shape their attitudes, behaviors, and skills. The tension between the personal and professional experienced by this study’s participants points to the intimate nature of transformational learning and suggests a need for future research on the best ways to use ePortfolios to evaluate this type of learning.

Cohort 1’s perceptions of the ePortfolio as redundant was also unanticipated. The original ePortfolio was designed so that journal entries could be used at the trainee’s convenience and at his or her discretion to populate the ePortfolio. Miscommunications and misunderstandings about this point illuminated the importance of frequent communication, explicit instructions, and consistent reminders, particularly if learners are completing multiple assignments in tandem with their ePortfolios (Wakimoto & Lewis, 2014).

Changes implemented in Phase 2, including a comprehensive user guide, more frequent working sessions (including peer support), and more explicit communication and instruction on the ePortfolio seemed to result in a more successful implementation with cohort two. Cohort 2’s appreciation for the ePortfolio as a new technology was encouraging and is a reminder that as society shifts ever more towards technology-based news, social media, and electronic collaborations, the skills of managing an online presence will become increasingly important (Kleppinger & Cain, 2015). Educators and program staff must continue to push students outside of their technological comfort zone so they can stay at the forefront of emerging technologies.

Cohort two overwhelmingly endorsed the technology as a useful tool for documenting their learning experience, reflecting on its impact on their growth, and how they were integrating their training experiences into their professional identity. While these preliminary results are promising and highlight the ePortfolio’s potential as a powerful learning tool, both cohorts expressed challenges with the technology and ultimately buy-in to the ePortfolio process. These challenges remained in Phase 2 despite targeted changes that the program staff made to the process between implementation years. Acceptability among interdisciplinary learners was further complicated by the fact that they come from diverse disciplines. While trainees from certain disciplines had previous experience with portfolios and were more receptive to the requirement (Wuetherick & Dickinson, 2015), others had no previous experience and were resistant.

The theme of accountability and support, which rang true for both cohorts, may reveal a key ingredient for successful ePortfolio implementation, especially in non-credit bearing scenarios (Thibodeaux, Cummings, & Harapnuik, 2017). To ensure these features are in place, ePortfolio initiatives need support from staff, faculty, and leadership at all levels of a program (Lievens, 2015). Peer support and regular peer accountability groups may also serve as a mechanism to generate buy-in and facilitate maximum benefit from ePortfolio initiatives (Gordon, 2017; Ring, 2015). While accountability and support may remedy many of the technical challenges related to ePortfolio implementation, the issues of privacy concerns and personal/professional tensions remain.

It seems privacy concerns and the dilemma of just how much to reveal in an ePortfolio is not unique to the GaLEND program. Students in more traditional, credit-bearing educational settings (Lin, 2008; Svyantek et al., 2015) have also expressed uncertainty about the potential audiences of their ePortfolios. This uncertainty may influence how students construct their ePortfolios if they attempt to engage in impression management (i.e., influencing what their audience thinks of them by

choosing how much or what to reveal in their portfolios; Norris, 2011). For programs attempting to use ePortfolios to assess transformational learning (including changes in attitudes, skills, and behaviors), this impression management may result in invalid assessment of learners or superficial assessment at best.

Limitations

The results of this study supported the utility of ePortfolios in interdisciplinary graduate-level training programs, yet this study was not without limitations. We examined data from two unique cohorts of trainees; as a result, some themes may be cohort- or even participant-specific. Furthermore, trainee perceptions in Phase 1 were captured via focus groups while in Phase 2, open-ended surveys were used. The choice of these methods could have impacted our results in a few ways. First, the use of focus groups may have allowed certain themes only held by a few participants to dominate the discussion. Potential group-think is unavoidable in these scenarios. The group setting also could have encouraged some more outspoken trainees to overshare while prohibiting other trainees from sharing their thoughts. Finally, although the open-ended surveys in Phase 2 were anonymous, the more positive perceptions of the ePortfolio process captured by the surveys may have resulted partially from social desirability bias. Despite these limitations, this study does contribute valuable knowledge about the use of ePortfolios in nontraditional interdisciplinary settings.

Conclusion

This study explored the acceptability and feasibility of ePortfolios among two cohorts of interdisciplinary trainees in a non-credit bearing, graduate-level, training program. Our results indicate that even in spite of personal challenges and buy-in challenges, ePortfolios can be successfully used for documentation, reflection, and curriculum integration in an inclusive interdisciplinary setting. Our data also suggest several possible areas of future research including the ways that personal/professional tensions and concerns about self-portrayal may differ for adult learners, learners in transformational learning programs, or learners in interdisciplinary contexts. In addition to targeted evaluation in these areas, our study suggests that evaluating the ePortfolio process and learner perceptions is a worthwhile effort. Ongoing evaluation of ePortfolio implementation, even on an annual basis, can improve implementation, trainee buy-in, and learner experiences with the technology.

Such evaluation is critical for successful ePortfolio initiatives because the potential of this learning technology cannot be fully realized in interdisciplinary

spaces unless learners fully buy-in to the ePortfolio as a learning tool. To ensure buy-in and compliance, transparent communication, regular technical assistance and support, and accountability are critical. Our findings have real implications for programs, organizations, and institutions that invest resources into ePortfolio initiatives. Without adequate support from staff, designated time devoted to ePortfolio implementation, and buy-in from participants, these initiatives may fail to yield benefits that make the investment worthwhile. Programs must overcome these implementation challenges before ePortfolios can be validly used for program assessment and evaluation.

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Appendix

Interview Protocol

Questions were asked in focus group format in Phase 1 and as open-ended surveys in Phase 2.

1. What was your initial impression of the ePortfolio component of GaLEND?
2. Has anyone ever had to create a portfolio for any other reason? If so, what for?
 - a. Can you share how the GaLEND ePortfolio was different from your past experience? Were there things about the GaLEND process that were better, same, or worse than your past experience?
3. What was the most challenging aspect of the ePortfolio process?
4. In what ways do you feel that constructing your GaLEND ePortfolio has been a valuable activity?
5. How did constructing your ePortfolio help you reflect on your GaLEND experiences?
6. How will you use your ePortfolio after completion of GaLEND?
 - a. Will you share with others (like potential employers, friends, family, etc?)
7. What could GaLEND faculty and staff do to improve the ePortfolio process for trainees?

Impact of a Portfolio Program on Self-Assessment Skills Involving General Longitudinal Outcomes

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Self-assessment is important in student and professional development. This study evaluated the impact of a structured electronic portfolio program that provided primarily global feedback on pharmacy students' self-assessment skills related to five general outcomes over a two-year period. The self-assessed outcomes, common to many academic programs, were communication/cultural competence, critical thinking/problem solving, evidence-based practice, professionalism/leadership, and teamwork/inter-professional collaboration. The primary outcome measure was a change in scores for each outcome from the students' earliest gradable submission to their latest over a two-year period, using a scoring rubric (maximum = 21 points) to evaluate self-assessment quality. Mean scores improved significantly for all outcomes. From the earliest to latest portfolio submissions across all longitudinal outcomes, rubric scores improved in 61% of submissions, remained the same in 16%, and decreased in 23%. A total of 141 submissions (41%) had a score increase of two or more points, with 45 entries (13%) increasing by > four points. Only 37 (11%) had a decrease in score of two or more points, with just nine entries (3%) showing a decrease of > four points. This article describes a unique portfolio program to develop students' self-assessment skills, including improvements that can be extrapolated to students across many academic disciplines.

Self-assessment involves analyzing one's actions, strengths, and areas for improvement, taking into account performance benchmarks and feedback. Self-assessment emphasizes the identification of strengths and weaknesses, generally based on comparisons with specific performance criteria, as well as strategies for further improvement and continued development (Desjarlais & Smith, 2011; McMillan & Hearn, 2008; Motycka, Rose, Ried, & Brazeau, 2010). It is a key component and important initial step in personal and professional development (Boud, Lawson, & Thompson, 2013; Boud, Lawson, & Thompson, 2015; Franco, Franco, Pestana, Severo, & Ferreira, 2017; Kalata & Abate, 2013). Engaging in frequent reflection—reviewing previous knowledge and experiences to gain better insight into situations or actions—and developing self-assessment skills are thought to positively impact education as well as promote lifelong learning (Briceland & Hamilton, 2010; Haldane, 2014; Lew & Schmidt, 2011; Motycka et al., 2010; Wetmore, Boyd, Bowen, & Pattillo, 2010).

Opportunities for self-assessment and reflection should be offered to all students and developing professionals (Wetmore et al., 2010). One method for accomplishing this is through portfolios. Although student portfolios vary in format and content across programs and institutions, they are generally compilations of work that can serve as the basis for reflection and self-assessment, demonstrate accomplishments, and illustrate areas for improvement (Briceland & Hamilton, 2010; Haldane, 2014; Plaza, Draugalis, Slack, Skrepnek, & Sauer, 2007; Wetmore et al., 2010). Portfolios can greatly assist students in developing and refining their skills (Briceland &

Hamilton, 2010; Kalata & Abate, 2013; Klenowski, Askew, & Carnell, 2006; Wetmore et al., 2010). The incorporation of opportunities to develop skills such as self-assessment, innovation, critical thinking, problem solving, leadership, and professionalism are meaningful in pharmacy, additional health sciences curricula, and other disciplines (Accreditation Council for Pharmacy Education, 2017; Ramia, Salameh, Btaiche, & Saad, 2016). The Accreditation Council for Pharmacy Education (ACPE), responsible for accrediting U.S. schools/colleges of pharmacy, supports the use of student portfolios in pharmacy curricula to document student progression in achieving program objectives and to develop self-assessment skills (ACPE, 2017).

Educators should facilitate the development of self-assessment in student learning (Kalata & Abate, 2013; Tsingos, Bosnic-Anticevich, Lonie, & Smith, 2015). Faculty members, tutors, and mentors can evaluate students' self-assessments, providing advice for improvement, thereby promoting informed self-analyses and decision-making (Tsingos, Bosnic-Anticevich, & Smith, 2014). The use of a standardized method, such as a rubric, to evaluate self-assessments also serves as an important student learning tool, with findings used to guide future curricular development (Tsingos et al., 2015).

Frequent self-assessment assignments throughout a program might be expected to develop self-assessment skills, particularly if the self-assessments focus on actual program work such as assignments. However, the best approaches for enhancing self-assessment skills have not been adequately studied (Boud et al., 2013, 2015). One study found that design and business students' voluntary scoring of their individual performance on tasks with defined criteria tended to converge with tutors' scores

Table 1
Questions for Longitudinal Outcome Portfolio Submissions

Question no.	Question
Q1	State the name of the item you are writing about; for example, diabetes case study, pharmaceuticals quiz, patient counselling paper, etc.
Q2	List the course number and course name this assignment was in.
Q3	Briefly describe how this work helped you improve your (insert longitudinal outcome here) knowledge or skills.
Q4*	If you entered item(s) last semester/year for (insert longitudinal outcome here), what did you say that you could continue to improve, and what have you done to improve in those areas?
Q5	Briefly provide AT LEAST two examples of specific (insert longitudinal outcome here) knowledge or skills you can continue to improve.

*Q4 not applicable for first submissions; it is only applicable for subsequent submissions.

over time, but it required the completion of most of a degree program before this convergence occurred (Boud et al., 2015). When consistent tasks were involved (e.g., written communication, verbal communication, critical thinking), convergence occurred more rapidly. Faculty often struggle with how to best enhance students' self-assessment skills throughout a curriculum in an efficient, yet effective manner. A portfolio program with frequent, repeated self-assessments might be an effective way to improve, document, and analyze student self-assessment skills while also tying these skills to specific program learning outcomes, thereby enhancing assessment (albeit indirectly) of student learning as well.

Providing students with clear expectations for high-quality self-assessments, using completed, graded assignments as the focus for their self-assessments, linking these assignments to consistent, longitudinal program outcomes, and asking students to answer focused questions for their self-assessments might help them improve as self-assessors, especially if they are asked to provide specific ways to improve and report subsequent actions taken. Thus, the objective of this study was to determine if students' self-assessment skills improved through the use of repeated portfolio self-assessment assignments with guided questions linked to broad-based educational outcomes.

Methods

Study Sample

Pharmacy students at our institution are required to complete self-assessments each semester as part of their portfolio curriculum requirement. Our curriculum is a full-time, four-year professional program that admits students who have completed at least two years of prerequisite coursework. A revised curriculum, initiated

with the entering first-year students, began in the fall 2015 semester (graduating class of 2019).

Portfolio Requirements

RxOutcome (CORE Higher Education Group, West Warwick, RI) is used for the electronic portfolio system. As part of the pharmacy portfolio in this study, students assessed their skills in five skills-related longitudinal outcomes: (1) communication/cultural competence, (2) critical thinking/problem solving, (3) evidence-based practice (use of best available evidence and professional judgment in decision-making), (4) professionalism/leadership, and (5) teamwork/inter-professional collaboration. Identified by the pharmacy faculty as skills that cross subject matter, these outcomes are important general abilities that pharmacy practitioners should possess and are reinforced across the professional curriculum. Some outcomes were grouped together under the same heading in the portfolio to help focus the outcomes, since aspects of one overlapped with and complemented another. These included communication (including written and verbal) and cultural competence; critical thinking and problem-solving; professionalism and leadership; and teamwork and inter-professional collaboration.

