A Bottom-Up Approach for Implementing Electronic Portfolios in a Teacher Education Program

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Abstract

In an effort to generate a bottom-up approach for the program-wide implementation of electronic portfolios, this article first reports on the ways in which teacher candidates perceived the benefits and setbacks of this experience, after an initial course. Second, this article reports on whether and how the teacher candidates continued to develop their e-portfolios voluntarily throughout the program, after the initial course. The results indicate that even though the electronic portfolios were initially perceived to be highly beneficial for several reasons (including the development of critical thinking skills and creativity, and as a useful way to showcase work for employers), the voluntary nature of the ongoing process discouraged further development. Overall, the two primary setbacks students perceived (technical challenges during development and the amount of time needed) outweighed the benefits, thus preventing them from continuing their electronic portfolios for future endeavors. Through these lessons learned, the authors provide recommendations to readers who are considering the adoption of electronic portfolios.

As technology advances during the 21st century, electronic portfolios (e-portfolios) are being recognized as an essential aspect of teaching, learning, and assessment practices in the education domain (Basoton, 2002; Lorenzo & lttelson, 2005). Yet a variety of studies have reported problems and challenges in implementing e-portfolios within teacher preparation programs (Ledoux & McHenry, 2006; Strudler & Wetzel, 2008; Wetzel & Strudler &, 2006). A college of education at a midsize university on the U.S. eastern seaboard has faced many challenges in this regard. At our school of education, the e-portfolio process began in 2002, when it was believed that it would be necessary for our next National Council for Accreditation of Teacher Education (NCATE) review. The decision was subsequently made by the college of education dean to use the LiveText online assessment management system, in an effort to institute an e-portfolio requirement, with the hope of gradually substituting a paper-based employment portfolio that was also being implemented. Even as an administrative requirement, however, LiveText adoption never really took hold, and after three years it was dropped due to a lack of support from faculty and students, a lack of resources to fully integrate it into the programs, a preponderance of technical glitches (Wilder & Adelman, 2003), and the high cost to students. Following this, the university purchased the Blackboard Content Management System, which had an embedded e-portfolio tool, and used it to start the development of student e-portfolios, as an assignment, in an online educational technology course titled CIEE 213: Teaching in a Global, Technological World. Students were required to take this course during the first semester of their program. The immediate objectives of the e-portfolio assignment were to enable them to get started and to help them better understand alternative assessments in general. It was hoped that students would keep adding artifacts to these developmental e-portfolios as they moved through the program in consecutive courses. However, because the continual development of the e-portfolios was not mandatory and faculty did not monitor or assess this process, it was not known whether students were actually continuing to build their e-portfolios in subsequent courses or if they were using them as the basis for the paper-based employment portfolios that are required in their final student teaching seminar.

It should also be pointed out that adopting an e-portfolio requires much more than simply substituting one medium (analog paper) for another (digital bits). Rather, the development process demands new work endeavors among faculty, administrators, and students, along with new demands for development time and technical competence. Given the faculty and administration's hesitation to make this change, we sought to discover whether it would be possible for change to happen in a more "bottom-up" approach, with students taking the lead in e-portfolio implementation. The aim of this study was thus to examine whether students perceived e-portfolios as having value and whether they would, on their own, follow through on this, even if the process was not mandatory. We specifically sought to answer the following questions:

1. How do elementary teacher candidates perceive e-portfolios? In what way and to what extent do they perceive e-portfolios as being beneficial or creating setbacks?
2. Do elementary teacher candidates continue to work on their e-portfolios voluntarily as they move through the program? If so, to what extent, and with what motivations?

   - Do they continue to use the organizational structure required in CIEE 213 (based on the New Jersey Professional Standards for Teachers), or do they create their

own way to organize material, which is subsequently added?

- Do they add only assignments completed in subsequent courses to their e-portfolios, or do they continue to write reflections as well?

3. Do elementary teacher candidates use their developmental e-portfolios to help them build their paper-based employment portfolio? If so, in what ways?

