

# The Journey to Best Practices: Results of a Two-Year Study of e-Portfolio Implementation in Beginning Composition Courses

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**Abstract:** In this paper, we present a case of implementing new technology. New technologies are often described or introduced to teachers and administrators in terms of their ideal use. Such accounts of “best practices” often fail to specify the conditions that contributed to success in a particular context. We describe the initial steps in a journey towards best practices, discussing the implementation path for electronic portfolios in beginning composition courses at the University of Washington. We highlight changes in the learning environment and classroom practice that emerged as critical for advancing along the trajectory toward an effective implementation of e-portfolios. This case identifies variables for other institutions to consider as they introduce e-portfolios or other new technologies.

## Introduction

Implementing new educational technology is never easy. As research in the learning sciences has demonstrated, classrooms are complex learning environments where variables such as curriculum and instructional practices, cultural beliefs, social and physical infrastructure, and experience with technology all interact and influence how effectively technology is used (Brown & Campione 1996; Collins, Joseph & Bielaczyc 2004; Shofield 1997). New technologies do not come with directions for how to create the environment that will support their most effective use. Katerine Bielaczyc uses the term “implementation path” to describe the sequence of phases teachers move through as they progress from initial trials with a new technology to more sophisticated and effective use. Advancing along this trajectory, Bielaczyc argues, involves more than gaining familiarity with the functionality of a tool; it may also require shifting the mindset of students and teachers, engaging students in new types of learning activities, and moving toward new types of interactions among students and others outside of the classroom (2006).

New technologies are often described or introduced to teachers and administrators in terms of their ideal use, disconnected from issues of context. Accounts of “best practices” in implementing technology can be similarly misleading. While such accounts might provide a sense of what can be done with the technology and the kinds of outcomes that can be achieved, best practices often fail to specify the conditions that contributed to success in a particular context, or to discuss what was involved in learning to use the technology successfully. In this paper, we describe initial steps in the journey towards best practices, discussing the “implementation path” for electronic portfolios (e-portfolios) in beginning composition courses at the University of Washington (UW). Comments from both teaching assistants and administrators involved in our pilot study reflect a growing awareness of the restructuring that must occur in the writing program and in the minds of teachers and students to take full advantage of the new technology. In the sections that follow, we highlight changes in the learning environment and classroom practice that emerged as critical for advancing along the trajectory toward an effective implementation of e-portfolios.

Our focus on the implementation path for e-portfolio technology intersects with a popular theme in e-portfolio scholarship: support for lifelong learning. Lifelong learning represents an ideal state of e-portfolio use, where instructors use e-portfolios as teaching aids and as tools for their own professional development and where students continue to make use of their e-portfolios long after graduation. Extending the reach of this technology beyond the

educational requirements of a course, program, or institution is an advanced stage of implementation, but one that has received considerable scholarly attention. Gary Greenberg views e-portfolios as a logical forum for personal and professional development, both within formal education and after a course of study has been completed (2004). Brad Wheeler refers to e-portfolios as potential sites of “K-through-gray” learning (2004). Susan LaCour suggests that e-portfolios can become valuable tools in government and business (2005). Our focus on the early steps of e-portfolio implementation both compliments and complicates the discourse on lifelong learning. On one hand, we reveal the early stages of a journey that may eventually lead to e-portfolio use beyond the institution. On the other hand, we emphasize the everyday challenges of e-portfolio adoption, rather than the ideal outcome. Our research highlights subtle shifts in practice and culture that can, over time, culminate in dramatic transformations. While visualizing ideal use provides inspiration, analyzing the journey of technology implementation increases our practical understanding of educational change.