Each semester, students were required to select completed, graded assignments/exercises from their portfolio coursework involving knowledge or skills encompassed by the longitudinal outcomes and to answer focused questions (see Table 1) about their learning and aspects for improvement. For outcomes involving two components, such as critical thinking and problem-solving, students were asked to describe how the portfolio work submitted specifically improved their skills, and how they could continue to improve those skills, in one and/or both areas. Students were also given definitions and examples of each individual component of an outcome, such as the differences between critical

thinking and problem-solving, and the definition and components of cultural competence so they would recognize the characteristics of each individual skill.

During their first three professional program semesters, incoming fall 2015 students were required to add at least one graded assignment or exercise from each required pharmacy course and the answered self-assessment questions to their portfolios. Thus, each outcome had at least one entry by the end of the academic year, with a minimum of five or six portfolio entries during that time period. During their fourth semester (spring 2017), students could select one or more relevant assignments from *any* required or elective professional course, so that each outcome during a semester had at least one entry accompanied by the answered self-assessment questions. This resulted in the same number of entries per semester and guaranteed that each outcome had at least one entry per semester. The portfolio component was pass/fail based upon students' completion of the requirements each semester instead of letter graded. Thus, a student's self-assessment, whether or positive or negative, did not factor into an actual grade.

At the start of the fall 2015 semester, students were required to attend an hour-long orientation about portfolios, their purpose, the portfolio requirements for that semester, and general expectations for the self-assessments. Students were also required to attend another hour-long portfolio session at the beginning of each subsequent semester, during which examples of model self-assessments were shared with students along with the features that constituted an excellent self-assessment.

Outcome Measures

This study reviewed portfolio self-assessments from pharmacy students who completed their second year of the professional program in spring 2017 to ensure the availability of two years of data for this

study. Student entries were submitted to the portfolio over three semesters: spring 2016, fall 2016, and spring 2017. Portfolio entries from the first semester, fall 2015, were not included because Q4 (see Table 1) was not yet applicable for scoring.

A specially designed rubric was developed to determine the quality of the students' self-assessments. The investigators searched the published literature for rubrics previously created for similar purpose and adapted the rubric's performance criteria from previously published reflective and self-assessment rubrics to ensure content validity (Tsingos et al., 2015; Wetmore et al., 2010). The investigators incorporated elements that highlighted key components of a high-quality self-assessment such as descriptiveness, specificity, relevance, etc. Inter-rater reliability (Intraclass correlation coefficient [ICC]) on a draft rubric was determined by comparing results from two of the investigators who used the rubric independently to grade the same sample of 36 random submissions (student names removed; a mix of earliest and latest gradable submissions). The investigators obtained an ICC score of 0.72, indicating good inter-rater reliability. Next, the investigators discussed score discrepancies and made minor wording changes to the final version of the rubric used for scoring (see Appendix). Finally, one investigator used the completed rubric to score the quality of each student self-assessment for consistency.

Student entries for all five longitudinal outcomes were analyzed. Randomly assigned numbers replaced student names prior to the review and scoring of the self-assessments and for grade point average (GPA) analyses. For each portfolio outcome, the rubric score for the students' earliest gradable submission was compared with their score on their latest (i.e., most recent) gradable submission.

Table 2
Differences Between Mean Scores from Earliest to Latest Entries

Longitudinal outcome	<i>n</i>	<i>M</i> score (range): <i>M</i> score (range):		<i>MD</i>	95% CI	<i>p</i> *
		First entry	Last entry			
Communication/cultural competence	68	17.40 (12-21)	18.16 (13-21)	0.76	0.21-1.32	0.0075, 0.012
Critical thinking/problem solving	74	16.26 (11-21)	17.03 (12-21)	0.77	0.26-1.30	0.0048
Evidence-based practice	73	15.96 (11-20)	17.79 (12-21)	1.84	1.32-2.36	< 0.0001
Professionalism/leadership	55	16.45 (10-21)	17.67 (13-20)	1.22	0.73-1.71	< 0.0001
Teamwork/inter-professional collaboration	73	16.92 (13-21)	17.49 (14-21)	0.57	0.10-1.05	0.017, 0.0031
Mean (all outcomes combined)	74	16.58	17.59	1.01	0.73-1.29	< 0.0001

Note. *Values from paired *t* test and Wilcoxon signed-rank tests, respectively; both identical if only one value listed.

The change in rubric score from the baseline (i.e., earliest gradable entry) to the end (i.e., latest gradable entry) provided the primary measure for each outcome. Scores ranged from a minimum of seven points to a maximum of 21 points for each submission. If students entered multiple submissions for the same outcome in a semester, only the first was evaluated as their earliest gradable entry, and only the latest submission was evaluated for their second gradable entry. Secondary outcome measures included: (a) the relationship of the changes in rubric scores to the baseline (earliest) gradable submission scores, (b) the correlation between average earliest submission rubric scores (across all outcomes) and professional program GPA, and (c) the correlation between earliest submission rubric scores for each individual outcome and professional program GPA.

Data Analysis

Rubric scores were analyzed as both continuous and ordinal data using a paired *t* test and Wilcoxon signed-rank test, respectively. Scores for each of the five longitudinal outcomes were analyzed separately. Pearson correlation was used to analyze the correlation between rubric scores and professional program GPAs. Statistical significance was determined if $p \leq 0.05$.

Results

Portfolio data from all students ($N = 74$) in the entering pharmacy class during fall 2015 were reviewed, with the following numbers of students analyzed for each longitudinal outcome: communication/cultural competence ($n = 68$), critical thinking/problem solving ($n = 74$), evidence-based practice ($n = 73$), professionalism/leadership ($n = 55$), and teamwork/inter-professional collaboration ($n = 73$). The numbers analyzed varied depending on the complete submissions (earliest and latest) present for each outcome during the study period. A total of 343 paired entries were analyzed across the longitudinal outcomes. A total of 50 students had complete, gradable paired entries for all five outcomes.

The mean scores and differences between mean scores for the earliest and latest gradable entries are shown in Table 2 for each outcome, individually and combined. All scores improved from the first to last entries with statistically significant gains. Mean improvement was greatest in the evidence-based practice domain, with an increase of almost two points, and smallest in the teamwork/inter-professional collaboration domain.

To illustrate the type of improvement that was observed in portfolio entries, an example is provided of a student who showed a large increase (six points) in their rubric scores from their earliest to latest submissions. This student's responses to questions 3-5 on their first communication self-assessment follow. The student

referred to an uploaded assignment for the self-assessment and received a rubric score of 13 on this first submission due to a lack of clarity and descriptiveness. Q3: "It helped me learn to communicate my thoughts and opinions in a written manner." Q4: "Last semester was based on a PowerPoint presentation and included speech and transitions. I have slowed my speech in recent presentations as well as improve on transitions, both orally and written." Q5: "I can better communicate my ideas in a written manner as well as improve on the style of writing, to ensure understanding by patients, professors, and many more."

This same student's responses on their latest communication self-assessment are shown below. The rubric score increased to 19, and the responses clearly demonstrate greater thought and detail compared to the first entry. The student could have achieved a higher rubric score on this last entry by providing specific improvement strategies for communication skills and writing style. Q3:

This assignment helped me communicate information in a way that made it possible for people that are not used to scientific language to understand. I was able to write in a way that patients are able to understand.

Q4:

Better communicate my ideas in a written manner and also improve my writing style so people can understand what I am presenting better. I have improved the way I communicate my written ideas by spending more time developing my thoughts and ensuring that they sound correct before I write them down on paper. I also critiqued my writing style so that it comes across more professional and more understandable towards the readers. I did so by brushing up on my English skills and proof reading the papers that I write.

Response to Q5:

I can do a better job of communicating with others from other cultures in a way that makes them feel comfortable. I have been criticized for not seeing things from their side of the culture spectrum. I can also continue to improve my writing style so that I am more understandable when I write.

Overall, from the earliest to the latest submissions across all longitudinal outcomes, rubric scores improved in 61% of the submissions, remained the same in 16%, and decreased in 23%. The degree of change in the self-assessment scores is shown in Table 3. Larger changes in scores occurred for those with

Table 3
Degree of Rubric Score Changes From Earliest to Latest Submissions

Longitudinal outcome (Total <i>n</i>)	No. of entries with indicated change						
	Increase			No change	Decrease		
	≥ 4 points	2 to 3 points	1 point	0 points	1 point	2 to 3 points	≥ 4 points
Communication/cultural competence (68)	9	14	11	16	7	10	1
Critical thinking/problem solving (74)	11	17	14	11	9	9	3
Evidence-based practice (73)	17	18	18	8	11	1	0
Professionalism/leadership (55)	5	23	7	10	6	4	0
Teamwork/inter-professional collaboration (73)	3	24	16	11	10	4	5
Total (343)	45	96	66	56	43	28	9

Table 4
Changes in Latest Submission Scores Based on Earliest Submission Scores

Earliest submission score	Entries with indicated change <i>n</i> (%)		
	Increase	No change	Decrease
18 or less	197 (73%)	37 (14%)	34 (13%)
19 or greater	10 (13%)	19 (25%)	46 (62%)

Table 5
Correlations Between Portfolio Submission Scores and Grade Point Average

	<i>n</i>	<i>r</i>	<i>p</i>
Average earliest submission score across all outcomes and professional program GPA (end of second year)	74	.467	< .001
Average earliest submission score for communication/cultural competence and professional program GPA (end of second year)	74	.250	.032
Average earliest submission score for critical thinking/problem solving and professional program GPA (end of second year)	74	.394	.001
Average earliest submission score for evidence-based practice and professional program GPA (end of second year)	74	.504	< .001
Average earliest submission score for professionalism/leadership and professional program GPA (end of second year)	74	.265	.051
Average earliest submission score for teamwork/inter-professional collaboration and professional program GPA (end of second year)	74	.332	.004
Average earliest submission score of 16 or less across all outcomes and professional program GPA (end of second year)	28	.553	.002
Average earliest submission score of 16 to 18 across all outcomes and professional program GPA (end of second year)	29	.112	.562
Average earliest submission score across all outcomes of 18 and above and professional program GPA (end of second year)	17	.258	.318

Note. GPA = grade point average.

improvement in their submissions compared to those with worsening skills. Across all outcomes, 141 (41%) had an increase in rubric scores of two or more points, with 45 entries (13%) showing an increase of at least four points or more. In contrast, only 37 (11%) had a decrease in score of two or more points, with just nine

entries (3%) showing a decrease of at least four points or more.

Further analyses of each pair of portfolio entries broken down by the earliest submission score are seen in Table 4. Low- to mid-range scorers (i.e., rubric score ≤ 18) on the earliest submissions were more likely to

improve in later submissions and were less likely to show score decreases compared to initial high-range scorers (i.e., rubric score ≥ 19).

Figures 1-5 show a further breakdown of the change in rubric scores from the initial to the latest score for each longitudinal outcome. Overall, most students improved their rubric scores. For each outcome, the mid-range scorers, with an initial rubric score of 13 to 15 or 16 to 18, most frequently improved. The greatest actual number of improved scores occurred for students with earliest submission scores in the 16 to 18 range, although proportionately more students with earliest scores in the 13 to 15 range improved compared to the 16 to 18 range (84.3% vs. 67.1%, respectively). Ten of the 12 students with an initial rubric score 12 or lower in any outcome improved their rubric scores on the last submission. High-range scorers, with an initial rubric score of 19 to 21, had a decrease in score more often than no change or an increase (see Table 4). Of the 46 high-range scorers with a decrease in rubric scores, 27 students (59%) had less than a two-point decrease. Of the remaining 19 students, the larger score decreases occurred for self-assessments in two domains: teamwork/inter-professional collaboration and critical thinking/problem solving.

Statistically significant correlations existed between the students' professional program GPAs and their rubric scores both overall and for each longitudinal outcome, with the exception of professionalism/leadership (see Table 5). A moderately strong, statistically significant positive correlation was found between the professional program GPA and students' mean rubric scores for the earliest submissions across outcomes for students whose initial scores were 16 or below.

Discussion

The ability of students to self-assess their knowledge and skills is important for personal and professional development as well as the educational process (Franco et al., 2017; Haldane, 2014; Lew & Schmidt, 2011; Motycka et al., 2010; Wetmore et al., 2010). However, students are often unfamiliar or inexperienced with self-assessment practices. They may be unsure about the purpose or value of a portfolio and how it will be evaluated. In addition, although faculty in disciplines such as pharmacy might be required by accreditation or other standards to promote students' self-assessment skills (ACPE, 2017), accomplishing this can be unclear and confusing. The majority of our students demonstrated an overall improvement over time in self-assessment skills related to five general longitudinal program outcomes, with minimal intervention on the part of faculty members.

