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Reflective Course Design: An Interplay between Pedagogy and Technology in a Language Teacher Education Course

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This study reports on a sequence of iterative redesigns of a graduate-level foreign language teacher education course. The study describes the interplay between technology and pedagogy that resulted in important curricular changes, from a focus on individual to social and then holistic reflection. Using a team-based design model, instructional experts worked collaboratively over multiple redesigns, sparked by the unique affordances of emerging technologies such as video, video editing, and electronic portfolios, as well as shifts in pedagogical approaches and changes in course goals.

Recent changes in thinking about the role of education have brought about important shifts—from an instruction paradigm to a learning paradigm (Barr & Tagg, 1995) and from a content-centered approach to a learning-centered approach (Fink, 2003). With these shifts come a rethinking of the roles of teacher and student, of the course, and of the curriculum as a whole. These disruptions in higher education also call for a rethinking of teaching and course design – away from an individualistic approach to course design, with the instructor at the center and support staff at the fringe, to a team-based course design model, with the course and student learning at the center, surrounded by the instructor and learning support working as a team (Bass, 2012). In this new model, the instructor and members of the instructional support staff collaborate as a team on both course design and delivery of the course, each person contributing his or her expertise to the goals of the course. According to Bass (2012), instead of assuming that innovation will come about by converting faculty, "this model focuses on changing course structures so that faculty will be empowered and supported in an expanded approach to teaching as a result of teaching these courses" (p. 30). This study reports on iterative redesigns of a graduate-level teacher education course brought about through an interplay between technology and pedagogy that resulted in important curricular changes—from a focus on individual, social, and then holistic reflection—to a team-based design model. In our course, instructional experts worked as a team over multiple redesigns, sparked by the unique affordances of emerging technologies as well as shifts in pedagogical approaches and changes in course goals.

Theoretical Framework

Teacher Reflection

In many teacher education courses, student teachers are encouraged to apply theories and methodologies to their own classroom teaching experiences in order to build up a repertoire of teaching techniques and to explore ways to make student learning more effective and engaging. The reflective model of teacher learning holds that teachers learn best through experience, reflection, conceptualization, and experimentation (Dewey, 1933; Richards & Lockhart, 1994; Schön, 1987; Ur, 1996; Zeichner & Liston, 1996). This recursive cycle lays the foundation for ongoing professional development and enables teachers to develop their own personal theories of teaching and learning. Richards (1995) explained that "becoming a reflective teacher involves moving beyond a primary concern with instructional techniques and 'how to' questions" (para. 2) to ask deeper questions that regard instruction and managerial techniques as part of broader educational purposes, and not simply as ends in themselves.

Teacher reflection can support this development by pushing teachers to confront prior assumptions about teaching and learning, to question their own teaching practices, and to inquire into not just what works in the classroom but also why it works. Two early influences on the practice of reflection in teaching are Dewey (1933) and Schön (1987). For Dewey, reflection is "active, persistent and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and the further conclusions to which it tends" (1933, p. 9). In Schön's (1987) definition, teachers construct knowledge through *reflection-in-action* (at the moment of teaching) and *reflection-on-action* (action planned before or after teaching). Teacher reflection can consist of several stages, where teachers identify a problem or question regarding teaching or learning, propose actions to address the question, gather and analyze data, and evaluate the solution. This process can uncover new questions and lead to new cycles of teacher inquiry. This is in line with sociocultural perspectives on teacher learning, which

> is characterized as a long-term, cyclical process of dialogic mediation in which learners' everyday

> concepts are made explicit and reflected upon, and scientific concepts are introduced, experimented with, and used in various meaningful and purposeful activities, with the goal of advancing learners' cognitive abilities so that they can accomplish goals or solve problems on their own. (Johnson, 2009, p. 63)

Sociocultural perspectives on teacher learning. Sociocultural theory understands cognitive development to be a socially mediated activity dependent on the specific social activities in which we engage, which in turn allow us to reconsider and reshape existing knowledge, beliefs, and practices (Lantolf, 2000; Vygotsky, 1978, 1986). This development occurs through a process of internalization and transformation. Internalization is "the progressive movement from external, socially mediated activity to internal mediation controlled by individual learners" (Johnson & Golombek, 2003, p. 731). Initially, learners engage in an activity mediated by other people or cultural artifacts but later appropriate the tools to regulate their own activity individually and internally. Cultural artifacts can be physical tools (e.g., a teaching journal, research/readings, or technology) or symbolic tools (e.g., language). Through socially mediated activities, learners confront and reshape knowledge and appropriate new ways of thinking, in a process of transformation of self and activity (Johnson & Golombek, 2003).

Johnson and Golombek (2003) considered teacher learning to occur at the intersections of experiential and expert knowledge, where student teachers use expert knowledge to name and ground their experiences and understandings, transforming and appropriating this knowledge in a personally meaningful way. This is important for teacher education because sociocultural theory

> enables teacher educators to see how various tools work to create a mediational space in which teachers can externalize their current understandings and then reconceptualize and recontextualize their understandings and develop new ways of engaging in the activities associated with teaching. (Johnson & Golombek, 2003, p. 735)

Johnson (2009) recognized three movements that have generated mediational tools and spaces that foster teacher development: reflective teaching, action research, and teacher research movements. In these models, self-directed, collaborative, inquiry-based learning can "encourage teachers to engage in on-going, in-depth, and reflective examinations of their teaching practices and their students' learning, while embracing the processes of teacher socialization that occur in classrooms, schools, and wider professional communities" (Johnson, 2009, p. 6).

Development of professional identity. This new understanding of teacher education contributes to the development of professional identity and to the creation of community, since learning occurs through social interaction within a community of practice by "constructing new knowledge and theory through participating in specific contexts and engaging in particular types of activities and processes" (Richards, 2008, p. 164) that are collaborative in nature. In teacher education programs, collaborative learning can "foster the emergence of a professional discourse, heighten a feeling of membership in a professional community, and lessen the isolation and irrelevance often associated with university-based professional course work" (Johnson, 1999, p. 2-3). Learning to teach is understood as a process of acculturation and identity formation as student teachers learn the language (discourse) of practice to ground their experiences, to appropriate new knowledge, and to operate as full members of a new culture and community. Professional identity can be understood as

> people's legitimate participation in a profession; their occupation of a professional 'role' and ability to control the practices, language, tools, and resources associated with that role; the ideals, values and beliefs that lead them to commit to a profession; the unique way in which they personify their professional role as a result of the experiences that have influenced them through their career; and the representation of themselves as a professional that they project both to themselves and to others. (Maclean & White, 2007, p. 47-88)

In engaging in activities that are collaborative or other-regulated, teachers work together in a mediational space to externalize and reshape their knowledge, creating and contributing to a community of professionals.

Technology and Teacher Education

The shift from a teaching paradigm to a learning paradigm in education (Barr & Tagg, 1995) changes not only the roles teachers and learners play, but also the role of technology, as well as the role of those who shape and support technology integration in education. Today, teaching technologies are not just repositories of information or passive delivery mechanisms of static packaged course material (Batson, 2011), but play a significant role in helping us with the difficulties inherent in the paradigm shift we are experiencing, in which monitoring and responding to learners' progress becomes just as important as, if not more important

than, delivering instructional content and assessing students' final products (Cambridge, 2010). As Bass suggested, technologies help us because they "allow us to see, capture, harvest, and design for the intermediate learning processes" (2012, p. 28). Technologies such as video and electronic portfolios (i.e., ePortfolios) can be harnessed in teacher education programs to support the intermediate steps of learning, as well as to promote teaching and learning through reflective practices. Bass (2012) went on to propose that technologies such as blogs, discussion boards, and collaborative writing tools "serv[e] as a bridge from novice process to expert practice" (p. 29), leading students through iterative processes to, eventually, "speak from a position of authority" (p. 28).

Many reasons compel us to believe that the most opportune moment for integration of technology in teaching is in the teacher education process. Like the familiarity one had to have with the tools of the trade in the days of stylus and tablet or pen and paper, today's technology also needs to be exercised in prolonged use before it can be effective in teaching. Teacher education programs can provide the training and initial experiences teachers need with technology as they build up a repertoire of tools for their professional careers.

Video reflection and teacher education. Videotaping, digital video editing, and annotation tools have been used in teacher education courses to support teacher reflection through delivery of models of best practices in teaching (Dhonau & McAlpine, 2002), video-based cases (Hewitt, Pedretti, Bencze, Vaillancourt, & Yoon, 2003), video clubs (Sherin & van Es, 2009), and self-observation (e.g., Bryan & Recesso, 2006; Calandra, Gurvitch, & Lund, 2008; Geyer, 2008; Preston, Campbell, Ginsburg, Sommer, & Moretti, 2005; Rich & Hannafin, 2008; Rosaen, Lundeberg, Cooper, Fritzen, & Terpstra, 2008; van Es & Sherin, 2002; Yerrick, Ross, & Molebach, 2005). Video integration offers many advantages in supporting teacher learning. For example, video allows teachers to replay and view the teaching event multiple times at their own pace and with a different focus each time. It is a permanent record that can document one's professional development over time. It can be shared with colleagues, inviting opportunities for collaboration, peer mentoring, and social reflection. Video can be archived, edited, and used for different purposes and with different users. "Video affords the opportunity to develop a different kind of knowledge for teaching—knowledge not of 'what to do next,' but rather, knowledge of how to interpret and reflect on classroom practices" (Sherin, 2004, p. 14).

ePortfolios and teacher education. Portfolios have functioned as "assessment" tools in the context of art and design well before they were adopted in education in the 1980s (Larson, 1991). Their use in education, however, has evolved to include other dimensions, such as learning and institutional data gathering, as well as uses beyond the context of formal education, such as personal and professional development and life-long learning (Cambridge, 2010; Elbow & Belanoff, 1986; Yancey & Weiser, 1997; Zeichner & Wray, 2001). Portfolios have been used widely in teacher education programs (Diez, Hass, Henn-Reinke, Stoffels, & Truchan, 1998; Zeichner & Wray, 2001). Often referred to as *teaching portfolios*, these portfolios may be used to "document growth in teaching over time" ((Zeichner & Wray, 2001, p. 615) as well as to ensure that teachers are "continuous learner[s] who reflect on practice" (Darling-Hammond & Snyder, 2000, p. 529).

Portfolios are generally categorized according to their purposes: for instance, as process, showcase, or assessment portfolios (Abrami & Barrett, 2005). Process portfolios represent the learning transformations that the student has gone through. Showcase portfolios emphasize the student's goals and achievements, and assessment portfolios are geared towards evaluation and grading of the student's work. Casting the issue another way, Cambridge (2001, 2010) categorized portfolios as having primarily two perspectives: they can be about the "individual," and/or they can be about some "institutional standard" against which the individual is being evaluated. While the two perspectives are frequently viewed as mutually exclusive and contradictory (Barrett & Carney, 2005), Cambridge (2010) drew on the history and philosophy of western education to resolve their opposition and show their close relationship. In the decades after their adoption in education, implementations of the portfolio method have involved various combinations of these purposes, making it generally difficult to define the approach as a single pedagogical technique. For the most part, however, whether or not the goals are contradictory, the aim of portfolios (and, by extension, ePortfolios) has been to allow students to develop reflective self-assessment skills, and to allow evaluators to have access to authentic student work for assessment.

Having evolved in close parallel with the growth of digital technology, portfolios have, not surprisingly, evolved into ePortfolios. While the core components of the portfolio have remained focused on the original objectives of collecting artifacts, promoting self-reflection, and providing authentic assessment for students, teachers, and educational institutions, as occurs with the introduction of any new technology, the evolution from paper-based portfolios to ePortfolios has added new dimensions to the original purpose. Cambridge (2010) listed "multimedia and hypertextual evidence" (p. 200), annotation, visualization, and "scaffolding learning processes" (p. 199; including "distributed scaffolding," p. 209) among the potential

benefits of ePortfolios as the capabilities of digital technology continue to evolve.

Method

Course Context

Our teacher education course, Teaching Foreign Languages, is a required course for all first-year MA and PhD students in our department, which they take concurrently while teaching Spanish, Italian, or Arabic language courses for the first time at our institution. Most of the graduate students in this course have never taught before, and so our course is designed to address the immediate concerns and challenges that they may encounter during their first semester of teaching. One of the main goals of the course is to provide graduate student instructors (GSIs) with numerous opportunities to observe and apply new ideas and teaching principles through practical activities and to develop their own personal theories of teaching through systematic reflection and experimentation. Through engaging in course activities, graduate students will come to see themselves as competent and confident teachers, will understand the value of ongoing teacher development, and will be able to identify appropriate resources and tools to support that growth. Course activities include in-class discussion, teaching observations, reflective essays, an action research paper, research presentations, and a teaching portfolio. These activities are designed to support teachers as they externalize and reshape prior conceptions about teaching and learning through socially mediated activity and as they appropriate new ways of thinking and contribute to a community of practitioners.

Population

Students. The teacher education course typically enrolled 12 to 27 graduate students. In any given year, two to four of those would be PhD students in Spanish, while the rest would be MA students in Spanish, Italian, or Middle Eastern Studies. The student population was diverse, with most students coming from the US but others from Europe, Latin America, or the Middle East; their ages ranged from 22 to 45. While taking our teacher education course, the Italian MA students taught one section of Elementary Italian, the Middle Eastern Studies MA students taught one section of Elementary Arabic, and the MA and PhD students in Spanish generally taught two sections of Intermediate Spanish.

Instructional team. The instructor of this course, Emily Scida, was also the director of the Spanish and Italian Language Programs at the University of Virginia. She coordinated the beginning and intermediate Spanish and Italian language courses, trained the GSIs, and supervised the 35 to 40 GSIs and lecturers who taught these courses. Each GSI taught one or two sections of beginning or intermediate Spanish or Italian each semester, totaling approximately 75 sections of beginning and intermediate Spanish and Italian offered per semester; about 1,600 undergraduate students were enrolled in these courses per semester. Spanish GSIs who have advanced in their degree program may teach upper-level language and literature classes. All GSIs in Spanish and Italian had full responsibility over the entire course—they taught six hours a week, prepared their own daily lessons and practices, created exams, assessed students' progress, and held office hours. The director was responsible for the selection of the textbooks, the creation of course syllabi, and the supervision of the teachers of the beginning and intermediate levels. In addition, her duties included teaching the teacher education course every fall semester.

The faculty consultant in instructional technology, Yitna Firdyiwek, had been in his position since 1997. He had coordinated a Teaching + Technology Initiative, a program that funded faculty-driven projects in instructional technology focusing on undergraduate teaching. His position involved working with faculty to identify technology integration questions that are worth exploring, developing attainable goals, drafting budgets, and assisting with effective and sustainable management of the project beyond the development stage. He focused on designing solutions from the instructor's point of view, by which is meant an approach that takes the instructor as the lens through which the needs of all of the course's stakeholders (e.g., students, administrators) are addressed. The approach combined technology integration and faculty development in an effort to achieve a critical and reflective engagement with technology for pedagogical purposes. E-folio, the portfolio-based course management system used in this project, was designed by him with this broad perspective in mind.

Over many iterations of this course, we collaborated as a team in designing the course and learning activities, considering the alignment of new technology integration with our course goals and rethinking changes for the next course offering. We both delivered the classes, although the instructor was the primary classroom presence, and we both consulted with students outside the classroom on technology and content matters. This team-based approach supported significant curricular innovations with every offering of the course in a collaborative cycling from one year to the next. The collaborative process allowed us to:

- maximize our resources without burdening one or the other of us in the process;
- engage in, and model for the student teachers, our own reflective approach in the scholarship of teaching;
- document and maintain a history of the course from multiple perspectives (student/teacher, technical/pedagogical); and
- develop the "portability" of the course to enhance sharing of the curriculum as well as results of our investigations.

As indicated by Bass (2012), the team-based approach to curricular design leverages resources more efficiently while refocusing course design on promoting learning and freeing the course from dependency on a single instructor.

Three Course Redesigns

First redesign: Use of best practices video archive. The goals of the Teaching Foreign Languages course included enabling GSIs to apply theories and methods to their own classroom teaching and instilling in them a lifelong habit of teaching improvement and documented professional development through critical thinking and self-reflection. A challenge common for teacher education courses is that student teachers often feel disillusioned by the perceived irrelevance of theory and research on teaching to the immediate challenges and problems they face as first-time teachers. This is the difficulty in teaching such a course—how to address practical and immediate teacher concerns and, at the same time, help GSIs understand the relevance of methods, approaches, and theories to their own classroom teaching. Prior to the first course redesign described below, GSIs engaged in reflective activities that asked them to observe an experienced teacher and then reflect on the teaching event in a reflective essay, meaning that each GSI observed a different teacher. Our experience at that time was that many teachers did not delve deeply enough in their analysis of their own teaching, the application of new ideas and materials, or their observations of other teachers. Studies have suggested that novice teachers tend to focus their reflections initially on classroom management, teacher behaviors, and survival concerns, rather than on student learning (Davis, 2006; Gebhard, 1999). The fact that each GSI observed a different teacher for such assignments added to this problem—it did not allow us as a class to engage together in a focused, detailed, and critical analysis of the observed lesson during class time.

Our hope is that GSIs will think beyond teaching tips and focus on the attainment of student learning outcomes in their courses—in other words, away from questions like "How do I teach this material/skill?" to questions of "Why is this technique/activity effective in helping students learn this material/skill?" so that GSIs can appropriate the tools necessary to make informed teacher decisions in new contexts. Richards (1995) broached this same dilemma: "How can teachers move beyond automatic or routinized responses to classroom situations and achieve a higher level of awareness of their teaching skills, and of the value and consequences of particular instructional decisions?" (p. 59). Our conviction is that we can support new teachers make this transition through activities that help them apply the research and theories they are learning about in our education courses to authentic teaching situations.

In the first course redesign cycle, we sought to offer these opportunities through the online delivery of models of best practices in teaching and subsequent teacher reflection, with the following goals in mind: application of theory and research to practice; improved critical thinking and reflection; accountability and improved quality of work through an online public forum; and collaboration and peer learning. These curricular goals were achieved through two technology implementations: (1) the integration of a video archive of teaching clips, and (2) the creation of a web-based collaborative writing framework using E-folio, which allowed the students to view and comment on each other's work.

Technology. E-folio was originally conceived as an electronic performance support system (EPSS), an approach to software design that allows for the creation of support systems with a high degree of integration between "information, tools, and methodology for the user" (Gery, 1991, p. 34). The goal for E-folio was to help instructors apply the principles of the portfolio method of teaching and assessment in a digital environment. Following the EPSS guidelines, the main features of E-folio, which grew out of successive iterations, consisted of:

- a multimedia document management system;
- a commenting system that can be attached to any multimedia document;
- a video archiving and editing system;
- an instructional feedback and assessment system; and
- a process for selecting artifacts and generating individual and course portfolios.

Using E-folio, instructors could assign work to students, have students exchange and comment on each other's work, and provide students with feedback. Once students had done all of the required work, they could select the items they wanted to include and submit their portfolio for review. Following a review, the reviewer has the option simply to return the work or to publish it,

in which case the system would generate a portable format of the portfolio for the student. Figure 1 shows the three main panels in E-folio: Activities, where students post their work including discussion boards, assignments, video clips, and portfolio; Class Space, where students can view and search class postings and portfolios; and, Instructor, where the instructor can create assignments and publish student portfolios, among other functions.

In addition to the principles of the portfolio method of teaching, as articulated primarily by Elbow and Belanoff (1986), the design of E-folio is also influenced by the works of Spiro and Jehng (1990), whose research in cognitive flexibility theory and learning in "complex and ill-structured domains" (p. 167) of knowledge informed the design of E-folio's interactive video editing capabilities. Spiro and Jehng (1990) pioneered the exploration of computers for what they termed "random access instruction" (p. 165), in which the computer's capacity for reconfiguring information (e.g., connecting different clips from a video) is leveraged to help students make connections and draw conclusions at advanced levels of instruction. Learning how to teach foreign languages presents just such a problematic knowledge domain involving complex concepts that require varied and multiple perspectives. Much as Spiro and Jehng (1990) did with hypertext searching and retrieval of film clips from laser disks to support students writing analytical essays, E-folio provides our GSIs with tools for working with video clips that are accessed selectively from streaming sources and for embedding them in web-based hypertext documents.

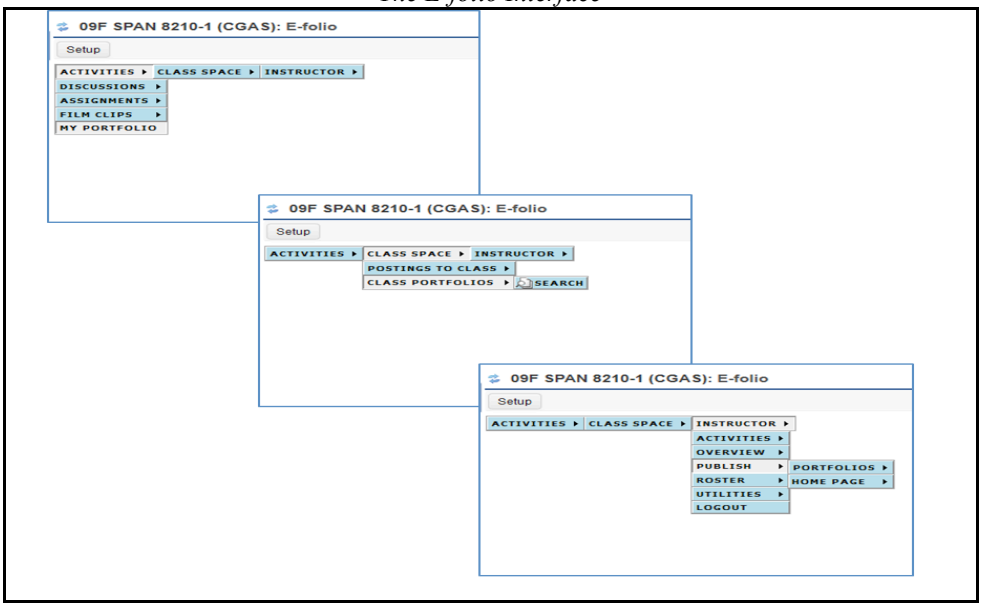
In this course redesign project, funded through a University of Virginia Teaching + Technology Initiative Fellowship, the instructor videotaped the classroom teaching of 15 experienced GSIs, lecturers, and faculty teaching different levels of Spanish and Italian courses in our department. We hired a graduate student to compress the video files and add hinting (to allow the finding of specific segments in the video). The videos were then uploaded onto a streaming server and accessed through E-folio. At this stage, the videos were accessible only to the instructor, who edited short clips that tied in with specific learning units of the course. The archive of complete lessons and short video clips was then made available to the class as a whole, who could also view them through E-folio.

This video archive was used as a means to bridge theory and practice in our teacher education course. Short clips that would work well with the units of the course were selected and uploaded onto our E-folio course website, where GSIs viewed the clips and reflected on them in an online essay. For example, for the unit on Teaching Vocabulary, GSIs viewed three short video clips of an experienced teacher teaching vocabulary and then responded in a reflective essay, guided by questions that helped them link the course readings to the video, and posted their essays on E-folio, where others could read and respond using the comment feature. In Figure 2, we see the archive of video clips, the preselected video clip open for an assignment, as well as the window displaying the assignment prompt for the reflective essay. In some assignments, GSIs were asked to select other videos from the archive to watch and to edit a short clip that represented for them best practices in that particular category (e.g., Teaching Vocabulary). Figure 3 shows the video-editing tool in E-folio and the video embedding process. In a subsequent semester, students responded to the model clips in a threaded discussion format. Viewing the preselected clips allowed us all to observe the same teaching event outside of class time and, together, evaluate in-depth the effectiveness of specific teaching techniques, practice activities, and classroom interactions that we saw in the video clips. Figure 4 summarizes the tools in E-folio that were used in the first redesign of the course.

Second redesign: Video and self-reflection. While the first course redesign was successful in bridging theory and practice, we still felt that many times, levels of reflection and analysis in assignments did not reach beyond a superficial level. The video archive was effective in delivering models of best practices of experienced teachers, but we wondered whether the use of video could enhance teacher learning even further. Our goal was to consider new ways of engaging GSIs to promote deeper levels of reflection and self-analysis. Video facilitated reflection on others' teaching, but could GSIs turn the video on themselves this time around to engage in meaningful self-reflection? We discovered that research on K-12 teacher education reported positive results on teacher learning from the integration of video annotation, editing, and self-videotaping (Geyer, 2008; Preston et al., 2005; Rich & Hannafin, 2008; Rosaen et al., 2008; van Es & Sherin, 2002; Yerrick et al., 2005). With the emergence of FlipCams, an inexpensive and easy-to-use pocket video camera, we were inspired to experiment with a new solution.

Studies have reported improved quality of teacher reflection in activities that incorporated videotaping and video editing and annotation (Preston et al., 2005; Rich & Hannafin, 2009), and so we carefully considered how these tools might be incorporated into our course. Many of the benefits of video integration described for the video archive of best practices apply here, as well. For example, video allows the teacher to view and replay the lesson multiple times and at his or her own pace, noticing details and different aspects of the teaching event each time. The availability of the recorded lesson also allows for some distance in time from the event, allowing the teacher to view the lesson from a more

Figure 1
The E-folio Interface



Note. This figure shows the three main panels in E-folio.

