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# Qualitative Analysis of Student Perceptions of E-Portfolios in a Teacher Education Program

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## Abstract

*In the last decade, e-portfolios have moved to the forefront of teacher preparation programs across the United States. With its widespread use, faculty and administrators need to understand teacher candidates' perspectives to meet their needs. In the present study, the researchers gathered in-depth information from 244 students who were required to create e-portfolios for their academic program. The researchers asked students, using open-ended survey items, about the advantages, disadvantages, and obstacles they faced when creating and disseminating their e-portfolios. Additionally, each student described his or her most significant e-portfolio learning experience and how to make the process more meaningful. Overall, there were seven themes: increased scope, guidance, timing, alignment with standards, reflection and growth, organization of work, and the inaccessibility of the e-portfolio system to persons outside of the university. This article discusses findings as well as practical recommendations for e-portfolio integration and ideas for future research. (Keywords: e-portfolios, student perspective, digital portfolios, teacher education, teacher preparation)*

Approximately 90% of teacher preparation programs across the United States use portfolios to assess their students (Salzman, Denner, & Harris, 2002). The National Council for Accreditation of Teacher Education (NCATE) has played a large role in the rapid increase of e-portfolio use because "institutions are expected to use technology to maintain their assessment systems" (NCATE, 2010, Para. 16).

Widespread adoption of e-portfolios in teacher education programs is also attributable to increased emphasis on constructivist pedagogy and the ease of accessibility and use of information and communication technology (Meeus, Questier, & Derks, 2006; Ritzhaupt, Singh, Seyferth, & Dedrick, 2008; Strudler & Wetzel, 2005a). E-portfolios occupy a contested space in teacher education because of the many needs for students' critical reflection and professional assessment (Hicks et al., 2007). As the e-portfolio movement grows, additional questions arise regarding how to effectively integrate e-portfolios for the primary beneficiaries—students who will become future teachers and school leaders (Bowers, 2005).

The current trend toward online assessment management systems can distort the original purpose of e-portfolios (Barrett & Knezek, 2003; Batson, 2002). Hence, Barrett (2004) highlights the need to distinguish between assessment systems and e-portfolios in order for researchers to validate the pedagogy. Referring to Barrett (2004), one distinction between e-portfolio and assessment systems is that the first one is usually designed to showcase a student's work products based on some competencies, and the latter is more institution controlled and operates like a database management system, where other unit assessment data (e.g., indirect measures such as student satisfaction surveys, students' scores, employer surveys, admission criteria, etc.) may be stored. In other words, whereas e-portfolios are usually student controlled and mainly focus on students' mastery of certain competencies, the assessment system brings in other sets of data for a more holistic view of the unit. Accordingly, e-portfolios allow students to collect and organize artifacts using

multimedia (audio, video, graphics, and text) and hyperlinks as evidence of meeting standards to showcase lessons and work products, and to show compliance with certification requirements and professional behaviors. Aside from documentation, e-portfolios also provide space for self-reflection and recording personal growth (Stansberry & Kymes, 2007; Wilhelm, et al., 2006). E-portfolios have an ease of accessibility, portability, and manageability in terms of storage, presentation, and duplication (Strawhecker, Messersmith, & Balcom, 2007). This inherently leads stakeholders to use them as assessment systems, making it increasingly difficult for the e-portfolio to satisfy both student and program needs (Barrett, 2004; Strudler & Wetzel, 2005a; Wilhelm et al., 2006).

Due to the variety of e-portfolio uses, there are multiple stakeholders, including administration, faculty, support personnel, employers, accrediting agencies, and students. Each stakeholder has a different purpose for using an e-portfolio (Ritzhaupt et al., 2008). Therefore, many challenges associated with successful e-portfolio integration are largely attributable to the competing purposes of these stakeholders. These competing purposes create misunderstanding and dissatisfaction among students, who create their e-portfolios solely to satisfy outside readers (Wilhelm et al., 2006). Existing research has explored best practices and what "good" e-portfolio implementation looks like, along with the advantages and disadvantages of e-portfolio use from faculty perspectives (Strudler & Wetzel, 2005b). Hence, the researchers suggest examining preservice teachers' perspectives to facilitate the implementation of e-portfolio initiatives that are student-centered and accomplish the programs' mission.