## **Our Partnership**

Catalyst Research & Development develops and maintains a suite of Web tools for use by faculty members, students, and staff at UW and conducts research on the use of technology for teaching and learning. As participants in the Inter/National Coalition for Electronic Portfolio Research (I/NCEPR), Catalyst researchers have been collaborating with representatives from nine other colleges and universities since 2003 to study e-portfolio adoption. Our ongoing research on e-portfolios seeks to understand how students learn to compose in this medium—to select and reflect on artifacts, combine words and images in a coherent whole, effectively employ hypertext, and demonstrate awareness of audience and purpose. In autumn 2005, we had the opportunity to enter a partnership with the Expository Writing Program (EWP) in the department of English to better understand the effects of using e-portfolios in a specific context. Having used paper portfolios for years in their required beginning composition course, EWP was interested in what value might be added by moving to an electronic format. During the 2005/6 academic year, Catalyst researchers partnered with EWP to pilot the use of e-portfolios in nine sections of beginning composition. Participants in the pilot also agreed to take part in a study on the opportunities and challenges involved in e-portfolio adoption. In this paper, we share findings from our study of the e-portfolio pilot.

In the current academic year, 2006/7, EWP administrators have given all beginning composition TAs the choice of teaching with electronic or paper portfolios. We are in the process of studying this new phase of e-portfolio adoption. In the discussion section of the paper, we share observations on the current status of e-portfolio use within EWP.

## **The Technology: Catalyst *Portfolio***

In 2002, Catalyst released two new Web tools, Catalyst *Portfolio* and *Portfolio Project Builder*, to the campus community. Catalyst *Portfolio* provides a Web space where students can assemble, reflect on, and present a collection of digital artifacts. Catalyst *Portfolio Project Builder* enables instructors to provide a model template or instructional scaffold to guide students through the process of creating an e-portfolio. The portfolio project template provides an organizational structure and includes prompts and instructions for students to reference as they assemble their e-portfolios. The content of a project template is not a visible part of students’ published e-portfolios. Depending on the settings selected by the instructor, project templates can be open or locked. Locked projects do not allow students to make changes to the structure of their e-portfolios; open projects allow students to exercise creative control over all aspects of their e-portfolios. Students can also create e-portfolios without using an instructor-provided template. For the e-portfolios described in this paper, instructors distributed an open portfolio project template to their students.

## **The Setting**

Several characteristics of EWP made it an ideal setting for adoption of e-portfolios. For one, the program had in place clearly articulated course outcomes and a well-developed paper portfolio assignment; administrators and instructors easily saw a fit between the *Portfolio* tool and the established curriculum. Although individual instructors determine the exact texts and assignments for each section of beginning composition, all students complete

assignments designed to target four course learning outcomes. For the final portfolio, students are required to select 5-7 papers and develop a statement about how these works demonstrate achievement of the outcomes. In the traditional paper portfolio, students are asked to write their statement in the form of a cover letter to their instructor. While the online format of an e-portfolio differs considerably from a paper portfolio, we felt that the best way to help teaching assistants translate formats was to develop a sample template in the *Portfolio Project Builder* based on the original “cover letter” model. Requirements for the assignment could remain unchanged.

Other aspects of the program and classroom practice, however, posed challenges for our pilot. The first was how we could successfully train instructors on the functionality of the tool. Upwards of 30 sections of English 131 are offered each quarter, all of which are taught by teaching assistants. Nearly all of these TAs are in their first year of appointment; many have no prior teaching experience. Use of Catalyst *Portfolio* would have to be made as easy as possible for TAs already burdened with learning to teach, never mind teach with technology. More daunting challenges were posed by the department’s physical and social infrastructure: English, traditionally, does not have a strong technology culture. The majority of classrooms assigned to EWP courses, and many other courses in English, do not have technology available that would make the demonstration or discussion of e-portfolios easy. Exceptions to this pattern were courses in the department’s Computer-Integrated Courses (CIC) program, which has two computer classrooms dedicated to instructional use. Teaching in CIC is not an option for the majority of graduate students teaching beginning composition, since the program’s facilities serve a large population and have limited availability.

In addition, many current teaching practices in English, particularly in composition, are paper-based; instructors are accustomed to printing hard copies of papers and commenting on them by hand, and classroom peer review sessions are similarly structured. We also encountered beliefs by instructors and TAs that the quality of their reading and assessment of student work would diminish if they responded to work online rather than in a printed format. Certain kinds of practices that support effective use of e-portfolios—providing electronic feedback on papers, facilitating electronic peer review, encouraging the use of multimedia or hypertext in the development of arguments—would be new to (and perhaps distrusted by) instructors and students in EWP. Traditional conceptions of “composition” suggest a linear organization of ideas presented on printed pages; e-portfolios, however, challenge instructors to expand on this notion and consider how visual rhetoric and design, and multiple navigational paths (afforded by hypertext) may also figure in the work of composing. Traditional practices and beliefs, as well as the physical infrastructure of English department classrooms, were challenges we anticipated might require a longer time frame to address.