Figure 2
The E-folio Video Archive With a Sample Clip Open

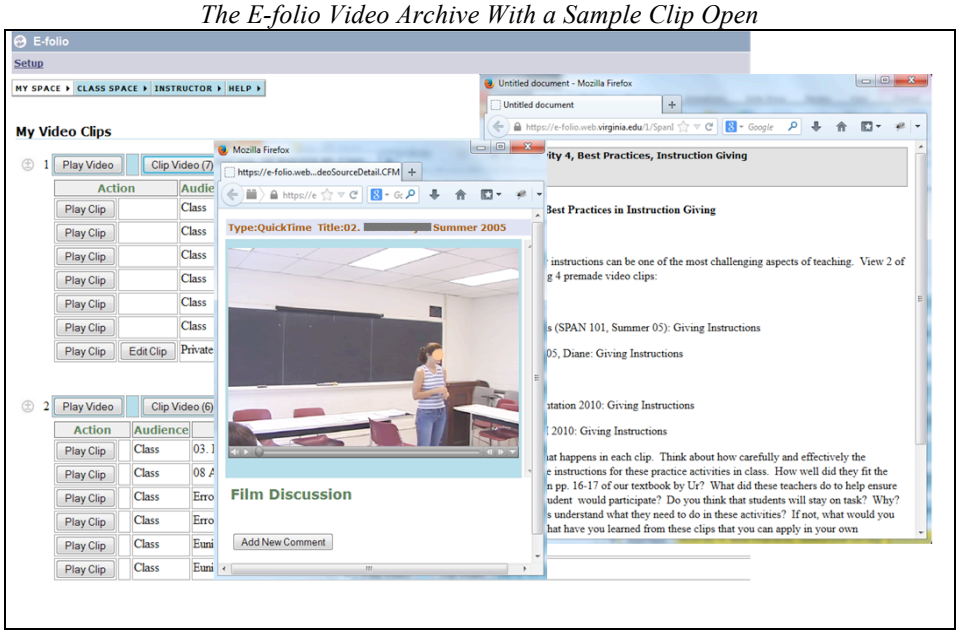


Figure 3

Video Editing Dashboard and the Screen for Selecting and Embedding Video Clips

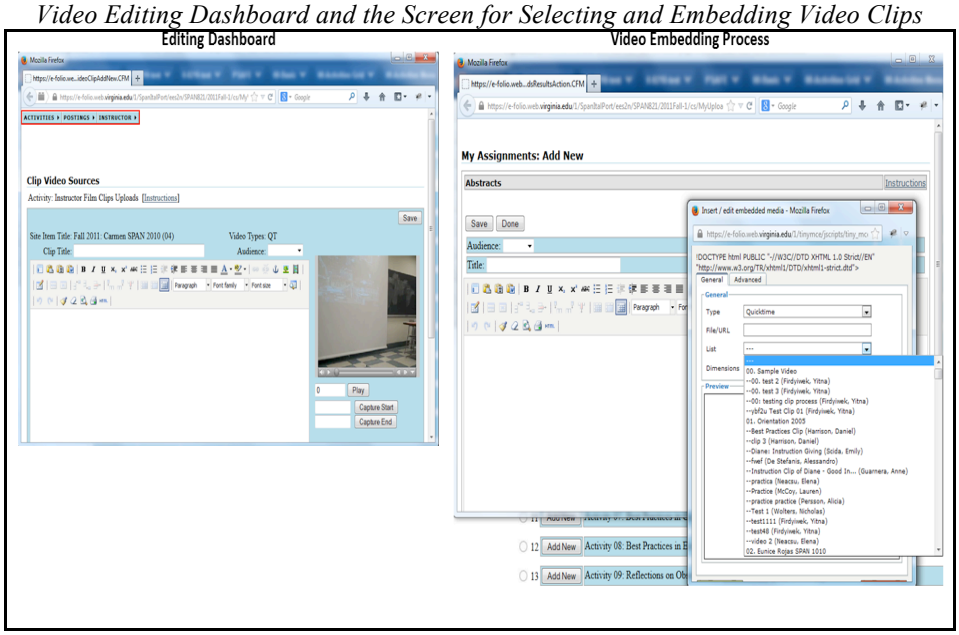
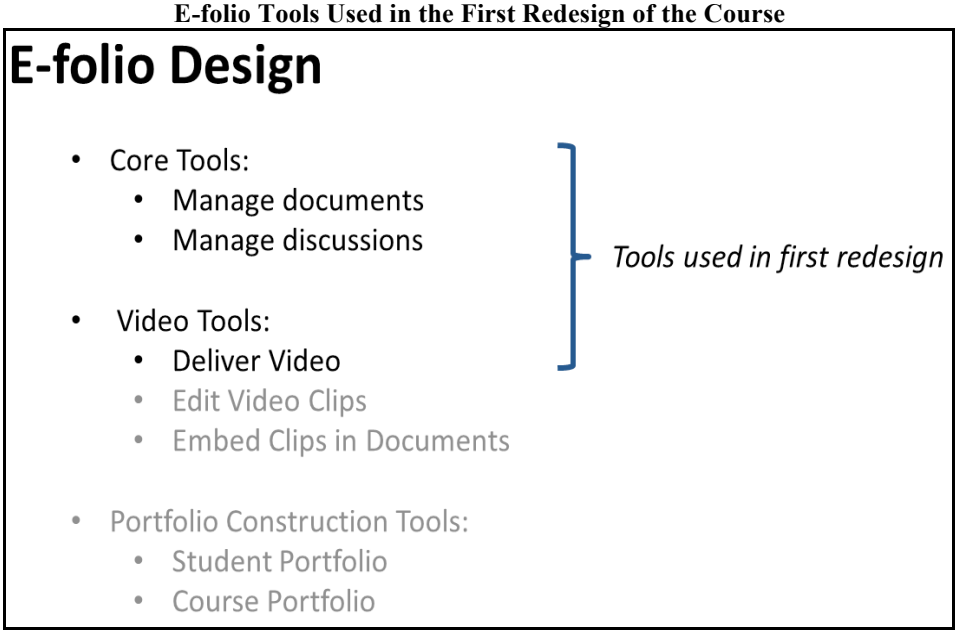


Figure 4

E-folio Tools Used in the First Redesign of the Course



objective viewpoint and without the pressure to act or react at the moment of teaching. The ability to view the videotaped lesson repeatedly and as an objective viewer could contribute to more nuanced and meaningful reflections. In addition, video invites opportunities for sharing, collaboration, and participation in social reflection with peers, expanding the structures of learning to include peer mentoring, peer learning, and participation in a community of practitioners.

Technology. GSIs borrowed FlipCams from the instructor or from the Language Lab to videotape their own classroom teaching. Once finished, they submitted the FlipCam to the instructor, who then uploaded the video segment onto her computer. The video was then compressed, uploaded to the server, and placed as a streaming video onto our course E-folio site by either the instructor or faculty technology consultant. Video editing and embedding were done by the GSIs directly

in E-folio, where all videos were archived and all reflective assignments were submitted. The video management process for the second redesign is summarized in Figure 5.

In this iteration of the course, GSIs engaged in video reflection through two types of assignments (Scida & Firdyiwek, 2013). The first new assignment promoted both self- observation and peer observation through video. GSIs self-videotaped their classroom teaching and then reflected on the teaching event in two stages—first based on memory alone and then again after watching their videotaped lesson, comparing and contrasting the advantages and disadvantages of self-reflection based on memory and video-based reflection. On E-folio, GSIs watched their entire videotaped lesson and selected and edited short clips that demonstrated significant teaching or learning moments for them. GSIs shared these clips in our online video archive and embedded selected clips directly into their online reflective essays, as visual evidence for the arguments made in their writing. At the end of their essays, GSIs posed questions for their peer reviewer. The peer reviewer read the essay and watched the embedded video clips and then responded to the GSI's questions in the comment box.

The second new use of video reflection occurred in students' action research papers. Although the assignment itself was not new to this iteration of the course, the integration of video was new. The action research paper allows GSIs to investigate a teaching concern or interest from their own classroom during the course of the semester, posing research questions, developing a plan for addressing those questions, gathering and analyzing data, and evaluating the results of the research experiment. This time around, the data included self-videotaped lessons that the GSIs viewed, edited, and embedded directly into their research papers as evidence for ideas or arguments. As with all other assignments, the research paper was submitted and shared online, where the peer reviewer read the work and viewed the embedded clips, offering comments in the comment box. These technology implementations were intended to result in deeper levels of reflection, meaningful collaborations, and social reflection (Scida & Firdyiwek, 2013). Figure 6 displays those tools within E-folio that were used in the second redesign of the course.

Third redesign: ePortfolios and self-reflection. While we had encouraged use of all features of the E-folio throughout the first and second iterations of the course, it was not until the third redesign that we focused on a complete integration of the portfolio process in which we tried to bring together the pedagogy and the technology, emphasizing holistic reflection on learning through the affordances of the ePortfolio. Figure 7 shows those tools in E-folio that were used to achieve these goals in the third iteration of the course.

The third technology implementation in this course redesign was the creation of online teaching portfolios, in which GSIs reflected on their development as teachers during the course of the semester, and of final ePortfolios, in which, at the end of the course, GSIs reflected on their own reflection and on the portfolio process. The primary goal of the teaching portfolio was the documentation by GSIs of their improvements, successes, and challenges during their first semester teaching, providing them with a mediational space to externalize and reshape their knowledge about teaching and learning and to appropriate new tools for continued development. The writing of the various reflective essays and final research paper that were included in the teaching portfolio was intended to promote learning goals such as critical thinking and self-reflection and application of theory and research to one's own teaching practices, as described above. The use of the online forum for the portfolios was intended to result in improved quality of student work, peer learning and collaboration, socialization to the teaching role, and professional preparation (Austin, 2002; Bellows, 2005).

The teaching portfolio included standard documents, such as a statement of teaching philosophy, as well as reflective essays on the video clips viewed online, teaching observations, and participation in teaching workshops. In addition, GSIs created lesson plans and new materials for use in their own teaching that corresponded to the units studied in the course (e.g., teaching vocabulary). These materials were shared with the other teachers in the course and in the department, on the E-Folio website. The project unfolded in stages: first, we used static clips with threaded discussions and basic teaching portfolios. Then we moved towards building a dynamic archive of videos that allowed GSIs to browse and view teaching videos and embed video clips directly into documents, which provided for a more robust portfolio. We found that the sharing of ideas through both the reflective essays and the creation of teaching materials online contributes to the socialization process experienced by GSIs as they begin to understand their role as members of a teaching community (Austin, 2002).

Data Collection and Analysis

To measure the effectiveness of each course redesign, we collected the following data sources: students' reflective essays, final action research papers, teaching portfolios, anonymous course evaluations, and anonymous online surveys. We analyzed the data for students' statements about their learning through reflection (individual, social, and holistic), on the effect

Figure 5

Videotaping and Archive Management Process Involving GSIs, Instructor, and Technology Advisor

1. Videotaping -- by Graduate Student Instructor
2. Video compression and "hinting" added for streaming – by Instructor, or Technology Advisor
3. Video uploaded to streaming server – by Technology Advisor
4. Video added to *E-folio* – by Instructor, or Technology Advisor
5. Video clipped and used in documents – by Graduate Student Instructor

Figure 6

E-folio Tools Used in the Second Redesign of the Course

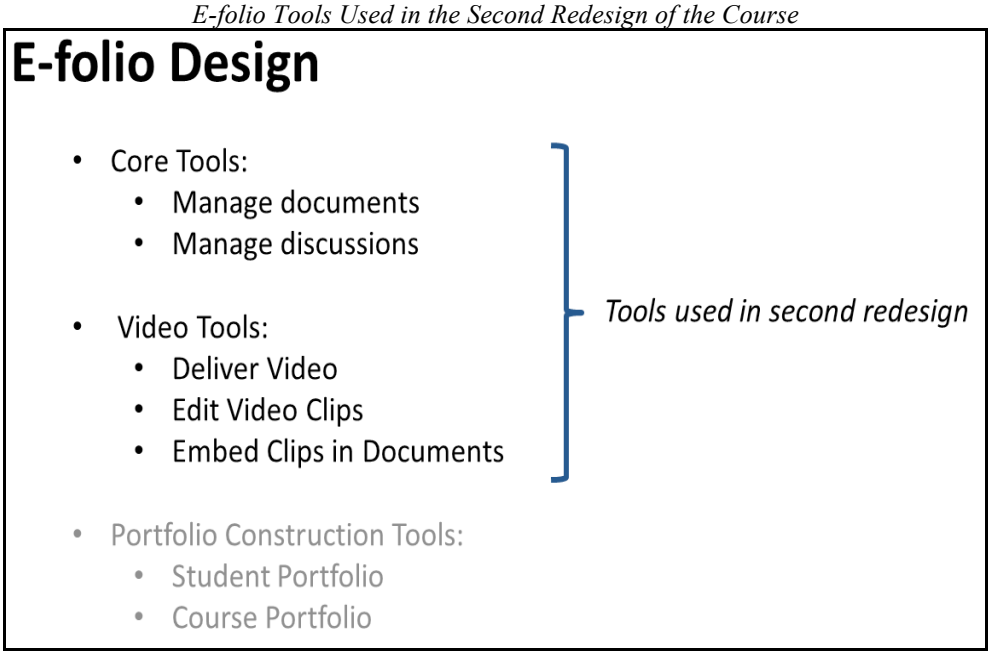
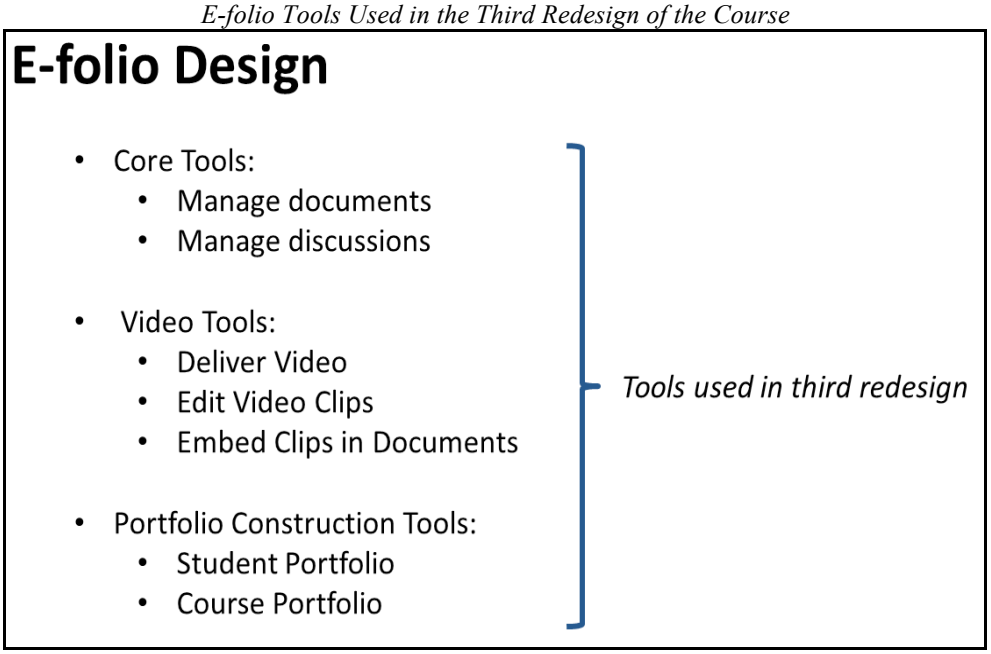


Figure 7
E-folio Tools Used in the Third Redesign of the Course



of the use of video tools and of E-Folio on their development, as well as their reactions to the technologies. We examined the data for evidence that each course redesign had achieved or not achieved the particular goals of that iteration. We used the results of the data analysis of each iteration to rethink the interplay between technology and pedagogy and to develop new course design objectives based on the successes and failures of the prior course iteration.

Results

First Course Redesign

The goals of the first redesign were to bridge theory and practice in teaching and to support the application of theory to the GSI's own teaching practices, through a video archive of best practices. The benefits of observing the classroom teaching of other teachers (in person or on video) are numerous. Richards (1995) noted that "peer observation exposes teachers to different teaching styles and, at the same time, provides them with opportunities for critical reflection on their own teaching" (p. 60). In having everyone "observe" the same teaching event (through an online video clip), GSIs were able to contribute to more thoughtful and meaningful discussions during class time, and the critical analysis of the classroom events (of the clip) was much improved from prior semesters. Not only were GSIs better able to make connections between theory and practice, but they could also apply research and readings to a real teaching situation. One GSI noted: "I thought that the clips were especially useful because they targeted one specific teaching area, which coincided with what we were reading outside of class and discussing in class."

As models of best practices in teaching, the clips served to inspire self-reflection about one's own teaching effectiveness by providing new ideas for teaching techniques, material use, or problem solving. The video clips prompted the following teacher to think more critically about his approach:

> I think the most important lesson I received from viewing this clip is that it made me evaluate my grammar presentation method . . . Therefore, I believe the take-away lesson here is that every good lesson plan needs to have a balance of inductive and deductive approaches in order to assure that all students can benefit.

In many cases, the video clips provided models of approaches or techniques that GSIs could appropriate into their own classroom teaching:

> I think that something I could learn from these clips is to always be aware of the way in which I correct students, so that I can make sure that they will learn from their mistakes. It doesn't help to correct students if they continue to make the same mistakes over and over again, so the correction techniques I use should be ones that will teach

> them the reason why they made the mistake in the first place and show them how to fix it both in that specific case and in the future.

The use of video clips makes it easier to give GSIs multiple examples of teaching practices for the benefits outlined above. Hansen (1990) noted that new teachers "need to see a large variety of models in order to build a repertoire that allows them to develop a sense for subtle differences" (p. 19).

One of the benefits of the online forum is that it provides a medium for both observation and reflection—the clips allow GSIs to observe a certain aspect of teaching, practice it in their own classroom, and reflect on its effectiveness (Hansen, 1990). For some GSIs in the course, the video clips motivated interest in a particular topic for their action research paper. GSIs also benefited from the peer learning involved in the sharing and viewing of teaching events by other teachers in the program. The commenting feature of E-Folio allowed GSIs to read and respond to each other's reflections on the clips and to consider other points of view on the same teaching event, fostering social reflection. It has been suggested that reflection is both an individual and social process, and that social interaction may promote deeper reflection (Hansen, 1990; Lord & Lomicka, 2007). The online forum used here afforded GSIs an opportunity for continued discussion outside of class time. In addition, the reflective writing associated with viewing the clips encouraged GSIs to watch the clips repeatedly and at their own pace in order to respond to the writing prompt thoroughly: "The reflective writing caused me to watch the clips many times to be sure I was extracting as much as I could from them."

GSIs noted both the advantages and disadvantages of video-based teaching observation versus in-person observation. While video observation was more convenient, less time-consuming, and more helpful in stimulating critical reflection on a specific aspect of teaching that corresponded to course readings, potential drawbacks of the video clips included limited analysis and limited observer view. Another remark pointed to the value of whole-class viewing and discussion of the video clips to further the analysis during class time, continuing the online reflection into the classroom. At the end of this iteration of the course, we reflected carefully on these and other student observations and responded to them by implementing changes in subsequent offerings of the course. For example, in subsequent semesters we included both direct observations and video-based observations in reflective assignments. In response to student observations about the value of in-class reflection, we added video clip viewing during class time to generate whole class reflection.

Looking back, we concluded that this course redesign was successful in helping GSIs see connections between research on teaching and learning and real classroom practices. The technology implementations—the video clip archive and E-folio site—effectively supported this pedagogical goal by making theory and teaching approaches come to life. In addition, viewing the video clips prompted GSIs to make comparisons between techniques that they saw in the videotaped class and their own personal classroom techniques, and E-folio successfully supported their self-reflection and critical analysis. While we were satisfied with the interaction of pedagogy and technology at this stage, we concluded that levels of student reflection could be improved. In our next course redesign, we aimed to address this concern.

Second Course Redesign

Our goal in the second redesign was to consider new ways of engaging GSIs to promote deeper levels of reflection and improved self-analysis, in both individual and social reflection. Data gathered from teachers' reflective essays in this iteration demonstrate that GSIs were able to engage successfully in self-reflection and social reflection with their peers, through self- and peer video observation. In the video self-observation activity, GSIs noted the benefits of observing their own teaching on video, which allowed them to notice facets of their teaching or classroom dynamics that they otherwise could not and inspired them to appropriate new ways of thinking about their teaching decisions. In the following excerpt, video has prompted the teacher to reflect on himself—his actions, behavior, and decisions in the classroom:

> After watching this video, I am aware that I spent far too much time drilling in the repetition of verb forms. While it is important to memorize the conjugations of verbs, my lesson would have been much better if I have used the verbs in the context of a sentence that communicated their definition and how they are used. Instead of spending lots of time eliciting repetitive conjugations from the students, I should have spent more time with communicative activities.

In this iteration of the course, the online discussion component became more prominent, as GSIs read and commented on each other's video-based reflections, engaging in self- and peer observation. In comparison to the best practices reflection, where the focus was on another teacher, this time the focus of the reflection was the GSIs themselves. To promote more substantive discussion online among peers (social reflection), we asked GSIs to pose questions at the end of their reflective essay for their peers to

respond to in the comment box. The following excerpt from a reflective essay demonstrates the beginning of the collaboration between GSI and her peer as she poses questions for her partner:

> The second teaching issue that I describe here was also noted by a peer observer of my class. Here, while monitoring a grammar activity I walk around the class to monitor the activity. The problem is that it is a passive monitoring of the class. I help the students who ask for help, but fail to check in with all of the students to see if they are on the right track. I am wondering if it is necessary to check in with all students? When I do check in, how do I decide which errors to correct? Is complete accuracy necessary for learning?

The video reflection and the use of the comment box embedded in each reflective essay prompted meaningful and valuable exchanges between GSIs and resulted in collaborations in tackling common problems, sharing ideas, peer mentoring, and social reflection. The availability of the online forum allowed teachers to continue to dialogue on teaching matters outside of the course and the work environment. In the comment in Figure 8, the GSI references her partner's video and then offers support and advice.

In their action research papers, GSIs were able to use embedded video clips as evidence or support for their ideas, making the research paper come to life for the author and the reader. The following excerpt comes from a teacher's research paper:

> In the next step you will see another video clip of [group 2] working on the exact same exercise in pairs. The [group 1] students in this clip are successfully completing the exercise they have been assigned but the difference in the two clips is striking. It is actually hard to believe that the two groups are working on the same thing . . . The volume of language here is higher than during the rest of the lesson but still very low relative to G2's lesson.

As we can see from teacher reflections, video brought to life aspects about their teaching and classroom dynamics that they may not otherwise have noticed and opened up opportunities for peer collaboration, sharing of ideas, and social reflection to establish an online community of practitioners.

Reflecting on this course redesign, our primary objective was to promote deeper levels of reflection and more substantive discussions and peer interaction. The technology implementations—self-videotaping, editing, and embedding—allowed GSIs a window into their own teaching practices and also supported more detailed, specific, and meaningful self-reflections. The E-folio site again supported this reflection, as well as peer interaction and social reflection, and gave GSIs all the tools they needed for video editing and for embedding and posting and sharing of written work. We saw that these technologies supported individual and social reflection effectively, and in our next course design iteration we asked whether these same tools might help GSIs appropriate reflection on reflection—holistic reflection on their reflective work as well as on reflection as a tool for continued professional development.

Third Course Redesign

Moving from individual and social reflection in the first two redesigns, the primary goal of the third course redesign was holistic reflection—the documentation of and reflection on the teacher's improvements, successes, and challenges during his or her first semester in teaching, as well as reflection on reflection as a tool and on the portfolio process. Results of the data collected in this iteration were positive. GSIs noted that the reflective work prepared for inclusion in the portfolio prompted critical thinking about their own teaching practices, providing them with a mediational space to externalize and re-conceptualize their knowledge about language teaching and learning:

> Integral to this growth has been the continual process of reflection and self-evaluation that is documented in this portfolio. This process has allowed me to examine my motivations and values as an educator in order to make more informed decisions in the classroom.