Faculty and Student Perspectives on Electronic Portfolios

Wilhelm et al. (2006) noted that successful implementation of e-portfolios involves a shared vision among faculty, students, and the administration. This shared vision includes faculty agreement on a conceptual framework, strong administrative support, and a continuous process of articulating the vision and framework to students (Herner, Karayan, & McKean, as cited in Wilhelm et al., 2006). Several studies have been conducted to understand faculty and students' perspectives on e-portfolios. Strudler and Wetzel (2008) investigated the benefits and costs of using e-portfolios in a U.S. preservice teacher education program, from the faculty's perspective. Their study identified benefits, including (a) increased opportunities for students to reflect and learn, (b) better student understanding of teaching standards, (c) better faculty access for assessing student work and communication with students, and (d) improved tracking of student performance of accreditation and program improvement. They also identified disadvantages, including (a) the amount of time and effort required for implementation and (b) incompatibility of e-portfolios for faculty's goals, values, and needs, including issues of the state and national standards-based reporting and academic freedom.

Wetzel and Strudler (2006) also found that, from the students' perspective, the benefits of using e-portfolios in the six preservice teacher education programs they examined included (a) opportunities to reflect, (b) better access to professional documents, (c) increasing technology skills, (d) better understanding of teaching standards, and (e)

the possibility of enhancing employment opportunities. They discovered that the disadvantages included (a) issues of program implementation, (b) access to and reliability of technology, and (c) the amount of time and effort expended. Evans et al. (2006) additionally mentioned that some other benefits of using e-portfolios included reducing the amount of paper used, enabling teacher candidates to document their performance in an auditory and visual medium for their growth over time, and greater personal involvement in the selection and design processes (Wiedmer, 1998).

Implementation Approaches

As noted by Hall & Hord (2001), change in education is a complex process that takes a minimum of three to five years, with large-scale innovations taking longer. As such, instituting an e-portfolio requirement when paper-based portfolios have been implemented is a formidable task. Hall and Hord (2001) also suggested that each top-down change and each bottom-up change has pros and cons. They further indicated that top-down change can be successfully initiated if accompanied by support, training, and an understanding of the change process. Fullan (2001) also noted that the strategies needed to initiate positive changes should combine top-down and bottom-up approaches. Even though there are potential tensions between these two perspectives, there are some studies that show how each might contribute to building individual and collective knowledge (Hartnell-Young, 2006). Furthermore, Barrett and several other authors (Barrett, 2004; Barrett, Carney, Strudler & Wetzel, 2005) have long supported the use of e-portfolios as being student-driven processes that serve to generate reflective development rather than being part of a college of education's assessment system.

In line with the above literature, at our institution, the top-down approach, initiated by the college of education dean to adopt the e-portfolios, was unsuccessful due to resistance from faculty members, who often raised concerns over academic freedom; adjuncts and many faculty, who were not completely on board; training

schedule delays for LiveText that were then never actualized; and technical glitches in the system (Wilder & Adelman, 2003). This led us to try to provide students with the opportunity to develop their e-portfolios on their own, in a voluntary manner.

Method

To examine the research questions stated above, the authors employed two surveys. Survey I, comprised of a Likert scale as well as open-ended questions, investigated the teacher candidates' perceived benefits as well as any setbacks encountered while developing their e-portfolios, right after they initiated them in the CIEE 213 course, during the first semester of the program. The authors developed the Likert-scale items through the literature review regarding the potential benefits of e-portfolios. Survey II, consisting of both structured and open-ended questions, explored whether and how teacher candidates' voluntary continuous development of their e-portfolios occurred throughout the program.

Context and Participants

Survey I. The first author of this article distributed the online survey at the end of the spring 2007 semester to students enrolled in four sections of the CIEE 213 course. Thirty-seven students, who were pursuing NJ K–5 or dual P–3/K–5 certification (K–5: 35; dual P–3/ K–5: 2), voluntarily participated in this survey. As noted previously, in this CIEE 213 course, students were required to start an e-portfolio using the Blackboard e-portfolio system (at no charge to them). All students included reflective narratives for all of the artifacts they had added, explaining why they selected the artifact to demonstrate the standard(s) and how it showed their mastery of the NJPST standard(s) they chose. They were encouraged to keep working on them as they moved through the program, but this was not a requirement beyond this course.