## Literature Review

As noted by Wheeler (2003), the defining characteristic of an e-portfolio is its purpose. Further, Strudler and Wetzel (2005a, 2005b) and Ritzhaupt et al. (2008) both concluded that purpose is a key factor to successful integration of an e-portfolio system. When implementing an e-portfolio program, faculty must decide on the purpose of the e-portfolio. Hartnell-Young and Morriss (1999) believe that e-portfolios that are used in a student-centered manner can serve multiple purposes: as learning systems for professional development, for formative and summative assessment, and as employment portfolios. In the field of education, many scholars perceive the creation of e-portfolios as a developmental process for teachers (Darling-Hammond & Snyder, 2000); Delandshere & Arens, 2003; Harttman & Calandra, 2007; Wilson & Wineburg, 1993). For instance, Darling-Hammond and Snyder (2000) suggest that e-portfolio development helps teachers “to internalize professional standards, examine more deeply what they are doing and what it means, come to multiple perspectives on the meaning of events, and thus enhance their ability to learn from those events” (cited in Harttman & Calandra, 2007, p. 538). Also, e-portfolios can help identify further trajectories for students’ professional development (Wilson & Wineburg, 1993).

The structure of e-portfolios varies based on their intended purpose and the tool selected for implementation. Some e-portfolios are “highly structured online databases designed to meet an organization’s need for uniformity and accountability of standards,” whereas others are “open-ended formats that foster creativity and a sense of ownership for learners in constructing their own evaluation of their work” (Barrett & Knezek, 2003, p. 1). Based on the intended purpose and structure of e-portfolios, students may be required to submit work samples for each objective, samples of their best work, or samples of their work over time (Bowers, 2005). Barrett (1999) acknowledges that na-

tional and state standards for students and practicing teachers provide an ideal framework for organizing the content of an e-portfolio. However, Bowers (2005) articulates the following considerations:

First, will the student be able to discriminate among objectives which are similar in nature? Templates built on state learning standards may have objectives which overlap or are unclear to the student. Will the student be able to discern what is meant by the objective or standard? (Para. 9)

Admittedly, students can experience obscurity when required to document how they have met each standard.

Silver et al. (2002) documents the difficulty that students experienced selecting content to show how their teaching was consistent with the standards from the National Council of Teachers of Mathematics. Although mathematic topics (e.g., number and operation, geometry) were equally covered, the 32 students whose e-portfolio entries were examined frequently included material outside of mathematic contexts. Whereas some academic programs allow students to choose the best evidence for each objective, other programs specify the evidence that students must submit (Barrett & Knezek, 2003), which influences whether or not the student sees the value and worth of the assignment (Wickersham & Chambers, 2006). Administrators and faculty should find ways to increase the meaningfulness of students’ e-portfolio experiences. Students are intrinsically motivated by tasks they find meaningful (Walker, Greene, & Mansell, 2006), and this may result in a “major difference” in the e-portfolio experience (Stansberry & Kymes, 2007).

### **Mechanics of Implementation**

Use of an e-portfolio also depends, in part, on university resources for technology support. Necessary university resources include faculty time, training, and technical support and support for evaluation and mentoring. Students also need an adequate amount of technological

and instructional support (Ritzhaupt, Ndyoe, & Parker, 2010). Stansberry and Kymes (2007) reported that creating an e-portfolio based on teaching, which required technological savvy, was disorienting for most of the 78 graduate students, who were inservice teachers, in their study. The students described themselves as “inept,” “confused,” and “out of [their] comfort zone” as they were introduced to the e-portfolio assignment. Another student admitted he had “extremely limited awareness of the task involved...” (p. 491). The mechanics of implementation require students to invest a significant amount of time in the process, and as such, time was often a major constraint in the e-portfolio implementation process. The time involved for preparation and assembly of the e-portfolio will vary, for each student, based on his or her ability to match standards and artifacts, use multimedia, and navigate the e-portfolio system (King, 2000). Whether or not students implement their e-portfolios as products (exit requirement) at the end of their course of study or as a process (embedded throughout their program) is another consideration. There may be other issues that administrators, faculty, and employers have not conceptualized, which can be illuminated by engaging students in the process of e-portfolio development and assessment.