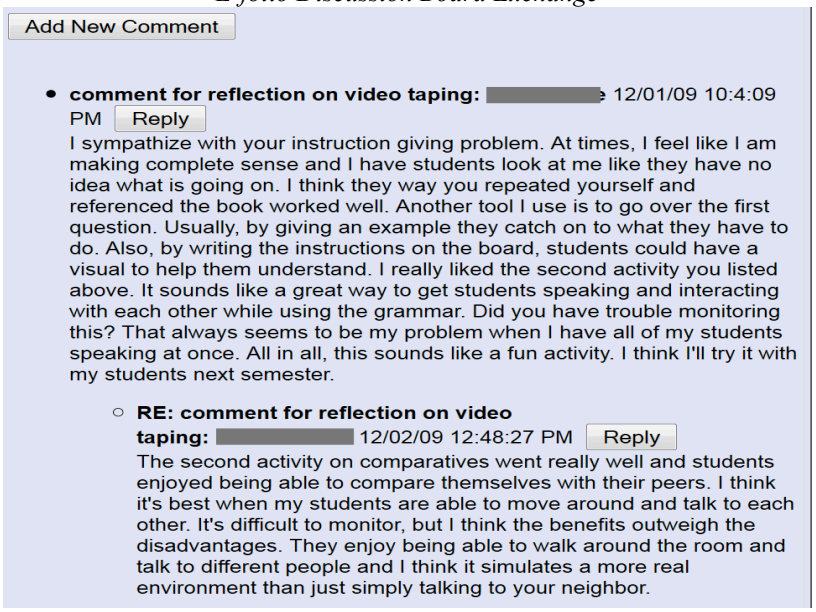
In addition, they recognized the impact of reflection as a process and tool that they can take beyond the course to further their professional development:

> This portfolio serves as a tool for me to use as I continue my career as a teacher. I believe that each part of my portfolio functions as an important piece in the overall picture of what I have learned this semester.

The online forum used for the teaching portfolios promoted peer learning and collaboration, socialization to the teaching role, development of professional identity, and participation in a community of practitioners:

> Making this teaching portfolio afford[ed] me an opportunity to reflect on my teaching style in a comprehensive manner. This experience has been a great tool for self-analysis. Besides, one of the most important aspect of doing this portfolio was the systematic exchange of ideas with other educators.

Figure 8
E-folio Discussion Board Exchange



As Bass (2012) stated, "e-portfolios can be powerful environments that facilitate or intensify the effect of high-impact practices. As tools of integration, they also help students make connections and think about how to present themselves, their work, and their learning to an audience" (p. 30). With the development of ePortfolios online, GSIs could more easily access, share, and evaluate each other's teaching materials, generating a true collaborative community of teachers and allowing them to engage in reflection as a social process. In addition, GSIs took greater responsibility for their own teaching improvements, and their quality of work was improved because of the public nature of the online collaborative medium (Hatton & Smith, 1995; Lord & Lomicka, 2007; Shoffner, 2008). In designing new course materials for use in their own teaching, GSIs focused on improving student learning outcomes in their courses. Finally, the portfolio served to document ongoing professional development, with concrete evidence of teaching improvement, reflection, and learning, a document that will serve them well when on the job market or for tenure and promotion (Seldin, 2003). It is our hope that the ePortfolio, with reflection on reflection and on the portfolio process, will extend beyond the teacher education course, becoming a life-long habit of self-reflection and experimentation for each GSI, with the ultimate goals of more effective teaching and improved student learning. In this third redesign, GSIs leave the course with a product—their teaching portfolio saved and downloaded to a CD-ROM—for future development. In the end, the process of creating a teaching portfolio helps GSIs to situate themselves as members of a community of practitioners and to articulate their own attitudes and beliefs about teaching and learning (Austin, 2002; Bellows, 2005).

Discussion and Conclusion

Preparation of future faculty should address graduate students' need for experimentation and reflection on teaching and learning, as well as socialization to their new roles as teachers and scholars, through engagement in authentic activities and contexts. The integration of instructional technologies into a teacher education course can provide the mediational space to promote these objectives in the following ways. First, reflective writing in an online forum creates an environment for individual as well as social reflection, while the creation of a teaching portfolio allows for holistic reflection on teacher learning. By collaborating and sharing reflections, ideas, and materials online, GSIs contribute to an online community of teachers. The act of participating in social reflection promotes deeper critical thinking about one's own teaching practices and exposes one to a variety of views and ideas (Hansen, 1990; Lord & Lomicka, 2007).

These technology integrations and the creation of online portfolios both contribute to teacher preparation

and ongoing professional development and also expose future faculty to the benefits of traditional and innovative technologies that will inform their own decisions about instructional technology use in their classes. The reflective activities and technological tools that teachers appropriate to advance their own development could be leveraged to support student learning in the courses that they teach: an online learning portfolio could create the mediational space for individual and social reflection, collaboration and peer learning, and the creation of a community of learners, whether in foreign language courses or in other disciplines that emphasize holistic learning.

In our course, the trajectory of curricular focus on individual, social, and then holistic reflection has been prompted by both innovations in technologies and shifts in the teaching/learning paradigm and changing curricular goals. In the first redesign, an archive of video clips was integrated to bridge theory and practice in teacher reflections. The success of this implementation and the emergence of FlipCams prompted us to take videotaping one step further in the second redesign, incorporating self-observation through video to support deeper levels of teacher reflection and social reflection. In the third redesign, we asked whether these tools could foster holistic reflection on learning through the affordances of the ePortfolio. As Bass (2012) stated,

> The team-based model asks not only how . . . instructional experts might collaborate with faculty on a new design but also how some of them [e.g., academic and IT support staff] might play a role in the delivery of the course so that not all of the burden of the expanded instructional model falls on the instructor. (p. 32)

The three iterations of the course were the result of the dynamics of reflective, team-based course design, where each of us brought our expertise to work toward instructional goals we held in common.

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Using ePortfolios to Assess Program Goals, Integrative Learning, and Civic Engagement: A Case Example

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Providing opportunities to foster students' civic engagement during their undergraduate education is a goal of many universities. There are a variety of ways in which students participate in community service and in community change efforts and social change initiatives; capturing how students integrate these experiences into their broader learning goals can help both students and educators to understand better the impact of civic engagement programs on educational outcomes. ePortfolios are one method being used to assess this type of integrative learning and the transformative civic engagement experiences involved. Using a case example of an interdisciplinary undergraduate minor focused on community action and social change, this paper draws on an analysis of 51 ePortfolios completed by students in the capstone class for an Interdisciplinary Community Action and Social Change Minor to demonstrate how ePortfolios can be used to assess individual student outcomes related to civic engagement, as well as to provide input about program impact.

As a growing body of literature indicates, ePortfolios enable students to reflect critically on their learning and provide a basis for administrative and program assessment in a variety of fields (Clark & Enyon, 2009; Peet et al., 2011; Ring & Ramirez, 2012). To date, however, there are few documented case examples of how programs focused on social justice and civic engagement can use ePortfolios to evaluate and understand student outcomes. Using ePortfolios to assess themes of engagement and social justice is an especially promising practice for fields such as social work, education, public health, and other schools or disciplines that engage social justice concepts in their missions (Fitch, Peet, Glover, & Tolman, 2008). This paper adds to the growing literature and case documentation of the use of ePortfolios for critical reflection and student learning by examining their use in assessing civic engagement and integrative learning outcomes in a social justice minor within a school of social work.

Using a case example of an interdisciplinary undergraduate minor focused on community action and social change, we demonstrate how ePortfolios were used for assessing individual student change related to civic engagement as well as for providing input about program impact and outcomes. We present the themes that emerged from an analysis of 51 ePortfolios completed by students who participated in the minor and discuss how these themes contributed to understanding the impact of the minor on individual students and on the program's goals related to civic engagement. We conclude with lessons learned from incorporating ePortfolios as an assessment tool for capturing integrative learning within transformative civic engagement education.

ePortfolios for Integrative Learning and Program Assessment

Over the past few years, electronic or ePortfolios have emerged as a useful tool for assessing both individual student change over time and program impacts (Buyarski & Landis, 2014; Fitch et al., 2008). As Clark and Eynon (2009) noted, ePortfolios allow students to collect, select, reflect, and connect learning that has occurred in classroom settings and in activities outside the formal classroom (e.g., volunteer experiences, leadership experiences, civic engagement activities). Students who develop ePortfolios identify a *collection* of learnings from various domains (e.g., classroom, volunteer experiences, and work settings), they *select* particular learnings that they want to examine in more detail, and they *reflect* on the specific learning experiences to uncover the tasks and skills developed. Finally, they *connect* the learning to their future goals. Reflecting on actions is crucial to the philosophy of ePortfolios and to integrative learning (Nguyen, 2013; Ring & Ramirez, 2012).

Integrative learning involves helping students uncover how learning from one domain (e.g., the classroom) can be connected to learning in a different domain (e.g., volunteer work). Students work to capture the tasks that were involved in carrying out a particular learning experience and the skills that they demonstrated. The areas involved in the integrative learning process include: (a) values and beliefs, (b) academic and personal interests, (c) knowledge and skills, and (d) learning experiences. One of the key goals of integrative learning activities is to assist students in bringing to the forefront what they have learned and the impact of that learning on their day-to-day interactions and future goals.

One of the most popular ways to foster integrative learning is to engage students in sharing their learning with peers, who record what they have heard and provide feedback. Another is for students to develop ePortfolios and present them at ePortfolio showcases, giving them the opportunity to convey, not only through the ePortfolio itself but also through discussion with others, what they have learned from the projects presented (Fitch et al., 2008).

In addition to being key tools for integrative learning, ePortfolios can be used to capture program assessment information. Students may be asked to select the learning experiences that best demonstrate their fulfillment of a program goal or competency, and a rubric is then established to assess the achievement of such competencies or highlight outcomes related to program goals.

Because portfolios offer an opportunity to look at multi-dimensional aspects of a program, including, among other measures, students' understanding, integration of concepts, and presence of stated outcomes (Rhodes, 2010), they may be especially important tools for fields such as social work that seek to understand students' outcomes and programs' impacts on a variety of measures. These measures often include outcomes that are challenging to assess using traditional quantitative tools, such as a program's ability to foster social justice and civic engagement practices and values in students. Portfolios can be a rich way to gather information about civic engagement, diversity outcomes, and social justice because they allow for nuanced and in-depth articulation of experiences. There is growing evidence that this type of assessment, when employed alongside traditional measures, provides a broader understanding of the meaning students take from experiences, as well as their ability to integrate across experiences (Ahn, 2004; Bowers, 2009; Rhodes, 2010).

The Case Example: The Interdisciplinary Community Action and Social Change Minor

The interdisciplinary Community Action and Social Change (CASC) minor was developed and funded under a 2009 university-wide initiative to enhance multidisciplinary perspectives and team teaching efforts in undergraduate education. The School of Social Work and the College of Literature, Science, and the Arts joined together to deliver an undergraduate minor built on multidisciplinary perspectives related to community action and social change. The minor's underlying conception of civic engagement emphasizes citizen involvement in activities aimed at creating a more just and equitable society. As its name suggests, CASC views civic engagement as both active and change-oriented.

The goals of CASC are to provide undergraduate students with opportunities to

- examine community action and social change concepts using a multidisciplinary framework;
- address community action and social change efforts in multilingual and multicultural communities;
- integrate, using a multidisciplinary framework, social justice values into the community action and social change processes; and
- engage in service-learning opportunities to promote community action or social change initiatives.

To accomplish these goals, the multi-disciplinary faculty team behind CASC's development designed a curriculum that incorporates best practices from service-learning and co-curricular service programs and provides students with space and guidance to articulate their own conceptions of and plans for civic engagement. The minor requires 16 credits for completion, including a foundation course in theory and practice for community action and social change; four additional courses from three clusters (context, diversity learning, and action service learning) that are selected from a list of courses in departments across the university, including American Culture, Anthropology, English, History, Political Science, Psychology, and Sociology; and a capstone course that requires students to complete an ePortfolio assignment integrating their learning across the CASC clusters.

The university—and the School of Social Work in particular—has been a national leader in the ePortfolio movement. Since the inception of ePortfolios at the University, the School of Social Work has been a leading player and innovator of practice. Faculty from the School of Social Work were members of the initial research team developing and assessing the effectiveness of ePortfolios, and the School has continued to create innovations related to ePortfolios through class, course, and school-level integration of activities (Peet et al., 2011). Thus, the development of a capstone ePortfolio for the CASC minor was part of a rich history of portfolio development within the School of Social Work and the University as a whole.

The Capstone Course

The steps involved in developing an ePortfolio for students in this case example were formalized through a one-credit capstone course taken in the last semester before graduation. The goal of the course is to provide the space for students to reflect on their experiences in the minor and in social justice activities, articulate their values and skills, build relationships with others

graduating from CASC, and help position students for the post-graduation experience.

In the capstone course, students develop a philosophy statement highlighting their beliefs and perspectives about civic engagement activities, plus three key projects that demonstrate their learning related to program competencies. While the core elements of the ePortfolio are defined by the program and the course instructors, the projects that students select to use to demonstrate their learning are determined by each individual student. They could be drawn from classroom experiences/assignments or from volunteer or work experiences that had focused on civic engagement activities.

To help students accomplish this, the class functions as a learning lab. Instructors draw on experiential activities and small and whole group activities to brainstorm ideas and process learning. Course instructors serve as facilitators, contextualizing learning and engagement within the classroom. The students and their ideas are the content.

To support student engagement and the ability to be reflexive, the course involves team building and experiential activities. These activities are often high energy and interactive, helping to set the space, deepen relationships, enable students to reflect on their experiences, and draw out ideas for discussions. The course also engages activities that prompt students to generate or brainstorm their ideas in order to be prepared to reflect on their learning. Examples of activities used include skill inventories, social justice timelines, and small and whole group discussions of images and ideas. Much of the work is done in small peer-groups that require students to listen and learn from one another, require them to reflect on and ask questions of each other's experiences, and provide the chance for students to talk about their work in public ways. Students receive feedback from the course faculty as they develop their key learning projects and philosophy statements. All students are expected to turn in their work periodically and to attend a "check-in" meeting with faculty to discuss their work along the way.

The students present their ePortfolios in process to other students throughout the course as well as in a showcase presentation at the end of the course. Students are also asked to share and get feedback from outside faculty mentors of their own choosing. The goal of the sharing is to help students to express and articulate their learning in ways that support deeper reflection.

The Sample

The sample for this review consisted of ePortfolios created by 51 CASC undergraduate students who graduated in 2011 and 2012. As noted earlier, completing an ePortfolio was a required component of their capstone course for the minor. The CASC students in this sample were from a range of liberal arts and science majors as well as from professional schools such as engineering and business. Core curricular elements of the capstone course that supported the ePortfolio development included:

- leadership and team building activities developed to create community, open up space for reflection, and find common connections between students;
- activities to prompt individual reflection on experiences (e.g., inventory activity, mapping experiences on timelines);
- small-group sharing to draw out additional ideas (e.g., generative interviewing, small group activities);
- assignments that encouraged the articulation of values about themselves and their work (e.g., philosophy statements, "what are you for?"); and
- creation of artifacts that helped students to demonstrate specific learning experiences and "unpack" experiences, skills, and lessons learned.

How We Used ePortfolios to Assess Change

Drawing on items from the National Survey of Student Engagement (2013) instrument and the Association of American Colleges and Universities' (2014) VALUE (Valid Assessment of Learning in Undergraduate Education) rubrics for civic engagement, intercultural knowledge and competence, and integrative learning, we developed our own rubric to be used for an assessment of students' civic engagement development and achievement of program goals (see Appendix). Our first step in analyzing CASC students' ePortfolios was for each of five colleagues to read through a portion of the 51 ePortfolios, noting the presence and depth of portfolios in relation to the rubric. If a given ePortfolio included a statement representing a particular element of the rubric, that student was assessed as having achieved the outcome in question. While many students had multiple examples of statements that fell into the main categories in our rubric, only one example for each category was necessary to meet the program assessment goals. The vast majority of the ePortfolios reviewed addressed all elements in our rubric, with only a few exceptions (n = 3).

As a second step, we wanted to develop a richer and more nuanced understanding of how students experienced and expressed their learning within their ePortfolios. To do so, we created a broader set of

categories—in keeping with but more open-ended than our original rubric elements—through which to explore the 48 portfolios that met the original rubric criteria for civic engagement. The three major categories included students': (a) personal experiences of transformative civic engagement; (b) integration of learning from the classroom and from various civic activities; and (c) clarification of personal values and beliefs through lifelong learning statements. These three categories correlate with the goals of the minor, which focuses on developing life-long social change agents through engagement in transformative experiences; integration of theory, multi-disciplinary frameworks, and practice; and articulation and understanding of social justice, critical social identity, and recognition of competencies needed for working in and across diverse settings.

After developing our three broad categories, team members revisited students' ePortfolios to document evidence and examples of statements related to each category. In the first category (see Table 1), we included statements related to how students were transformed by their experiences in civic engagement and community work. These included statements that used terms such as "the moment I truly understood" and "ready to learn" to capture the transformation that each student experienced.

The second category (see Table 2) noted examples of students' descriptions of integrating theories they learned in the classroom with experiences they had working with others in the community. The examples in Table 2 highlight how students "engaged in critical thinking" and took their "passion and desire to help others and turned it into a set of skills and strategies that can help make a difference."

Finally, the third category (see Table 3) identified statements that provided greater clarity and awareness of how students' personal values and beliefs influence the work they do when they engage others in change processes. Our examples illustrate how students experienced paradigm shifts, increased their understanding of the challenges of change work, and built their confidence.

Discussion

As the examples presented in Tables 1, 2, and 3 demonstrate, the richness of the experiences captured by students using the ePortfolio process provided opportunities for the CASC minor to assess program impact based on student reflections of specific projects/learnings. Beyond static examples of activities that might have been captured using a more traditional survey instrument, the ePortfolios provide a view into the depth and breadth of student experiences in our program, echoing Nguyen's (2013) articulation that the "ePortfolio serves as a 'living portal' through which students may continually re-articulate their ideas of self to others, bringing about new understandings and ethical intentions" (p. 135).

From a program assessment perspective, through the ePortfolios students captured projects that highlighted core program goals. Some students involved in the CASC minor begin the program having had multiple opportunities to be involved in civic engagement activities, while other students enter the minor with limited experiences. Rather than expecting all students to have similar outcomes, the ePortfolio process allows students, wherever they are in their own development, to reflect on their current learning and goals related to civic engagement.

As a capstone activity, the ePortfolio provides students with an opportunity to reflect on and process their learning creatively and to capture that learning through projects that have emerged in all areas of their life experiences (e.g., course work, co-curricular activities, clubs). We intentionally created an open structure for students to develop their ePortfolios. Although students were asked to create key learning projects that reflected the major components of the minor (frameworks and context, diversity learning, and action/community engagement), they were given leeway to select experiences (curricular or co-curricular) and make connections between their experiences and the major components.

This flexibility is critical to ePortfolios. As many university, academic, and student service programs begin to utilize ePortfolios, there is a need to balance structure with flexibility to ensure that students are not having duplicative experiences. One of the tensions we recognized early on with our minor was that some students were coming to the capstone having already done an ePortfolio, while others were engaging in this process for the first time. Allowing students to draw on a range of learning and create their own ways of capturing their experiences was essential. Had the ePortfolio included a required set of experiences, it would have potentially led to students' duplicating and repeating tasks rather than thinking more openly and deeply about their learning.

Having developed our own rubric and categories for assessing this learning, CASC faculty will be able to provide ongoing feedback to future students concerning their progress in demonstrating program outcomes. As we can see from this case example, determining a program's core goals and collecting evidence to support the demonstration of these goals using ePortfolios facilitates ongoing program assessment.

Next Steps

While ePortfolios helped us to capture whether students were successfully achieving program goals,

Table 1
Representative Examples of Quotes from the ePortfolios and Link to Core Theme: Personal Experiences of Transformative Civic Engagement

	Quotations from Students' ePortfolios
1	As a person, I have watched myself grow tremendously from this wonderful experience. I find myself putting others before myself more . . . I am not always consumed with my own needs and wants, but I am concerned with giving back to others who may be less fortunate than I am. I am also more grateful for everything that I have.
2	I myself never questioned [the fundamental pillar, "treat others the way you want to be treated"] until recently, when an 11-year old product of the City Public Schools provided me with a new perspective. "Instead of treating people how you would want to be treated, you should treat people how THEY want to be treated," she told me. I'll always remember this as the moment I truly understood the definition of empathy. It's moments like these--the moments that challenge the very fiber of your being, from the most unlikely of sources--in which the most learning can occur.
3	There is action/activism happening everywhere. I do not need to come in to a place trying to fix it. I need to come in ready to learn and join in.
4	Having challenged my own perspectives and beliefs during my time at school, I have truly learned to keep an open mind about every person, situation, and issue. I feel an intrinsic responsibility to promote educational equity, cross social boundaries, and advocate social justice, all while spreading these values to create positive change one person at a time.
5	Participating in the Community Action and Social Change (CASC) minor has helped me learn about social issues I wasn't previously aware of as well as the opportunity to take action and work towards change. Throughout my experience I have been able to take classes in many different disciplines including: sociology, history, social work, psychology and education. These classes have helped me consider social issues from various perspectives and have helped guide me in the process of finding the social issues that I feel most passionate about. My passion for helping children succeed in school has undoubtedly been influenced by these courses and my experiences through CASC.

Table 2
Core Theme: Integration of Learning from the Classroom and Civic Engagement Activities

	Quotations from Students' ePortfolios
1	The context, diversity, and action clusters within the minor have allowed me to take my education to the next level and engage in critical thinking about community action and social change.
2	My time in CASC has helped me become involved in social justice both in classes and in extracurricular activities. It has allowed me to explore different ways in which I can personally promote change and work for causes that I am passionate about in my own community. My experiences working on a crisis hotline, with English language learners, and as a reading tutor in the City Public Schools have all helped me connect what I have learned in class to experiences that are related to my interest in working with young people in a school setting. CASC has taken my passion and desire to help others and turned it into a set of skills and strategies that can help me make a difference.
3	Combining the formal classroom instruction from diversity learning and the context cluster provided me with tools to understand how community action and social change works, as well as the dynamics of social identity and power. This instruction provided me with a solid foundation of knowledge, but the action service learning cluster took my learning to a new level. What was so important in the action service learning cluster was that the knowledge I had gained through formal instruction was now being applied to situations outside of the classroom. Service learning put me in a position responsible for social action that required me to be a compassionate ally, supportive and aware of diversity and how to handle it.
4	As I reflect on my time in college, I realize that many of the most important things that I most remember were not learned in any academic context. While the classroom concepts of calculus or supply and demand will probably always be vaguely remembered, I will never forget what I have learned about people and our society from my time in college. Much of this was learned through extensions of the classroom, none more because of my minor in community action social change.

Table 3
Core Theme: Clarification of Personal Values and Beliefs and/or Lifelong Learning

	Quotations from Students' ePortfolios
1	Growing Allies is an organization on campus that works to promote social justice and create a socially aware community on campus. Being a part of this community has taught me a lot about myself as well as how to communicate and understand others. I have learned how to be an ally and support others who may or may not be different than me in a number of ways. We all share this world and I think that working to understand each other and support one another can only lead to a more harmonious society.
2	I experienced an amazing paradigm shift on my view of homelessness and what it means to love those who are homeless. Though I've always had a heart for the homeless, many times I find it easy to get annoyed with beggars and lump them all into a category of people who are using what little money they get for alcohol or other drugs instead of helping their situation. Because of my experience with the Delonis Center, I now see that my view of the homeless community is based solely on stereotypes that do not accurately depict the majority of those who are homeless.
3	Being able to understand what I was capable of and be confident in that was something I always thought I had, but had never truly been challenged until this experience. I now feel confident in my ability to make and maintain successful working relationships based on mutual respect and trust.
4	Usually race is talked about in context of minorities, but through this dialogue I have come to understand that white people have a race, too. I was taught to ignore racial conflict because it is not "involve" me directly and used to believe I did not have a position on these issues. On the contrary, I realize now that this privilege and ignorance of it has kept me from being a social change agent.
5	Because of my experience in IGR, my privileges of being white and being a man have become very salient to me, and I have begun to learn how to name my privileges and am gaining the tools and ideas of what it takes to be an ally. These points of self-discovery have been vital to my conceptualization of social justice. I am a double major involved in many organizations and communities around campus yet, my involvement with my CASC community is the one I leave undergrad most proud of. As I will be a student at the University of Michigan School of Social Work this fall, I will most definitely carry with me the lessons and values that CASC has instilled in me.
6	I have set a goal for myself to one day be a part of a non-profit organization that utilizes both youth and sport to combat social issues. Through several diverse experiences I have come to realize my own potential as a single individual that is capable of improving the lives of others.
7	The minor has had a profound effect on my value system and has pushed me to be more conscious of social justice in other aspects of my life. All three of my artifacts in this portfolio embody just a portion of what Community Action & Social Change has to offer. As I finish up my undergraduate education at the University of Michigan, I am excited to examine how other aspects of the minor play into whatever career awaits me.

they are just one tool that we can use in assessing program outcomes. In the future, we hope to refine our process by incorporating a means of capturing students' understanding of and skills for civic engagement when they enter the minor in order to establish a point of comparison when we re-assess such understanding and skills through the capstone ePortfolio. It will also be important to follow students after they graduate to assess how their learning related to civic engagement continues as they enter the workforce. Aligning minor goals and measuring achievement of these goals over time is a critical next step, and the use of ePortfolios will facilitate this ongoing process.