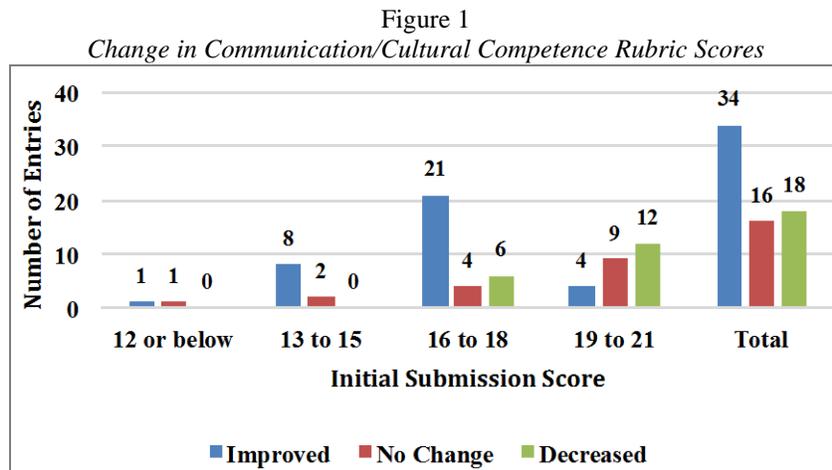
Instructions and examples of appropriate self-assessments were posted online for students, which likely helped them improve over time. Direct feedback was also provided to a relatively small number of students with missing or unacceptable submissions each semester to indicate needed changes. Overall, the portfolio itself provided students with the opportunity to individually hone their self-assessment skills with time and experience. The specific outcomes, including communication/cultural competence, critical thinking/problem solving, evidence-based practice, professionalism/leadership, and teamwork/inter-professionalism, are important skills in most academic disciplines. Thus, the findings from this study are applicable to a variety of subject areas and programs.

Adding more structure and guidance might clarify portfolio expectations for students, but our program believes in a balance between freedom of thought and "expected" writing (Franco et al., 2017). Our portfolio structure was designed to help achieve this balance. In this study, as we have shown, students selected the completed, graded exercises or assignments from their coursework each semester. They chose to enter and place them in the longitudinal outcome folder(s) they felt were most relevant. They were given some guidance for their self-assessments in the form of a small number of focused, specific questions to address, but they could answer the questions as they wished.

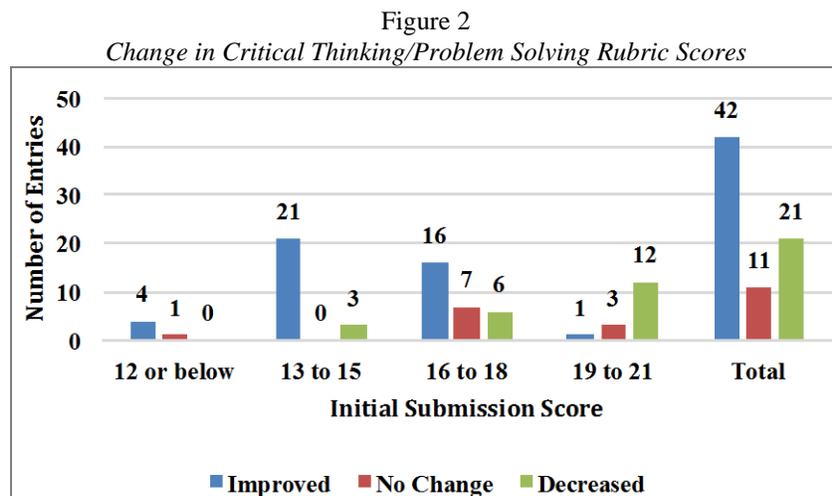
This structure and balance served our students well. At the beginning of each semester, students received instructions for portfolio access/use and were given a few examples of thoughtful, well-written answers to questions completed by previous students to illustrate desired features in a self-assessment. A staff member used a checklist at the end of each semester to ensure that students met the requirements for the number of portfolio entries and that all questions were answered for each entry.

Any checklist item scored as "not completed" resulted in the system (RxOutcome) automatically generating a response to the student that their portfolio was not satisfactory and needed to be corrected; students could view the checklist and comments provided to determine the changes needed. The staff member shared the names of students with unacceptable or missing portfolio entries with the portfolio director, who followed up with students as needed to ensure the work was done.

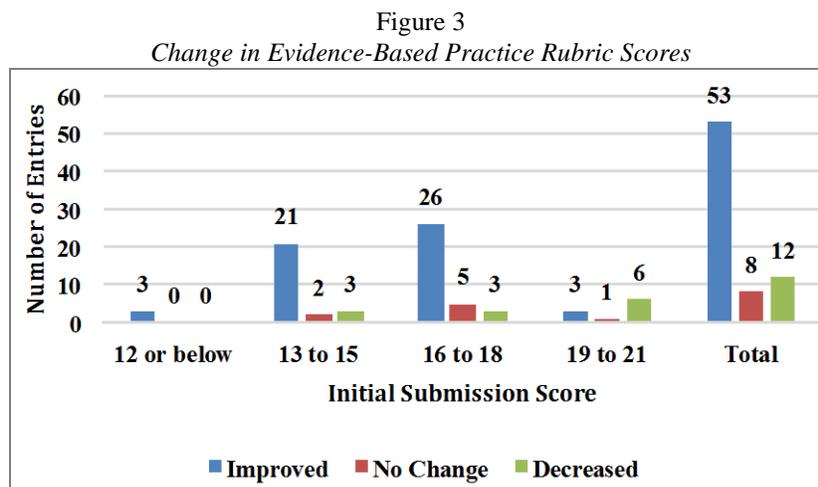
Consistent with previous research (Boud et al., 2013, 2015), our mid-range scorers had the largest number of improved self-assessment rubric scores from their earliest to latest portfolio submissions and high-range scorers (i.e., ≥ 19) were more likely to have a decrease or no change in scores. An explanation for the pattern with high-range scorers is that they may have already had well-developed self-assessment skills at



Note. Number of entries with the indicated change in communication/cultural competence rubric score from the initial to the latest submission, based upon initial submission score.

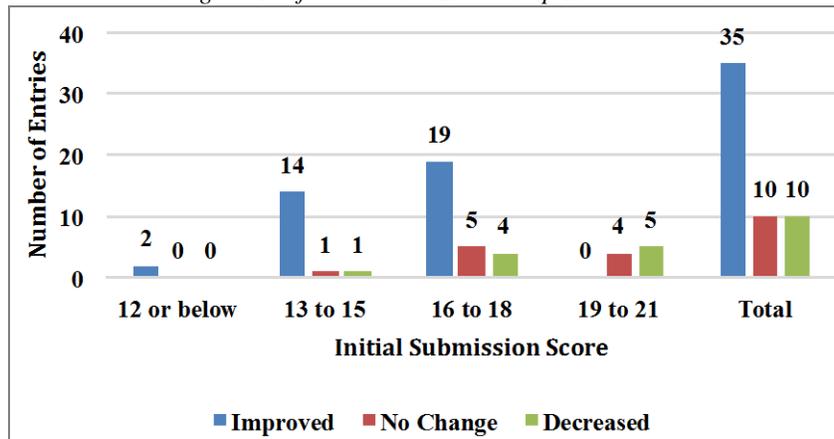


Note. Number of entries with the indicated change in critical thinking/problem solving rubric score from the initial to the latest submission, based upon initial submission score.



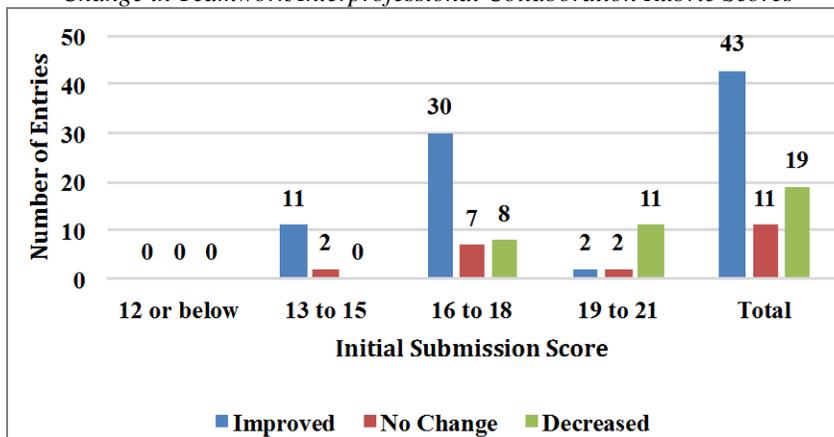
Note. Number of entries with the indicated change in evidence-based practice rubric score from the initial to the latest submission, based upon initial submission score.

Figure 4
Change in Professionalism/Leadership Rubric Scores



Note. Number of entries with the indicated change in professionalism/leadership rubric score from the initial to the latest submission, based upon initial submission score.

Figure 5
Change in Teamwork/Interprofessional Collaboration Rubric Scores



Note. Number of entries with the indicated change in teamwork/interprofessional collaboration rubric score from the initial to the latest submission, based upon initial submission score.

baseline, and therefore had less room for improvement (Boud et al., 2015). For over half of the high-range scorers with a decrease in their scores for any of the outcomes, the decrease was small (one or two points). In most of these cases, their latest scores were still fairly high, demonstrating acceptable self-assessment skills. A possible explanation for the pattern among low- to mid-range scorers is that those students may have had less developed self-assessment and judgmental skills at baseline, or they might not have put forth sufficient effort, especially if they did not understand or appreciate the purpose and benefits of self-assessment. Most of these individuals showed improvement in their last self-assessment rubric scores after subsequent practice and experience.

Of the five longitudinal outcomes that were the focus of the self-assessments, the greatest improvement in rubric scores occurred in the evidence-based practice domain ($MD = 1.84$ points). This could be explained by the fact that students had little evidence-based practice exposure in the curriculum until after their first gradable portfolio entry was due. For future portfolio improvements, more explanation regarding evidence-based practice could be provided to first-year students, or students could be required to address this outcome only after they have completed a required evidence-based practice course during their second year of the curriculum. In contrast, students demonstrated the least improvement in the teamwork/inter-professional collaboration domain ($MD = 0.57$). The mean score for the earliest submission was relatively higher for this outcome compared to the others,

which may have contributed to a smaller number of improved scores for this outcome. Alternatively, students might have had more difficulty self-assessing this particular area. This is also consistent with the finding that teamwork/inter-professional collaboration was one of the outcomes in which a small number of higher scorers on their initial submission experienced larger decreases in subsequent scores.

An interesting finding in this study is that moderate to weak statistically significant positive correlations were observed between students' initial rubric scores and their GPAs. The stronger of these correlations ($r = 0.55$) was found for students with lower initial scores of 16 or more. It might be beneficial to provide focused self-assessment guidance and tailored advice to students with relatively low GPAs, especially when a first self-assessment is observed to have substantial deficiencies.

Portfolio programs vary across institutions and are often evolving in an effort to improve students' reflective and self-assessment skills. For our current portfolio requirement, a tutor or mentor was not assigned to each individual student due to increased faculty workloads with the implementation of a new curriculum. Personnel limitations might also be common to other institutions, especially during times of budgetary cutbacks or concerns. We found significant improvement in most students' self-assessment skills across longitudinal outcomes through the use of many practice opportunities but with minimal individual faculty-student interactions. Perhaps students' self-assessment skills could be improved to a greater extent by providing them with more exemplary portfolio self-assessment examples. Additionally, as students progress through each semester, a number of interested faculty could review most, or a broad sampling of, self-assessment entries and provide formative feedback to individuals or to the student body as a whole.

This study had several strengths, including the relatively large number of portfolio entries analyzed over a two-year period. Self-assessments focused on five general longitudinal outcomes, which provided insight into possible differences in self-assessment proficiency involving specific domains. A rubric for evaluating the quality of student portfolio entries was created and validated to quantify changes in self-assessment skills. Finally, student GPAs might be used to identify individuals who could benefit from greater assistance or intervention to improve self-assessment skills.

Although the study involved a two-year period, one limitation is that it is unknown whether students' self-assessment skills would improve with additional semesters of portfolio use. Future studies should evaluate students with prolonged portfolio experience to determine if further improvements occur with ongoing practice. Another limitation is that only one class year of students was analyzed in this study.

Additional research can determine whether consistent results are found among various student classes within and outside of an academic program. It is also possible that improvements found in our students' self-assessment skills resulted from other curricular experiences and not the portfolio assignments themselves. However, the assignments reinforced these skills, and they proved to be a good tool for evaluating the quality of the self-assessments. In addition, it should be noted that the pharmacy students in this study as a group may be both high-performing and highly motivated given the focused nature of the program and admission requirements. The broad applicability of this portfolio approach for use in general education programs or programs with less stringent admission requirements needs further study.