### **Disadvantages and Advantages of E-Portfolios**

Difficulties students experience in terms of e-portfolio development frequently involve organization and outcomes. Carney (2003) outlined these difficulties, which can be perceived as disadvantages, in five categories:

1. **Multiple-purpose dilemma:** Teacher e-portfolios may fulfill many purposes, but it may be hard to accomplish any purpose.
2. **Personal-revelation dilemma:** Technology allows preservice teachers to share teaching knowledge widely, but this may be off-putting for novices who are uncomfortable revealing teaching-related problems.

3. **Cognitive-overload dilemma:** Learning the technology while trying to reflect on practice may be too much.
4. **Self-expression dilemma:** Customized systems enable individuals with limited technology skills to create e-portfolios effortlessly while constraining those who are more creative and facile with technology.
5. **Dead-end dilemma:** Using a customized system limits teachers from developing skills to produce E-portfolios outside of the system to further their professional development.

Despite the disadvantages, e-portfolio use is prevalent in teacher education because of its perceived benefits. According to Shulman (1998), e-portfolios (a) permit the tracking and documentation of teaching and learning beyond supervised observations; (b) encourage the reconnection between process and product; (c) institutionalize norms of collaboration, reflection, and discussion; (d) introduce structure to the field experience; and (e) shift the agency from an observer back to the teacher interns (p. 36).

Currently, the advantages and disadvantages of developing e-portfolios from the student perspective have been largely ignored (Bowers, 2005; Stansberry & Kymes, 2007). We need to understand what aspects of e-portfolios promote teacher learning and the resulting knowledge (Pecheone, Pigg, Chung, & Souviney, 2005). Preservice teachers (particularly student interns) can relay the practicality of their experiences because of their direct link to their educational program and supervising teacher's classroom. They can describe how meaningful the process is—especially if they are completing an e-portfolio to fulfill academic requirements.

The purpose of this study was to investigate student interns' perceptions of the e-portfolio process and what they learned as a result of this practice. Understanding their perspectives can lead to improvements in the implementation of e-portfolios, further the program's mission, and ultimately benefit all stakeholders.

### Method

The researchers used survey research to discover which facets of e-portfolio development were most meaningful and challenging to students. The survey included five open-ended questions to gain insight into the use of e-portfolios by students. The survey included open-ended questions to gain a broad perspective of students' views on e-portfolios. The researchers employed qualitative analysis to meaningfully interpret these data. Specifically, the survey included the following questions:

1. What could be done to make the preservice e-portfolio experience more meaningful to you as an inservice teacher?
2. Please list any obstacles that prevented your e-portfolio experience from being as meaningful as you wanted.
3. In general, what would you say is the most significant learning experience from your e-portfolio experience as a preservice teacher?
4. Reflecting back on your e-portfolio experience as a preservice teacher, what do you see as the advantages of developing an e-portfolio?
5. Reflecting back on your e-portfolio experience as a preservice teacher, what do you see as the disadvantages of developing an e-portfolio?

### E-Portfolio System Context

This e-portfolio initiative occurred within a teacher preparation program at a public university in the southeastern United States. Since 2002, this program has required preservice teachers to create an e-portfolio during their 15-week field experience. The purpose of the e-portfolio system within this setting is to (a) foster students' reflection, learning, and development; (b) provide the faculty with a means to support and monitor student learning toward expected standards of each program; and (c) help the teacher preparation program to meet accreditation requirements (specifically, NCATE). During the internship, students practice teaching and are required to create and showcase their artifacts.