We are also considering viewing the portfolio through an additional lens to provide a more objective assessment of student learning. Using new technology platforms that enable students to "tag" competencies and learning to specific experiences would allow for more objective assessments of student learning and enable us to identify gaps or weaknesses across portfolios. We also plan to engage faculty readers to assess presence and level of student learning as an additional source of evidence for the minor.

Other plans for future work include: examining how students use ePortfolios over time to determine whether this way of capturing learning is something students in new jobs and situations continue to use or simply a one-time project; moving to the development of a web-based course that encourages students to begin the ePortfolio process when they enter the minor rather than waiting until their final semester; and examining the integrative learning components of ePortfolios in order to support the use of ePortfolios for program assessment and student growth.

Overall, these additional plans will enable the CASC faculty and staff to use ePortfolio content in new and on-going ways. We hope that the learning from student's reflections and experiences can support

innovations in curriculum, including the addition of new content or the creation of new courses to support student needs. Additionally, we hope that the ePortfolio content and learning can be used to develop new co-curricular programming opportunities by drawing on high-impact experiences and/or supporting gaps as articulated by students. We can also imagine the potential for ePortfolios as a tool for peer-to-peer learning within the minor and peer-to-peer mentoring and support between current students and alumni.

Conclusion

As we have learned in the CASC minor, the ePortfolio provides an innovative platform for assessment, and we look forward to continuing to explore the various ways in which ePortfolios can be used to support pedagogical and curricular developments, assess program outcomes, and facilitate changes in the minor to enhance students' overall civic engagement education.

In addition, ePortfolios provide an opportunity to capture civic engagement and social change outcomes in more depth than do traditional assessment tools. Although this study was not of a sufficient scale to be generalizable, our observation is that the ePortfolio process has enabled us to capture elements of what we know are high-impact practices for civic engagement, service learning, and social action education (Buyarski & Landis, 2014). Through our preliminary efforts, we believe that ePortfolios make high-impact practices visible, allowing students to reflect on experiences and communicate them in new ways and to articulate and share the value of these types of experiences with external audiences, such as family members, employers, or academic advisors.

While this case example focused on an interdisciplinary undergraduate minor, the development of a rubric and subsequent categories to capture core goals and assist programs in assessing outcomes related to civic engagement can be used by other programs. The ePortfolio, when student-driven with links to program goals, allows for diverse perspectives to emerge, helping students to organize their learning and enhance their abilities to tell their own story of change.

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Appendix
Initial Portfolio Assessment Rubric

Student's Name		Key: C = capstone (highest rating); M = milestone
CATEGORY	**RATING**	**COMMENTS/QUOTES**
Cultural self-awareness	Articulates insights into own cultural rules and biases (e.g. aware of how his/her experiences have been shaped by these rules and how to respond to cultural biases, resulting in a shift in self-description). C	
	Recognizes new perspectives about own cultural rules and biases (i.e. comfortable with the complexities that new perspectives offer). M	
	Identifies own cultural rules and biases but with a strong preference for those rules shared with own cultural group. M	
Diversity of communities and cultures	Demonstrates evidence of adjustment in own attitudes and beliefs because of working within and learning from diversity of communities and cultures. Promotes others' engagement with diversity. C	
	Reflects on how own attitudes and beliefs are different from those of other communities and cultures. Exhibits curiosity about what can be learned from diversity. M	
Civic identity and commitment	Provides evidence of experience in civic engagement activities and describes what s/he has learned about her/himself as it relates to *reinforced and clarified* sense of civic identity and *continued* commitment to public action. C	
	Provides evidence of experience in civic engagement activities and describes what s/he has learned about her/himself as it relates to *growing* sense of civic identity and commitment to public action. M	
	Evidence suggests involvement in civic engagement activities is generated from expectations or course requirements rather than sense of civic identity. M	
CATEGORY	**RATING**	**COMMENTS/QUOTES**
Civic leadership	Demonstrates independent experience and shows initiative in team leadership of complex or multiple civic engagement activities, accompanied by reflective insights or analysis about the aims and accomplishments of one's actions. C	
	Demonstrates independent experience and team leadership of civic action, with reflective insights or analysis about the aims and accomplishments of one's actions. M	
	Has clearly participated in civically focused actions and begins to reflect or describe how these actions may affect individuals or communities. M	
Connections to experience	Meaningfully synthesizes connections among experiences outside of the formal classroom to deepen understanding and broaden own points of view. C	
	Effectively selects and develops examples of life experiences to illuminate concepts, theories, and frameworks. M	
Reflection and self-assessment	Reviews prior learning in depth to reveal significantly changed perspectives. Envisions a future self and possibly makes plans that build on past experiences in multiple and diverse cotexts. C	
	Reviews prior learning in depth to reveal clarified meanings or broader perspectives. Evaluates changes in own learning, recognizing complex contextual factors. M	
	Reviews prior learning with some depth. Articulates strengths and challenges within specific experiences to increase effectiveness in particular contexts. M	
Total Categories Fulfilled:		

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A University-Wide ePortfolio Initiative at Federation University Australia: Software Analysis, Test-to-Production, and Evaluation Phases

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This paper describes an ePortfolio implementation strategy at Federation University Australia, Victoria (formerly the University of Ballarat). The authors combined a personal and practical viewpoint to elicit pitfalls, challenges, and recommendations for improvement. The paper is divided into three main areas in order to outline the experiments that occurred. The first section provides a standard literature review around ePortfolio adoption as well as a research-based analysis of available ePortfolio software at Australian universities. The second part depicts the University's ePortfolio implementation strategy that focused on "test-to-production" and technology dissemination phases. This section is based on the authors' personal viewpoint of ePortfolio adoption at a university where a "top-down management decision making model" (Slade, Murfin, & Readman, 2013, p. 178) was used. Third, the evaluation strategy is reported, which was based on similar research conducted at Australian universities (Hallam & Creagh, 2010; Hallam, Harper, Hauville, Creagh, & McAllister, 2009). This part is offered as a modest-scoped, mixed methods evaluation process. The paper extends on ePortfolio implementation strategies (Bell & White, 2013; Coffey & Ashford-Rowe, 2014; Jarrott & Gambrel, 2011; Lambert & Corrin, 2007; Ring & Ramirez, 2012; Slade et al., 2013) and software analysis (ACODE, 2011; Slade et al., 2013). Recommendations are made for the careful integration of pre- and post-rollout of ePortfolio programs with face-to-face ePortfolio tutor support, offering online resources and alternative portfolio-making options for students with poor broadband access.

Literature Review

The practice of ePortfolios in higher education and in the vocational education and training sector has increased steadily over the years (Coffey & Ashford-Rowe, 2014; Galatis, Leeson, Mason, Miller, & O'Neill, 2009; Ring & Ramirez, 2012). However, research indicates that the term *ePortfolios* "will not encompass every possible permutation" (Galatis et al., 2009, p. 6; Hallam & Creagh, 2010), its uses (Hallam & Creagh, 2010; Lambert & Corrin, 2007) or its purposes (Whilhelm et al., 2006). It would appear that some research around ePortfolio pedagogy and technology describes the general characteristics and different types of ePortfolios, users' experiences, attitudes, and opinions alongside providing opportunities for learners to demonstrate evidence of individual achievements, such as employability skills and graduate attributes (Barrett, 2007; Hallam & Creagh, 2010; Stefani, Mason, & Pegler, 2007; Strivens, 2007; Wade, Abrami, & Sclater, 2005). Other research provides numerous examples of the benefits of ePortfolios for fostering students' sense of pride in their work (e.g., Sherry & Bartlett, 2005), increasing students' learning motivation (e.g., Tosh, Penny Light, Fleming, & Haywood, 2005), and viewing ePortfolios as a way for students to share their work with others (e.g., Wilhelm et al., 2006).

Given the many proven learning and teaching benefits of ePortfolios in higher education, there is a need also to understand that to ensure success with implementing ePortfolios as a long-term project, time is required to perform an initial study on the experience, challenges, and issues, after which wider implementation can occur. However, effective technological adoption and undertaking of a wide evaluation process can be problematic for those who are at the "coal face" of ePortfolio adoption when a "top-down management decision making model" (Slade et al., 2013, p. 178) is used, or when time and financial constraints are of importance. Concomitantly, a review of previous university-wide ePortfolio initiatives is therefore beneficial (Coffey & Ashford-Rowe, 2014; Hallam & Creagh, 2010; Hallam et al., 2009; Lambert & Corrin, 2007; Slade et al., 2013).

The study reported in this paper was influenced by research advocating the importance of reviewing learning design and existing technologies in higher education, particularly in the area of enterprise (e.g., Ferdig, 2005; McAfee, 2006; Salmon, 2011). Notwithstanding, it was also motivated by the literature that showcases an understanding of technology implementation strategies, such as considering the existing culture of an organization (e.g., Conole, White, & Oliver, 2007) in the midst of significant change (e.g., Ferdig, 2005; Henriksen, 2002) and the necessity of "alignment to institutional and user needs" (Slade et al., 2013, p. 177).

ACODE (2011), Butler (2006), Himpsl and Baumgartner (2009), and Uys (2007) have extensively reviewed the success criteria for an ePortfolio system and identified key elements. In addition, alternatives to traditional ePortfolio platforms such as websites, blogs, and wikis have also been recognized, but with different implications for learners and institutions (e.g.,

Electronic Portfolio Action and Communication Wiki Space, 2013). Moreover, based on the work conducted in the UK as part of the Joint Information Systems Committee (JISC, 2008) ePortfolio investigation, a series of five threshold concepts were suggested to ensure successful institutional adoption of ePortfolios. These were: the purpose, learning activities design, process, ownership, and disruptive nature of ePortfolios (JISC, 2008; Joyes, Gray, & Hartnell-Young, 2010). Furthermore, the success criteria for ePortfolio implementation relating to students (curricular) has been outlined by Butler (2006), the Australian ePortfolio Project (Hallam et al., 2009), and Joyes et al. (2010), who proposed that ePortfolio-making is more likely to occur with support from the university's highest level, such as learning and teaching committees, internet technology staff, and faculty leaders (Allan & Cleland, 2012). Alternatively, Slade et al. (2013) advocated a middle-out approach rather than a top-down approach to technology adoption. By contrast, within the Faculty of Education at the University of Tasmania, Australia, the creation of a community of practice for the learning management system was initially established, in which students could have all questions related to ePortfolios answered from both a technical and educational perspective (Allan & Cleland, 2012). The community of practice, along with a structured workshop series, scaffolding of activities, and the provision of templates were key to the successful implementation three years on.

The study noted in this paper focuses on the approach reported by Parker (2010), in which a lecture style was used for training, along with the option of seeking additional help, and was found to be inadequate. Instead, students viewed demonstration and training in a computer laboratory as more advantageous. This research project takes as its lead recent studies that advocate such notions and also identify key barriers to ePortfolio technological implementation (Butler, 2006; Owen, 2009). These are:

- The need for and access to adequate hardware and software that is maintained;
- An awareness of the lack of technological skills amongst staff and students;
- Addressing technical problems and support for staff and students;
- Adequate storage space and server reliability;
- Demands on staff time;
- Efficient use of student time;
- Ownership and technological issues;
- Security and privacy of data;
- Appropriate features and control over them;
- Access and permission controls;
- On-going access for students upon completion of their course.

It would appear that the substantial literature and reports on ePortfolio practice and pedagogy illustrate a breath of implementation overview, practice, users' experience, and users' advice (e.g., Chau & Cheng, 2010; Dinmore, Kherwald, & Bradford, 2011; Halstead & Wheeler, 2009; McNeill & Cram, 2011; Taylor, Dunbar-Hall, & Rowley, 2012; Whilhelm et al., 2006). However, there is still immense scope for further research into specific implementation methods that expand on the literature. More specifically, in Australia there is limited research available on the practice of implementing ePortfolios at a university-wide level where a "top-down management decision making model is used" (Slade et al., 2013, p. 178; e.g., Coffey & Ashford-Rowe, 2014; Hallam & Creagh, 2010; Hallam et al., 2009; Lambert & Corrin, 2007). Therefore, this study addresses the critical issue of selecting an institution-wide ePortfolio system based on the following: (1) a top-down management decision making model; (2) significant time and financial constraints; (3) limited technological support; and (4) the requirement to implement a centralized ePortfolio system for learners.

Federation University Australia is a rural, dual-sector university and the third oldest site of higher learning in Australia, with approximately 23,500 domestic and international students enrolled each year. Many of these students are the first in their family to attend university. The institution offers secondary schooling, vocational education and training, higher education, and post-graduate studies. Thus, the ePortfolio software must be appropriate for a wide range of disciplines, educational contexts, accreditation needs, and have the ability to showcase a wide range of artifacts and evidence of learning, as the software will be used by students from both the vocational education and training and higher education sectors. With this in mind, it is important to consider that rural universities do not tend to have the resources (and/or finances) readily available for such undertakings compared to the larger capital city-based institutions. Therefore, in this study, the success or otherwise of ePortfolio implementation is dependent on the perspective of those involved. As Joyes et al. (2010) and Voigt (2009) noted, while technical support may be important to some, it will be pedagogical support that is more important to others. Finally, the study reported in this paper contributes to ePortfolio implementation strategies, innovative technologies in education, and inherent challenges (e.g., Bell & White, 2013; Burnett, 2001; Jarrott & Gambrel, 2011; Lambert & Corrin, 2007; Ring & Ramirez, 2012; Slade et al., 2013).

Limitations

One of the major limitations of this study is that the technological innovation adoption (test-to-production) was made over a limited period of time. This was mainly due to staff turnover, particularly in the area of technical ePortfolio support as well as institutional time and financial constraints (due to external factors). A more stringent test of adoption of an innovation, or success of an implementation plan, would be needed to ascertain its continuation or persistence over a longer period, such as several years. The results presented here do not show data collected over a longer period of time. However, because of the importance of exploring innovation adoptions over an extended period of time, a further mixed methods research ePortfolio project is currently being completed at the university. This, in turn, will assist in furthering conversations, evaluation outcomes, and recommendations, as well as the promotion of ePortfolio adoption at the university.

Implementation

In the following sections, the method and results of the implementation phases of the ePortfolio adoption are outlined, noting the various successes and challenges. This is achieved by describing the information under three main headings: (1) ePortfolio software at Australian universities, where information about the choice of software is presented; (2) implementation strategy; and (3) a modest-scoped evaluation process, which was based on similar research conducted at Australian universities (e.g., Hallam & Creagh, 2010; Hallam et al., 2009).

ePortfolio Software at Australian Universities

Choosing the right ePortfolio platform is no easy matter. For instance, deciding on an appropriate university-wide ePortfolio platform can vary extensively from institution to institution (Conole et al., 2007; Goldsmith, 2007; Slade et al., 2013). For Federation University Australia, implementing a university-wide tool proved challenging, with the following points of particular concern:

- How will ePortfolios be used?
- Who will use ePortfolios?
- How to avoid smothering innovation and creativity (Slade et al., 2013);
- Who is the intended audience?
- How to ensure that the software meets the needs of all users;
- Ascertaining the costs and availability of hardware and software resources (ACODE, 2011; Butler, 2006; Himpsl & Baumgartner, 2009; Uys, 2007).

Conversely, Himpsl and Baumgartner (2009) stated that in 2008 there were over 60 ePortfolio providers to select from, which can make decisions even harder. For instance, Slade et al. (2013) highlighted the difficulties of deciding on an ePortfolio platform due to the extensive list of ePortfolio solutions that are now available, and "chos[ing] to only consider options for which there was either experience available with the university and more generally available in the higher education sector" (p. 180). Himpsl and Baumgartner's (2009) ePortfolio software categories and the Educational Technology Survey report (ACODE, 2011), which was conducted by Sarah Lambert, were important factors for the University of Southern Queensland's ePortfolio decision-making strategy (Slade et al., 2013). Similarly, the abundance of alternative choices to traditional ePortfolio platforms that are presented on the Electronic Portfolio Action and Communication Wiki Space (2013; e.g., Wordpress, Google Apps, and wikis) further creates various issues around ePortfolio decision-making.

For this research project, it was the ACODE (2011) and Himpsl and Baumgartner (2009) reports that were used, aiding conversations and recommendations regarding the University's senior management culture for decision making. The reports exhibited the group of leading ePortfolio software in the higher education area, namely Mahara and Pebblepad, which presently are the most frequently used (traditional) ePortfolio platforms in Australia's higher education sector. However, the reports did not emphasize each university's ePortfolio software in detail. Due to the ever-evolving technological ePortfolio landscape in Australia's higher education, the present authors conducted a World Wide Web internet search of 35 Australian universities' homepages to gain an "Australian-centric" ePortfolio users' perspective (see Appendix). The internet search review was deemed advantageous by the University's senior management so that technology adoption software that was currently being used in Australia could be analyzed, with the information gained being used for official decision-making. The review process was based on a similar collection method conducted by Hains-Wesson (2012), in which "Australia's and the United Kingdom's universities' homepages were located on the World Wide Web . . . in order to present a detailed account of online creative journals that operated as Work-Integrated Learning activities" (p. 267). The method was adapted to fit the research project's purpose. The review was completed by first utilizing the list of Australian universities presented on

the ACODE (2011) survey report and then manually completed an internet search of each university's homepage with the key search words "ePortfolios," "portfolios," and/or "education portfolios." The process enabled the researchers to locate current ePortfolio information. To account for any missing information, a member from the research team telephoned each university's Learning and Teaching Centre and/or sent an e-mail to the appropriate manager to request and obtain the data. The data presented in the Appendix corresponds to the ACODE (2011) survey results, but with the addition of specific ePortfolio platform details from each university. The authors extracted specific data relating to rural, dual sector universities from the information presented in the Appendix to help address the broader needs of students at Federation University Australia (see Table 1).

At the time, a close analysis of the literature around ePortfolio software analysis (ACODE, 2011; Himpsl & Baumgartner, 2009), alongside the data presented in Table 1, suggested an even spread of Mahara, Pebblepad, and other ePortfolio use at Australian universities. Using the data from the reports and the internet search review process, the information was presented to the University's senior management team, providing extra evidence. In addition, senior management requested the following additional criteria to be considered:

- The ability of the software to deliver a diverse range of institutional reporting needs, such as demonstrating competency and accreditation requirements and showcasing a variety of artifacts;
- The ability of the software to be integrated with the university's learning management system (Moodle);
- That the software should be open source and have an active community of practice;
- The ready availability of introductory online resources (e.g., information on how to set up an ePortfolio);
- The ability of the software to provide built-in tools such as content management and plug-ins for mobile use within the university's learning management system (Moodle);
- A history of other universities active use of the ePortfolio software in order to establish a community of inquiry across institutions, encouraging knowledge-sharing.

Moreover, when implementing new technology, the university's context, management culture and goals are key when making decisions. Evans and Benefield (2001) pointed out that to evaluate ePortfolio adoption properly, it is beneficial to undergo an extensive review in order to make good decisions. With this in mind (and the above review method and points taken into consideration), Mahara was chosen to be the official ePortfolio platform.

First, it met the university's criteria. Second, it was an educational and functionally effective solution for Federation University Australia because of its open source software licence, ease of compatibility into the university's LMS (Moodle), and focus on being a personal learning environment that mixes with social networking and allows users to easily collect, reflect on, and share their achievements. However, the university's decision to purchase an open source ePortfolio software such as Mahara, with its active community of practice and history of other universities using the software, did not mean fewer challenges. These challenges are detailed in the following section in terms of the implementation strategy employed.

The Implementation Strategy

As mentioned previously, the following implementation strategy was based on a top-down management decision model rather than a "middle agent feasibility study" (Slade et al., 2013, p. 178). It is also important to note that in early 2012, when senior management decided that a Mahara system was to be implemented as the university-wide ePortfolio system, a test phase was established and opened up to interested teachers and students to experiment with on an ad hoc basis. The majority of ePortfolio users in the test environment were from the disciplines of education and nursing. This outcome aligns with research around specific disciplines that are most likely to take-up ePortfolio adoption quickly (Bashook, Gelula, Joshi, & Sandlow, 2008; Maher & Gerbic, 2009) compared to others areas of study, such as engineering or mathematics (Carroll, Markauskaite, & Calvo, 2007). By late-2012, and after much deliberation with numerous university stakeholders, the university's Learning and Teaching Committee released a document titled "Learning and Teaching Plan 2012-2014" (University of Ballarat, 2012). In this document, the authors noted that ePortfolios were one of the key eLearning tools to benefit learning for reflective practice, assessment, and evidence learning (Slade et al., 2013). University of Ballarat (2012) also presented key performance indicators for the university-wide ePortfolio initiative, anticipating that students' active use of ePortfolios would increase by the end of 2015. In order to meet the University of Ballarat's (2012) objectives, meet the Federation University Australia's strategic learning and teaching outcomes, and to go effectively from test-to-production, it became essential

Table 1
Summary of ePortfolio Software Platforms Supported in Australia's Rural and Dual Higher Education Sector in 2014

Name of institution	Mahara	Pebblepad	Other
Central Queensland University***	√	X	X
Charles Darwin University**	X	X	Web2.0
Royal Melbourne Institute of Technology*	X	√	X
Southern Cross University***	X	√	X
University of Sunshine Coast***	X	√	X
The University of New England***	√	X	X
Victoria University*	X	X	Desire2Learn
Total	2	3	2

Note. √ = Used. X = Not used. **Swinburne University of Technology are two of only five dual-sector institutions in Australia, of which **Charles Darwin University is the only one outside Victoria. The others are *Royal Melbourne Institute of Technology and *Victoria University. ***There are five rural universities in Australia.

that a dedicated staff member be made responsible for the rollout. The requirement to support test-to-production with pedagogical and internet technology support was enacted, and providing support structures for teachers and users was highly recommended. As a consequence, a working party was created to encourage innovation and individual staff members selected to introduce change and encourage peers to follow (Cummings, Phillips, Tilbrook, & Lowe, 2005). The working party included key ePortfolio stakeholders, such as those who had influenced the test phase, and staff members such as internet communications technology staff, administrators, academics, general staff, and one student representative with the knowledge that ePortfolios can "enhance teaching, learning and assessment practices" (Davis & Murrell, 1994, p. 2). The formation of the working party also aligned with the recommendations made by the Australian ePortfolio Project (Hallam et al., 2009), as well as the successful university-wide ePortfolio project that had occurred at the University of Wollongong, New South Wales, Australia (Lambert & Corrin, 2007). The members of the working party were also responsible for communicating recommendations to senior management, the test-to-production phase, a modest-scoped evaluation, and the following specific outcomes:

- Review, evaluate, and fix any errors associated with the Mahara test environment, ePortfolio software, and hosting system;
- Plan, develop, and implement an appropriate and effective production rollout framework (i.e., test-to-production);
- Organize the website branding of the open source software to coincide with the university's webpage design and policy;
- Develop best practice internet technology upgrades, solutions, and website hosting procedures post-test-to-production phase;
- Increase the membership of the working party to enable more expert advice on the effective use of ePortfolios and implementation across the rural dual-sector university;
- Create online resources that are user friendly and relevant;
- Communicate, plan, and implement ePortfolio workshops and seminars around internet technology and pedagogy for students and teachers, particularly those who were new to ePortfolios.

In reality, however, the above objectives were not free from hindrance. For instance, the test-to-production phase took place at a time when the Victorian State and the Federal Governments had announced financial cutbacks that affected the vocational education and training and the higher education sectors in Victoria, Australia. The Victorian Government (the Baillieu Government at the time) "had slashed $290 million from the sector, with around the same amount to be cut in both 2013 and 2014" (Rea, 2012, p. 16). It was also essential that the rollout plan occurred in order to meet the University of Ballarat's (2012) learning plan outcomes, the requirements of the Australian Quality Framework (the national policy for regulated qualifications in Australian education and training), and the Tertiary Education Quality and Standards Agency (Australia's independent national regulator for the higher education sector) by 2015 (Milne, Heinrich, & Lys, 2010). In order to provide a high quality ePortfolio experience for students and staff that met the above points at a financially difficult time, the formation and involvement of the working party was imperative. In

addition, the ePortfolio platform required an appropriate upgrade, as the test environment had already alerted the university's technological support staff to various errors in the program that were occurring at the time, such as a failure to embed certain files and videos successfully, and sporadic text disruptions throughout users' ePortfolios. Website branding also needed to occur and the online resources and policies associated with privacy, assessment, and security needed to be updated. In other words, it was important to get the technology right before ePortfolios could be successfully rolled out on a university-wide level. One of the main challenges during this time was keeping in mind the established users within the test system. Without internet technology being stable and up-to-date, there were risks of ePortfolio test-environment users becoming ePortfolio-fatigued and/or lacking ePortfolio creation motivation. Additionally, without effective internet technology support, it would be difficult to meet the university's curriculum-renewal strategy for undergraduate degrees (University of Ballarat, 2011). As one of the key recommendations stated,

> The University will ensure that all students are provided with the opportunity to record the development of their graduate attributes and that attainment of these be assessed, where possible and applicable, as part of the curriculum using an assessable portfolio which is part of a final course. (University of Ballarat, 2011, p. 1)

With the decision to rollout Mahara as the official ePortfolio software for Federation University Australia, and to therefore go from test-to-production, it became necessary to offer workshops and seminars on ePortfolio making for new users on assessment practice and on showcasing and evidencing learning. This needed to occur within a constricted time frame, which was approximately eleven weeks. Ultimately, the working party needed to keep abreast of the University's assessment due dates across the teaching landscape, so as to minimize any disruption due to the upgrade from test-to-production, notwithstanding the fact that successful broader implementation of ePortfolios can be dependent on evaluation.