Survey II. The first author distributed the online surveys at the end of the fall 2008 semester to the students enrolled in the student-teaching seminar course (see Appendix A, p. 90), as well as to their instructors (see Appendix

Table 1. Five-Point Likert-Scale Items and Their Means

Questions	Mean (SD)
Creating my e-portfolio helped me:	
Improve my computer/technology skills	4.22 (.92)
Develop a better understanding of alternative forms of assessment	4.27 (.73)
Develop critical thinking skills	4.35 (.72)
Develop organizational skills	4.27 (.96)
Understand the NJ Professional Standards for Teachers (NJPST)	4.43 (.80)
Critically reflect on projects I have worked on	4.46 (.56)
Evaluate my career goals	4.14 (1.03)
Someday I would like to show my e-portfolio to a potential employer.	4.24 (.98)

Note: Maximum score 5 = strongly agree.

B, p. 91). Eighteen students and four instructors participated in the surveys. This seminar course was a required capstone course at the end of the program for all of the teacher candidates, with a paper-based portfolio evaluated by the student-teaching seminar instructor.

Results

The findings are reported below, organized by the research questions.

How do elementary teacher candidates perceive e-portfolios? In what way and to what extent do they perceive e-portfolios as being beneficial or creating setbacks?

Perceived benefits. Overall, as shown in Table 1 from Survey I, for each Likert-scale item, students indicated that the e-portfolios were very helpful, with all of the mean scores above 4 out of 5. Even though this survey was administrated after students had just begun to build their e-portfolios, the results of this study support the findings of Wetzel and Strudler (2006). Once our students began to develop their e-portfolios, they already began to ascertain several benefits.

To better understand students' perspectives that may not have been otherwise captured through the Likert–scale questions, student answers for the open-ended questions were also analyzed. Several themes were then derived. Table 2 presents four new themes that were not originally included in the closed-ended Likert-scale questions. The first and primary reason given as an e-portfolio benefit was that it helped students to express and/or develop creativity. The second was that it was a good storage mechanism for keeping all of their assignments in one place. The third was that it allowed them to demonstrate their technology skills. The fourth was that the e-portfolio was more cost effective and affordable than a paper-based portfolio.

When asked "Looking back, would you say that the e-portfolio experience was of value? Why? Why not?" all participants except one answered that this process was of value. The primary reason for this was that they thought their e-portfolios would help to obtain a teaching position in the future (employment portfolios). Students considered that they could not only showcase their artifacts, but also demonstrate their creativity, knowledge, qualifications, and understanding of technology. They also viewed the e-portfolio as being a very useful tool during job interviews. Some comments include:

- "Yes, I do see myself presenting my e-portfolio along with my resume in a job interview."
- "It was very valuable because I am able to keep working on it and improve it as much as I can so I will want to show future employers."
- "Yes, because when I show it to a potential employer it will show my lessons, but it will also show my knowledge of technology, which is very useful in today's education."
- "Yes, it is important to have this for an interview."

One student addressed the value of the e-portfolio as being "developmental," and thus a long-term project-wide process, even though this student only started to build it in one class. For instance, this person said, "Yes, because it will help me in the long run with all my additional education courses. I will be able to see which areas I fully understand and where I need improvement as I move through the program. Again, it will give me a chance to see what I've learned when adding links to work I complete in other education courses."

Perceived setbacks. As presented in Table 3, the disadvantages that emerged were also similar to Wetzel and Strudler's study (2006). For this study, two more things to add were limited functionality and limited built-in options within the Blackboard e-portfolio system, as well as confusion in building it. As creativity was the highest benefit students reported, it is fairly easy for us to determine why students felt that limited functionality of this system was a problem. After all, this system provided a specific structure in terms of the page layout, color, and buttons styles, so it was not an open Web design program in which students could add their own elements. Furthermore, as the educational technology course was online, students may have felt the development process was confusing or challenging, as they had to read through long procedural documents, in addition to voluntary in-person workshops that were provided. It appeared that this was one of the critical setback factors.

Do elementary teacher candidates continue to work on their e-portfolios voluntarily as they move through the rest of the program? If so, to what extent, and with what motivations?