Students are advised to follow a standard format for their e-portfolios using TaskStream templates. TaskStream is Web-based software designed to collect and organize students' work. Students have control over uploading their artifacts and/or releasing them to other individuals for viewing and evaluation. TaskStream allows students to demonstrate competencies with respect to national and state standards. Faculty can use TaskStream to perform assessment and student support-related functions and activities. Faculty can collect and evaluate student work, track student learning progress, develop a centralized database system for a more integrated assessment data, or use it to communicate with students (TaskStream, 2012).

Participants in this study had the flexibility to choose their own artifacts (mainly one per standard). Although program faculty provided a template for the e-portfolio, the students decided how to present their work (via PowerPoint, text, video, etc.). As occurs at other institutions, the students were responsible for scanning artifacts, "making connections to standards, and interpreting their own learning" (Strudler & Wetzel, 2005a, p. 412). Regardless of how the students presented the artifacts, they received written feedback via TaskStream and orally from the faculty supervisor and partnership teacher. Students were prompted to reflect on how each artifact helped them develop as teacher candidates and what they learned.

### Participants

Students ( $N = 224$ ) participated in the research during their final semester of the 2008–2009 academic year. Ninety-two percent of the participants were female, and 8% were male. Of the 197 students who responded about their race, 92% were Caucasian, 5% were African American, 3% were Hispanic, 1% was American Indian/Alaska Native, and 1% was Hawaiian/Other Pacific Islander. The age range of the participants was 21–54 with a mean of 26.79 ( $SD = 7.82$ ) years. Sixty-three percent of the participants were completing degrees in elementary education, 11% in middle grades education, 6% in special

education, 4% in early childhood education, and the remaining in other related degree programs.

**Procedure**

In the fall of 2008 and spring of 2009, the instrument was accessible in a Web-based format using SelectSurvey. The researchers sent a hyperlink to the instrument via email encouraging students to respond to the survey. They informed students of the purpose of the research and option for anonymity and that their participation was voluntary. To encourage participation, they raffled off five \$20 gift cards to a popular restaurant. The survey was available for a 3-week period each semester. During this time, the researchers sent three reminder emails. The overall response rate was 81%, which is considered high for an online survey (Cook, Heath, & Thompson, 2000; Sheehan, 2001).

**Data Analysis**

Two researchers were involved in the qualitative analysis, which consisted of three types of coding procedures: open, axial, and selective coding. For each of the five questions, each researcher individually coded responses line by line. The researchers discussed the codes for each question and reconciled differences prior to recoding each response. Together the researchers formed categories and subcategories (open coding) and explored the interrelationship of the categories (axial coding). Collectively, the researchers formed a series of propositions about the nature of the relationships among the various categories and created subcategories (selective coding). The researchers reached saturation when they could produce no new codes or categories from the information available.

**Results**

The researchers analyzed the data along the five questions. The number of responses varies by each question according to the number of students who provided an open-ended response for that item. Table 1 displays the number of responses, codes that each researcher

**Table 1.** Number of Responses, Codes, and Categories by Question

Question	N	Codes		Categories
		Coder # 1	Coder #2	
1	109	14	16	5
2	112	11	13	7
3	120	11	12	6
4	122	9	15	4
5	105	7	12	8

**Table 2.** Codes, Categories, Frequency, and Sample Comments for Making the E-Portfolio Experience More Meaningful

Themes (Frequency)	Sample Comments
Scope (33.94%)	“Being continually updated during my 3 years.” “More assistance available. More classes using it.”
Guidance (31.19%)	“Lots of examples that we could hold in our hands to examine after the training sessions were over. I still think I had no clear example to use to help me visualize the completed project.” “More feedback”
System (26.61%)	“I do not think that the e-portfolio was set up in a valuable manner. I am very proud of my work and feel prepared to teach; however, I do not think that the e-portfolio shows my work in the best manner. I will not show the e-portfolio to prospective employers.” “The e-portfolio process could be more user friendly. I had a lot of difficulties posting certain objects to my portfolio and the windows took forever to load completely in order to edit. You also had too many windows to go through in order to edit your portfolio.”
Timing (4.59%)	“I think it should be done after your internship. It was due at the wrong time.”
Pace (3.67%)	“Maybe to cover only one or two standards at a time. Then review and feedback on those and get a stronger grasp of each standard.”

identified, and categories for each question. Examples of codes included timing, cost, burden, examples, coverage, and organization.