The portfolio program described in this study involved longitudinal outcomes applicable to many other disciplines. The Association of American Colleges and University's (AAC&U) LEAP Essential Outcomes and Valid Assessment of Learning in Undergraduate Education (VALUE) rubrics encompass most of the longitudinal outcomes, or important components of these outcomes, that were analyzed (AAC&U, 2017). A marriage of AAC&U LEAP outcomes assessment with a portfolio program such as this could support and enhance the self-assessment skills of students in any discipline, while simultaneously tying these skills to other program learning outcomes. This approach could be of particular value when assessing common general education or institutional outcomes such as critical thinking, cultural competence, and the ability to work on teams, which are often only tangentially related to course content and a program's curriculum and can be difficult to teach and assess in their own right.

Conclusion

Self-assessment skills are important for student and professional development, and the portfolio is a useful tool to promote this development. Overall, this study found that students' self-assessment skills related to specific longitudinal outcomes significantly improved through the use of repeated self-assessment entries in a portfolio. Initial self-assessments by students that received a mid-range rubric score showed the largest extent of improvement. This type of portfolio can help improve students' self-assessment skills while allowing faculty to analyze self-assessment performance, thereby providing another powerful indirect measure of student learning within a program. Greater guidance and specific formative feedback might be needed for students who experience problems with initial self-assessments, especially for those who might be struggling to a

greater extent academically, as evidenced by lower GPAs. Institutions should consider implementing a portfolio program to improve students' self-assessment skills.

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Appendix
Portfolio Self-Assessment Evaluation Rubric

	Poor 1	Fair 2	Excellent 3	Score
Describes the experience	Description either missing or unable to determine what the experience involved.	Provides an incomplete or vague description of the experience.	Provides a complete, specific description of the experience.	
Relates the experience to the desired outcome	Provides no association between the experience and the outcome.	Provides a vague or incomplete association between the experience and the outcome.	Provides a complete and clear association between the experience and the outcome.	
Implementation of previously stated ways to improve*				
Includes previously stated ways to improve	No previous ways to improve are included.	Some, but not all, previous ways to improve are included.	All previous ways to improve are included.	
Describes previous ways to improve and specific strategies for improvement	Description is not detailed or explicit for any previous ways to improve, and strategies for improvement are missing.	Description lacks detail or explicitness for some previous ways to improve, or some strategies for improvement are missing or vague/unclear.	Description is both detailed and explicit for all previous ways to improve and specific strategies for improvement.	
Indicates change in behavior	Provides no mention of a change in behavior for any previous ways to improve.	Provides mention of a change in behavior but includes little to no explanation or evidence (if applicable) for one or more of the previous ways to improve.	Completely/clearly explains a change in behavior, with evidence (if applicable) for all previous ways to improve.	
Provision of new ways to improve				
Describes new ways to improve and specific strategies for future improvement	Description is not detailed or explicit for any new ways to improve, and strategies for improvement are missing.	Description lacks detail or explicitness for some new ways to improve, or some strategies for improvement are missing or vague/unclear.	Description is both detailed and explicit for all new ways to improve and specific strategies for improvement.	
Provides new ways to improve that are relevant and distinct	No new ways to improve are relevant to the outcome.	Only some new ways to improve are relevant to the outcome, while others are partly or vaguely relevant; OR all ways to improve are relevant but are vaguely distinct and partly overlap.	All new ways to improve are clearly relevant to the outcome and are clearly distinct.	
			TOTAL SCORE: (Maximum score = 21)	

*This section is not applicable for first submissions; it is only applicable for subsequent submissions

Digital Ethics and the Use of ePortfolio: A Scoping Review of the Literature

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ePortfolios have become more than simple repositories for professional development, achievement, and assessment; they now provide opportunities for students to develop an online profile and presence. As ePortfolios become more widely implemented in higher education, some unintended consequences around privacy, consent, and confidentiality have caused ethical dilemmas, particularly with vulnerable communities such as patients and children. This systematic scoping review found a dearth of literature surrounding policies and guidelines for students. While there appears to be guidance on consent with respect to accessing information or images from vulnerable communities, there is limited guidance on how to address the ethical use of information online. When planning, reviewing, and evaluating guidelines provided for students to develop their personal ePortfolios, ethical use of online information requires careful consideration. Such guidelines will prevent negative impacts on vulnerable communities and improve the quality of work produced by students and their understanding of digital ethics when creating ePortfolios.

ePortfolios provide creative opportunities for online profiling of student achievements (Fisher & Hill, 2017; Johnson, Mims-Cox, & Doyle-Nichols, 2010) beyond a simple repository of professional development, achievements, and assessments (Yancey, 2009). Increasingly, disciplines in higher education use ePortfolios “to support self-regulation, build online community and encourage reflection” (Scholz, Tse, & Lithgow, 2017, p. 140) rather than for the sole purpose of assessment (Zeichner & Wray, 2001). ePortfolios can provide deep and sustained learning opportunities that students can adapt to new situations, which demonstrates its importance as a high impact practice (Rhodes, Chen, Watson, & Garrison, 2014; Watson, Kuh, Rhodes, Light, & Chen, 2016). New opportunities to use ePortfolios in online social avenues promote connection and ease of use for students but they can also bring ethical challenges unique to the digital environment including privacy, confidentiality, and data protection (Denton & Wicks, 2013; Kirkham et al., 2010; Tan, 2011).

There are many resources students can use to develop an online presence using ePortfolios while also developing an awareness about how to keep their artifacts safe and private (Fawns & McKenzie, 2010). A number of free and intuitive internet resources are available for students to access and use in showcasing their work such as Google Sites, Carbonmade, and Behance (Smith, 2013). Students can also enhance their online presence by sharing their ePortfolios with other professionals, engaging through social media by posting a photograph on Instagram or Facebook, and sharing links or embedding these artifacts into their ePortfolios. Facebook’s popularity is due to its capacity to facilitate social presence and encourage frequent interaction amongst users (DeSchryver, Mishra, Koehler, & Francis, 2009). Further, by writing blogs

and sharing them on social media sites such as Twitter, Facebook, LinkedIn, Google+, and StumbleUpon, students can develop a comprehensive online presence, sharing links to their personal ePortfolios. LinkedIn can be used to develop a professional portfolio and online presence. A LinkedIn page describes career history, education, and other related content students may want to publish about themselves for a range of purposes. Access to their LinkedIn profile can then be shared by including a link in their email signature or resume header. Access to and use of evidence from educational institutions for job applications tends to be unregulated (Fisher & Hill, 2017; Yancey, 2009). While many universities and professions now have social media policies, it is unclear how these are translated or understood by students in relation to the digital content produced and collected during their course of study (Bennett, Rowley, Dunbar-Hall, Hitchcock, & Blom, 2016; Fisher & Hill, 2017).

Across many professions, ePortfolios may be used to respond to the growing need for students to show proficiency in dealing directly with the public, including work with vulnerable populations such as children, patients, older people, or those with cognitive disabilities. Teacher trainees, for example, may need to demonstrate classroom management skills with young children including evidence that they have followed state and federal curriculum requirements (Fisher & Hill, 2017). However, unlike paper-based portfolios, artifacts and reflections used for assessment can be posted online and access is controlled solely by the student. As such, this information may be shared with a wider online community. This may occur accidentally, through inadequate digital literacy and knowledge about the software they are using. Issues that may occur include the inappropriate sharing of their work, which

often spans multiple systems in the creation of one ePortfolio, or non-ICT related reasons such as neglecting to take seriously the potential impacts of privacy and confidentiality.

In health care education, ePortfolios are used for recording, assessing, and reflecting on learning, which may include the documentation of artifacts such as certificates of competency, video recordings of student and patient consultations, or observations (Nagler, Andolsek, & Padmore, 2009). In teacher education, ePortfolios are used in similar ways for students to capture their learning on practicum placements in schools, working with children, and documenting how they are meeting the National Professional Standards for Teachers. Using ePortfolios in these ways raises many ethical issues around privacy and confidentiality, as well as the protection of personal data across professions with increasingly flexible online modalities (Fisher & Hill, 2015, 2017). How students are prepared for the ethical use of such information in ePortfolios is unclear.

Exploring ePortfolio Ethics

The ethical use of sensitive information in ePortfolios is further complicated by higher education's focus on employability skills designed to be showcased beyond the institution. New graduates and recruiters view ePortfolios as a mechanism for demonstrating examples of work to potential employers (Reardon, Lumsden, & Meyer, 2005; Yu, 2012). By tailoring an ePortfolio to meet industry expectations, students can showcase their work in new and

innovative ways, so that their application stands out to an employer. This requires the appropriate selection of artifacts contained within student ePortfolios related to individual career aspirations. One method to stand out from other applicants and increase employability is to develop an online presence (Bennett et al., 2016).

As ePortfolios become even more widely implemented and used by higher education and employers, the risk of unintended ethical consequences remains. Current digital ethics literature discusses the implications of an ePortfolio user's privacy and data protection (Fawns & McKenzie, 2010; Poot & Austin, 2011; Razavi & Iverson, 2006) but falls short in considering the secondary use of data from vulnerable groups (e.g., children, clients) used by higher education students in professional degree programs. For example, in health and education in particular, higher education students work with patients and school-aged children and are asked to gather evidence to demonstrate mastery of a learning goal, outcome, or professional standard. This evidence collection involves multiple layers of potentially vulnerable groups. The first layer involves the students in the program or course being asked to collect evidence; the second layer involves the school students or patients included in the process of learning, evidence collection, and communication (Fawns & McKenzie, 2010).

This context and others like it across other disciplines can create challenges in terms of confidentiality, access to information, and consent, especially as students begin to share their ePortfolios to

Table 1
Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> Undergraduate or postgraduate student located in university Use of ePortfolio (e.g. student experience; lecturer's knowledge of student use) Considers ethical issues such as consent/rights/dignity Privacy and confidentiality of vulnerable groups (e.g. children, older people, people with disabilities, homeless people or those in hospital or community centered requiring support) Professional competence where ethics is a competency being addressed Peer reviewed papers including published conference papers Education policy documents relevant to themes Peak body reports (e.g. HEA, JISC, OLT etc.) 	<ul style="list-style-type: none"> Trainee in medical education not located at a university Development of ePortfolio (e.g. technical development) Students not registered at a university; lecturers or graduate teachers for their own purpose Privacy and confidentiality of student users Digital competence Conference abstracts Policy documents on development and / or adoption of ePortfolio Peak body reports on development, adoption and / or utility of ePortfolios

secure work and share their practice. Therefore, this paper reviews the literature to assess what is known in this field. As this is an emerging field of study, a scoping review was used to identify research in relation to how ethical issues are addressed in ePortfolios, identifying any research gaps in the literature. Scoping reviews are most relevant where multiple research methodologies may be used, thus enabling the summarization and dissemination of literature (Arksey & O'Malley, 2003).

Method

This paper follows the five-stage framework for a scoping review suggested by Arksey and O'Malley (2003): "Stage 1: Identifying the research question; Stage 2: Identifying relevant studies; Stage 3: Study selection; Stage 4: Charting the data; Stage 5: Collating, summarizing, and reporting the results" (p. 22). Our research question was "How are the issues of privacy, confidentiality, and consent managed in ePortfolios where students are engaging with vulnerable and/or disadvantaged communities, groups, and individuals?"

Search Strategy

To ensure a breadth of coverage, we searched the following databases up to and including June 1, 2017: Pubmed, Eric, Scopus, and Web of Science. The search terms were intentionally broad to ensure we captured as many papers as possible with Boolean operators "AND/OR" to ensure maximum breadth and included: eportfolio* OR e-portfolio* OR electronic portfolio* AND privacy OR confidentiality OR consent OR vulnerable OR patient* OR disadvantage* OR consequence*.

Reference lists were checked from all papers retrieved to ensure all relevant studies were included. Website searches using the search terms of "ePortfolio" and "Portfolio" were also conducted for the following peak bodies: (a) Post-16 Education: Joint Information Systems Committee (JISC; based in the UK providing digital solutions); (b) Advance HE (formerly HEA; providing international guidance in post-16 Teaching and Learning); (c) Australian Health Practitioner Regulation Agency (AHPRA; for health professional pre-registration education); (d) Nursing and Midwifery Council (NMC), UK; (e) the Australia College of Midwifery; (f) the Australian College of Nursing; (g) Occupational Therapy Australia; (h) Pharmaceutical Society of Australia; (i) Exercise and Sports Science Australia; (j) Australian Podiatry Association; (k) Dieticians Association of Australia; (l) the Nutrition Society of Australia; (m) Australian Health Promotion Association; (n) the Australian Orthotic Prosthetic Association; (o) the Australian

Institute for Teaching and School Leadership (AITSL); and (p) the Australian and New Zealand Association for Health Professional Educators (ANZAHPE). Existing networks such as ePortfolios Australia were utilized to identify grey literature/reports not located elsewhere. Reports meeting the inclusion/exclusion criteria were retrieved for full paper review.