In the following sections, the modest-sized evaluation phase of the project is presented, which was based on the authors' viewpoints from the participants' experiences in workshops and seminars.

The Evaluation Process

Participants who were new to ePortfolio-making were encouraged to take part in the evaluation phase of the project. Users within the test environment were also invited to participate. This was achieved through notification of the opportunity to participate in ePortfolio workshops and seminars via posters, word-of-mouth recommendations, networks, and program presentations. The ePortfolio initiative was modestly evaluated due to the majority of participants being self-selected and new to ePortfolios. The workshops centered on information about specific challenges for new users to the system and how to use ePortfolios for an assessment task such as reflective practice for teachers, course accreditation requirements, and the showcasing of artifacts. The majority of participants (n = 34) had no prior knowledge of ePortfolios (96%). They were keen to find out what an ePortfolio could offer in terms of professional development, such as research, networking, and/or the evidencing of achievements as part of the student learning experience. Student participants (n = 18) were invited by their teacher/s to take part in the ePortfolio workshops because reflective practice via ePortfolio was being introduced as a major assessment item. Similar to those for staff, student ePortfolio workshops were often presented in computer laboratories, with three additional seminars being presented in a classroom. On request, all workshops and seminars for staff and students were repeated when requested within the 11-week period.

Method

The Australian ePortfolio Project's (AeP, 2010) learning and teaching survey was modified for the project's modest evaluation phase. Minor changes were made to the AeP survey, with the following research questions guiding these changes:

- What factors do you believe will help you to implement/develop an ePortfolio?
- What factors do you believe prove or are proving difficult for you to implement/develop an ePortfolio?
- If you have developed an ePortfolio, what impacts do you believe have occurred as a result of your ePortfolio use?

Participants

The participants (n = 52) consisted of 89% from the higher education sector, with the remaining from the vocational education and training area. There was an even mix of male and female participants.

Survey

The construction of the survey was based on similar research conducted at Australian universities

(Hallam & Creagh, 2010; Hallam et al., 2009). The survey consisted of a mixture of eight open-ended and closed questions.

Workshop Implementation

It is important to note that each workshop was purposely delivered according to the needs of the participants. For example, some presentations were conducted in a seminar room, where the presenter showed information to the audience via a large computer screen, or in computer laboratories where participants could actively try out the new information being learned. At each presentation, the following main topics were focused on: (a) an introduction to the term ePortfolio; (b) the benefits of creating and sustaining an ePortfolio; (c) where to find online resources for the novice ePortfolio designer; and (d) showing examples of good practice ePortfolio-making from the active test environment already established in the system. Additionally, any internet technology concerns that participants had were also a priority in the workshops (e.g., how users share ePortfolios, how to insert links and videos). Each session concluded by inviting participants to provide anonymous feedback via the survey. The second aim of the evaluation was to gather information from new ePortfolio users, such as their opinions and experiences. This part of the evaluation strategy was important to the research team in order to ensure that the technology was functioning at a high standard.

Survey Results

The participants came from a variety of disciplines and areas, such as psychology, sciences, internet technologies, business, food science, and the vocational education and training sector. There was not enough data to disclose gender or age range as a variable. Once the feedback from the surveys was collected, the data were extracted, de-identified, and placed into an Excel spreadsheet. The research team analyzed and used pivot tables to provide quantitative analysis, with the qualitative responses being manually coded by themes. The key themes that emerged from the data were: (a) understanding ePortfolio use; (b) issues around ePortfolio use; and (c) support around ePortfolio use. The following section provides the quantitative analysis by theme followed by the qualitative responses.

Quantitative Results

Understanding eportfolio use. The ePortfolio workshops during the test-to-production phase were developed to encourage new and established test environment users to feel supported when discussing the challenges and benefits of implementing ePortfolios in learning and teaching experiences. The workshops also provided participants with an avenue to provide feedback to the research team in order to instigate positive change during the test-to-production phase and to communicate recommendations to senior management. The workshops were also a good opportunity to make sure that the technology was functioning at a high standard, as well as to address any learning and support gaps. The workshops also assisted the researchers in deciding which cohort would be most advantageous for a future technological adoption-evaluation outcome over a longer period of time.

One of the main outcomes of the workshops was that a number of participants (n = 20) suggested that they gained more than a rudimentary understanding of ePortfolios, with over 80% of informants noting that they felt ePortfolios were *very important* or *important* to their teaching and learning journey.

Issues around eportfolio use. Some of the key concerns that participants had about implementing ePortfolios involved not understanding the software program, and they often stated that they were slow to learn, especially when internet technological support was not present or internet access was slow. Factors respondents felt might impede their ePortfolio making included: (a) self-motivation and a lack of clear direction; (b) a lack of internet access at home; and (c) the nature of the Mahara program (e.g., "sometimes I find it just confusing, with all the many tabs that Mahara has").

Support for eportfolio use. The quantitative results from the surveys further illustrated that after a second or third workshop, users were more aware of online assistance being offered rather than the hardcopy support resources or face-to-face tutor support. For example, 27% versus 54% were aware of online resources and tutor support, with over 50% of participants being aware of online guidance on how to use Mahara, a tutorial program to support the ePortfolio process, and the opportunity of face-to-face tutor support for learners. Therefore, while less than 30% were aware of online tutor/mentor support for feedback at the end of a workshop, this number had doubled by the time additional sessions were offered to the same cohort. For instance, at the completion of a third ePortfolio training session participants indicated that the factors they believed would help them with their ePortfolio assessment were: (a) ease of accessibility, (b) confidence with the software program; (c) getting face-to-face help from the ePortfolio support staff member; and (d) completing the training sessions and receiving on-going face-to-face feedback from the lecturer.

In terms of the workshops, 92% of participants found them to be highly effective, and many participants (including both teachers and students)

noted that they found the workshops worthwhile (e.g., "Meeting new people, being able to read other people's work for my benefit only—what I compete with really—and how I can improve my writing—something I'm not strong at").

Qualitative Results

Understanding eportfolio use. A number of participants were unaware of what an ePortfolio was or its capabilities, saying, for example, that "I had never heard of ePortfolios so it was a good introduction and I am very interested in starting one" and "I didn't know about ePortfolios until today—will have to explore further to know what it might mean for me in the future." The workshops proved useful for new users due to the benefit around introducing teachers and students to the software as well as its educational opportunities that already had an active community of practice within the system. For example, by the end of the workshop participants were writing insightful comments. The following list illustrates participants' comments on the opportunities an ePortfolio could offer: "It's like a blog or social network site where students interact with each other"; "[It's] a place to show your professional history"; "[It's] a tool to develop material related to study that may be useful in the future"; "[ePortfolio is] an on-line repository of personal and professional information that can be available to myself and others"; and "Viewing what others have already done with their ePortfolios [is beneficial] for [developing] ideas."

Support around eportfolio use. The overall feedback gained from the participants also showed that there was a real need for consistent support, such as online and face-to-face resources (blended) and showcasing (early) good practice (e.g., examples of effective ePortfolios in order to fully appreciate its value in learning and teaching). The participants' responses suggest that this needed to occur prior to, during, and after the test-to-production phase. According to JISC (2008), it is necessary to understand that the learner's initial difficulties with both technology and reflective learning increase the workload of tutors and internet technology support staff in the early stages of implementation. This was also a key concern that was expressed and observed by the research team in the workshops. However, once autonomous learning was established, the support required from tutors and internet technology staff diminished, making more time for proactive interventions with individuals around their ePortfolio-making endeavors.

Issues around eportfolio use. One area of concern was related to an instructor's awareness of the advantages and disadvantages of ePortfolio assessment. On the one hand, digital portfolios offered more efficient working practice, enabling marking and verification to take place incrementally. Yet, the diversity of evidence contained in ePortfolios can make them harder and more time consuming to mark. There were also concerns raised by participants about ePortfolio ownership upon graduation. As a result, the feedback from participants assisted the working party to solve this particular issue by orchestrating and sustaining stronger links with the university's administration process, alumni membership, Careers Centre, and Student Experience Officers to grant graduates continued use of their ePortfolios after graduation. This particular issue and outcome is also in line with previous research (Hallam et al., 2009; JISC, 2008), and ideally, the ePortfolio system should always allow users to export their ePortfolio account and/or to continue using their ePortfolios as an Alumni member to encourage life-long learning.

Participants also explained that ePortfolio construction was only important to them because of a course's requirements of ePortfolio assessment. It was often teachers who were also students that made these types of comments (e.g., "[Unless] consistent and effective feedback is provided, [I would] prefer face-to-face contact and an assessment task that could be handed in via a hard copy format"). Students regularly reflected on being "personally frustrated" with ePortfolio making, which was mainly due to inadequate feedback and insufficient internet technology support or training rather than the ePortfolio platform itself.

Some participants expressed that using a remote and/or poor internet connection influenced their decision to avoid completing an ePortfolio assignment. In the literature, this is also a common concern, particularly in the context of rural universities (e.g., Bell & White, 2013). The below quote from a participant further reflects this particular point:

> The videos [that help explain how to make an ePortfolio] may have been more helpful if they would have downloaded faster at home. For some reason your videos literally take forever to download at our rural property and therefore are not accessible for me unless I travelled either to the university or my workplace (64 kilometres away).

Conclusion

The study described a challenging ePortfolio implementation strategy at a rural, dual sector University in Victoria, Australia, which was based on the researchers' perspectives via a top-down management approach to technology adoption to drive change (Cummings et al., 2005). The findings detail an ePortfolio implementation process, alongside a modest-

scoped, mixed method evaluation, which was impacted due to time and financial constraints. Throughout the study, the authors combined a personal and practical viewpoint to elicit the complex nature and continual shifting ground of ePortfolio adoption at an institutional level where management culture, financial, technological, and pedagogical constraints are of importance. According to Rogers (2003), most faculty members adopt innovations at individually varying rates, and achieving faculty compliance takes time and development. For example, when users were asked what factors helped them to plan, develop, and sustain an ePortfolio in their teaching and learning, the majority of participants commented that receiving help from peers, perseverance, actively accessing online tutorials about ePortfolio use, participating in face-to-face workshops, trial and error, a desire to create web pages, and previous knowledge of ePortfolios as well as technological skills were all highly beneficial.

Despite the modest number of participants (n = 52) who took part in the mixed-method evaluation phase, the results have been advantageous to the ongoing rollout and improvement of the ePortfolio program at Federation University Australia. For instance, the following recommendations were developed and were based on the participants' experiences at the workshops and seminars:

- Provide engaging and minimal downloads of hypertext links to video or PDF files for all online resources, as well as offer face-to-face professional development sessions around alternative ePortfolio submission practices for students with poor broadband access;
- Provide users with engaging and minimal downloads for all online resources to showcase alternative ways to evidence learning, such as using audio (podcast recordings) that can be uploaded when at a campus internet accessibility area or via a rural Wi-Fi community hub area;
- Encourage the use of CD-ROM formats for critical content that is easily accessible for students who do not have effective broadband access;
- Offer students ePortfolio alternative submission practices, such as DVD/CD or USB modes, especially for those who have mobility issues, in order to provide inclusive learning practices;
- Provide ongoing introductory sessions for new users, ePortfolio workshops via face-to-face sessions around sustaining an ePortfolio, and "tricks of the trade" for intermediate to advanced users;
- Provide online forums or a comment function for staff and students to submit opinions and express their learning and teaching needs around the university's standardized ePortfolio system for improvement;
- Allow for successful growth of simple social technologies such as blogs, wikis, rich site summary (RSS) feeds, and social networking tools, alongside the university's ePortfolio tool to support the use of a variety of digital learning experiences that can meet diverse learning and technology requirements;
- Provide examples of rubrics in order to assist teachers with the time-consuming nature and difficulties around the marking of ePortfolio work.

The results from this project indicate that more can be learned from studies such as these, especially around the subjects of the impact of ePortfolio-making over a longer period of time and of minimizing the digital divide for rural-based learning via a wider evaluation process. Other related areas of further research might include whether or not universities would be wise to offer multiple ePortfolio systems for students alongside traditional platforms, including hardcopy options if broadband is not sufficient. It would also be advantageous to conduct a global ePortfolio software analysis and collect data from sites such as Electronic Portfolio Action and Communication (EPAC) and report the findings alongside the internet search data collection process used here. Another area of interest is to discover what industry's expectations might be regarding students evidencing of learning and graduate outcomes for job readiness, especially considering the recent Hart Research Associates (2013) report, in which "four in five employers say an electronic portfolio would be useful to them in ensuring that job applicants have the knowledge and skills they need to succeed in their company" (p. 3). Finally, we concur with previous studies (e.g., Allan & Cleland, 2012) that ePortfolio workshops are more beneficial in high functioning computer laboratories than in lecture theaters and that offering ePortfolio aid wholly online via engaging and minimal downloading as well as providing continual face-to-face support options at the introductory, intermediate, and advanced levels is important for sustainable ePortfolio implementation.

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Author's Notes

1. Ethics clearance was obtained: D12-003 (2013).
2. Ethics clearance was obtained: B12-135 (2013-2015).

Appendix
A Summary of ePortfolio Software Platforms Being Supported in Australia's Higher Education Sector (2014)

	Name of Institution	Mahara	Pebblepad	Other	url address as of 2014
1	Australian National University	√	X	X	http://cecs.anu.edu.au/files/ePortfolioConferenceHandout.pdf
2	Central Queensland University***	√	X	X	http://www.cqu.edu.au/about-us/learning-and-teaching/office-of-learning-and-teaching/resources/learning-technologies/e-portfolios
3	Charles Darwin University**	X	X	Web2.0	http://learnline.cdu.edu.au/units/hit381/eportfolio/startup/startup.html
4	Charles Sturt University	X	√	X	http://www.csu.edu.au/division/landt/resources/eportfolio
5	Curtin University	X	X	In-house	https://iportfolio.curtin.edu.au/
6	Deakin University	X	X	Desire2Learn	Learning Management System log in access only
7	Edith Cowan University	X	√	X	http://intranet.ecu.edu.au/learning/current-projects/learning-portfolio-pebblepad
8	Flinders University	X	X	Web2.0	http://www.flinders.edu.au/eportfolio/
9	Griffith University	X	X	Blackboard	unknown
10	James Cook University	X	√	CareerHub	http://www-public.jcu.edu.au/careers/JCUPRD_034893
11	La Trobe University	X	√	X	http://www.latrobe.edu.au/students/it/teaching/pebblepad
12	Macquarie University	X	X	X	unknown
13	Monash University	√	X	X	http://www.monash.edu.au/news/monashmemo/assets/includes/content/20100623/stories-more-uni-news1.html
14	Murdoch University	X	√	X	http://our.murdoch.edu.au/Educational-Development/Educational-technologies/PebblePad/
15	Queensland University of Technology	X	X	In-house	http://www.studenteportfolio.qut.edu.au/
16	Royal Melbourne Institute of Technology*	X	√	X	http://rmit.edu.au/browse;ID=075sqig1pgj0z
17	Southern Cross University***	X	√	X	http://scu.edu.au/teachinglearning/index.php/79

18	Swinburne University of Technology**	X	X	Online Galleries	http://www.swinburne.edu.au/design/portfolios/docs/pdf/GPS_Gradex.pdf
19	University of Adelaide	X	X	X	unknown
20	University of Canberra	X	X	X	unknown
21	University of Melbourne	X	X	Blackboard	http://www.lms.unimelb.edu.au/user_guides/portfolio_student_guide.pdf
22	The University of New England***	√	X	X	unknown
23	University of New South Wales	√	X	X	unknown
24	University of Newcastle	√	X	X	unknown
25	University of Queensland	√	X	In-house	http://www.elearning.uq.edu.au/content/eportolios-eportfolios-currently-used
26	University of South Australia	√	X	X	http://w3.unisa.edu.au/tel/learnonline/eportfolio.asp
27	University of Southern Queensland***	√	X	X	http://www.usq.edu.au/ele/eportfolio
28	University of Technology Sydney	X	X	In-house	http://www.iml.uts.edu.au/elearning/eportfolios.html
29	The University of Sydney	X	√	X	http://sydney.edu.au/elearning/staff/getStarted/ePortfolio.shtml
30	University of Tasmania	X	√	Desire2Learn	http://www.teaching-learning.utas.edu.au/elearning/eportfolios
31	University of Sunshine Coast***	X	√	X	http://www.usc.edu.au/university/learning-and-teaching/eportfolios
32	University of Western Australia	X	X	In-house	http://www.ecm.uwa.edu.au/__data/assets/pdf_file/0020/2285201/FASE-Seminar-Flyer-16-April-2013.pdf
33	University of Western Sydney	X	X	X	unknown
34	University of Wollongong	√	√	X	http://staff.uow.edu.au/eteaching/ePortfolio/index.html
35	Victoria University*	X	√	Desire2Learn	http://learningandteaching.vu.edu.au/teaching_practice/blended_learning/elearning_environment/eportfolio/
Total		10	12	14	

Note. √ = Used. X = Not used. *Federation University Australia is the only regional multi-sector university and **Swinburne University of Technology are two of only five dual-sector institutions in Australia, of which **Charles Darwin University is the only one outside Victoria. The others are *Royal Melbourne Institute of Technology and *Victoria University. ***There are five rural universities in Australia.

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A Proposal: Mitigating Effects of the Economic Crisis With Career ePortfolios

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Contemporary labor markets are suffering from the recession and structural shifts, which can cause various mismatches through processes of search friction. A lack of informational transparency among worker- and job characteristics is the common denominator of these search frictions. In this paper, the potential of the career ePortfolio, which consists of information beyond what is typically found in a jobseeker's resume, in reducing these mismatches and search frictions is explored. The career ePortfolio, it is argued, leads to better worker-to-job matches, increased worker mobility, and reduced unemployment levels and transaction costs. By exploring mismatches and search frictions theoretically, the required features of such a career ePortfolio were identified. A multi-disciplinary approach was used, drawing from literature on labor market economics as well as human resource management. It was concluded that the career ePortfolio should consist of competence-based information on both the aggregate and individual levels in order to facilitate workers and firms in their career and personnel planning and help government and educational institutes devise appropriate labor market policies and curricula. Major challenges include the required shared understanding of competences among workers and firms, given their heterogeneity, as well as the need for credible information, given the asymmetrical nature of labor market information.

In the past few years, labor markets have been affected by severe economic turmoil, which has impacted the labor force and economic activity all over the world. In the EU, many member states have suffered from low job-finding rates, rising unemployment rates, and longer spells of unemployment (European Commission, 2012; van der Ende, van Heel, Walsh, de Wit, & Ziminiene, 2012). In the US, it has been reported that more than half of all adults in the labor force reported a spell of unemployment, a cut in pay, a reduction in hours, or an involuntary shift to part-time work since the last recession, which commenced in 2007 (Pew Research Center, 2010). Currently, economic expansion can be observed; however, unemployment levels remain relatively stable (International Labor Organization, 2013). Many organizations are still experiencing great difficulty in filling key positions in certain sectors of the economy (Bureau of Labor Statistics, 2013; European Commission, 2012; van der Ende et al., 2012; West, 2013). Many unemployed jobseekers pursue employment in sectors different from those in which ample vacancies exist, which is theorized to be one of the main causes of the low job-finding rates around the globe (Sahin, Song, Topa, & Violante, 2012). Furthermore, there are three emerging structural shifts to consider: the globalization of labor markets and consequent economic migration; industrialized economies becoming progressively knowledge-based; and the aging of working populations (Organization for Economic Co-Operation and Development, 2011a, 2011b).

These issues have also been identified by the Organization for Economic Co-Operation and Development (OECD) and the European Commission, which resulted in the OECD Skills Strategy and the EU Agenda for new skills and jobs, as part of the Europe 2020 strategy (European Commission, 2013; OECD, 2012). Both agendas are based on the notion that the matching of workers to jobs can improve with a better coordination between recruitment strategies employed by firms, public employment services, and private labor market intermediaries. In addition, the changing demands for skills have to be translated into up-to-date educational curricula. One of the main requirements for achieving this is distributing richer information about the particular skills that employers demand and how they contrast with the skills possessed by workers (European Centre for the Development of Vocational Training [CEDEFOP], 2012).

Currently, the role of job-matching is fulfilled by labor market intermediaries, such as online job boards and recruitment agencies, who involve themselves in the matching of workers to jobs (Autor, 2013). In this paper, the potential of competence-based career ePortfolio systems will be explored theoretically by drawing from literature on labor market economics and human resource management. This is relevant to the relatively new portfolio literature, which typically revolves around the educational context from a pedagogical perspective. The research question of this paper reads as follows: "What is the promise of the career ePortfolio, given the manifestations of mismatches and search frictions in the labor market?"

The paper is structured as follows. First, the career ePortfolio concept and its potential role in the job matching process will be described. Then, existing labor market problems will be analyzed on a macro-economic level by looking at cyclical and structural economic developments. On this basis, the required

scope of the career ePortfolio concept will be established. Then, underlying mismatches will be identified, and the implications for the career ePortfolio will be discussed. Subsequently, these mismatches will be analyzed using theories about search frictions in the labor market. Search frictions are problems arising from the heterogeneous nature of workers and jobs, which can hinder the matching process (Mortensen, 2010). Based on the characteristics of these mismatches and the common denominator of search frictions—the presence of imperfect information—the potential role of the career ePortfolio will be discussed by identifying its required features.

Job Search and Career ePortfolios

Due to the growing prevalence of job-searching via the Internet, information about jobs and workers can be widely spread, increasing the scope of search for both workers and firms at a lower cost. In theory, this has a positive effect on match quality, raising the productivity level of a match, worker earnings, and firm profits (Autor, 2001). Additional benefits include lower unemployment levels, reduced transaction costs of matching, and an enhanced mobility of workers, who can more easily engage in an on-the-job search (Autor, 2001; Freeman, 2002). These benefits are expected to be achieved by the provision of richer market information through career ePortfolios, which has previously been operationalized as organized evidence of work readiness and specific job skills which can be focused to show the skills that employers want (Smith, 1996). Smith (1996) and Woodbury, Addams, and Neal (2009) added that the career ePortfolio consists of a resume, plus evidence of abilities, knowledge, skills, and potential in order to build credibility. The evidence consists of artifacts that demonstrate competence, including assessment results, research papers, certificates, or reports on projects, teamwork, or internships (Amarian & Flanigan, 2006).

The concept of a "career ePortfolio" is derived from the ambiguous concept of "ePortfolio" (i.e., electronic portfolio), which is considered to be the overarching concept in its relatively new field of literature. There is a lack of consensus about what exactly constitutes an ePortfolio (Batson, 2013; Grant, 2005). Several different ePortfolio definitions have been identified, contributing to the conceptual confusion. Definitions range from considering the ePortfolio as a collection of artifacts for a certain purpose (IMS Global Learning Consortium, 2005), to describing it as an information management system that uses electronic media and services (Haywood et al., 2007), or a combination of the two (Challis, 2005) For the most part, the literature revolves around the use of ePortfolios in education for learning purposes. This can be explained by the fact that the concept originally arose in this setting with the use of paper-based portfolios. It was defined as a selection of student's work for learning and assessment purposes, emphasizing the importance of aspects such as self-reflection and the student's ownership of the learning process (Paulson, Paulson, & Meyer, 1991). The electronic portfolio became a topic of growing scientific interest in the early 2000s; nevertheless, the literature remained predominantly rooted in the educational context. In the contemporary literature, ePortfolios are typically characterized as having three distinct purposes: facilitating the learning process; demonstrating learning outcomes through assessment; and showcasing learning outcomes to others (National Learning Infrastructure Initiative, 2003; Balaban, Divjak, & Kopić, 2010; Greenberg, 2004; IMS Global Learning Consortium, 2005). There is a consensus among scholars and practitioners that the concept is useful for career purposes, such as professional development, career planning, and job seeking (Amarian & Flanigan, 2006; Balaban, Divjak, & Mu, 2011; Cambridge, 2010; Greenberg, 2004; Jafari & Greenberg, 2003; JISC, 2007; Tosh & Werdmuller, 2004).

The job-matching process is contingent on the availability of representative and reliable information about the demand and supply sides of labor (Isgin & Sopher, 2013; Mortensen, 2010). The career ePortfolio can be utilized to provide this as part of the online job search, which has become a significant component of the job-searching process over the past years. Kuhn and Mansour (2011) found that an Internet job search reduces individual workers' unemployment durations by 25%. They replicated Kuhn and Skuterud's (2004) study, in which it was found that unemployed workers who utilized an Internet search in fact endured longer unemployment durations compared to their offline searching counterparts. One explanation provided at the time was that the online job search is an inferior job-searching tool. The 2011 replication had a different outcome, proposing that the reduced unemployment durations that they found can be attributed to a significant uptake in Internet use and connectivity, consequent new low-cost channels of interaction between job seekers and firms, and an overall improved design of Internet job search sites, such as Linkedin and Monsterboard (Kuhn & Mansour, 2011). However, despite these improvements, it can be argued that given the labor market problems of today, the need to enhance the job-matching process is still present.