An example of a category is Scope, which represented the e-portfolio’s integration throughout courses, and corresponding codes include more artifacts, more flexibility in artifact selection, and variation. To determine the extent to which the categories represented the responses for each question, the researchers divided the number of responses for each category by the total number of responses for that item. The categories presented in this paper are the most inclusive by question. This resulted in seven major themes: increased scope, guidance, timing, alignment with standards, reflection and growth, organization of work, and inaccessibility of the e-portfolio system to others.

**Question 1: What Could Make the E-Portfolio More Meaningful?**

Respondents reported that expanding the scope of the e-portfolio and provid-

ing more guidance would make it more meaningful to them. These two themes constitute 65.13% (Scope 33.94 and Guidance 31.19%) of the 109 comments provided.

**Scope.** According to respondents, the e-portfolio should not be due at the end of the internship but should be started earlier or as soon as the student is admitted to the teacher preparation program. Most of the respondents’ comments reflect this concern, and they suggested that the program “begin the process in the first education class and continue to have professors check your work each semester.”

**Guidance.** Respondents also reported that guidance (clearer expectations and requirements, more support, more feedback and directions, modeling through examples) would make the e-portfolio project more meaningful for them. Getting feedback on their reflections would especially make the e-portfolio more meaningful, reported one respondent: “I thrived on the constant feedback I received from my

**Table 3.** Codes, Categories, Frequency, and Sample Comments about Obstacles with E-portfolios

Themes (Frequency)	Sample Comments
Not enough time (25.00%)	"I guess I felt like it took a lot of time to use it and planning and making my lessons took a lot of time as well so I just wish I had more time available to use it."
Unclear expectations (19.64%)	"Just general confusion until all aspects were fully explained, which took awhile." "I wasn't aware of me needing one until the last minute. I was very lost and it took me a while to navigate around the portfolio."
Inappropriate system (12.50%)	"I had a ton of technical issues, I actually could not use my account for over 2 weeks due to a browser issue..."
Busy work (7.14%)	"Too much busy work in the program such as writing '10' detailed coaching plans and filing them.... A couple would have been sufficient so everyone could have evidence that the partnership teacher and intern were processing well. However '10' devolved into busy work which took away from the more beneficial aspects."
Not suitable for employment (5.36%)	"I didn't get to really think out my portfolio I feel I was rushed to put one together because it was part of a grade. I do not feel confident enough to show an employer my portfolio as of yet."
Lack of flexibility in choosing artifacts (2.68%)	"Only using one format (6 point) the entire time did not always work well with every lesson"

**Table 4.** Codes, Categories, Frequency, and Sample Comments about E-Portfolio Learning Experience

Themes (Frequency)	Sample Comments
Familiarity and alignment with standards (27.5%)	"Aligning my tasks and artifacts with standards. I found I could organize my general portfolio with the aid of standards directed artifacts."
Reflections (26.6%)	"The most significant learning experience for me was doing the reflection especially after my university supervisor had made his comments."
Growth (17.5%)	"It was interesting to review older entries and see how much my lesson planning has changed."
Organization of work (14.16%)	"It helped me to organize and consolidate my thoughts."
Feedback (8.3%)	"The feedback is most significant to me."
Technology (5.83%)	"I became more fluent with technology."

university supervisor, and this system would probably benefit from more portfolio reviewers." Respondents also suggested achieving more guidance through modeling expectations and showing examples of completed e-portfolios and reflections, such as having "a model to go by and printed out and put in our folder to use as an example to see exactly what we needed to produce."