As shown previously, even though the majority of students indicated the value of e-portfolios and their potential usage (especially for their future job interviews),

Table 2. New Perceived Benefits

Themes	Examples
As a way to display creativity	"Allowed me to be creative in choosing what is to be included." "The 'creativity' part of it. I was able to add or remove features easily when and where I desired." "The fact that I can create it into my own style and add as many features as I want. "I got to show my personality."
Storage for all assignments in one place	"Showing my work and keeping it in one place."
Demonstration of technology skills	"It's a great way to show a future employer how technologically savvy you are:-)" "It demonstrates that you are computer literate."
Using virtual tools	"…I had to do a portfolio for art class and I wish I could have used this E-portfolio. I spent a lot of money on ink, paper, protective covers for my photos, binder, and spent time arranging everything." "Each artifact can be viewed right on one's computer without having to print out multiple copies."

Table 3. Perceived Setbacks Emerged

Themes	Examples
Technical challenges during development	"It was kind of confusing." "I had a difficult time figuring out how to upload some of my artifacts."
The amount of time needed	"It took a lot of patients and time." "It took a lot of time!
Limited functionality and built-in options within the Blackboard e-portfolio system	"Not being able to add a background color and clipart." "Very limited options when using the e-portfolio creator."

right after initiating it in the CIEE 213 course, the results of the Survey II showed that that majority of students did not continue building their e-portfolios on their own. The primary reasons for this a re described in Table 4 (p. 88).

Two students, however, reported that they continued working on their e-portfolios. One of the two started to make a new e-portfolio organization structure, after CIEE 213, and the other one used the same structure made in CIEE 213. They both not only added the assignments they had completed in subsequent courses, but also added reflections. Additionally, they added new content besides the assignments completed in the program, such as other coaching papers and content involving their own families.

Do elementary teacher candidates use their developmental e-portfolios to help them build their paper-based employment portfolios? If so, in what ways?

The results of Survey II revealed that the majority of students did not use their e-portfolios to help in their paper-based employment portfolio development process. As seen in the comments below,

the primary reason was that it was not viewed as helpful in building their paper-based portfolios:

- "I did not use my e-portfolio to develop my paper-based portfolio because my e-portfolio contained very few of the items required for the paper-based portfolio."
- "No, there was really not much in the e-portfolio to begin with."
- "No, because I didn't have anything on my e-portfolio that would help me develop my paper-based portfolio."

Three students mentioned the helpfulness of the e-portfolio development initiation in CIEE 213 in the following comments:

- "CIEE 213 definitely prepared and gave me a better understanding of portfolios than the other education classes since not many require them and if they do require them it's what the professor wants."
- "Yes, it gives you things that you should put in your portfolio so it helped."
- "Yes, because I wouldn't have known how to set it up without that course"

Three of the four seminar instructors also showed similar responses. They said that their student developed e-portfolios in the CIEE 213 course didn't seem to help them build them paper-based ones. For example, they said:

- "My students did not seem to know about what was required in the employment portfolio, and did not mention the e-portfolio."
- "Students don't add to it; they receive portfolio information in their first field experience."
- "Students don't maintain the bb e-portfolio; they keep hard copy of assignments and materials."

However, one instructor said that it was helpful for the seminar students:

Many of my seminar students use artifacts from CIEE 213 in their portfolios. It helped in compiling artifacts. This information has been helpful in guiding our seminar students through their cover letter, resume and interview preparations which we cover carefully in their senior seminar. It provides confidence in putting their final portfolios together. Although not all principals and

Table 4. Reasons for Not Continuing to Develop E-Portfolios

Themes	Examples
Lack of time	"I have not continued working on my e-portfolio since CIEE 213 because this semester has been brutal I wouldn't have had the time to do it!" "There has been absolutely no time to work on this e-portfolio."
Perceived steep learning curve	"Clear directions not given on how to complete and what to include." "I did not do anything further with my e-portfolio because I thought it was too hard and I was not completely sure how to keep adding all of my work samples that were not pictures." "If I had more knowledge about how to create an e-portfolio I might have enjoyed using that a lot more."
Not required in other classes	"I had forgotten that I created one and no other class makes us use it". "I started my e-portfolio during my first semester, and no reference was ever made to it again by any of my professors in subsequent courses…. I think that it would be helpful if the e-portfolio was referred to by the professors in the courses taken subsequently to the CIEE 213 course. " "I did not continue with my e-portfolio because I was not required to and I was busy with my classes, field experiences, and my other portfolio." "No, because I only had to go to a class on how to create a e-portfolio, and then nothing else was ever mentioned about doing an e-portfolio again."

superintendents are anxious to read all portfolios, the preparation of portfolios prepares our students for the interview process. It also makes them better scholars as they enter their new profession.