Cyclical and Structural Developments and Career ePortfolios

Labor market problems can result from either cyclical economic problems or structural shifts. In order to explain the role of these two phenomena, one can start by looking at the behavior of a labor market over time. Macroeconomists use the Beveridge curve for this

purpose (see Figure 1). The Beveridge Curve, named after economist William Beveridge, is a graphical depiction of the relationship between a labor market's vacancy rate and the unemployment rate. The behavior of the curve represents the state of the economy and can be helpful in determining if there are cyclical economic problems or structural ones. On the vertical axis, the job openings rate measures the number of unfilled jobs in a labor market, whereas on the horizontal axis, the unemployment rate represents the number of unemployed job seekers. Generally, in times of cyclical economic decline the unemployment rate is high, whereas the job vacancy rate is low. This can be recognized by a downward sloping movement of the Beveridge curve towards the lower-right. In the case of structural changes, the curve is likely to shift out or inwards, indicating the changing degree of efficiency at which a labor market operates (Daly, Hobijn, Şahin, & Valletta, 2012; Mortensen, 1994). For example, an outward shift indicates higher levels of job openings for a given level of unemployment, indicating increased difficulty in matching job openings to unemployed workers.

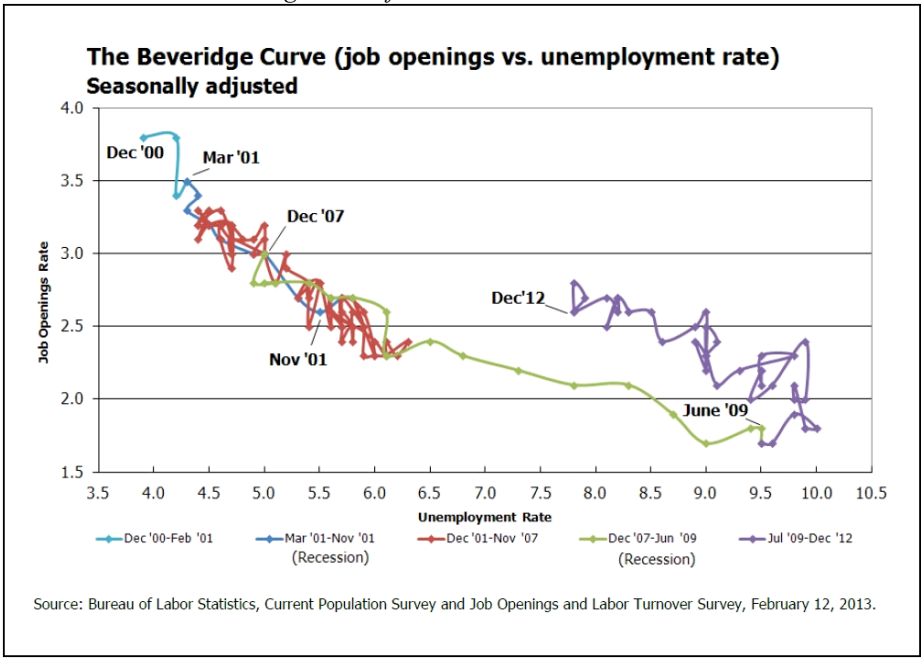
As can be inferred from Figure 1, the US economy suffered from a major economic contraction between December 2007 and June 2009, as illustrated by the decline in job openings and an increase in the unemployment rate. After 2009, the curve shifts outwards and shows a disproportionate increase in the number of vacancies relative to the unemployment rate. This suggests a less efficient matching of workers to jobs (Federal Reserve Bank of Chicago, 2012). This shift outwards is also observed in many OECD countries, especially in the United Kingdom and Sweden. There are several possible explanations for the shift.

First, it is possible that the shift is the result of cyclical economic behavior and therefore expected to be of a temporary, frictional nature. Unemployment rates are known to respond more slowly than vacancies to economic shocks, due to job matches not being instantaneous (Mortensen, 2010). Another contributing factor may be that given the economic uncertainty, firms' recruiting intensity declined (Barnichon, Elsby, Hobijn, & Şahin, 2012). Employers are also known to be more selective in times of a recession; given the large number of jobseekers, they keep searching for a better alternative (Capelli, 2011). At times, this results in over-inflated selection criteria (Zimmer, 2012). Conversely, the search intensity of the unemployed may also have declined, due to extensions of unemployment benefits or discouragement (OECD, 2011a, 2011b). Second, it is possible that the shift reflects a structural rather than a cyclical change, since there are increasing levels of both unemployment and vacancies (Shiferaw & Robertson, 2010). Furthermore, when comparing the current behavior of the Beveridge curve to the previous post-recessionary period, no previous significant outward shift can be observed (Bureau of Labor Statistics, 2011). Therefore, it can be argued that the shift is indicative of a worsening structural mismatch between certain characteristics of jobseekers and job vacancies. Third, it is possible that the behavior of the Beveridge curve reflects a shift from a cyclical to a structural change (DeLong, 2010) or a combination of both cyclical and structural changes (Bureau of Labor Statistics, 2011; Diamond, 2013; Shimer, 2005). The latter is suggested in a recent analysis of the US labor market, which revealed patterns indicating a strong cyclical and a relatively small structural effect on the unemployment rate (Levine, 2013). In a different recent study, it was proposed that out of all OECD countries, the US was the least vulnerable to an increase in structural unemployment (Guichard & Rusticelli, 2010).

With regards to cyclical changes, the career ePortfolio could prove to be valuable in the matching of workers during times of fluctuating demands for labor. When information about worker and job characteristics in a certain labor market (e.g., in a certain region) is transparent, this enables the reallocation of workers by helping them to find suitable work at various organizations whose demands for labor can be affected differently (Bonin et al., 2008). Furthermore, the career ePortfolio could be a viable concept in light of careers becoming increasingly boundaryless, with more complex and multifaceted career progression across boundaries of organizations, sectors, and regions (DeFillippi & Arthur, 1996; Gunz, Evans, & Jalland, 2000). To help facilitate this in Europe, the Europass initiative has been introduced to enable citizens to communicate their skills and qualifications in a uniform manner across European borders. Europass consists of several standardized documents, among which are a curriculum vitae, a language passport, and various documents issued by educational and training authorities. These documents include information about an individual´s skills and knowledge that is recognized across the continent. However, the information included is relatively broad and generic, as a standardized common skills and competence model is still under development (Open Education Europe, 2010). Currently, the European Commission is coordinating the development of European Skills, Competences, and Occupations (ESCO), which is a European classification of jobs and skills that can be utilized to complement the Europass initiative.

In the case of structural changes—for example, when new technologies emerge that may lead to the obsolescence of certain skills— workers whose skills no longer match those required of them find themselves in a precarious situation. This situation can be prevented

Figure 1
The Beveridge Curve for the US in the 2000-2012 Period



by workers investing in their employability, maintaining a varied and transferable competence package that can facilitate necessary transitions to employment in other environments (van der Heijde & van der Heijden, 2005). Cyclical and structural developments are both associated strongly with mismatches on the labor market, with various manifestations.

Labor Market Mismatches and the Career ePortfolio

In economic terms, a mismatch on the labor market is an imbalance between the supply of and demand for human capital. The concept of mismatch arose in the 1980s, when economists attempted to clarify the sustained rising levels of unemployment in Europe (Sahin et al., 2010).

There are several types of mismatches. First, a quantitative mismatch indicates that there are fewer workers available than jobs, or vice versa. It is anticipated, for example, that many OECD countries will deal with labor shortages in the future as a result of the aging working population (Gautier & Teulings, 2011). Second, there can be a geographical or regional mismatch resulting from a geographic dispersion of jobs and suitable workers. For instance, in the Brainport area in the Netherlands, due to regional shortages many high-tech organizations are being forced to recruit suitable workers internationally (NRC, 2013). Third, there can be a mismatch of preferences among workers and types of jobs available. This occurs when certain characteristics of available jobs do not correspond to the preferences of the job seeker. For example, a worker may be unwilling to accept a certain job when he deems the remuneration, working conditions, or status it provides to be insufficient (Boswell, Stiller, & Straubhaar, 2004).

Mismatches can be categorized either as long-run aggregate qualitative mismatches or as short-run qualitative or quantitative mismatches (Sattinger, 2012). Long-run aggregate qualitative mismatches follow from structural changes in the economy that alter the mix of job and worker characteristics. Such changes include technological change, globalization, capital investments, and changing educational policies. Mismatches on this level, it is argued, lead to job polarization, inequality, and restricted firm expansion and economic growth (Sattinger, 2012).

Short-run qualitative and quantitative mismatches are the result of two fundamental labor market features that lead to mismatches, namely that great variety exists among both jobs and workers, and that search frictions prevent firms and workers from being fully informed about each other. These mismatches often occur upon entry into the labor market, causing workers to change jobs frequently, deal with spells of unemployment, and accept positions for which they are over- or underqualified (Sattinger, 2012; Wolbers, 2003). For firms, evidence was found that firm productivity is

positively related to the proportion of overqualified workers, and negatively related to the underqualified (Kampelmann & Rycx, 2012). For the economy as a whole, as research by Gautier and Teulings (2011) has shown, mismatches cause a 5% to 10% loss in output for the economy, following from idle sources like the unemployed, spending resources on recruitment activities, and the sub-optimal assignment of workers to jobs.

While this might be a feasible investment for international organizations such as Philips and ASML, companies with a smaller scope of business might not possess the resources or the desire to recruit personnel internationally. Therefore, other than a career ePortfolio for the jobseeker, there should also be a portfolio of the firm at which a worker applies. For example, the online job search engine Glassdoor offers prospective workers with information provided by current or past employees of a company in order to help workers make informed decisions. The information provided relates to remuneration, company reviews, and experiences with the recruitment process. Another website, WikiJob, provides insight into the graduate recruitment process and working life of several companies in the United Kingdom. Job seekers, graduates, students, and employers can all contribute information to this independent website. This information can help individuals to make informed decisions about the compatibility of the job with their work values, which is known to affect job choice decisions (Judge & Bretz, 1991).

It is important to note that being well matched with respect to qualifications does not rule out the possibility of being mismatched with respect to skills. A horizontal mismatch is estimated to occur in one out of every five jobs and occurs when the type of qualifications or skills does not correspond with those required for the job (Sattinger, 2012). The career ePortfolio can be utilized here to enhance a worker's employability. This can be achieved by facilitating the identification of prior learning, the development, demonstration, and presentation of competences through processes of formal, informal, and non-formal learning over the course of a lifetime (lifelong learning). Formal learning occurs within an organized and structured context such as educational settings and in-company training; non-formal learning consists of learning embedded in activities that are not designated as for learning such as on-the-job learning; and informal learning is defined as learning resulting from daily life activities such as work or leisure (Bjornavold, 2000). The learning outcomes can be formalized and validated through assessments and competence tests that can then be used for matching purposes. The mismatches described above result partly from cyclical and structural developments and partly from manifestations of heterogeneity among workers and jobs. The latter feature of the labor market is largely responsible for the state of contemporary labor markets, as it elicits search frictions that hinder the effective allocation of workers to jobs. These search frictions will be further detailed below in order to further develop the criteria for a career ePortfolio.

Search Frictions and the Career ePortfolio

In the process of matching, search frictions arise due to imperfect information about mostly heterogeneous workers and jobs and a lack of coordination. The key implication is that due to the presence of search frictions, the labor market fails to clear structurally, and unemployed workers coexist together with unfilled vacancies. The work of Nobel laureates Diamond, Mortensen, and Pissarides is considered to be among the most significant contributions to the standard theory of equilibrium unemployment, which recognizes that labor market trade is a costly and time-consuming process. Their theoretical contributions can be applied to other contexts as well, such as the housing and even the marriage market. These markets have in common that agents spend time and resources to meet, typically strive for long-term relationships, and compete with one another. In these markets, a house, partner, or job is deemed of acceptable quality when its expected future value exceeds the expected value of a continued search for a better alternative (Mortensen, Pissarides, Tatsiramos, & Zimmerman, 2011).

Search frictions result in two distinct phenomena that contribute to mismatches: costly job search and adverse selection.

Costly Job Search

In the labor market, jobs differ with respect to terms, location, remuneration, career development prospects, and skills required of the worker, as well as other characteristics. Among workers, there is great variation in their skillsets, preferences, and other relevant attributes. This makes it difficult for workers and firms to make informed decisions (Mortensen et al., 2011). Because information is costly, workers and firms have to invest in resources in pursuit of a productive match (Katz & Stark, 1987; Mortensen et al., 2011). The costs for workers are related to collecting information and applying for jobs. In turn, firms invest in recruitment and selection activities, such as posting job vacancies and conducting assessments. Both parties are hereby aided by online job boards, which have the potential to reduce search frictions by the distribution of labor market information at a lower cost than workers and firms could obtain for themselves. However, job vacancies typically lack adequate descriptions of the

skill attributes or competences required by firms, making it difficult for jobseekers to demonstrate their suitability (Bennett, 2002). Furthermore, due to the conceptual fragmentation of the term "competence," in contemporary recruitment practices competences are typically approximated based on one's qualifications. This is problematic, as empirical evidence has shown that a match between qualifications and job requirements is an insufficient condition for a good skills match (Quintini, 2011). In addition, qualifications imply the presence of competences, often without making these explicit (Barker, 2003). Furthermore, this approach is time-bounded, without consideration of continued (or life-long) learning through experience and on-the-job learning (Sattinger, 2012; Winterton, 2009).

In "Wiring the Labor Market" (2001), Autor introduced the useful distinction between "low bandwidth" and "high bandwidth" information relating to a worker's attributes. The former refers to such data as education, credentials, working history, and salaries, which are considered to be objectively verifiable and available in abundance through the Internet. The latter category involves features such as quality, motivation, and "fit," which he deems of crucial importance for a match and relatively hard to verify without direct interactions and interviews. Autor suggested that by transforming the operation of labor markets through standardization, matches can improve and adverse selection be reduced. This can be achieved by developing detailed, verifiable, and uniform skill certificates, on which basis matches are formed. However, given the heterogeneity among workers and jobs, it is questionable whether this is a realistic solution. The proposed alternative is to facilitate more detailed information disclosure through electronic resumes, which "may ultimately provide—in addition to credentials and experience—project portfolios, dockets of customer evaluations, and even standardized personality assessments" (Autor, 2001, p. 36).

The implication for the career ePortfolio is that it should be part of a transparent information system that includes individual and aggregate information about the competences of workers, which can be offset against those of firms in certain sectors and regions. This can facilitate the strategic personnel planning of firms and foster the ability of individuals to anticipate and react more adequately to the effects of job creation and destruction. Furthermore, this information can aid educational institutes and the government in the development of appropriate curricula and labor market policies.

Because of its various interpretations in the literature, "competence" is a concept surrounded by ambiguity and confusion. The term is used in a variety of models and approaches, complicating practical applications of the concept (Weinert, 1999; Winterton, 2009). With respect to job matching, competencies can be used by firms as the basis for establishing requirements for effective performance in a job (Hoge, Tondora, & Marrelli, 2005; Sattinger, 2012). Following an extensive literature review, Winterton, Delamare-Le Deist, and Stringfellow (2005) proposed a typology consisting of cognitive, functional, social, and meta-competences. The first three are in line with the influential Bloom's taxonomy (Bloom, Mesia, & Krathwohl, 1964) and, respectively, represent knowledge, physical skills, and attitudinal competences. Meta-competences were also included to represent the degree to which individuals can learn, adapt, anticipate, and create. These are related to processes of learning and reflection that are critical to the development of new mental models in various jobs (Briscoe & Hall, 1999; Brown, 1993; Kolb, Lublin, Spoth, & Baker, 1986). Competence utilization and development are dependent on the context in which they take place (Hodkinson & Issitt, 1995). Abstract, narrow descriptions of competence fail to represent adequately their complex nature in a working context (Attewell, 1990).

Competences can be divided into the vocational (field-specific) and generic categories. This distinction is important, as vocational competences are known to influence positively the chance of being matched inside a jobseeker's occupational domain, whereas generic competences increase the likelihood of being matched outside of one's domain, stimulating inter-sectoral mobility (Heijke et al., 2003).

Matching on competences can be facilitated by career ePortfolios by including information about available competences of graduates, the employed, and the unemployed, as well as information about competences required by organizations, provided that both the workers and firms have a shared understanding of the competences involved. This is contingent on these parties using the same terminology, which is a challenge of considerable proportion, given the intrinsic heterogeneity of workers and jobs (Autor, 2001). There is a top-down development in Europe to stimulate this with the EQF (European Qualifications Framework), although at the time of writing, this initiative suffers from the lack of a conceptually sound framework (Winterton, 2009). Apart from working towards a shared understanding of competences, it is crucial that this information be communicated effectively between ICT tools and services (e.g., different career ePortfolio systems). Several technical standards and information models have been developed to facilitate this interoperability, among them the NTA-2035 ePortfolio standard in the Netherlands, the international Leap2A ePortfolio standard, and the European funded InLOC project, which was conducted to enable the

representation of learning outcomes and competences across different career ePortfolio systems.

Blings and Spöttl (2008) proposed that a bottom-up approach, developing the framework through empirical analysis on the sector and occupational levels, is more feasible. The US-based Occupational Information Network (O*NET) system resembles this approach. It includes almost 250 measures of skills, abilities, work activities, training, work context, and job characteristics for approximately 900 different occupations in the US. Striving for current labor market data, the information is retrieved periodically from workers through survey questionnaires (United States Department of Labor, 2013). In addition, there are developments in the field of semantic matching, which entails the automated matching of competences by identifying similarities in their underlying meaning (Fazel-Zarandi & Fox, 2009). Given the wide variety of contexts in which competence development can take place, credibility is also an important consideration (Barker, 2003). This can be countered by the implementation of certain validation mechanisms, such as rubrics and feedback.

Adverse Selection

The presence of costly and asymmetric information inhibits an externality of adverse selection. Following the principles of Akerlof's (1970) classic Market for Lemons model, both workers and firms possess private information that might be of interest to each other and to other trading partners. For workers, the information can be related to the amount of training the worker has received and/or the worker's abilities (Chang & Wang, 1996; Katz & Ziderman, 1990). This harms the value of the worker to other firms, as the value of a worker is contingent on this type of information (Katz & Ziderman, 1990). Jobseekers need to signal their suitability for a job, while firms need to utilize various technologies to screen these candidates (Jovanovic, 1984).

Adverse selection is likely to arise because jobseekers may apply for jobs whose skill requirements they cannot meet. The risk of adverse selection is reinforced by the growth of Internet job searching, which lowers the barriers to applying for jobs. A natural consequence is that more workers will apply for more jobs (Autor, 2001). This lowers the average quality of the applicant pool and increases both the cost of selection and likelihood of mismatch (CEDEFOP, 2012). Adverse selection can also occur through opportunist behavior among workers and firms. Both parties can choose to conceal information or provide false information to the other party in an attempt to maximize the return from the match. Workers can, for example, misrepresent their skill and productivity levels during a job application. As a consequence, the equilibrium return to jobseekers' skill investments is reduced (Akerlof, 1970; Kuhn & Skuterud, 2004).

Adverse selection can be mitigated by facilitating and, either implicitly or explicitly, compelling workers and firms to disclose information through career ePortfolios that they would rather keep to themselves. An example for workers is the job search engine AlmaLaurea, set up in 1994 by a consortium of Italian universities, which revealed detailed administrative records for its students in the database, including information such as grades and rank in class. This made it possible for potential employers to screen the candidates based on credible information. As a consequence, the ability of lower performing students to misrepresent themselves was reduced. Furthermore, because firms can ascertain easily which students are high-performing, excelling students needed to put less effort into signaling their abilities. An empirical analysis has resulted in compelling evidence that this site has reduced the unemployment rate of the participating graduates. The career ePortfolio could work in a similar manner by adding information about the students' competences. While this system raises concerns about whether only successful students will grant permission to be included in the system, it could be argued that less successful students are implicitly compelled to do the same, as their absence from the database might cause employers to make unfavorable inferences about their competences.

For firms, the job search engine Glassdoor provides prospective workers with information provided by current or past employees about a company to help them in screening a job, preventing a potential mismatch of preferences. The information includes salaries, company reviews, and experiences with the recruitment process. However, because the information provided by (former) workers is not necessarily credible and may be biased (and even inhibit an externality of adverse selection, in case the reviewers are predominantly unsatisfied), the need for organizations to signal company and job characteristics remains. If an organization were to disclose this information voluntarily, in addition to detailed information about the competences they require from workers, qualitative and preferential matches could be avoided.

Conclusion

The career ePortfolio can prove to be a valuable instrument for matching workers to jobs, a process that is becoming increasingly dependent on information and communication technology in online job searches. Despite its advancements, the need to gather relevant information about workers and jobs is still present. By facilitating a more detailed and systematic disclosure of

information relevant to a match, the career ePortfolio may boost the quality of matches and the mobility of workers, and it holds the potential to decrease unemployment levels and the transaction costs related to a match.

By looking at recent labor market statistics, it can be inferred that many labor markets are affected by structural shifts and cyclical recessionary effects. The career ePortfolio can enable workers to maintain their employability levels by developing a varied and transferable set of competences, in order to be less threatened by competence obsolescence. Furthermore, the career ePortfolio can facilitate the reallocation of workers across the boundaries of affected organizations, sectors, and regions.

Given the various manifestions of mismatches in the labor market, the career ePortfolio needs to go beyond profiling individual jobs or workers. It should be part of an information system that contains information on both the aggregate and individual level. Workers need to be able to establish where suitable jobs are located, and in what quantity. Conversely, for personnel planning purposes, organizations need to be informed about the degree of availability of suitable workers. The information in this system can also help educational and governmental institutes develop appropriate curricula design and labor market policies.

Due to the nature of search frictions, the career ePortfolio should contain information about the competences possessed by workers, as well as those required in jobs by firms. A major challenge here relates to the required mutual understanding about competences by firms and workers. Given the heterogeneity among workers and firms, it is hard to align their terminology and understanding of the ambiguous term. Other challenges follow from the need for credible information, in order to prevent workers and firms from misrepresenting themselves.

While the potential utility of the career ePortfolio is evident first and foremost from a theoretical perspective, there is a need for empirical support to further investigate its practical merits. As part of a government-support project in the Netherlands, between 2012 and 2015 the above mentioned theoretical promise of the career ePortfolio, as well as related challenges, were empirically researched. The most challenging issues are as follows: compatibility of different competence languages; implications for HRM departments in organizations; support for individuals in building a career ePortfolio; ownership of data, security, and privacy; individual and organizational perceptions; and credibility and validity of information.

Compatibility of Different Competence Languages

Exchanging information about competences between workers and firms requires a shared understanding of its meaning. Therefore it is of crucial importance to explore the possibilities for this. In the research project, experiments are conducted with the creation of a universal competence framework, as well as with semantic-based competence matching.

Implications for HRM Departments in Organizations

Organizations typically utilize organization-specific instruments as part of their personnel management−for example, through assessments in cycles of appraisal. Because the career ePortfolio requires the transferring of information stored in these systems, the extent to which career ePortfolios can be integrated with these systems needs to be established.

Support for Individuals in Building a Career ePortfolio

There are substantial differences in digital literacy among the working population. Furthermore, competence assessments are often costly. Support and guidance therefore are required to help facilitate the recognition of competences on a large scale.

Ownership of Data, Security, and Privacy

Information about an individual's competence is often made explicit in organizational or education-specific processes, such as assessments. This raises questions about who owns the data: the individual or the organization that provides the tools for assessment. Furthermore, concerns of privacy and data security are the subject of global public debate. In 2012, social networking site LinkedIn suffered a hack that resulted in over six million accounts being compromised. Given the sensitivity of information that can be stored in a career ePortfolio system, the safety of this information needs to be ensured. The European Commission funds several projects in which experiments are conducted to ensure a reliable distribution of personal data. One such project is TAS3, in which the aim was to give the individual full control of his or her personal data within a trusted services network. An infrastructure was developed in which compliance with data protection was preserved (Centre for International ePortfolio Development, 2012). Follow-up projects are being undertaken at the time of writing this article (ABC4Trust, 2014).

Individual and Organizational Perceptions

Career ePortfolio use is contingent on the perceptions and attitudes of workers and firms. Anecdotal evidence from the project shows that organizations are wary of facilitating career ePortfolios, fearing that they will lose their best personnel to competing organizations. Furthermore, individuals fear that the information collected for the career ePortfolio

can be used to their detriment, for example in reorganizations. These concerns need to be explored further systematically.

Credibility and Validity of Information

Competences can be developed in various settings that are not always supported by assessment tools, especially in non-formal and informal learning settings. Therefore, it is a major challenge to ensure that claims made about competences are credible and valid.