Two members of the team checked titles/abstracts and full text papers independently, using the agreed inclusion/exclusion criteria (Table 1). A third member of the team was available when agreement could not be reached. Individual members also undertook searches of the websites, which were reviewed by a second member of the team. A single researcher using a framework relevant to the review question around the following headers undertook data charting:

- Author, date, country of origin
- Professional group using ePortfolio and sample size
- Vulnerable group involved
- Research methods
- Outcomes
- Issues of privacy/confidentiality
- Other ethical issues identified

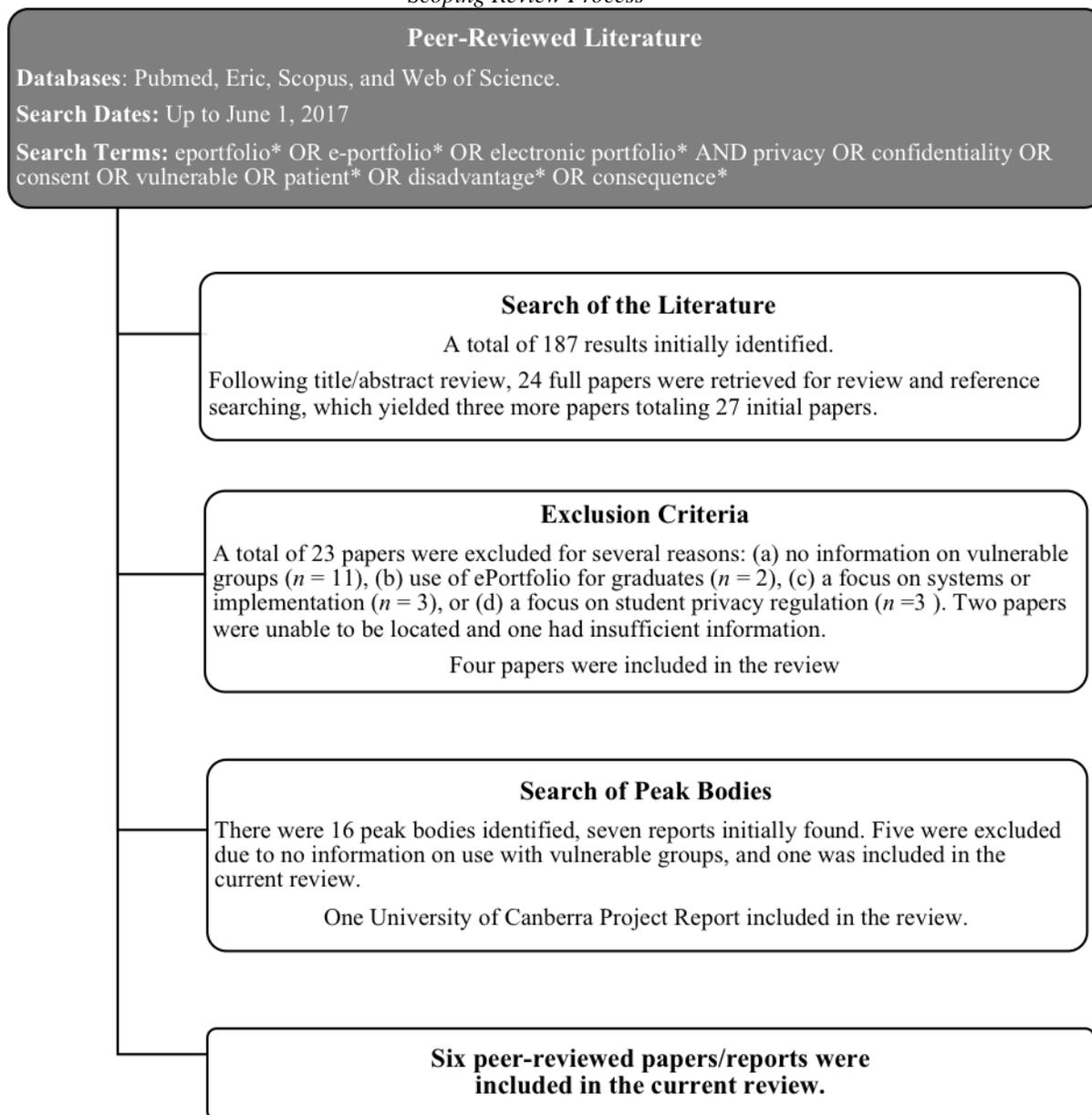
Results

The search strategy identified 187 papers (Figure 1). Following the title/abstract review, 24 full papers were retrieved for review and reference searching. Reference searching yielded an additional three papers for full review for a total of 27 papers. The full paper review resulted in the exclusion of 23 papers for the following reasons: (a) no information on vulnerable groups ($n = 11$), (b) use of ePortfolio for graduates ($n = 2$), (c) a focus on systems or implementation ($n = 3$), (d) or student privacy regulation ($n = 3$). Two papers were unable to be located and another two had insufficient information. This resulted in four peer-reviewed papers included in the review. The search of 16 peak bodies returned seven reports for full review with five excluded due to no information on use with vulnerable groups. One of these reports is included in the current review. Finally, a report written by one of the authors (Nuessler, 2012), was included as it detailed a project at the University of Canberra that met the inclusion criteria. See Table 2 for more information. Due to the limited number of papers included, findings will be reported in a narrative synthesis according to the two key themes that emerged: privacy and confidentiality of vulnerable groups and digital ethics (Denton & Wicks, 2012; Nuessler, 2012).

Table 2
Papers Included in Scoping Review

Author / date	Educational program	Participants, sample size	Research methodology	Outcomes reported	Quality appraisal Low-Mod-High	Privacy/confidentiality or ethical issues
Academic literature						
Denton & Wicks (2013)	Teacher training	33 graduate students	Single cohort case study	Students found this convenient but required additional training on writing entries.	Low: Limited explanation about methodology.	Digital citizenship: Using technology in safe, legal and responsible ways, positive attitude to collaboration and appropriate values.
Kift et al. (2007)	University wide, employability (mentions paramedics), Australia	2,300 active portfolios. Unclear how sample was derived	Description of policy to protect students	In three years, two students had to review their content due to potential risk.	Low: Descriptive implementation, limited explanation about methodology and what cohorts' data was used from.	Self-protection of students Student control over what is published—default system of not published. Access by public to ePortfolio/student use of images.
Martin et al. (2012)	First year pharmacy students, USA	273 students assigned an older person to work with and record health assessments in ePortfolio	Pre/post-test survey in student confidence	Across one year, students supported older people in maintaining active lifestyle and improved attitudes but had a lower score in confidence in maintaining confidentiality.	Moderate: clear explanation of methodology and reporting of data.	Students struggled with understanding of maintaining confidentiality with ePortfolio. Focus of compliance with data protection regulations.
Ross (2014)	Education programs in UK	20 students (postgraduate and undergraduate), 12 teachers	Qualitative semi-structured interviews	Management of digital presence is complex.	Moderate: Clear explanation of methodology and philosophical underpinnings of research- clear identification of participants.	Sharing of personal reflections in online environments, blurring of boundaries between what is expected in assessment and what is considered personal.
Grey literature						
Cowper & Crompton (2010a)	Identify legal requirements of ePortfolios in VET sector	Consultation with key stakeholder, 14 organizations (RTO's)	Literature review and consultation	Code of practice for learners on what to share online; guidelines about what is considered confidential-privacy training for students; privacy protection built into the systems	Comprehensive scoping report—clear outline of methodology and reporting of stakeholders' viewpoints and how these were collected- no specific quotes in data or "stakeholder voice."	
Nuessler (2012)	Not specified	2, not specified	Qualitative interviews	Unintended consequences of using ePortfolios when considering students caring for vulnerable clients	Low: Limited data based on two interviewees, unclear how this constituted action research.	De-identification of data (e.g., pixelate faces or school branding, appropriateness of content, verbal identification of names and places in audio visual content, receiving signed consent from parents to capture images of children).

Figure 1
Scoping Review Process



Privacy and Confidentiality of Vulnerable Groups

Four papers (i.e., Kift et al., 2007; Martin, Porter, Shawl, & Motl Moroney, 2012; Nagler et al., 2009; Ross, 2014) and two reports (Cowper & Crompton, 2010a; Nuessler, 2012) considered the issues of privacy and confidentiality of vulnerable groups. Kift et al. (2007) considered the similarities between ePortfolio use and the operation of social media discussion, raising concerns that many students did not appear to consider the risks to their own privacy in developing an

online presence. For example, some students appeared unconcerned that their published information might be misused by a third party with serious ramifications such as identity theft, fraud, or risk to employment (Kift et al., 2007). However, in a focus group of learners in the post-16 Vocational and Educational Training Sector in Australia, Cowper and Crompton (2010a) recorded how students were mindful of sharing personal information in an ePortfolio.

Researchers in graduate medical education in North Carolina, USA (Nagler et al., 2009) also noted that their

students (i.e., medical residents) were mindful of recording self-reflections while in clinical settings. Some residents worried that their future careers as physicians might be put in jeopardy if some of the contents of their ePortfolios, specifically their self-reflections, were “used as evidence for medical malpractice lawsuits” (Nagler et al., 2009, p. 1523). Teachers and residents alike acknowledged the usefulness of the ePortfolio to document their work and lauded the self-reflections as opportunities for growth and improvement in the quality of medical care for their patients. In graduate medical education in the USA, the use of ePortfolios carries some risk around “disclosure of clinical information, and professional liability exposure of physicians” (Nagler et al., 2009, p. 1522). This raises questions about students’ understanding of the importance of privacy in reflections when students are working with vulnerable groups (e.g., patients, children), which may place them at risk, even if this information is being shared within a closed group (Kift et al., 2007).

Much like Nagler et al. (2009), Nuessler (2012) acknowledged that ePortfolio use in some disciplines (e.g., medicine, teaching) is riskier than in others and indeed is an unintended consequence of implementation. In a small study in an Australian university, examples of how vulnerable groups’ privacy was ensured included the de-identification of reflections or pixilation of faces in images and assurance that individual or place names were not included in audio recordings (Nuessler, 2012). However, Ross (2014) reported students discussing how confidentiality of vulnerable clients was more than simply removing identifying details. They felt unsure about the level of disclosure required for assessment.

Cowper and Crompton (2010a) discussed the need for education providers to balance the importance of allowing students to express themselves, trusting them to make decisions about the inclusion of sensitive material. They acknowledged that this might be influenced by the age, life experience, and cultural background of the student. However, Nuessler (2012) found that existing guidelines in a major Australian university did not cover the variations of existing ethical issues that have emerged as a result of the use of digital media and online spaces. Nagler et al. (2009) posited that until peer-review statutes are reviewed to include privacy of information in ePortfolio documentation, U.S. institutions need to know their particular state’s laws concerning protected documents.

Martin et al. (2012) involved first-year pharmacy students in a U.S. university in undertaking and recording assessments with older adults in an ePortfolio as part of the course assessment. Students were provided with limited information on maintaining confidentiality in their introductory “boot camp” on the use of ePortfolios. In a post-assessment survey, student scores on maintaining client confidentiality were lower than at the start of the course. In explaining these

results, the authors did not consider the use of ePortfolios as a reason for this reduction in confidence.

Indeed, learners may be putting themselves at risk inadvertently through “sharing inappropriate material or permitting wide access to sensitive material” (Cowper & Crompton, 2010a, p. 15). There may also be risks arising from students’ reuse of evidence across contexts over time for different purposes (Nuessler, 2012), with students feeling confused about the level of disclosure and ownership of reflective spaces by a third-party provider (Ross, 2014). This issue was also reflected in concerns about the security of data, particularly in higher education institutions (Kift et al., 2007) and private training organizations responsible for vocational education in Australia (Cowper & Crompton, 2010a).

Digital Ethics

Only one paper (Denton & Wicks, 2012) and one report (Nuessler, 2012) considered ethical issues of digital citizenship. Digital ethics considers the values associated with an online presence using technology tools such as (a) the internet, desktop computers, and related software; (b) ePortfolio hosting systems such as WordPress and Mahara; (c) blogs, discussion boards, and online forums in safe, legal, and responsible ways (Denton & Wicks, 2012). Digital ethics also includes the use of respectful and appropriate language (Nuessler, 2012). The respect of others’ rights is a key aspect of digital ethics which has not been adequately explored in the use of ePortfolios, particularly in the conduct of gaining consent for the use of information and the validity of this consent when using the information in different electronic contexts (Nuessler, 2012).

Discussion

This scoping review investigated how the issues of privacy, confidentiality, and consent were managed in ePortfolios where students engaged with vulnerable and/or disadvantaged communities, groups and individuals. This review revealed a dearth of literature on how these issues were managed when implementing or using ePortfolios.