**Other themes.** The survey uncovered other reported themes. For instance, some comments were associated with making the system more user friendly (26.61%). Timing was also an issue because the e-portfolio was due at the "wrong time," meaning during student internships (4.59%). Finally, pacing was also a concern, and there was a suggestion to cover the standards one at a time (3.67%). See Table 2.

### **Question 2: What Obstacles Prevented the E-Portfolio Experience from Being as Meaningful as the Respondent Wanted?**

Although 27.68% of the 112 comments stated that there were no obstacles, 25% of them reported that lack of time was the major obstacle that prevented the e-portfolio experience from being meaningful.

**Time.** A typical response was, "I did not have enough time to reflect thoroughly." Most of the comments related to time revealed concerns regarding the potential barrier of having to complete the e-portfolio while they should be focusing on their teaching responsibilities, such as this comment: "My schedule as an intern was extremely busy and I often felt more pressure to work on the e-portfolio while I was keeping up with teaching."

**Other obstacles.** Others reported obstacles are unclear requirements (19.64%), inappropriate system for intended goal (12.5%), the e-portfolio being perceived as busy work (7.14%) or not suitable for employment (5.36%), and lack of flexibility in choosing the artifacts (2.68%). See Table 3.

### **Question 3: What Were the Most Significant Learning Experiences?**

Respondents reported that familiarity and alignment with standards (27.5%), combined with reflections (26.6%), were the most significant learning experience from the 120 comments. See Table 4. This subsection will focus on familiarity and alignment with standards, as reflection was a major theme for another question.

**Alignment with standards.** According to respondents, the e-portfolio experience familiarized them with the teaching standards. One respondent commented, "I was really able to gain a great understanding of what each standard means and how I had incorporated those standards into my classroom this semester." Besides the familiarity with the standards, the e-portfolio also provided respondents with an opportunity to reflect on their work: "It provided a great resource for reflections and artifacts that I could look at several months or years later. This will be a great tool to show my progress as an effective teacher." Respondents reported that writing the reflections allows them to develop better understanding of their work and develop areas of focus to improve their effectiveness as teacher.

**Other learning experiences.** Other significant learning experiences include being able to show how much one has grown as a teacher (17.5%), organization of work (14.16%), the feedback (8.3%), and technological skills learned (5.83%).

### **Question 4: What Were the Advantages of Developing an E-Portfolio?**

Respondents reported work sample collection and organization (50%) and being able to reflect on work (20.4%)

as major advantages of the e-portfolio experience. See Table 5.

**Organization of work.** According to respondents, the sample work collection was one of the major advantages in a sense that it helped them "...practice in collecting data to show teaching quality, and 'value added' judgments." Respondents also saw the work sample collection and organization as a convenient way to store work and update it, as it is always available and one can add to it if needed. "You will always have it available to you and you can always add to it," one respondent explained. Further, it helps "keeping track of my work."

**Reflection and growth.** Students affirmed that their e-portfolios provided opportunity for reflection and growth. One respondent said it "provided a great resource for reflections and artifacts that I could look at several months or years later. This will be a great tool to show my progress as an effective teacher." Writing reflections allowed students to develop better understanding of their work and identify areas to improve their effectiveness as a teacher. The e-portfolio also allowed students to track their growth: "While putting my portfolio together I was able to see my progress as a student into an educator. I was able to see the growth of teaching unfold on paper, graphs, and pictures."

**Other advantages.** Respondents also reported familiarity with standards and development (15.5%) and employment (13.9%) as advantages.

**Question 5: What Were the Disadvantages of Developing an E-Portfolio?**

The time it took to complete the portfolio (35.2%) was the biggest disadvantage, followed by inaccessibility of the e-portfolio system (21.9%), according to 105 respondents. See Table 6.