## **Study Design**

### **Participants**

During the e-portfolio pilot in 2005/6, six TAs assigned to teach sections of beginning composition in fall, winter, and spring volunteered to participate in the study. Two of the six TAs were instructors in CIC. While all TAs expressed interest in implementing e-portfolios in their classes, they ranged widely in their knowledge of and comfort with educational technology. Two administrators from the English department also participated in the study, as did 48 students from the 12 sections of composition taught by TAs participating in the pilot study.

Currently, we are in the process of gathering data from seven new TAs as they make decisions about which portfolio format to use in their 2006/7 courses. Program administrators are continuing to take part in the study. We are also recruiting students in the 21 sections of beginning composition taught by participating TAs.

### **Study Procedures**

In autumn 2005, Catalyst researchers worked with the director and assistant director of EWP to create a project template using *Portfolio Project Builder* that TAs could easily modify. The design closely matched the traditional paper portfolio, distributing portions of the cover letter over several Web pages and asking students to demonstrate achievement of the course outcomes. We also drew on our previous e-portfolio research (Fournier & Lane 2005) to design scaffolding within the template to help students write effective reflections, consider audience, and use HTML

to create a professional look for their portfolios. We created two e-portfolio templates—one in which pages were organized by outcome, the other by papers—to match the organizational structure students most often used in their cover letters. We also made two sample e-portfolios using these project templates; materials for these portfolios came from students who had taken beginning composition in the fall. At the start of winter 2006, we used the sample templates and e-portfolios as resources for participating TAs in a one-hour training session. We encouraged TAs to modify the project templates as they saw fit and to share the e-portfolio models with their students. They were also encouraged to make a model portfolio of their own, if possible. To control for effects of simply teaching the course a second time, three TAs taught with paper portfolios during winter quarter and three taught with e-portfolios; all six used e-portfolios in spring.

In our current research phase, we have modified our study to account for the expanded option to use e-portfolios in the program. We are no longer assigning TAs to teach with a particular type of portfolio. Instead, we are following TAs over the course of the year (through questionnaires and interviews) to learn what choices they make.

### **Data Collection**

At the start of winter quarter 2006, all participating TAs in the pilot study completed a questionnaire about what challenges and opportunities they anticipated, for themselves and for their students, in the transition from paper to electronic portfolios. At the end of winter and spring quarters, we interviewed TAs and asked them about their experiences using paper or e-portfolios and what they discovered (positive and negative) in this process. We also collected copies of each TA's portfolio assignment and any support materials they distributed to their students. During the interviews, TAs shared three sample portfolios that represented a range of responses to their assignment.

Students in participating sections of beginning composition also completed a brief survey at the end of winter and spring quarters. The surveys asked students about their overall experience completing the paper portfolio (three sections in winter) or e-portfolio (three sections winter, six in spring). Once at the start of winter quarter and again at the completion of the pilot, we interviewed two administrators from English about the challenges and opportunities they anticipated in a transition from paper to electronic portfolios, and later what they had experienced or learned as a result of the study.

During our current phase of research, the majority of our data collection methods have remained the same as those described above, with the following changes. The questionnaire given to TAs at the beginning of the 2006/7 academic year also included questions about TAs' background with teaching and technology. We plan to give a second questionnaire at the end of spring 2007. We also are collecting paper and electronic portfolios from students.

### **Findings**

EWP administrators and TAs participating in the pilot study both considered the initial introduction of e-portfolios to be a success. Students in the nine sections of beginning composition where e-portfolios were used completed their e-portfolios with only minor technical difficulties. In addition, all TAs reported that the quality of students' e-portfolios equaled, and at times surpassed, the quality of paper portfolios that students had created during previous quarters. Several TAs observed that students who completed e-portfolios were better able to connect their writing with the course outcomes than students who completed paper portfolios had been. At the end of the pilot, administrators saw the potential for expanding this technology in EWP and eventually to other writing programs at the UW.