Student Perception of Digital Information Use in ePortfolio

While students need to understand what an ePortfolio is, how to use it, and how it relates to industries following graduation has been recognized (Tosh, Light, Fleming, & Hayward, 2005; Wetzel & Strudler, 2006), Kift et al. (2007) surmised that many younger students may not be aware of the risks of using online spaces. Razavi and Iverson (2006) suggested that, based on their social media behavior, when

younger people use ePortfolios, they cluster information into certain areas and make decisions about sharing based on the sensitivity of the data and the life cycle of the document being shared. However, Nuessler (2012) hypothesized that existing guidelines and frameworks in use may not always account for the kinds of ethical issues encountered in ePortfolios use because of the ability of students to share potentially sensitive information on a large scale, instantaneously, with an unregulated audience. Damage can be equally instantaneous and control over the content can be lost if artifacts are completely copied.

In order to be successful, universities need to engage students in the design and use of the ePortfolio as well as provide multi-dimensional scaffolding for how to use the technology for both the educator and learner (Chau & Cheng, 2010; Yancey, 2009). For students involved with vulnerable populations, this must also include digital ethics, particularly as many professions embrace ePortfolios as a way to collaboratively share information (Lin, 2008). However, there was limited reflection or consideration in the literature reviewed in this study on how students are prepared to behave ethically in a digital context.

Using ePortfolio When Working With Vulnerable Communities

Learners often use ePortfolios as a central repository of personal artifacts to demonstrate their learning for a wide variety of audiences thus providing a rich view of learners' experience (Razavi & Iverson, 2006). Traditionally, industry partners like to review applicants' skills, qualities, and attributes (Allen, 2016) developed throughout the course of an undergraduate degree. Usually this is provided through the job application, which may include a CV, cover letter, and answers to key selection criteria. A study by JISC (2008) suggested that ePortfolios provide the link between learners' social and personal experiences and their academic and work-related aspirations, to provide multi-dimensional scaffolding for learners beyond that of technology. While many students use digital devices for social networking and in their personal lives, it cannot be assumed that students are familiar with all technologies (Hagel, 2015). Therefore, students might inadvertently share potentially sensitive information with a wider audience than intended (Kift et al, 2007).

Vulnerable communities may give their consent for students to capture their image or record information about them for the purpose of assessment, knowing that their identities may be anonymized (Nuessler, 2012). However, how this information is regulated, stored, and shared is rarely discussed (Cowper & Crompton, 2010a). Students may also inadvertently share sensitive information without

realizing the potential risk to their personal safety, identity theft, or their present and future employability (Cowper & Crompton, 2010a). Therefore, training for students and staff on how to upload, reflect on, and share artifacts must include an appropriate context centered on compliance and articulating possible unintended consequences of their engagement with the ePortfolio hosting system and manipulation of data (Cowper & Crompton, 2010b; Fisher & Hill, 2015, 2017; Xu, Gao, Sorwar, & Croll, 2013).

Implications

Although there appears to be guidance on consent with respect to accessing information or images from the vulnerable communities with which students may be working, there appears to be limited guidance on how to address the ethical use of information online or in more than one context. This is particularly relevant as "the networked and public nature of the internet requires the capacity for thinking more abstractly about the effect of one's actions on unknown others or at the level of community" (Flores & James, 2012, p. 838). To address these issues, external organizations (e.g., the International Society for Technology in Education; ISTE) in the US have developed standards to guide children and teachers in how to behave responsibly in a digital environment developing legal, safe, and ethical practices (Greenhow, 2010). However, Flores and James (2012), in interviews with young people aged 16-25, found that ethical decision-making was most evident when that effect was individual. Amoral decisions were more often made by the same young people when their behavior had the potential to negatively impact those who were unknown to them. This raises questions about the guidance provided by higher education institutions and how such guidance might be developed to consider digital ethics when operating in an online context in relation to the use of educational tools such as ePortfolio.

One of the most significant challenges in using ePortfolios in the university and vocational education and training (VET) sectors in Australia is how to design, develop, and deliver a uniform strategy that enables ePortfolio service providers, typically referred to as *registered training organizations* (RTOs), to keep personal information contained in a hosting system secure from threats (Cowper & Crompton, 2010a). It is important for students, staff, and vulnerable people to work together to inform the development of a set of guidelines and procedures that incorporate privacy laws that protect client data, images, private reflections, and related documentation that could be compromised if electronic evidence records were accessed by unauthorized people such as hackers (Cowper & Crompton, 2010b; Fisher & Hill, 2017).

Conclusion

This paper reports on a systematic scoping review of the academic and grey literature following evidence-based guidelines, which is the first review of its kind in this field. The review considered how the issues of privacy, confidentiality, and consent were managed in ePortfolios where students engaged with vulnerable and/or disadvantaged communities, groups, and individuals and found a dearth of literature. The findings from this review are limited by the amount of literature included. Although every effort was made to keep the search terms very broad, other papers might have been missed or excluded due to publication in languages other than English. Equally, many of the included studies only considered issues of privacy, confidentiality, and consent with vulnerable communities as peripheral to the main issue of implementation and/or assessment. In this study, we found a dearth of literature on how the issues of privacy, confidentiality, and consent are managed in ePortfolios where students engaged with vulnerable and/or disadvantaged individuals and/or communities. Although there is a growing body of work on digital ethics related to business delivery, there is limited work on how digital ethics might be conceptualized in professional education. Furthermore, little is known about the guidance currently provided by educators in relation to the use of sensitive information in ePortfolios or how students make decisions about what to share using technology in an educational context. This suggests the need for more focused research in how students in professional education courses—who routinely engage with vulnerable individuals and/or communities—use the guidance currently provided and investigate how these students make decisions and how educators support them in the decision-making process when using ePortfolios.

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The Curricular and Technological Nexus: Findings From a Study of ePortfolio Implementation

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This paper presents findings from a qualitative study of ePortfolio experiences among health professions students at a major Australasian research-intensive university. This exploratory study of the scholarship of teaching and learning (SoTL) aims to understand the experiences and perspectives of students introduced to program-level ePortfolios across multiple curricula in the health sciences. Six key themes emerged from the data: benefits of an ePortfolio at the curriculum level, ePortfolios as an enabling technology, the value of reflection, the role of user support, the speed and quality of feedback, and mitigating distance and isolation. These data show that a program-level strategy that embeds ePortfolios across a curriculum, including delivering assessable tasks in the ePortfolio platform, is beneficial to students when a scaffolded, structured approach is taken.

ePortfolios, digital professional portfolios, are increasingly common tools in professional health education. ePortfolios have a significant potential to promote student responsibility for the self-regulated development of professional skills and knowledge (Biggs, 2006). They have been found to improve communication about expectations and feedback as well as to promote reflective thinking (Emmett, Harper, & Hauville, 2005; Howatson-Jones, 2004). However, ePortfolio implementation has been met with varying degrees of success (Endacott et al., 2004).

This study is related to a faculty-wide ePortfolio selection and implementation project that began in 2012. Our faculty is a large health sciences faculty located at a major research-intensive university in Australasia. Undergraduate professional programs in medicine, pharmacy, nursing, population health, medical science and optometry, and postgraduate programs (certificate, diploma, masters) in medical and health sciences were using either portfolio-based assessment or had ambitions to do so prior to selecting what would be a faculty-wide ePortfolio tool.

After an extensive selection process (Egan et al., 2015; Egan, Cooper-Ioelu, Spence & Petersen, 2015), Chalk and Wire was selected as our ePortfolio system. ePortfolio-based assessment was subsequently implemented on a staged basis across multiple programs. Support was delivered by a team of learning designers from our educational services unit, which is embedded within the faculty.

Literature Review

Scholarship related to ePortfolios has expanded significantly. Almost a decade ago, Timmins and Dunne (2009) described how paper-based portfolio assessment could include weighing and measuring the size of the final hard copy of a paper-based portfolio.

The field has evolved to emphasize the quality of work over volume.

Peet et al. (2011) offered a conceptual framework for understanding ePortfolio development: lifelong learning capacities focused on metacognitive skills, life-wide learning capacities of specific “how-to” knowledge in and across specific contexts, and critical reflexive capacities, including the ability to continually reflect as a learner within specific learning and work contexts. Jenson (2011) described a project where writing students used ePortfolios. Arguing that some students wrote “longer, not more reflective” (Peet et al., 2011, p. 50) statements in some instances, word count did “speak to the seriousness with which students approached the task of reflection” (p. 55). Jenson (2011) articulated a continuum of student writing, from naming to naming and describing to identifying learning outcomes to identifying self-regulated learning strategies.

Ehiyazaryan-Whiter (2012) reported on the benefits of using ePortfolios in a postgraduate education program in her action research project. She found student posts evolved from “how-to’s,” toward sharing successes, failures and uncertainty, toward revealing deeper approaches to learning. Pitts and Ruggirello (2012) examined ePortfolio as a discursive space “that afford users the capacity to analyze and illustrate growth within the discourse and standards of a community” (p. 50). They offered an assessment framework based on the use of evidence, the application of a (relevant) conceptual framework, and the extent to which overall ePortfolio development articulates growth. Applying the performance indicators of under-developed, good and excellent became the basis of an assessment rubric for students’ ePortfolio work. Cross (2012) reported on an ePortfolio for overseas trained teachers (OTTs) seeking registration in Australia. The ePortfolio project “required OTTs to create their own ePortfolios by following a structured and staged process” (Cross, 2012, p. 44);

however, few candidates in the first cohort moved on to successful registration.

O’Keeffe and Donnelly (2013) identified multifaceted challenges for students developing an ePortfolio: understanding the purpose, understanding the requirements, using specific ePortfolio technology, using multimedia to present information in diverse ways, and managing the time-intensive work of creating, curating and synthesizing an ePortfolio.

Parkes, Dredger, and Hicks (2013) described an ostensive four-step process for creating an ePortfolio: collect, select, reflect, and connect, though the advanced work required to configure an ePortfolio arguably is an initial (fifth) step: erect. In creating a learning activity that was ostensibly student-centered they nonetheless found that “students had different levels of aptitude for thinking and writing reflectively” (Parkes et al., 2013, p. 107), which seemed to impact the calibre of their ePortfolio work.

Richards-Schuster, Ruffolo, Keyda Nicoll, Distelrath, and Galura (2014) described an example case demonstrating ePortfolios used as an assessment platform and for gathering evaluative feedback from students enrolled in a civic engagement minor. Eynon, Gambino, and Török (2014) identified the potential for ePortfolios to “play a vital role in the evolution of higher education” (p. 111), particularly when integrative ePortfolios are used to “build student success, deepen student learning, and catalyze institutional change” (p. 111). Wuetherick and Dickinson (2015) explored continuing education (or university extension) students’ perceptions of ePortfolio use. They found that the convenience of working online was mitigated for some older students, who more often struggled with the online modality to the extent that it negatively impacted their ePortfolio experience.

Gordon (2017) described how language learners could use an ePortfolio to bridge the gap between course content and language usage outside of the classroom, as well as considering the extent to which these learners benefited from peer review and feedback. Singer-Freeman and Bastone (2017) reported on two related studies in their paper. For the first study, they proposed that ePortfolio word count could be equated with the quality of student work. They found students who worked online versus those who used a paper-based worksheet wrote much more extensively with respect to concepts, reflection and planning, acknowledging that “students’ preference for typing over [hand]writing” (Bastone, 2017, pp. 153-154) might account for this. For the second study, where students either submitted word processed papers or completed an ePortfolio, word counts related to concepts and reflection decreased, while word counts related to planning increased.

Morreale, Van Zile-Tamsen, Emerson, and Herzog (2017) evaluated a pilot capstone ePortfolio project for

third-year undergraduate students. The data showed that capstone ePortfolio experiences “can be valuable in giving students a chance to integrate . . . [learning and] . . . offer excellent opportunities for students to reflect on their undergraduate careers” (Morreale et al., 2017, p. 22). Bryant, Zeh Rust, Fox-Horton, and Johnson (2017) offered best practice recommendations for ePortfolio implementation with non-traditional university students. Using ePortfolios can “heighten levels of hope, improve students’ abilities to integrate knowledge from two or more disciplines, and help student link their learning to career skills” (Bryant et al., 2017, p. 136). Thibodeaux, Cummings, and Harapnuik (2017) looked at factors that could explain persistent use or discontinued use of ePortfolios. The minority of students (17.7%) who persisted in using ePortfolios post-program experienced “considerable choice over the learning process, combined with elements of voice, authenticity, and ownership of the process” (Thibodeaux et al., 2017, p. 8).