**Time.** According to these respondents, the e-portfolio was competing with the real purpose of the internship, which is classroom teaching, and consequently caused more problems with "stress that comes with putting it together and time taken away from your wonderful internship learning experience." One

**Table 5.** Codes, Categories, Frequency, and Sample Comments about Advantages of E-Portfolios

Themes (Frequency)	Sample Comments
Sample work and organization (50%)	"The ease of writing and collecting work electronically and the ease of presenting that work to those that need to review it."
Reflections (20.4%)	"being able to reflect on your work and having the work available electronically"
Employment (13.9 %)	"It is convenient to show to potential employers and reproducible so I can show more than one person."
Familiarity with standards and development (15.5%)	"It helped me develop a strong understanding of the new professional standards."

respondent stated, "The e-portfolio was too time-consuming and it prevented me from focusing on my classroom experiences."

**Inaccessibility of the e-portfolio system.** Students stated that it would have been more beneficial if other stakeholders, such as school principals and partnership teachers, could comment and review them. However, not all respondents felt other reviewers would choose to use the e-portfolio. For example, one student said, "Not all potential employers will care to access it."

Referring to the system, students listed difficulties uploading documents and the need to find a scanner as disadvantages.

**Other disadvantages.** Eighteen percent reported no disadvantages from the e-portfolio, but 8.5% cited lack of support, 7.6% cited cost, 4.7% cited lack of flexibility, and 2.8% cited a lack of feedback as perceived disadvantages.

**Discussion**

Interpretation of the results must be viewed within the limitations of this study, which used survey research rather than interviews that would have allowed the researchers to ask impromptu follow-up questions. Further, the coding process was subject to the interpretive lenses of the members of the research team. Different coders may have produced different emergent themes resulting from the student discourse. The researchers did not employ member-checking, and the data are based on one method as oppose to multiple forms of data collection, which would facilitate triangulation. In light of these limitations, the study revealed several interesting findings.

Approximately 34% of the students at this institution suggested integrating

e-portfolio development throughout their coursework rather than during the final stages (student teaching). Many of the students complained that it was busy work during their internship, which is perceived as a difficult period of transition because they are responsible for applying their knowledge and managing a classroom. Students hurriedly completed the tasks and collected the artifacts, detracting from the overall purpose of the e-portfolio. Yagelski (1997) also argues that e-portfolios should begin at the initiation of one's program to facilitate the learner's ongoing development. Similarly, Stansberry and Kymes (2007) emphasize the need for more experiences that connect "learning as student" to "practice as teacher" in education programs.

"The components of good e-portfolio development include purpose, collection, selection, and reflection on work demonstrating achievement of standards, a focus on employment, and ongoing professional development" (Barrett & Knezek, 2003, p. 4)." However, e-portfolio development requires university resources for creating and maintaining such projects. E-portfolio software can control, restrict, or enhance the e-portfolio development process (Barrett, 1999). Although there are trade-offs in using highly structured templates, such as the one in the present study, compared to open-ended e-portfolio designs for e-portfolio development (Barrett & Knezek, 2003), it appears that both methods can foster learners' intrinsic knowledge of themselves as developing teachers when students receive the guidance and time needed for reflection/growth and to organize their work.

E-portfolio use necessitates ongoing tutorials and workshops that

**Table 6.** Codes, Categories, Frequency, and Sample Comments on Disadvantages of E-Portfolios

Themes (Frequency)	Sample Comments
Time (35.2%)	"The work that went into the portfolio really took away valuable time, which I need to spend on my class and new students." "Principals will not have the time to view it online, and it looks.... I honestly saw this as a 'busy work'"
Inadequate system (21.9%)	"It only gives you a small window of information about our experience."
Lack of support (8.5%)	"A disadvantage was the lack of looking over the portfolio with a faculty member and having the proper training on the program."
Cost (7.6%)	"I wish it weren't so expensive so that we could keep it electronically for longer. This way, it could continue through our first years of teaching."
Lack of flexibility (4.7%)	"Not having enough samples to choose from."
Not enough feedback (2.8%)	"Feedback is delayed and/or minimal."