Given the variety of these challenges, answers will be sought through a multi-disciplinary research approach and through examining relevant international practices and developments.

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Using Introductory Videos to Enhance ePortfolios and to Make Them Useful in the Hiring Process

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This article explores whether or not there is a more effective way to develop and present portfolios to make them more meaningful and usable in the hiring process. An example of a pilot ePortfolio, with an accompanying three to four-minute introductory reflective video highlighting the pre-service teachers' beliefs about education, was shown to 15 practicing public school principals who represented a variety of school sizes, community locations, and grade levels. Semi-structured interviews addressing the potential use of ePortfolios and introductory reflective videos in the hiring process were conducted with participating principals. This article includes descriptions of how principals may make use of ePortfolios in selecting teachers. For instance, in contrast to the extremely minimal use of binder-based and traditional electronic portfolios, 93% of principals interviewed indicated they would use the introductory videos contained in the ePortfolios during the hiring process. This article includes a number of additional findings supported by rich qualitative data, suggestions for ways to improve on the pilot ePortfolio, and links to an example of the pilot ePortfolio (http://geturl.uww.edu/1o3) and to an example of the next version of the ePortfolio (http://geturl.uww.edu/1o2).

In most schools of education, portfolios are used to showcase students' teaching talent. On the one hand, many students' believe that if they create an outstanding portfolio that displays them in a favorable light, they will likely acquire a teaching job. On the other hand, principals report not having enough time to review portfolios during an interview (Mosely, 2005; Temple, Allan, & Temple, 2003; Whitworth, Deering, Hardy, & Jones, 2011), so that all too often the hard work of the student goes largely unnoticed. Herein lies the question. How can portfolios be designed to be more useful in the hiring process?

The purpose of this study was to investigate how ePortfolios might be designed to be more useful in the hiring process. The primary research question was: How do principals view and indicate that they might use the current pilot version of an ePortfolio, with an introductory video, in the hiring process? In particular, would an introductory video of students discussing their beliefs about education make the ePortfolios more valuable to principals? In addition, the researchers asked principals for recommendations for improving the ePortfolio so that it might be more valuable to potential employers.

Literature Review

What are Portfolios, and What Should Be Included in the Portfolio Quiver?

Portfolios are commonly used in graduate and undergraduate programs in a variety of disciplines, such as architecture, art, and elementary education. A portfolio has been described as a "systematic and purposeful collection of work samples that document student achievement or progress over a period of time" (Yao et al., 2008, p. 10). In the educational profession, portfolios are required by the National Board for Professional Teaching Standards for national certification (Zeichner & Wray, 2001). In teacher education, portfolios are simply containers that hold various examples of teacher candidates' work and learning, as well as teaching artifacts from student teaching. Early portfolios were generally written on paper and bound in three-ring binders.

Research has been conducted on the different types of materials that should be included in a portfolio. In surveying 15 representatives from Midwest colleges and universities, Boody (2009) reported that portfolios should include basic credential file items, such as transcripts, letters of recommendation, and student teaching evaluations. Antonek, McCormick, and Donato (1997) were much more specific and extensive in detailing portfolio contents. They labeled the portfolio contents "evidence" of teaching and said that portfolios should include

> sample lesson plans, notes from conferences with the cooperating teacher or [university] supervisor, photographs of bulletin boards, sample tests, quizzes, worksheets, activities, observation notes, evaluations of teaching, summaries of articles that directly informed teaching, examples of student work, evidence of school involvement, evidence of class management, and video and audio tapes of a lesson. (Antonek et al., 1997, p. 18)

Students should avoid including too many artifacts in their portfolios; instead, they should carefully identify and selectively include portfolio

material that best represents their beliefs and their orientation to teaching.

Increasing Use of ePortfolios

As technology grows and changes, the traditional paper-based portfolio "has gradually evolved into an electronic portfolio or ePortfolio" (Sircar, Fetzer, Patterson, & McKee, 2009, p. 121). Abrami and Barrett (2005) defined an electronic portfolio (i.e., ePortfolio) as "a digital container capable of storing visual and auditory content including text, images, video, and sound" (p. 2).

In business. Beyond the field of education, there appears to be increased use of ePortfolios in hiring, especially in business-related fields. For example, Yu (2012) studied the potential use of the ePortfolio in a wide range of industries including tourism, product design, real estate, information and technology, insurance, recruitment service, and so forth. Moreover, some industries have begun to experiment with new visual resumes called "visumes" for job applicants (Sengupta, 2013; Young, 2013).

In teacher education. Similarly, Milman (2005) found that teacher educators have been exploring the use of digital teaching portfolios. According to Milman (2005),

> Digital teaching portfolios, sometimes referred to as multimedia portfolios, electronic portfolios, e-portfolios, webfolios, and electronically-augmented portfolios are similar to traditional teaching portfolios in content but present professional materials in digital format. Professional materials included in digital teaching portfolios are electronic media such as audio recordings, hypermedia programs, databases, spreadsheets, videos, and word processing. (p. 374)

Furthermore, Lambert, DePaepe, Lambert, and Anderson (2007) found that an electronic "portfolio provides opportunities for students to showcase their talents, creativity, and individuality, as well as technological capabilities" (p. 76). In addition, according to Goldsmith (2007), the electronic portfolio is more flexible, often allowing for convenient and less cumbersome access and viewing than do traditional paper or binder-based portfolios. Thus, while ePortfolios may be somewhat similar in content to traditional portfolios, they may augment or enhance the presentation of content through the use of electronic media, including audio, video, hypermedia, and so forth. In addition, they may also be more convenient to access and use than traditional paper portfolios.

Lieberman and Rueter (1997) suggested that ePortfolios "should be a solid reflection of teacher development, quality of teaching, student learning, and quality teaching process and products, and a selective inclusion of electronic media can aid in meeting these teaching portfolio goals" (p. 46). When used well, electronic portfolios can provide information about an applicant well beyond what can be viewed on paper (Temple et al., 2003). ePortfolios can be designed to include evidence or artifacts that demonstrate the pre-service students' ability to teach. For instance, according to Yao, Aldrich, Foster, and Pecina (2009) "a portfolio needs to be designed to furnish real evidence of teaching competencies. Such evidence may include video-clips of teaching" (p. 36).

Video. Inclusion of videos in an electronic portfolio has the potential to bring the candidate to life and to provide examples of the pre-service teacher in action. Various researchers (e.g., Painter & Wetzel, 2005; Theel & Tallerico, 2004; Yao et al., 2009) have recommended including videos in pre-service teachers ePortfolios. In particular, when examining ePortfolios used in the hiring process, Strawhecker, Messersmith, and Balcom (2007/2008) found that 65% of the principals who responded (n = 37; response rate 37%) were interested in viewing a video clip of the teacher interacting with students in a classroom setting.

The Primary Purposes and Uses of Portfolios

According to Milman (2005), "who the audience is will greatly affect the contents and presentation of the portfolio" (p. 376). The problem for students is that there are many audiences, including teacher educators, licensure evaluators, and school administrators who wish to see evidence of student reflections and are charged with evaluating student growth. These audiences lead to three complementary and, at times, conflicting purposes for pre-service teacher portfolios. These are: reflection, evaluation, and hiring. While the pilot ePortfolio version, which is the focus of this study, encompasses all three purposes of portfolios, this article primarily focuses on the use of portfolios in the hiring process.

Reflection. A central purpose of portfolios is to cultivate, enhance, and document student reflection. This is perhaps the most frequently cited reason for having students create a portfolio (e.g., Antonek et al., 1997; Mansvelder-Longayroux, Beijaard, Verloop, & Vermut, 2007; McKinney, 1998; Zeichner & Wray, 2001). For example, according to Wolf and Dietz (1998), "More than anything else, the portfolio process should inspire reflection—alone and in the company of others, in writing and in conversation, in planning and in documenting one's teaching" (p. 14).

Fredrick (2009) suggested that reflection is key and that portfolios should include student insights about what has been learned and what needs to be learned. He

went on to identify three sub-skills. One, students can clearly articulate that they learned a skill and are able to name that skill. Two, students are able to point to evidence in their work that shows specific learning; and three, students are able to set goals for future learning (Frederick, 2009).

In terms of ePortfolios, Wetzel and Strudler (2008) found that teacher education faculty felt that ePortfolios enhanced student reflection and learning and fostered students understanding of the program's teacher standards. Painter and Wetzel (2005) found that the inclusion of video clips in ePortfolios was valued for its ability to give information about the applicant's relationships with students and ability to reflect on teaching. "Principals talked about how much they valued reflection in a candidate and liked hearing the person reflect on the video" (Painter & Wentzel, 2005, p. 26). Moreover, as a corollary to their reflective growth, Wilson, Wright, and Stallworth (2003) found that through the development of ePortfolios, student teachers also grew in their technological abilities.

Evaluation. Pre-service teacher portfolios are used for evaluation of pre-service teacher growth, as well as for evaluation and program revision in college/university teacher education programs. Some authors have identified portfolios as "barometers" of fulfilling teaching standards (Milman, 2005), "exfoliation devices" that peel back the layer of learning (Norton-Meier, 2003), an authentic assessment tool when used by colleges and universities (Guillaume & Yopp, 1995; McKinney, 1998; Wilson et al., 2003), and a repository of evidence that students are meeting the standards (Delandshere & Arens, 2003).

Portfolios are used as a way to evaluate pre-service teachers' readiness to become teachers. According to Vincent, Montecinos, and Boody (1997), "increasingly, teacher education programs across the country are requiring that their students develop portfolios to document their professional growth and teaching competencies" (p. 33). Many teacher education programs require their student to successfully pass a pre-service teacher portfolio prior to certification. Thus, pre-service portfolios have become high-stakes tests that many students must pass in order to be recommended for licensure.

Hiring. The final primary purpose for portfolios is as a resource or tool in the hiring process. In this respect, the research literature is a bit mixed, meaning that some studies appeared to indicate the benefits of portfolios in the hiring process, while other studies suggested limited use by administrators.

One way in which portfolios help in the hiring process is that all the work in compiling and reflecting upon their teaching may help teaching candidates prepare for job interviews. For example, Whitworth et al. (2011) concluded:

> Respondents in this study noted the value of portfolios in helping prospective teachers reflect on their abilities and skills and to anticipate and organize answers to possible interview questions. In this regard the portfolio can be an excellent tool for teacher applicants in preparing for job interviews. (p. 102)

In a national survey of school districts, Anthony and Roe (1997) found that although few school districts required portfolios in the application process, more than 50% of these districts later requested portfolio at the interview stage. Strawhecker et al. (2007/2008) found that past use of ePortfolios in the hiring process indicated future use. In other words, if the persons responsible for hiring have used ePortfolios in the past, chances are that they view ePortfolios as beneficial and would be willing to include them in future hiring decisions.

Still, much of the research evidence suggests that administrators and those charged with hiring teachers underutilize portfolios in the hiring process and undervalue what is presented in candidates' portfolios. To begin with, one significant barrier to principals using ePortfolios in the hiring process is that many principals may lack adequate technological skills to examine the ePortfolios effectively (Strawhecker et al., 2007/2008; Temple et al., 2003). Simply put, if principals do not feel comfortable accessing and navigating ePortfolios, it is unlikely that they will use them in the hiring process.

Whitworth et al. (2011) surveyed teacher educators (n = 127; response rate 12.8%) and administrators (n = 41; response rate 6.5%) in order to discern the value and use of portfolios in hiring, the quality and accuracy of portfolios, and the problems and barriers of using portfolios in hiring. Findings indicated administrators gave *some* weight (58%) to the portfolio in the hiring process. While teacher educators and administrators saw some value in using portfolios in the hiring process, "they did not perceive portfolios as having greater or even as great a value as other factors" (Whitworth et al., 2011, p. 99), such as direct observation of a candidate teaching. The limited use of portfolios in the hiring process was attributed largely to the administrators' lack of time to review them. The authors concluded, "The time factor could be controlled better with ePortfolios, particularly those that are web-based. The digital and hypermedia capabilities of such portfolios can make the selecting, organizing, and viewing of

portfolio items much more efficient" (Whitworth et al., 2011, p. 103).

Mason and Schroeder (2010) randomly selected principals from southeastern Wisconsin (n = 60; response rate 100%) and asked them various questions about hiring. They found a relatively neutral effect of portfolios and ePortfolios on the hiring process. On a scale of 1 to 5, the average response for the importance of a portfolio was 2.57 and of an ePortfolio was 2.54. Both of these responses fell between *somewhat unimportant* to *somewhat important*. Principals' comments helped to explain the neutral effect of portfolios and ePortfolios on the hiring process. For example, principals stated:

- "I just don't have time to look at a portfolio during an interview."
- "If I have an ePortfolio before the interview, I *may* have time to look at it."
- "A good portfolio certainly won't get you a job!"

Sivakumarran, Holland, and Heyning (2010) also studied portfolios using a survey instrument. Forty-one superintendents, 172 principals, and six human resource personnel responded to the survey instrument in Wisconsin, and two superintendents (n = 900; response rate 42%), 291 principals, and one human resources person responded to the survey in Louisiana (n = 700; response rate 42%). Results indicated that approximately 91% of the people surveyed *do not* require teacher applicants to present a portfolio of their work during the hiring process. Further, 58% preferred a paper portfolio, while 38% preferred a web-based or CD-ROM portfolio. Furthermore, only 12% of the respondents indicated that a digital or ePortfolio increases an applicant's chance of getting hired. The authors concluded that "portfolios are not considered an integral part of the hiring process" (Sivakumarran et al., 2010, p. 4).

One hundred forty-two K-12 principals in Illinois responded to Kersten's (2008) survey (35.7% response rate), where he found that only 3.3% of the school districts required traditional portfolios and just 0.8% of districts required digital portfolios. Kersten (2008) concluded, "[Portfolios] are not yet seen as valuable tools in the teacher selection process, even though university teacher preparation programs often require students to develop them" (p. 361).

In another study by Theel and Tallerico (2004), 32 principals were surveyed and asked about the importance of portfolios in the hiring process. Principals voiced concerns about the relationship between a portfolio and the ability to teach. Principals indicated that the materials found in portfolios reflect not what potential teacher candidates can do but what they say they can do. Further, the interview itself was too short for principals to look fully at a portfolio. Portfolios were too large and cumbersome to view, collect, share, and store in advance. The authors concluded, "Portfolios do not provide credible evidence of candidates' teaching abilities or people skills" (Theel & Tallerico, 2004, p. 29). Finally, several researchers (Boody, 2009; Jacobson, 1997; Mosely, 2005; Vincent et al., 1997) reaffirm that teacher portfolios are not a primary factor in the hiring process.

Clearly, these research studies represent an apparent disconnect between what is required at the teacher education level and what is actually useful in the hiring process. Many, probably most, principals currently do not consider or extensively consider portfolios as part of the hiring process. Research suggests that currently ePortfolios may not be any more useful to principals than paper portfolios. If portfolios are being underutilized by principals in hiring decisions, the questions is: How can portfolios designed so that principals will want to make use of them in the hiring process? With this question in mind, the researchers developed a pilot ePortfolio with an introductory video and directly interviewed principals, the chief hiring agents in a school, to find out if such an ePortfolio might be more useful to them in hiring decisions and to discern how ePortoflios might be improved for use as tool in the hiring process.

Method

Procedure

Development of the ePortfolio. During the student teaching semester, seven social studies undergraduate students and one graduate student enrolled in a special course designed to foster reflection on student teaching. Students in this course were required to construct an ePortfolio using Desire2Learn ePortfolio (v.1.1.0) that included a three to four-minute introductory video, a philosophy statement, and evidence of meeting and reflecting upon the 10 Wisconsin State teacher standards. The example ePortfolio that was created by Kate Arnold and shared with principals for this study can be found at http://geturl.uww.edu/1o3.

The student's ePortfolio, which included an introductory video, was shared with 15 public school principals, representing a variety of backgrounds and school size. Principals came from rural as well as urban public schools and from both large and small schools. Because of the representative size and location of a school district was of primary concern to the researchers, principals were intentionally, rather than randomly, selected. The demographics of principals interviewed can be seen in Table 1.

Table 1
Principal Demographics by School Type

School Type	*N*	Females/ Males	Student Population (*M*)	Principal Experience (*M*)	Educational Experience (*M*)
Elementary	4	3/1	412	13	24
Middle	5	3/2	524	8	17
High	6	1/5	1133	13	29
Overall	15	7/8	738 (555.88)	11 (6.5)	23 (9.49)

Note. Means are rounded to the nearest whole number. Parentheses indicate standard deviation.

The ePortfolio that was shown to principals contained a 3 min 34 sec video that addressed: (1) the student's description of the ePortfolio and its contents; (2) an overview of the pre-service teacher's philosophy of education, significant educational and professional learnings, examples of educational strategies, ways to connect with students, as well as beliefs about classroom management; and (3) a discussion of strengths and weaknesses, as well as professional goals and plans. The actual Introductory Video Reflection Assignment is provided in Appendix A.

Semi-structured interviews. After giving the principals time to view the introductory video and to review the ePortfolio, the researchers conducted semi-structured interviews with each of the 15 principals involved in the study. The semi-structured interview protocol is provided in Appendix B. Follow-up questions were asked to explain, clarify, or elaborate on answers.

The interviews were conducted at each principal's school and ranged from 15 minutes to 1 hour and 15 minutes. Two of the semi-structured interviews were conducted by both researchers, six were conducted by the course instructor, and seven were conducted by the other researcher. Thirteen of the interviews were audiotaped and transcribed. Two additional interviews were conducted, but due to audiotape malfunctions, only notes were taken during these interviews.

Data Analysis

Based on the interview transcriptions and interview notes, an initial list of descriptive codes (Miles & Huberman, 1994) was created. These codes were reflective of the categories inherent to the semi-structured interview protocol questions. The constant comparative method (Glaser, 1965) was used "to generate theory more systematically" (Glaser & Strauss, 1967, p. 437) and to structure and systematize the data analysis. The constant comparative method combines coding and analytic procedures and involves the continual assessment and comparison of emergent codes and categories to one another. It was used to refine and develop new codes, and to link codes into larger categories or themes. In order to validate the findings, the two researchers discussed and negotiated coding and collaboratively combined broad categories into emergent themes (Patton, 2002). Where differences existed, the researchers discussed the issues in question until an agreement was reached. Throughout the article, illustrative quotes are provided for the reader as low-inference descriptors (Ary, Jacobs, & Sorenson, 2010).

Findings and Discussion

All of the administrators interviewed indicated that they currently either do not use or minimally use portfolios or ePortfolios in the hiring process. Consistent with the literature, the most commonly cited reason for underutilization of portfolios in hiring decisions was insufficient time to review portfolios. Many principals expressed regret, in that they realize how much effort candidates put into their teaching portfolios. As one principal, who has a daughter who was recently certified to teach, said,

> Prospective teachers who are out interviewing put a lot of time into those portfolios and are disappointed in how little they get looked at. I know that it is a requirement, so they have to go through the hoops regardless. I think it is frustrating. (Principal 3)

With this as a baseline, we now turn to the primary research question.

How Do Principals View and Indicate that They Might Use the Current Pilot Version of an ePortfolio, with an Introductory Video, in the Hiring Process?

In marked contrast to the administrators' history of extremely limited use of portfolios, when shown the pilot ePortfolio with the introductory video, most of the principals who participated in the study saw value in the pilot ePortfolio and indicated that they would incorporate such a portfolio into their hiring process. In fact, all but one (93%) of the principals indicated that

they would use a similarly structured ePortfolio with an introductory video for hiring purposes. One principal was quite candid about how prior to the interview, he did not anticipate that he would use the ePortfolio, but upon viewing it, he significantly changed his tone. He stated,

> I was doing this (interview) as a service to the university, quite honestly, because I really didn't think what this was going to be—this is good stuff. I mean, I didn't think that it was going to be as good as it is. (Principal 6)

Introductory video. The key to the pilot ePortfolio seems to be the introductory video, as all but one (93%) of principals indicated that they would use the introductory video for hiring purposes. The value of the introductory video is that it allows principals to connect virtually with the candidate and to get a visual as well as a quick overall sense of the person. For example, after viewing the introductory video, Principal 2 stated,

> I would look at the ePortfolio anyway, but I think that the video really enhances the ePortfolio . . . I think that it is wonderful . . . It is a whole different way to connect with a person without that person being here.

Similarly, another stated,

> Instead of me reading through a whole bunch of documents and screening up and that—the video is a real visual piece, kind of . . . an introduction and a wrap up all together of who this person is. I would be more likely to view that. (Principal 7)

Given the importance of the introductory video, the researchers probed further to discern what made the video so valuable and how administrators might use it. Several principals suggested that the introductory video could be used as a kind of a pre-interview. For example, Principal 7 stated: "I feel like I conducted an interview just by what she said . . . By doing her 3 minute and 34 second, or whatever it was, I completed an interview" (Principal 7). Another principal elaborated on all the things that he might learn from the short introductory video:

> It is more than a picture, it's a presentation. They are talking about their pedagogy. They're talking about reflection. What does reflection mean to them? Their philosophies are embedded in there. I think that you get a lot from that 3-minute clip with the structure you have got. (Principal 13)

Another category that emerged from the data was that the introductory video enabled principals to gain some insight into the candidate's professional skills and dispositions. For example, Principal 2 stated, "You are able to tell through their communication if they have a passion for teaching. You can see it in the face. You can hear it though their words." While this administrator focused on passion, different administrators emphasized different professional skills and dispositions. Some of the many that were mentioned included: passion, enthusiasm, intelligence, articulateness, composure, genuineness, organization and presentation skills, professionalism, and confidence.

For many principals, the introductory video might entice them to examine further the ePortfolio. As Principal 8 stated,

> That [introductory video] was a good teaser. Like an advertisement that drew me in . . . I would hope that the ePortfolio would expand on some of those things that intrigued me, [that would] tie into to the standards.

It appears the introductory video may serve as a "hook" to grab the principal's interest and encourage him or her to examine other parts of the portfolio.

While administrators generally had a favorable view of the ease of use of the ePortfolio, technical glitches at the schools posed a significant problem to playing the ePortfolio's introductory video. The majority of principals (66%) had technical difficulties opening the introductory video using QuickTime. Many principals indicated that under normal circumstances, they would try once or twice to access the video, but would then move on to other tasks. Several researchers have reported that principals' lack of technological skills appears to undermine the use of ePortfolios in the hiring process (Strawhecker et al., 2007/2008; Temple et al., 2003). However, in this case, while some of the administrators seemed to lack the ability to correct the problem easily, it appeared that the schools' Informational Technology (IT) departments were to blame for not having the fairly basic QuickTime program loaded on the school computer. Surprisingly, in some schools the principals' computers were prevented from downloading programs by IT screens and firewalls.

A second version of the ePortfolio, which is provided in the "Improvements: ePortfolio Version 2 section," used Adobe Flash Player and YouTube. While this eliminated the problems associated with QuickTime, many schools have filters (i.e., firewalls) that limit the use of YouTube videos. This is a significant impediment to the use of introductory videos in ePortfolios, which is dependent on school districts IT departments to resolve.

Ease of use/efficiency. The course instructor made every effort to make the ePortfolio easy to use for administrators or other viewers of the ePortfiolio. The pilot ePortfolio used for this research was Internet based, with no password, which allowed for convenient Uniform Resource Locator (URL) access. This is consistent with the finding of Strawhecker et al. (2007/2008) that a URL (e.g., as opposed to leaving a CD) was the preferred delivery/receipt method of principals. Moreover, for more convenient entry, the URL was reduced significantly in length by using a university owned URL generator (geturl.uww.edu). Other potentially usable URL shorteners include: tinyurl.com or bitly.com.

One category that emerged from the data was that many of the principals viewed the pilot ePortfolio as easy to use, especially in comparison to the cumbersome traditional paper-based three-ring binder portfolios. For example, Principal 11 stated:

> The advantage of this is you don't have to have somebody leave a six-inch binder [paper portfolio] for 20 people that you talk to, and leave all these things on your desk, and get it back to them, and get them to pick it up. That's a pain. Having that right here at your disposal, click on it, when I'm done with it, I log off.

Two important advantages of ePortoflios over paper-based portfolios are apparent in this quote. First, electronic portfolios save office space, eliminating unnecessary clutter. And second, they limit wasted transactional time, eliminating the need for collecting and returning portfolios.

The ability to navigate quickly and easily to what the principal wanted to view was another advantage mentioned by many principals. For example, Principal 1 stated:

> I really appreciated how I had options that I did not have to look at the whole thing (ePortfolio) to find what I wanted. I wanted to know about a lesson. I went there. I wanted to know about her philosophy or resume I went somewhere else. I liked having options to see what I wanted to see—to navigate quickly.

Still, time is always precious to busy administrators, and Principal 11's comments highlight the tension between limited time and efficiency:

> I think it is a great tool, you can see a snapshot of each of the candidates, but time is always a factor in leadership. But at the same token, sitting down with a lot of different candidates and trying to screen out who is good and who is not, or who do you want to advance to the second and final stage. That also takes time as well. But it is a time factor. It depends on how many people that I would be asked to view.