Chittum (2018) created an ePortfolio learning activity to “facilitate deeper thinking processes . . . enable more meaningful connections between the content and practicum experience, make the assignment more useful” (p. 30) in the future. She found no significant difference with regards to some motivation constructs in ePortfolio and non-ePortfolio student cohorts, but significant positive differences concerning perceived usefulness in class and academic performance. Weber and Myrick (2018) identified themes related to reflection and feedback—enjoyment of the project, tracking of achievements to enhance motivation, pride in intellectual and personal growth, appreciation of feedback—along with challenges around the aesthetics of an ePortfolio.

ePortfolios in Health

ePortfolios have gained increasing prominence in professional health sciences programs—particularly in nursing education. Peacock, Murray, Scott, and Kelly (2011) examined student experience across a range of health-related disciplines, including radiography, physiotherapy and nursing, with consideration of the product (assessable tasks) and process (experience) of learning. Participants were “very positive about receiving tutor-generated feedback on the product of their learning through the ePortfolio” (Peacock et al., 2011, p. 43). Learning engagement levels were variable, because “learning engagement with the ePortfolio for both purposes (process and product of learning) was linked to their understanding of what feedback was and what they believed to be their role within the feedback process” (Peacock et al., 2011, p. 43). Peacock et al. (2011) recommended that ePortfolios be “integrated into the curriculum with full technical and pedagogical support available” (p. 44).

Bate, Macnish, and Skinner (2016) looked at Aboriginal health first-year medical students' experiences with ePortfolios delivered either within Blackboard or via Mahara. Most students were "unimpressed by the potential . . . to engage more deeply with the curriculum" (Bate et al., 2016, p. 87) and placed "little value on portfolio tasks in the development of their identity as a doctor" (p. 88). Chan (2012) evaluated the use of ePortfolios in a Physical Therapy Assistant program where a "balanced curriculum that develops professional competencies in students while preparing them for the licensing examination" (p. 149). He argued that an ePortfolio transcends a mere assessment platform and becomes "a pedagogical tool that encourages students to look beyond their education as merely a test-prep workshop or job training" (Chan, 2012, p. 161).

Landis, Scott, and Kahn (2015) looked at a broad range of ePortfolio projects across multiple disciplines, including nursing. They found instructors were often surprised at their students' difficulties with reflection. Josephsen (2012) evaluated the use of the webware program PBWorks as an ePortfolio platform for her blended modality Bachelor of Science (Nursing) students. While the use of ePortfolios was reported as having a number of advantages, some students continued to struggle with the platform if they lacked strong computing skills prior to enrollment in the program. Garrett, MacPhee, and Jackson (2013) evaluated how an ePortfolio was used to assess clinical competence in a Bachelor of Nursing program. They found technical issues were minor, with more concerns "related to pedagogy and use of competence based assessment" writ-large (Garrett et al., 2013, p. 1210). They saw using an ePortfolio "as a natural evolution of paper-based clinical assessment systems, having considerable advantages in terms of convenience, transparency and consolidation of learning" (Garrett et al., 2013, p. 1212).

In nursing, Bogossian and Kellett (2010) similarly reported on barriers to ePortfolio access in nursing clinical settings. When seeking to migrate from paper-based to digital portfolios their students and staff encountered barriers to accessing computers, finding time during clinical placements, and clinical staff attitudes about portfolios. Andrews and Cole (2015) identified "hurdles" nursing undergraduate students encountered when working in an ePortfolio space: access to pedagogical support, technical support, general IT literacy levels, computer and internet access, staff reluctance (impacting student efforts for support), "limited scope or perspective of ePortfolio pedagogy" (p. 57), and a lack of software knowledge.

More recently, Birks, Hartin, Woods, Emmanuel, and Hitchins (2016) also highlighted technical issues as a significant barrier for both undergraduate nursing and

postgraduate midwifery students. Only one-third of participants thought their ePortfolios might be beneficial in seeking employment, though almost half agreed they developed important professional skills while collating their ePortfolios. As well, "a trend was observed between age and perceptions of enhanced learning" (Birks et al., 2016, p. 49), where most of the students who found that the ePortfolio enhanced their learning were 30 years old or younger. Collins and O'Brien (2018) evaluated the impact of ePortfolio-based learning activities in a Bachelor of Nursing program. A plurality of students reported an increase in reflective learning; a majority felt they received enough feedback via their ePortfolios to improve their practice (Collins & O'Brien, 2018, p. 46). However, several students expressed concerns about the quality of feedback received.

What emerges from the literature is that ePortfolios can be a useful tool that drives learning, but only when educators critically and deeply reflect on how ePortfolios are designed and integrated into courses and programs. ePortfolios have the potential to stimulate deep reflection that can rival paper-based alternatives (particularly in professional disciplines) when they are well-scoped and supported. For ePortfolios to be an effective learning tool, students need to appreciate how ePortfolio tasks connect to other areas of the curriculum and their future professional practice.

Method

This exploratory, qualitative study of scholarship of teaching and learning (SoTL) aimed to understand the experiences and perspectives of students who engaged in ePortfolio learning in one of multiple curricula in the health sciences. This qualitative study (Bernard, 2012) included key informant interviews with university students ($N = 15$) who have been involved in ePortfolio-based teaching endeavours in one of our relevant faculty academic programs. The inclusion criteria were current or recent university students affiliated with one of the programs that used our new ePortfolio system.

Eligible participants were recruited from undergraduate programs in nursing, optometry, pharmacy and medicine. Program and course coordinators sent out an e-mail invitation to cohorts of students in each program using our ePortfolio system. Between May and November 2016, students were invited to participate in an interview of up to 60-minutes, from which a verbatim transcript would be generated. Participants were given the right to refuse to answer any individual questions and to withdraw from the study at any time without penalty; none made any changes to their transcript or withdrew from the study. All student participants were given a \$20 (New Zealand

Table 1
List of Participants

Participant	Program
Ngairé	Bachelor of Pharmacy
Neil	Bachelor of Pharmacy
Theresa	Bachelor of Pharmacy
Eric	Bachelor of Pharmacy
Jane	Bachelor of Pharmacy
Elyse	Bachelor of Optometry & Vision Science
Robert	Bachelor of Nursing
Charlotte	Bachelor of Nursing
Erin	Bachelor of Nursing
Michelle	Bachelor of Nursing
Ines	Bachelor of Medicine, Bachelor of Surgery
Marie	Bachelor of Medicine, Bachelor of Surgery
Anna	Bachelor of Medicine, Bachelor of Surgery
Arthur	Bachelor of Medicine, Bachelor of Surgery
Dan	Bachelor of Medicine, Bachelor of Surgery

Note. All participant names are pseudonymous.

dollar) supermarket gift card for their participation. The University's Behavioural Research Ethics Board approved this study design.

The research questions were:

- What are the experiences of students with ePortfolios at the curricular (or program) level?
- What are their perspectives with respect to the value of ePortfolio-based learning activities?
- What sorts of opportunities or challenges are experienced when working with ePortfolios?

The implications of these findings for curriculum development in health professional education were considered.

All interviews were recorded using a digital voice recorder. A professional transcriptionist transcribed each interview verbatim. Participants who provided an e-mail address were sent their transcripts for review and potential revision: none elected to revise the transcripts. We analyzed the transcripts using Atlas.ti qualitative data analysis software. Data were analysed naturalistically (Lincoln & Guba, 1985; Strauss & Corbin, 1998) using the constant comparative method (Glaser & Strauss, 1967).

The focus of this study was not to measure specific educational outcomes or academic performance levels—both of which would be difficult to disaggregate from other aspects of students' teaching and learning activities—nor to examine the potential role ePortfolio-delivered assessment can play. Rather, we wanted to examine the interplay between curriculum, teaching, and learning from the perspectives of students. Table 1 lists the participants and their programs of study.

Results

There was no unanimity of experience or perspective across the participants. Experiences varied among them, including those enrolled within the same academic program. There were, however, significant trends in participants' perspectives, in terms of the themes addressed. Within these themes there was also some variability among participants' accounts.

Six key themes emerged in our analyses: (a) benefits of an ePortfolio at the curriculum level, (b) ePortfolios as an enabling technology, (c) the value of reflection, (d) the role of user support, (e) the speed and quality of feedback, and (f) mitigating distance and isolation.

Curriculum

When we developed this research project we were keenly interested in the extent to which students might find value in ePortfolio integration of their experience at the curricular (or program) level, rather than at the course or learning activity level. We anticipated that students “at the coal face” of university study would be very task- and assessment-focused, to an extent that might disincentivize more in-depth considerations of their overall program-level experiences, including the ePortfolio. However, our assumption proved to be misplaced. Most respondents were exceedingly sophisticated in their understanding that their ePortfolio was a program (rather than course level) experience. Of the 15 students interviewed for this study, only one (Theresa) had no idea why an ePortfolio was used in the program.

Students from programs that utilized multiple affordances of the system described much more positive experiences with their ePortfolios. Erin’s description of how Chalk and Wire was deployed worked well at the program level:

I found it really helpful for me, just the way it works. I really felt good about using it because all my friends from the year before haven’t had a chance to use [an ePortfolio]. All my friends were saying it’s really good that we have this improved way of handing in [our] portfolio. They had some struggles communicating with the lecturer, or getting a feedback from the lecturer, especially in the middle placement that we have in the last semester of the curriculum. That’s a long one.

It’s quite important that we get a lot, like as much feedback as we can get from the lecturer. Because they are experienced, and they know better than us, obviously. So, I guess I look forward to using it [next year] because I have already benefitted, I got a lot of benefit from using it in the placement, even in the short one.

Erin’s analysis of her initial experience with Chalk and Wire already had her thinking about its applicability in the following year of her program. Michelle summarized the global benefit she experienced using Chalk and Wire. She found it “just makes you think about certain situations and makes you understand things that you wouldn’t have before. With reflective practice it definitely brings that to the program much more.”

Enabling Technology

Some respondents described ePortfolio benefits mostly in instrumental terms, in ways that delineated efficiencies in completing extant tasks or activities. For instance, Robert found using an ePortfolio “easier than e-

mailing back and forth a Word document.” Anna thought that moving to an online portfolio is “probably just keeping up with the times, really,” which she thought her program and the university “could do more of”.

While Elyse did not find using Chalk and Wire detrimental, she also felt that perhaps the ePortfolio tool was not leveraged as much as possible:

For what we did last year, not really, but if there was a lot more stuff on there... what they gave us essentially could have just [been] given as a printout, they could have just given us a printout and told us to submit it back. I can see how that interface could be used to do a lot more, but we didn’t really do that.

Several of the participants indicated that using an ePortfolio changed—and improved—their student experiences, including how they approached their learning. Ngaire described how Chalk and Wire allowed her to capture an experience iteratively and subsequently reflect on it:

For me it is different. I really enjoy the reflection part, so the reason for that is that if I do a reflection I note down what happened during the day, and one mistake I made, and what improvement I made during the day. [I found] it quite helpful, to push me going.

For Ngaire, having a central place where much of her work related to clinical placements was, in particular, useful. Similarly, Neil liked how his ePortfolio “shows the evolution of our learning over time, so I think we are using the portfolio for our third and fourth year, so probably by the end of it the benefits of it, my learning, will be more apparent.”

Anna found that the granularity of her program’s Chalk and Wire template, combined with online access, facilitated learning:

The organisation, of knowing where everything is, and grouping everything together, because I am a very “categorisation” sort of person, [the ePortfolio] works quite well for me. The other thing I was thinking about before is being able to access it anywhere, whereas if you get a [paper] folder of things sitting in your flat, they’re not any use to you when you’re at uni and you need to access them. So, the online stuff is fantastic for that.

Elyse shared a similar perspective. She found the Chalk and Wire end-user experience a significant improvement over another learning technology tool, the university’s in-house learning management system (LMS). She found the LMS interface “was just so annoying that having a

nice website like Chalk and Wire actually made everything a bit easier.” As ease of use was a key element of our ePortfolio selection criteria, these accounts were affirming. Erin also found the online access enabling, as much for how it facilitated feedback while on a clinical placement offsite:

You can do whatever writing you need to do and then you can just save it, upload it. The clinical lecturer, who sees our portfolio, they can give us constant feedback for our portfolio. Last year I had to send the Word document every week and then they give a bunch of feedback for the week. Then we go on and then improve or add stuff and then they give us a reply back a week later.

While using Word and e-mail offered a similar task protocol, the ease of use in the ePortfolio workflow made both the work and the feedback more accessible for Erin. Similarly, Michelle described how using Chalk and Wire iteratively provided “an opportunity to share what you’ve done with your lecturer without actually talking to them, then they give you feedback on it and talk about how you reacted to it.” Michelle’s description of the text-based interaction as “talk” is worth highlighting: it indicates the communicative aspects of the undergraduate nursing ePortfolio—which to a significant extent were designed to mitigate isolation during clinical placements—was successful.

However, for some participants, an ePortfolio was viewed neutrally or negatively. Marie thought using Chalk and Wire “made it more complicated, just because it’s just a portfolio for the portfolio itself.” Neil found navigating Chalk and Wire unnecessarily complex:

Well, just in terms of the way it is designed. I feel it was kind of awkward to navigate. There is a list of contents, a home page and you click on it and it would be within the same browsing window, but you would have to scroll up, sort of like this thing comes out from the side and it’s got all the questions and you’ve got to click on it and it comes up with all the questions. I feel it would be easier to navigate if every time you clicked on the thing that you were going to, it opened up a new tab.