Discussion and Recommendations

This study provides new insights about the benefits of developing e-portfolios. In particular, we found that the first and primary perceived benefits of e-portfolios was that they helped the students express and develop their creativity. The findings also provide a snapshot of a transitional period in which our teacher preparation program attempted to implement a bottom-up approach to best generate program-wide e-portfolio development, after failing to have success with a top-down approach. Our previous experience with a top-down requirement echoed the findings of other studies (Strudler & Wetzel, 2008; Wetzel & Strudler &, 2006) and was subsequently abandoned. However, this study also showed that a bottom-up approach was not free of challenges, either. We initially believed that e-portfolio development should not be implemented in a coercive manner. Rather, it was assumed that once students were taught how to make them, they would be able to document their attainment of certain levels of proficiency during the rest of the program, which would then have lifelong benefits (Ledoux & McHenry, 2006).

Likewise, we hoped that buy-in from other faculty would happen gradually. Nevertheless, this study revealed that, even though most students initially viewed e-portfolios as valuable and beneficial for various reasons, the voluntary nature of the process discouraged further development and use. It appeared that the two main disadvantages students reported in Table 3 (technical challenges during developments and the amount of time needed) outweighed the benefits they reported, thus preventing them from continuing the process. Although all of the students initially developed their e-portfolios successfully (both the structure as well as adding their assignments and reflections), they needed continuous technical support beyond this point. Additionally, they seemed to need guidance even for the selection of artifacts, monitoring every semester by each course instructor in the program, and assistance in reflecting upon what they had completed.

The results from this study also caution that voluntary e-portfolio programs need to take into consideration the students' willingness and capability to carry out the intended goals, in addition to all of their other academic and personal responsibilities. After all, "students, the ones who actually do the implementation, should be important stakeholders in the change process" (Fullan, cited in Wetzel & Strudler, 2006, p. 107). Furthermore, school and teacher educators should provide students with a culture of inquiry in the learning process (Herman & Winters, 1994).

Based on these findings and the lessons we learned from this study, we provide the following recommendations.

Administrative Support for Both Faculty and Students

Even with an approach that is purely student-driven, the need for encouragement and backing from the administration is crucial, and as this study discovered, this needs to go beyond general expressions of support. The administration needs to provide the resources for technical support and comprehensive advisement, whether the e-portfolio is mandatory or not. Furthermore, the administration should have a way of recognizing and rewarding students' efforts—for example, setting up a career day, in which graduating candidates can talk through and display their e-portfolios as part of a mock job interview, or a website that showcases exemplary e-portfolios that students have voluntarily submitted. At the same time, the administration might give release time to a faculty member to be an "e-portfolio resource person"—someone students could go to for guidance and suggestions on how to use an e-portfolio to best demonstrate who they are and what they can do.

Systematic and Ongoing Technical Support for Both Faculty and Students

It is clear that students need to have constant support for using the technologies needed for e-portfolio development as they move through the program. As

such, to enable a voluntary e-portfolio development approach to blossom, it is desirable for teacher education programs to make sure that faculty and students have access to adequate technical resources as well as a place where they can go for face-to-face technical support. The latter could be accomplished through faculty collaboration with an in-house campus computing center that offers support on a drop-in basis. Scheduled classroom workshops offered every semester for those who might need a refresher after the initial development process would also be helpful.

In retrospect, we found that it might have been better if we had used technology tools that many college students were already comfortable with—for example, a variation of the popular Facebook system—rather than a proprietary solution. Tying the e-portfolio creation and continued accumulation to a tool that students could access for themselves on a daily basis could have made the process a more seamless part of their professional growth. On one level, the e-portfolio system in Blackboard does facilitate this by letting students submit their assignments to their instructors while at the same time uploading it to their artifact collection, but this facility is only realized if faculty require submission this way. Even with a technology that is easily mastered, it may be more important to use one that is perceived to be a more ubiquitous and automatic function of students' lives. Many students, for example, use cell phones, which they carry with them everywhere to update their Facebook and Twitter entries on an "at the moment" basis. Certainly, in order to thoughtfully and judiciously put together an e-portfolio, students will need to sit down and devote time and deliberation to the process, but a system that takes into account current students' technology habits might make this a more natural procedure and afford greater ownership. This is an area for continued research.