In this quote, the principal appears conflicted. On the one hand, the ePortfolio can be used to screen efficiently potential interview candidates, which is a net time saver. On the other hand, the principal appears concerned about how much time he might have to invest in reviewing several portfolios.

Uses. One primary aim of this research was to focus on how and when the introductory video and the ePortfolio might be used. In general, the principals reported using the introductory video and the other parts of the pilot ePortfolio in various ways, as listed in Table 2. In actuality, the introductory video and the other parts of the ePortfolio are inherently connected, and it is somewhat artificial to separate these aspects of the ePortfolio into two parts. In fact, administrators frequently conflated the two.

The researchers anticipated that the introductory video and other parts of the ePortfolio would be used primarily as an introductory screen for selecting candidates to be interviewed. However, this proved not to be the case. While principals reported that they would use introductory videos quite often (73%) to screen and would use other parts of the ePortfolio a majority of the time (57%) to screen, these aspects of the ePortfolio were more likely to be used after the initial screening, either immediately prior to interviews or following interviews. Still, as is evident in Table 2, principals quite often reported that they would use the introductory video and other parts of the ePortfolio to initially screen candidates, to prepare for interviews, and to more thoroughly evaluate candidates following interviews.

Initial screen. Nearly three-quarters (73%) of principals indicated that they would use the introductory video, and a majority (57%) indicated that they would use other parts of the ePortfolio to screen or help to decide which candidates to interview. For example, an elementary principal (Principal 8) mentioned that if he had 180 candidates' application materials to review, he would quickly peruse all the introductory videos and parts of the ePortfolio in his quest to interview the best candidates. He stated the following:

> I mean 3 minutes to do a scan. It took me about 5 minutes to screen each candidate initially [prior to this system]. I could look at a quick resume. Look at this [the introductory video], probably at the same time, honestly. I'd pull up this thing while looking at the resume—if it is a quick [link]—and do them both simultaneously. (Principal 8)

As is evident in this quote, principals were quite concerned about using their time efficiently. Implied in

Table 2
General Uses of Introductory Video and Other Parts of the ePortfolio

	Introductory Video (93%)	Other Parts of the ePortfolio (83%)
Initial Screen	73%	57%*
Prior to an Interview	80%	79%*
Following an Interview	80%	86%*

Note. $n = 15$. For percentages with a asterisk (*), due to missing values $n = 14$.

the above quote is that using the ePortfolio need not add to the amount of time the principal invests in selecting candidates as he could multitask, watching the video and reviewing the resume simultaneously. This quote harkens back to limitations on time being a critical limiting factor for principals and the notions of ease and efficiency of use of the pilot ePortfolio.

While many principals would screen using other parts of the ePortfolio (57%), more would use only the introductory video (73%) as a screening device. This discrepancy seems to be related, once again, to concerns about time limitations. Principals could use the new media of video and audio to multitask, perusing other documents while playing the introductory video. It appears that they hoped to make a decision by "thin slicing" (Ambady & Rosenthal, 1992; Gladwell, 2007); that is, to use experience, intuition, and this quick survey of information about applicants to make good, perhaps superior, interview selections.

In contrast to the principal noted above, who indicated that he would quickly review parts of the 180 different ePortfolios, many principals indicated that they would focus on just the introductory video, and depending upon the number of applicants, they would decide when to use the video as a screening device. For instance, Principal 6 noted that based on the number of applicants, he might use the introductory video as a primary or a secondary screening tool:

> If we have 10 applicants, I'd probably look at all ten of them. If we had 50 applicants, I'd probably narrow it down to our top candidates with the paper screen. Quite honestly, I probably wouldn't look at all 50 of them.

Prior to an interview. Principals noted the value of using the introductory video (80%) and the other parts of the ePortfolio (79%) to prepare to interview a job applicant. For example, in the following quote, Principal 2 indicated how she would use the ePortfolio to prepare herself and the interview team to consider what she calls "look fors" (i.e., critical position-related dispositions and skills):

> I would look through it [the ePortfolio] first and then of course have the team see it. If I look through it first, I could list some bullet points to have some "look fors" for the team to consider, so that they can look for some of the things that we need for that specific position—Make sure you look at the communication skills. Make sure you look and see if there is the eye contact. Make sure that you look at the lesson. Are the lessons centered around the Wisconsin Standards?

In addition to this quote revealing how the principal might use the ePortfolio to prepare for an interview, an assumed benefit is that the ePortfolio could be easily shared with the interview team. In contrast to a paper portfolio, which would have to be passed awkwardly from person to person, several members of the interview team could conveniently access the ePortfolio prior to an interview.

Following an interview. When it came time to make a hiring decision, principals noted the value of using the ePortfolio (86%) and the introductory video (80%) to double check on things mentioned in the interview or simply to recall the various candidates. For example, Principal 7 said,

> I definitely would have used it as a follow up. If there is anything there that I just—you know maybe I had a question in my mind after I did the six interviews and then I come back to her, and I go, you know, I just need to go back and refresh myself and—I would have gone back and used her artifacts, her reference, or even just what her spoken video said.

Having the ePortfolio readily accessible enables principals to look for confirming or disconfirming evidence of claims made in the interview and to more carefully consider things perhaps not fully addressed in an interview. Moreover, in the hustle and bustle of busy administrators' work weeks, they may interview many candidates for several jobs. Trying to remember who said what may be challenging. Easily pulling up an introductory video and reviewing various portfolio artifacts may help principals to recall and differentiate better between the many job applicants.

In terms of differentiating between teaching candidates, principals noted that the ePortfolio can be

used to both select a candidate and rule out others. For example, Principal 6 stated, "You are down to the two candidates. So now you're thinking, I am going to read this because I am looking for reasons not to hire this person."

Unexpected creative possibilities. Beyond the previously mentioned uses of the introductory video and the ePortfolio, individual principals mentioned a number of creative and, to the researchers, unexpected additional ways that they might use the pilot ePortfolio. A few principals noted that the introductory video in the ePortfolio could be used to introduce the new hire virtually to the department, the staff, or even to parents and guardians. Furthermore, the contents of the ePortfolio could be used to justify a hiring decision to the superintendent or the school board. Other principals noted the value of the ePortfolio in facilitating mentoring relationships. Not only could the mentor teacher be introduced virtually to the new hire, but the mentor could become familiar with the current capabilities, tendencies, and goals of the new hire. The mentor could use this information as a way to constructively begin helping the new hire to learn and grow as a professional. In addition, the new hire's good ideas could be shared with the department or staff as an example that others might emulate.

Sharing recommendations. A few principals noted that, with the permission of the applicant, the ePortfolio of a strong candidate who was not hired might be sent to another principal for consideration. One principal put it this way:

> When I hired a teacher just recently—I got another three—I would have hired all three of them. I could very easily send it to let's say another principal in a district [who] has a new opening that pops up. Hey, here is somebody, take a peek, and here's the link. In a bigger district, I could see that happening quite a bit . . . If another principal gives me something to look at about a candidate, I am going to take a close look at it. (Principal 8)

Principals regularly network and share good candidates with each other. In fact, according to Mason and Schroeder (2010), principals seriously consider the recommendations of other administrators.

With a paper-based three-ring binder portfolio, the transactional effort of sending the portfolio to another principal would likely prevent the original principal from forwarding it. In contrast, with an ePortfolio the URL can be easily emailed to one or more principals. This recommendation helps the principals who receive it by potentially reducing their candidate screening time and by receiving not just a recommendation, but one with evidence of the candidate's quality attached. In addition, the contact information of the candidate is readily accessible in the ePortfolio. This sharing of recommendations between principals is not only important to hiring quality new teachers, but it also enhances the collaborative network of trust between administrators, schools, and school districts.

Circumvent the district screen. In many larger school districts, the initial screening of job applicants is done by the Human Resources department at the central office. While larger school districts have reasons for this bureaucratic procedure, principals in these districts may miss potentially good candidates, as they may be screened out before the principal even becomes aware of them. Two principals in our study were from different large urban school districts that used this type of central office screening procedure. Each principal noted that if the job applicant had sent the principal a cover letter or an email containing the ePortfolio URL, the principal would quickly review the ePortfolio. And in the case of an especially promising candidate (such as the one they had reviewed for this study), each principal would have contacted the district office and asked that this candidate be added to the approved interview list. For example, Principal 7 stated:

> If I received it [the URL for the ePortfolio] before the interview, she [the candidate] would be one that I would ask the district to send me her name [i.e., put on the district office list of candidates who would be approved for interviews].

When asked about how a job applicant might transmit the URL to them, both administrators were surprisingly open to receiving a letter or an email, and in one case, the principal even welcomed a quick drop-in visit. When pressed about the time involved in these unsolicited contacts, both administrators emphasized that perhaps the most important thing they do is to hire exceptional teachers and that time devoted to this task is not wasted.

Benefits to Candidates

While the primary focus of this article is on the value of the pilot ePortfolio to principals involved with hiring, three benefits of the ePortfolios to teacher candidates are also worth mentioning. First, it is obviously beneficial to strong teacher candidates to have administrators recommend and share their portfolios with others who are in a position to hire them. Second, it is potentially beneficial to job candidates to circumvent the screening procedures of a district's central office by sending the URL of their ePortfolio directly to the principals who will make the final hiring decision. And third, many administrators assumed a level of

technological expertise by teaching candidates with an ePortfolio. For example, Principal 2 stated,

> I'd be willing to bet that if we need something done electronically this person could help to do in-services for other staff members, could lead staff development in that area, and could work with their "family" [instructional team] to develop lifetime ePortfolios. I certainly see that person as a trendsetter.

Given the support provided by the university, even students with relatively weak technological skills were able to put together a presentable ePortfolio. Still, the assumption of technological competence may give students with an ePortfolio a competitive advantage over their counterparts who use paper-based portfolios.

Recommendations and Improvements for the ePortfolio

While the researchers were pleased that the pilot version of the ePortfolio was so well received, they were careful to ask principals about their concerns and for suggestions as to how to improve the ePortfolio to make it even more valuable to administrators in the hiring process.

Brief introductory video. When asked about the appropriate time length of the introductory video, nearly all the principals indicated that three minutes was a good length and anything over five minutes was too long. Principals are busy, and they expect candidates to be focused and to the point. In fact, one principal stated that even with a three to four-minute video, "those first 20 seconds will determine whether they [the principal and the hiring team] will watch the whole video" (Principal 4).

Cautions against a canned assignment. Principals cautioned that if the introductory video assignment involved too much structured preparation and was too prescribed, it would diminish in value. As one principal put it, "If we start getting candidates from the university and they all look boilerplate—I know that they are going to address this and they are going to address this—then it will lose its value" (Principal 4). Another principal, indicated that it would be fine for the university to provide some guidance or give the assignment some structure, but instructors should be careful not to lead the students too much on exactly what they should say. For example, Principal 7 stated:

> If [teacher educators] go out and give them a template and say here are some things to talk about, you know here are some things that you might look at—that is one thing, and I think that that is okay. But they need to put who they are into that template because I think that otherwise it is too much of a canned advertisement out of [the university].

The key suggestion implied in these comments was that rather than simply parroting the ideas of their professors, students should be encouraged to genuinely express their own views and ideas. This will enable principals to better distinguish between the stronger and weaker teacher candidates. Ultimately, principals hoped that leaving the assignment somewhat open-ended would give them a better sense of prospective teaching candidates and of what they genuinely believed about education.

Including a teaching video. While most principals spoke favorably of the value of the introductory video, many principals wanted to observe the candidate in action, to see them teaching and working with students. For example, a middle school principal stated,

> Better than this to me would be videotaping them actually in instruction . . . I'd like to see student teachers live instruction in their science and math classes . . . I'd like to see them interacting in the hallway, running a lunch period, conducting a study hall, as well as class. (Principal 3)

This finding is consistent with other research addressing the value of including videos of candidates teaching in ePortfolios (Strawhecker et al., 2007/2008; Temple et al., 2003; Whitworth et al., 2011; Yao et al., 2009). In the current study, many principals expressed a desire to see both an introductory video to get a sense of the person and his or her beliefs about education and another video showing the candidate's actual abilities as an educator. The combination of these two videos would allow the administrator to evaluate the candidate's ability to articulate their knowledge and beliefs about education and to judge how well the candidate enacts these beliefs when working with students.

In addition to these comments about the inclusion of teaching videos, one principal suggested that teaching candidates might include a video as evidence for several of the teacher standards. Another principal suggested that the teaching candidates might provide a teaching video and periodically infuse this video with a voice-over, in which the candidates reflects upon their practice.

Additional general suggestions. Individual principals provided a number of additional suggestions for improving the introductory videos and enhancing the ePortfolio. In terms of the introductory videos, various principals suggested that the candidate consider carefully the setting of the introductory video so that it is consistent with the general message of the video.

Another principal suggested that perhaps the introductory video could be less of a "talking head" and include images of the school, classes, etc. while the teaching candidate explains his or her beliefs about education. Another principal suggested that the candidate might create some type of anticipation guide, or an outline, that corresponds to and supports the introductory video. Finally, a few principals discussed the benefits and drawbacks of refining the videos to include headers, transitions, and other graphics. Some felt that greater polish might enhance the video, while others thought these things could become distracting. Ultimately, it seems appropriate to create a quality video, in which technological enhancements are used judiciously and purposefully to convey the overall message more clearly.

Individual principals also made several suggestions for improving the overall ePortfolio. For example, two principals suggested the inclusion of a photo of the teaching candidate, along with the candidate's name and contact information. A few principals suggested that the entire ePortfolio could include appropriate supporting visuals and graphics. For example, one principal suggested that the philosophy statement might include a graphic representation of the key words used in the philosophy statement. This graphic is easily developed using the Web 2.0 tool Wordle (wordle.net).

Improvements: ePortfolio, version 2. The course instructor took many of the suggestions noted above and revised the ePortfolio to make it even more valuable to administrators in the hiring process. First, while the introductory video in the portfolio example was only 3:34 minutes, the course instructor allowed the pilot introductory video to be longer than four minutes. For version two of the ePortfolio, the course instructor was more adamant that students keep their videos to less than four minutes. Second, in an effort to avoid turning the introductory video into an inauthentic, "canned" performance, students were provided with structured support through the Introductory Video Assignment (see Appendix A), but were allowed to modify the assignment and to include the content they felt was most appropriate. Third, while the initial pilot ePortfolio (e.g., Kate Arnold's ePortfolio, http://geturl.uww.edu/1o3) had only an introductory video, version two (e.g., David Huss's ePortoflio, http://geturl.uww.edu/1o2) included an introductory video and a teaching video. Fourth, given the many technical glitches encountered by principals when trying to use QuickTime to open the pilot introductory videos, version two uses Adobe Flash Player and embedded YouTube videos. Fifth, in the pilot version students were not required to create a Wordle visual for their philosophy statement (although the student provided in the example had done so). In version two, students were taught how to use Wordle and required to include a Wordle visual for their philosophy statement. Finally, in version two, students were required to include a photo, with their name and contact information on the side border of their ePortfolio. In this way information was always visible to whomever might be reviewing the portfolio. Ultimately, the researchers are hopeful that these research-based changes will make version two of the ePortfolio even more useful in the hiring process.

Limitations

The limited number of principals interviewed may not make this study generalizable to the entire population, but may be a sufficient number to determine general direction and thought. The sample was convenient and not representative of the principal universe. All principals were from one Midwestern state, so they may represent the thoughts, feelings, and values of this area of the country.

Since one of the researchers was also the course instructor, it is possible that principals may have felt pressure to be positive about the potential uses of the ePortfolio. Every effort was made to make the administrators feel comfortable and to encourage them to give open and honest responses. Given the candid nature of many of the principals' remarks, it seems unlikely they were trying to please the interviewer. Moreover, there appeared to be no significant differences in responses by principals when the interview was conducted by one or other researcher. In short, the researchers have no reason to believe that administrators were responding in inauthentic ways in order to please the interviewers.

Recommendations for Future Research

The current article is based on research that was conducted with school principals from a single Midwestern state. The authors recommend that similar research be conducted with principals from other regions of the country. This broader geographic sampling of principals may reveal regional differences and enable researchers to identify national patterns regarding the use of introductory ePortfolios in the hiring process.

Additional research might be conducted on how the use of ePortfolios with introductory videos impact reflection by teacher candidates. On the one hand, the use of the ePortfolio as a tool in the hiring process could undermine open and honest reflection, as pre-service teacher candidates may seek to "perform" for potential employers and therefore may be less apt to examine critically areas of their practice in which they have struggled. On the other hand, if candidates believe that their ePortfolios may be reviewed by prospective

employers, they may attend more carefully to the quality of the materials and reflections included. Hence, it is unclear exactly how reflection would be impacted. Further research could address the question of whether the creation of an introductory video and/or the inclusion of teaching videos impacts reflection by teacher candidates. How do the candidates approach these tasks, and how do they select the content for the introductory video, as well as the examples of teaching and other aspects of their practice, for inclusion in the videos?

A third fruitful area of future research might address how the creation of an ePortfolio with an introductory video may impact the teacher candidate's interview performance. Are candidates who create an ePortfolio with an introductory video better prepared for interviews? Are they more cognizant of their dress and their body language? Are they better prepared to marshal evidence and provide stronger more specific examples to support claims they make in the interview?

Finally, a fourth important area of research might address how the visual nature of ePortfolios impacts the selection of candidates for interviews. The candidate's race, ethnicity, gender, and to some extent, language fluency and disability status, are visually on display. For good or for ill, administrators may be influenced by these identity factors. Some schools may see this as an opportunity to interview candidates who are perhaps under-represented on their staff (e.g., minority candidates, male elementary school teachers). On the other hand, it is possible that some administrators would discriminate based on these readily apparent identity features. The examination of how ePortfolios enables selection based partially on identity features merits further study.

Conclusion

Many colleges and universities require the portfolio as a student exit device to demonstrate the student's teaching knowledge (Vincent et al., 1997). Some states also require portfolios for completion of a teacher education program. Students often believe that a portfolio is necessary to secure a job. Yet the research literature suggests that too often, principals simply do not have the time to review portfolios during the interview process.

The current study looked at how principals might use an ePortfolio with an introductory video in hiring decisions. Overall, principals were quite taken with the pilot ePortfolio, seeing the introductory video as an enticement to look further at a teacher candidate's ePortfolio. Based on the 15 principals interviewed for this study, 93% reported they would use the introductory video, and 83% reported they would use other parts of the ePortfolio in the hiring process.

Principals appreciated the ease of use, as well as the convenience of being able to view an ePortfolio on their own schedule and not having to worry about returning it when they were done. And while reviewing the ePortfolios and/or watching the introductory videos might take time, principals indicated that the introductory video was like a mini-interview that could help them initially to screen teaching candidates. Moreover, the principal could multitask, scanning key parts of the ePortfolio while watching the introductory video. Many principals reported that they might use the ePortfolio to prepare for an interview or to review after interviews to help them evaluate and recall individual candidates. In addition, principals identified a variety of creative uses of the ePortfolio, such as using it to introduce the candidate virtually to staff, superintendents, or parents; to justify hiring decisions; to facilitate mentoring relationships; and simply to share good ideas. Moreover, there is the potential to share easily the ePortfolios of strong candidates who were not hired with principals at other schools who are looking to fill a similar position. Furthermore, in districts with central office screening procedures, principals indicated that based on a strong introductory video and ePortfolio, they might override the district screening procedures and add the candidate to the interview list.

While principals generally saw value in the pilot ePortfolio, they made a number of recommendations, such as keeping the introductory video short, avoiding too much guidance in order to make the introductory videos authentic representations of the students' voices, and adding a teaching video so that the principal could assess the candidate in action. These ideas and others were incorporated into an updated version of the ePortfolio. The URLs for an example of the original pilot ePortfolio (Kate Arnold's ePortfolio, http://geturl.uww.edu/1o3) and the new version two ePortfolio (David Huss' ePortoflio, http://geturl.uww.edu/1o2) are provided so readers can judge the merits of the ePortfolio for themselves.

The use of web-streamed video, whether it be for the introductory video or for a teaching video, seems critical to the value of this version of an ePortfolio. Unfortunately, due to technological glitches, including school computers not having basic video-streaming software and district firewalls preventing the downloading of the necessary software, many principals had trouble playing the videos. Even a YouTube video could not be played in some venues because of district firewalls. This major problem needs to be overcome if web-streamed videos are to be used universally in ePortfolios.

Finally, pre-service portfolios are used to foster reflection, enable evaluation, and facilitate hiring. These purposes may be contradictory, or are at least in

tension with each other. Can pre-service teachers really reflect honestly when passage of the portfolio is required for licensure or is going to be viewed by those in charge of hiring? The proposed ePortfolio does not solve this issue, but it may inspire students to do their best work. The course instructor and co-author believes that students who created the ePortfolios with an introductory video appeared to take the assignment more seriously, to work harder, and to reflect more deeply than previous students had on their paper portfolios. Perhaps these educational benefits were due to the inherent value that students saw in creating an authentic, professionally useful ePortfolio.

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Appendix A
Introductory Reflective Video Assignment

You should create a 3-4 min. (maximum) introductory video reflection for your e-portfolio. Please address the questions below. The level of detail on any particular question may vary. In order to stay within the time limit, you might want to address several of these questions at the same time. Like any formal document, I encourage you to edit your video. The WITRC computer lab can provide technical assistance with the editing process.

Begin your video with some basic introduction. For example:

My name is_____, and I will be certified to teach Secondary Social Studies, specifically _____, _____, and _____. I would like to introduce my e-portfolio by sharing some of my thoughts and reflections on education.

1. What is your overall philosophy of education?
2. What have you learned in your teacher education program that will help you as a teacher?
3. What do you believe are the best ways to educate students?
    a. Provide concrete examples
    b. Describe a successful lesson. What made it successful?
4. How do you develop positive relationships with students?
5. Describe your approach to classroom management? What beliefs guide this approach?
6. *Optional:* Discuss any (Pick one or two) or all of the WTSs.
    a. Discuss its importance,
    b. How do you demonstrate it, and
    c. Identify your goals in regards to this standard.
7. What are your strengths and weaknesses?
8. What are your goals as an educator? How do you plan to grow and improve as an educator?

Other ideas[1] that you might want to include:

1. What do you want to accomplish as a teacher?
2. How will (do) you go about finding out about students' attitudes and feelings about your class?
3. An experienced teacher offers you the following advice, "When you are teaching be sure to command the respect of your students immediately and all will go well." How do you feel about this?
4. How do you go about deciding what it is that should be taught in your class?
5. A parent comes to you and complains that what you are teaching his child is irrelevant to the child's needs. How would you respond?
6. What do you think will (does) provide you the greatest pleasure in teaching?
7. When you have some free time, what do you enjoy doing the most?
8. How would you go about finding what students are good at?
9. Do you like to teach with an overall plan in mind for the year, or would you rather just teach some interesting things and let the process determine the results? Explain your position.
10. A student is doing poorly in your class. You talk to her, and she tells you that she considers you to be the poorest teacher she has ever met. What would you do?
11. If there were absolutely no restrictions placed upon you, what would you most want to do in life?

[1] From the Berea Independent School District Application

Appendix B
Semi-Structured Interview Questions

Reflective Video

1. Would you use this short introductory video in the hiring process? Yes No
   If so, how?
   a. Would you use the short introductory reflective video in any of the following ways:
      i. As an initial screening device
      ii. Just prior to an interview
      iii. Following an interview
      iv. And/or in another way
2. If you would not use an introductory video, why not?
3. If you would not use an introductory video, can you see a way of using one in the future?
4. After viewing this introductory video, would you have any interest in looking more closely at a candidate's E-portfolio?
5. Do you have any suggestions for improving and/or streamlining the introductory reflective video?

E-Portfolio

6. Would you use this E-portfolio, or parts of it, in the hiring process? Yes No
   If so, how?
      a. Would you use the E-portfolio, or parts of it, in any of the following ways?
         i. An initial screening device
         ii. Just prior to an interview
         iii. Following an interview
         iv. And/or in another way
7. If you would not use the E-portfolio, why not?
8. If you would not use and E-portfolio, can you see a way in which you might use an E-portfolio in the future? Consider both modifications to the E-portfolio and changes in the way you might approach hiring in the future.
9. Do you have any suggestions for improving and/or streamlining the E-portfolio?

Notification and Delivery

10. How should a job applicant notify you of the existence of an introductory video?
11. How should a candidate notify you of the existence of an E-portfolio?
12. What would be the most convenient way for you to receive an introductory video from a candidate? (e.g. DVD, URL or another method)

Further Involvement

13. At another time, perhaps in conjunction with a follow-up interview, would you be willing to offer further suggestions for the introductory video/E-portfolio?
14. Would you be interested in serving on a team of administrators and perhaps teachers who would evaluate an E-portfolio defense? The portfolio defense might serve as a culminating activity for students as they complete their teacher education program.

Demographic and Background Questions

1. How many years have you been a principal?
2. How many years have you been in education?
3. Note gender: M F
4. Is the school: Elem Middle HS
5. How many students in your building?
6. How many classroom teachers do you have?

Approximately how many teachers do you hire in a given year?