While, in general terms, the first leg of the journey towards the implementation of e-portfolios was traversed with ease, our research on the e-portfolio pilot identified four critical variables within the instructional context that affected, positively and/or negatively, the implementation of e-portfolios within particular course sections and had implications for long-term success of the project within the EWP program. These include: assignment function, instructional practice, access to technology, and audience engagement. In this section, we discuss each variable in detail, providing insights from TAs and administrators and sharing our observations on various aspects of the research data.

## Assignment Function

Assignment function has two inter-related aspects: TAs' understanding of the function of the portfolio assignment, paper or electronic, in the curriculum and their understanding of the how the functionality of Catalyst *Portfolio* reconfigures the standard paper portfolio. In our review of TAs' portfolio assignments, we observed that TAs described a portfolio, whether paper or electronic, in the following ways: as a comprehensive collection of all course writing, as a vehicle for students to describe their journey as writers, and as a forum for persuasive argument.

The traditional paper portfolio used in EWP begins with a "cover letter" addressed to the instructor, in which the student introduces the contents of the portfolio and discusses them in relation to the course outcomes, followed by a comprehensive collection of all writing assignments, from revised papers to early paper drafts with instructors' comments. The electronic portfolio is not simply an electronic version of the cover letter. Instead, it takes the reflective writing traditionally done in the cover letter and distributes it across several pages of the portfolio. This distributed form of reflection allows students to discuss artifacts (papers, segments of papers, images, or other materials) at the point at which they are introduced. It also emphasizes the selection and organization of artifacts over the comprehensiveness of the collection.

In general, the TAs who emphasized the portfolio as a comprehensive collection of all course work had the most difficulty transitioning from the paper to the electronic format. For instance, one TA, Amanda (all names are pseudonyms), felt strongly that the e-portfolio would not be complete without a distinct cover letter, in addition to the distributed reflections. Thus, she had students begin their e-portfolio with a page (or screen) containing the complete cover letter. They then copied various sections from this cover letter and distributed them throughout the pages where they introduced artifacts (papers, etc). Another TA, Ivy, felt strongly that all of her handwritten comments on early drafts of papers should be a part of the e-portfolio, so she asked her students to scan all comments. In both cases, the TAs' desire for a comprehensive e-portfolio directly translated into more work for their students than would have occurred with the traditional paper portfolio model or using the e-portfolio templates without the addition of a separate cover letter or scanned comments. In interviews, both TAs indicated that their students expressed some resentment over the workload, although they were able to complete the assignment successfully. In contrast, TAs that emphasized students' journeys as writers or students' abilities to write persuasively about course outcomes adjusted more easily to the electronic format. Jenna was pleased that the e-portfolio allowed students to talk about individual artifacts more directly than the paper portfolio did. Cole described the difference between the paper and e-portfolio as follows: "Paper is a little more holistic and I think e-portfolios get specific." Both Jenna and Cole felt students presented more compelling and detailed accounts of their progress with the e-portfolio than they had with paper portfolios. Adjusting assignments to play to the strengths of the e-portfolio represents a tangible step in the journey towards best practices, and one that can be taken with relative ease. Even TAs that initially struggled with this adjustment were able to identify the changes that would lead them to better practice in the future.

## Instructional Practice

Achieving seamless integration between the e-portfolio and other course elements required flexibility in TAs' instructional practice. In the final interview, Ivy, the TA who asked her students to scan all comments, observed, "I think it is impossible to just pretend it [the e-portfolio] can be taught the same way as the paper portfolio." Indeed, all six TAs described various aspects of their instruction where they had made adjustments, or felt that they should have made adjustments, to integrate the e-portfolio into the curriculum. For instance, several TAs felt that the e-portfolio needed to be introduced early in the course, rather than at the end, so that any technical difficulties could be diagnosed and overcome with less time pressure. In addition, they acknowledged that this would allow students to have more opportunities to share their e-portfolios and learn from each other and the transition between the earlier paper assignments and the e-portfolio would be less abrupt. TAs also observed that the e-portfolio influenced the other assignments they designed for the course. One TA intentionally designed a paper assignment with a visual component so students would have more visual elements to include in their e-portfolios.