provide students with the technological knowledge and skill to maximize its use. Each semester, faculty and key personnel should explain the purpose of the e-portfolio and share examples from similar programs. In addition, staff should be devoted to helping students overcome technological glitches related to the software or e-portfolio system (Seyferth, Ritzhaupt, Singh, & Dedrick, 2007). The multimedia aspect of e-portfolios allows prospective teachers to share their work with different audiences, including students, parents, colleagues, administrators, and the general public (Hicks, et al., 2007). Students can share their work online or save their work elsewhere, which allows them to access their artifacts and reflections beyond their student teaching experience, during interviews with prospective employers, or with colleagues, etc. Therefore, teacher education programs should invest in making sure that students know how to use their e-portfolio systems to demonstrate what they have learned from their educational experiences.

Other important considerations in the integration of e-portfolios in teacher preparation programs are the opportunities to document growth, organize work according to standards, and type and frequency of feedback provided by faculty and other key personnel to students developing e-portfolios. As Strudler and Wetzel (2005a) note, teacher preparation programs can achieve these by having periodic check-points to assess student progress toward standards and benchmarks. In the

present study, students received formal feedback from their university supervisors during a 15-week field experience. In fact, although students received feedback from supervising teachers and peers in the development process of the artifacts, some of the students did not account for it. This may be due to the fact that students tend to perceive the building of the e-portfolio as a separate process from the practices and experiences that lead to the development of the artifacts. The frequency with which the students receive guidance and feedback is critical. As noted by several students, timing of the feedback affects how the students will respond, especially as the e-portfolio development process occurs simultaneously with student teaching. Guidance and feedback should be provided at previously announced check points so that students can plan, have enough time to reflect, and revise their e-portfolios accordingly. Guidance might be enhanced if multiple reviewers (e.g., peers, teacher supervisors, and other faculty members from teacher preparation programs) provide feedback at different points during e-portfolio development and at its culmination.

In teacher education, aligning the e-portfolio with educational standards mainly through accreditation requirements strengthens the success of an e-portfolio. Accreditation, especially NCATE, has played a significant role in the adoption of e-portfolios as a means of assessment of teacher candidates' competencies in support of the efforts to meet accreditation requirements.

Therefore, developing strong connections between accreditation standards and teacher candidates' views of their abilities to meet those standards will help better address and reconcile the program's and student's needs. As Stansberry and Kymes (2007) assert, the appeal of e-portfolios "rests on the twofold strategy of reflection, both in the selection of artifacts and development of the portfolio, and in the statements of reflection imbedded with the artifacts and examples of learning" (p. 488). Although students felt that the e-portfolio process was time consuming, many of them found it meaningful to their development as teachers, which is evidenced by suggestions for increased scope and the benefits of reflection and growth. It appears as though removing the barriers to implementation, such as technology issues, lack of guidance, and providing more time for the e-portfolio development, would lead to even more favorable outcomes.

### Future Research

The examination of e-portfolios in teacher preparation programs is an open-ended realm of research. For instance, to date, the vast majority of the empirical research in the use of e-portfolios in teacher preparation has largely focused on preservice teachers using e-portfolios as part of their program of study (e.g., Hartmann & Candler, 2007; Ritzhaupt, Singh, Seyferth & Dedrick, 2008; Smits, Wang, Towers, Crichton, Field & Tarr, 2005). Whereas most common definitions suggest that e-portfolios should be used to augment and assess growth over time, little to no research has documented whether inservice teachers continue to use e-portfolios as a tool for their professional growth and learning (Ritzhaupt, Ndoeye, & Parker, 2009). Additionally, few studies on e-portfolios have examined the perceptions of school hiring personnel (i.e., barriers and benefits) (Strawhecker, Messersmith, & Balcom, 2007). Therefore, little is known about how school personnel perceive the use of e-portfolios in the hiring of teacher candidates. Interviews with principals,

etc., may lead to alterations in the development and implementation of e-portfolios that increase their meaningfulness and learning outcomes for students.

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