In terms of the selection of our ePortfolio system, none of the products we reviewed offered a tabbed interface unless each transaction opened into a new browser window. While savvy end-users can elect to have new windows open as tabs, for others, the opening of multiple new windows was viewed negatively during our piloting of two shortlisted systems. There was no sophisticated ePortfolio system with tabbed browsing as its default. Having to scroll down within a single screen

was determined to be preferable over managing multiple browser windows concurrently during a single session.

Anna’s experience indicates other aspects might have contributed to some students’ challenges with Chalk and Wire:

It was mainly that there was no introduction to it. I didn’t even know where to find it on the internet. I just typed in “Chalk and Wire” and hoped for the best. So, the introduction by [staff] probably wasn’t the best. They could have done a little bit of “here’s how to find it, here’s how to navigate around it”, because, had [this] been explained, it probably wouldn’t have been a problem. Because we would have known where to find everything.

Students like Marie, Neil and Anna, who did not have a positive perspective on their ePortfolio experience, consistently described that a perceived lack of value in the tasks required to complete their ePortfolio denuded its pedagogical value as did the lack of facilitated access.

Value of Reflection

A key driver in our faculty’s decision to select an ePortfolio tool was to enable reflection among our professional students, particularly those who would be seeking registration or licensure upon graduation. While the nature of reflection varies somewhat between our programs, the expectations around program-level facilitation of reflective practice were similar across all four programs. Based on Schön’s (1987) work, we endeavored to produce early career health professionals who are skilled at *reflecting on* and *reflecting in practice*.

The extent to which Chalk and Wire enabled this sort of reflection was, on the whole, substantive. Most participants articulated either the value of having an ePortfolio for reflection or described specific ways that completing their ePortfolio enabled reflection. Robert explained how he was already anticipating how reviewing his ePortfolio will facilitate his transition from student to working nurse:

[It] makes me realise that actually when I come to the end of three years and I need a portfolio of some description to give to my employers or I need to show evidence of reflection in practice, it’s all in one spot, which wouldn’t have been the case with Word documents. They probably would have been lost somewhere on my computer by then.

Lisa, also a nursing student, described how using Chalk and Wire facilitated reflection:

[using the ePortfolio] just makes you think about certain situations and makes you understand things that you wouldn't have before . . . reflective practice, it definitely brings that to the program much more, I think, particularly with things like cultural competence. It brings that to the curriculum because we don't necessarily have assignments based on that but the portfolio kind of brings those sorts of things.

Lisa described both reflecting on (after events) and reflecting in (during events) and why working iteratively, with faculty feedback and support, accelerated her development of reflective practice competencies. However, students like Arthur seemed to find the emphasis on reflective practice challenging:

Yeah, I understand that once we start hitting the clinical years it would be good—and it's important—to reflect but at this stage we haven't really done anything clinical. I am continually reflecting in my head. I don't need to write it down on paper. It just increases stress.

Charlotte found using Chalk and Wire “really handy for reflective, for reflection in your own practice and just seeing what we have done and how [it] could be used to see what we do better next time or to define key learning needs.” Michelle perceived using an ePortfolio as “really helpful”:

Oh yes, it's helped because we've had to do some reflection assignments, which have been like a whole assignment on reflection. It's helped with those for sure. You've got the examples in your head already, so you can kind of just get them out.

Getting examples of things upon which to reflect “out” of her mind into words facilitated Michelle's reflection.

Dan initially captured content for his ePortfolio “outside” (in Microsoft Word), though he entered things directly into Chalk and Wire more often over time:

It was a bit of both. So, this year I started a lot of things outside Chalk and Wire. Like I have done my own reflections, which I am going to go back into Chalk and Wire and see where I can integrate them.

What Dan described was metacognitive learning: self-regulated learning activities (Biggs, 2006) that a student employs to facilitate their own learning.

Role of Support

Given our relatively small, six-person educational services unit team, we were unable to staff a telephone-

based help desk in support of Chalk and Wire. As a faculty-specific tool we were also unable to integrate our support needs into the wider university's user support ecosystem. Thus, we focused on four levels of locally provisioned support:

- Extensive work with staff to develop and refine each program's ePortfolio template.
- A hands-on demonstration in each program at the beginning of the term when ePortfolios are first introduced.
- Bespoke user guides for each program, with specific guides each for students (and staff).
- An e-mail address for Chalk and Wire support requests, monitored during core university working hours.

Overall our approach seemed to work well. We were keen, however, to ascertain students' perspectives on support levels and their effectiveness. The amount of technical support required by the participants varied significantly. Around half of the students either needed no technical support or did not seek any support when they encountered challenges or difficulties. Some, like Ines, asked their friends for assistance with any problems. Eric replied “No, I'm a male. Who does that, unless stuck?”

Robert, Charlotte and Michelle all found an in-class demonstration of Chalk and Wire at the beginning of term very helpful. As Charlotte described:

It was helpful with the lady that came in every time we started placement where she reminded us how to do the set up. But after doing it a couple of times you kind of learnt quickly what need to be checked and what need to be unchecked.

The demonstration, combined with often repetitive tasks, enabled Charlotte to develop the skills required to use Chalk and Wire to complete her work.

However, some of the more interesting responses came in response to the bespoke user guides. Robert, for example, was able to complete his work without reviewing the user guides because of the demonstration session, as was Elyse. Theresa “just followed” the guides, which were transaction-focused, and had no need for further assistance. Two participants' accounts—Michelle's and Anna's—delineated two very different experiences with the user guides for some participants. Michelle's experience reflected our intentions in creating these guides:

Interviewer: And where did you go to get that assistance?

Michelle: They kind of made this massive document with all the help we might need on it so

looked at that and then I think I had to e-mail a lecturer once, or one of our administrator people, and then they told me what to do.

Interviewer: That big guide that you got, how was that, was that useful?

Michelle: Yeah it was useful. Just took a while just to find what you were actually looking for, but yeah, it was okay.

The user guide, along with support from her lecturer and other university staff, were sufficient for Michelle to successfully use Chalk and Wire. Anna's experience was different:

Interviewer: Did you have any need for technical support or assistance at all?

Anna: No, I think I was alright in the end actually. I just kind of uploaded things and hoped that they ended up in the right place.

John: Did you find the user guides that were created of any use?

Anna: Didn't know that there were user guides.

Interviewer: We created a user guide for you folks, specifically for [your] program.

Anna: I never saw that. That probably could have been quite helpful.

Several students in Anna's program reported not having received user guides nor being made aware they were available.

Overall, students who recalled receiving these guides found them useful, though some found the guides were somewhat detailed and dense. Having access to—and perhaps being directed when to use—the user support materials developed for their program might have led to a more positive user experience.

Our team received (to our support e-mail address) relatively few user-support requests. Most related to user ID and password or other account-level issues, rather than the use of Chalk and Wire itself. We attribute the relative paucity of requests for troubleshooting to the efficacy of the other elements of our four-point user support system.

In programs where Chalk and Wire was embedded persistently through a range of assessed and non-assessed learning activities, students described their experiences more positively (and using an ePortfolio more valued) than in programs that used a more “hands off” approach. Karla did not experience Chalk and Wire embedded across her program's curriculum:

We never really used it until the end of the year and obviously it gets put off and put behind, all the tests and everything we are going through. So pretty much most of us that are using, I know with my friends, we only knew how to use Chalk and

Wire two days before submission because we already had all the content anyway and it was just more of uploading it or pasting it into the portal. Yeah so, we didn't really spend that much time on it.

Most other programs took a scaffolded and embedded approach to using Chalk and Wire: their students more often described Chalk and Wire as more relevant and useful. Therefore, how an ePortfolio is embedded across and within a curriculum seems to significantly impact students' experiences.

Mitigating Distance and Isolation

A key element of pre-service health profession education involves clinical placements, which are routinely delivered at non-university sites in the community, including (for our programs) hospitals, community pharmacies and health clinics. While these placements are considered exceedingly important in developing professional competencies, some students struggle with a sense of isolation from their program and university while on placement, particularly extended placements.

In particular, Several nursing student participants found that using Chalk and Wire as an iterative assessment and communication platform assuaged their sense of isolation during placement. For example, Michelle said,

I guess you are getting the instant feedback and the lecturers can monitor your work quite often, because then we don't have to send all these e-mails. I think you can save some time because, if you just go on Chalk and Wire you can see without sending a separate e-mail to say “I did this, can you check please” because we keep constantly checking. I think it's good for students to get this constant feedback which you can work on in the clinical setting. When we are in the placement, not after we finished the placement.

Staff in the Bachelor of Nursing program chose to strategically leverage Chalk and Wire's “collaboration” affordances for students out on clinical rotations, to significant effect. While supporting students as they configured these elements of their ePortfolios was somewhat complex, the benefits seemed to outweigh the onboarding challenges.

Speed and Quality of Feedback

When participants were asked why Chalk and Wire had been implemented at the curricular level, the most common reason surmised was to make assessment and feedback more efficient. Charlotte described some of the efficiencies related to ePortfolio use:

I think it's just so easy for them to mark because then everybody will then have their set up portfolio and it's not sort of like a hard copy where you have to submit and then they have to go through a file, so it's just easy. It doesn't take up any physical space. It's better for the environment and it's just easier to refer to. So, if you happened to have internet access and a connection then you can just go and have a look at it whenever.

Charlotte's experience was similar to several other participants. In using a digitized workflow, turn-around times for assessment were often reduced through both the elimination of paper-based submissions and the leveraging of tool affordances like rubrics, assessor pools, and online assessment moderation.

Friendly Advice

Our last interview question for the participants was offered as a sort of capstone question about their ePortfolio experience. It also plugged into the sort of task focus students have while at university: What one piece of advice would you give other students about to start using an ePortfolio? Rather than emerging as a theme from the data, these direct responses to a particular question were relevant and valuable to both instructors and students.

Their responses varied widely. Some focused on aggregating evidence, others on the tool's affordances and others on how they approached learning writ large. Ngaire encouraged other students to treat their ePortfolios "as a diary," which would help students "figure it out themselves." Theresa suggested they review their portfolio's requirements in advance "so you know what to do pre-work and post work and just stay organised." Similarly, Ines thought early access was key to success. She found using an ePortfolio "really great" and wished she had spent a bit more time early on. Had she followed her own advice, she perhaps would not have experienced "a panicked frenzy when the time comes to actually submit [her] work." Marie, Dan, and Anna also thought earlier access was best.

Neil encouraged copious capturing of placement experiences, as writing down "heaps of notes" would "make answering the portfolio so much easier." Arthur, conversely, discouraged uploading evidence (as attachments) because "at the end of the year you just sum it up and turn it in."

Charlotte suggested students "structure and format [it] just to get an idea in what you need to write about" and to "use the communication tool." In other words, plan ahead and use the ability to feed back and forward with your instructors through the platform. In addition, Michelle suggested, "take your time to plan out what you are going to write rather than just blurring it out."

Discussion

These data show that a program-level strategy that embeds ePortfolios across a curriculum, including delivering some assessable tasks in the ePortfolio platform, can be beneficial for students and staff.

In programs where Chalk and Wire was embedded persistently through a range of assessed and non-assessed learning activities, students described their ePortfolio experiences more positively than in programs that used a more "hands-off" approach. The undergraduate pharmacy and nursing programs took a scaffolded and embedded approach: their students more often described Chalk and Wire as relevant and useful than those studying medicine or optometry and vision science. Therefore, how an ePortfolio was embedded across and within a curriculum seems to have significantly impacted students' experiences.

Challenges for students were more often related to the time required for upskilling and onboarding with the new system. Opportunities included having a central repository for program-related collateral and the potential for migrating elements of a program-related ePortfolio to a professional ePortfolio or curriculum vita when entering the job market.

Broadly speaking, participants had a substantive understanding of the curricular aspects of their ePortfolio work. Most viewed their work as program-level rather than course-level, though course-specific elements of their ePortfolios were often the foci. This reflects the task-focus of university students in managing their workload.

Limitations

This study is qualitative in nature and the findings are therefore not generalizable. While a range of professional programs are represented in the data set, these are all programs that produce early career health professionals: the ePortfolio requirements were driven largely by the professional competency frameworks for these particular professions. Thus, the relative transferability of this study should be considered.

The New Zealand higher education system, however, is not dissimilar to that of Australia, Canada, the United Kingdom, or the European Union (EU). Universities are public institutions with student places subsidized on a per-student basis. Unlike much of the EU, New Zealand universities have, until recently, charged students tuition and fees to study. Beginning in 2018, any first year of tertiary study is fully funded by the government so long as the student has not previously enrolled in any tertiary program.

Pre-registration programs for physicians, nurses, pharmacists, and other health professions can vary from jurisdiction to jurisdiction. To a significant extent it is

feasible for New Zealand-trained health professionals to transfer their registration to these other parts of the world. There is significant coherence between Australia and New Zealand; there are professional peak bodies in each country, but the overall accreditation requirements for these programs are very similar. There can be, however, differences in how things are taught at different universities.

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