Establishing a Shared Vision among Faculty

As the findings from this study indicate, some of the faculty who were teaching the capstone course were not even aware that students were developing e-portfolios early in the program. Additionally, no other faculty throughout the program mentioned the e-portfolio process at all, which discouraged students from continuing to work on their e-portfolios. Again, even with a bottom-up, student-driven approach, there needs to be a shared vision and endorsement from the faculty members to ensure that adequate assignments and experiences are provided for students, so that they may develop artifacts that fully demonstrate their capabilities. In this sense, a set of e-portfolios can be useful tools for evaluating the effectiveness of a program even when the ownership of it belongs to the students. Therefore, faculty members need to work together to design and implement a program that provides sufficient opportunities for collecting and reflecting on assignments and experiences that demonstrate students' competencies. Furthermore, this may help students (and faculty who might have gotten a little too caught up in their particular course) to see the "bigger picture" of the program and what its overall goals are.

Acknowledgments

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Appendix A

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1. When did you take the online CIEE 213 course? (Year _____); Semester_____)

2. After starting your e-portfolio in CIEE 213, have you continued to work on it since then?

☐ Yes (If yes go to Question 2.1.)
☐ No (If no go to Question 2.2.)

  2.1. If you answered "yes" for Question 2, please answer the following four questions, being as detailed as possible.

   a) ☐ I continued developing my original e-portfolio
   ☐ I started a new e-portfolio:

   If you started a new e-portfolio, please explain why:

   b) Did you include assignments completed in subsequent courses to your e-portfolio? ☐ Yes ☐ No
   Why or why not?

   c) Have you continued to write reflections? ☐ Yes ☐ No
   Why or why not?

   d) Have you added anything else, besides your assignments? ☐ Yes ☐ No
   If yes, what types of items were they?

   e) Have you continued to use the organizational structure that was
   required in CIEE 213 (as based on the NJPST), or did you create your own way of organizing artifacts which
   were added? Please explain:

   f) Why did you use this specific organizational structure afterward
   completing CIEE 213? Please explain:

  2.2. If you answered "no" for question 2, please explain why not, being as
  detailed as possible.

3. Did you use your e-portfolio to help develop your paper-based employment portfolio? Why or why not? If you did, how did you develop it?

4. Did learning how to develop the organizational structure of your e-portfolio early on in the CIEE 213 give you a better understanding of what employers are looking for and help you assemble a culminating paper-based employment portfolio? Please explain why you feel this way:

5. Did having an organized way of collecting assignments in your developmental e-portfolio (in CIEE 213 and/or throughout the program) help you assemble and select the material which best displayed your achievements in your culminating paper-based employment portfolio?

6. Are there any other comments regarding e-portfolios and/or paper-based portfolios that you would like to add?

Appendix B

1. Do you think your seminar course students have used the e-portfolios they initiated in the CIEE 213 course to build their paper-based employment portfolio?

   ☐ Yes ☐ No

   If yes, in what ways? Please provide specific details.

2. Do you think knowing about and working with the organizational structure early on in the program in CIEE 213 through the e-portfolio assignment has given your students a better understanding of what employers would be looking for and helping them assemble a culminating employment portfolio more easily?

   ☐ Yes, very much.
   ☐ Yes, somewhat.
   ☐ I am not sure.
   ☐ No.
   ☐ No, not at all.
   ☐ Please indicate why you feel this way.

3. Do you think having an organized way of collecting assignments (starting in CIEE 213 using the Blackboard e-portfolio system) throughout the program has helped students assemble and select the material which best displayed their achievements in their culminating employment portfolio?

   ☐ Yes, very much.
   ☐ Yes, somewhat.
   ☐ I am not sure.
   ☐ No.
   ☐ No, not at all.
   ☐ Please indicate why you feel this way.

4. Do you think your students' e-portfolios' have helped them to develop their paper-based employment portfolio in this seminar course? If so, in what ways? If not, why not?

5. Do you have any other comments on e-portfolios and/or paper-based portfolios that you would like to mention?