TAs expressed that e-portfolios had a long-term potential to become vehicles for teaching students how to integrate text and images and for introducing multimedia elements into the course. In our review of students' work we

encountered a handful of visually sophisticated portfolios and a couple that experimented with multimedia, but these skills were not widely evident. In the final interview, one TA, Rob, shared his vision for the future of e-portfolios: “It becomes less of ‘this is an English paper’ and more of ‘this is an interdisciplinary project’ where students can bring in various media and bring in various resources.” Like assignment function, instructional practice is an area where individual initiative leads to a readily attainable course of action for the future.

### **Access to Technology**

The six TAs participating in the pilot study had widely divergent access to technology in their classrooms. Two TAs were a part of CIC, where they alternated their class sessions between a computer lab and a traditional classroom. Other than CIC, the EWP does not have dedicated instructional space, so the classrooms assigned to the other four TAs varied each quarter. As graduate student instructors, teaching small classes (20-22 students), in a department that does not have a strong reputation for technology use, the TAs typically were assigned small classrooms with very limited technology—no computer station, no data projector, and limited or non-existent Internet access. Regular access to a computer station and Internet in classrooms influences how fully e-portfolios can be integrated into all aspects of the beginning composition course. While it is possible to use e-portfolios in non-technological classrooms, the lack of access limits the full realization of their potential, since TAs are not able to display e-portfolios for discussion or to walk students through the aspects of the e-portfolio creation process and students are not able to easily share their work during class sessions.

During the pilot it was relatively simple, due to the small number of courses involved, to reserve a campus computer lab for one day during the quarter to show students e-portfolio models and orient them to *Catalyst Portfolio*. However, this solution loses viability as more sections of beginning composition use e-portfolios, since lab reservations are limited. While the CIC program does provide technology facilities, it does not have the capacity to accommodate all beginning composition TAs. Expanding the use of e-portfolios to a larger number of course sections will require taking steps to ensure TAs adequate access to technology in classrooms. One option is to lobby for equipped classrooms for these courses. Also, as wireless Internet access becomes pervasive across campus in the near future as part of the UW’s strategic plan for technology, it will be possible to do more in less equipped classrooms. TAs will be able to check out laptops and projectors from central services and/or make use of instructor and student laptops. Regardless of the solution (or solutions) ultimately employed, overcoming the challenge of limited technology in classrooms will be essential for the expansion of e-portfolio use. Making progress in this area will likely require action at the program level, since instructor initiative will only overcome part of this challenge.

### **Audience Engagement**

At the outset of the pilot study, both TAs and administrators felt that e-portfolios presented the opportunity for students to compose for a public audience. By the end of the pilot we observed that some progress had been made in this area; students’ writing in e-portfolios tended to address an audience beyond the instructor, unlike the cover letter in the traditional paper portfolio. Some TAs, however, questioned the extent of audience engagement that was possible with the current use of e-portfolios. They observed that opportunities for students in their sections to share their e-portfolios with each other were limited. Introducing e-portfolios earlier in the quarter and access to better-equipped classrooms would facilitate the sharing of student work within a course section. Engaging an audience beyond an individual course section represents a larger challenge. As Amanda observed, “The writing might look really different if it were not being evaluated by their composition instructor.” By the end of the pilot, she felt an ideal e-portfolio would use less formal language that explained its contents in a manner that would engage an outside audience.

Publishing an e-portfolio online does not make it automatically “public.” Building an authentic external audience requires a substantial effort from TAs, program administrators, and Catalyst or other technology support units. Facilitating the sharing of e-portfolios between students in the EWP program would be a useful next step towards expanding audience engagement. Enabling such an exchange would likely require a technical solution for collecting, sharing, and sorting students’ e-portfolios, along with changes in program curriculum to encourage interaction between courses. Building an audience beyond the program constitutes an even larger challenge. This leg of the e-

portfolio implementation path covers difficult terrain, since making this journey requires a cultural shift towards increased connection between EWP and other individuals and units at the UW and beyond the institution.

## Discussion

### Implications for EWP

Bielaczyc (2006) claims that the implementation of new pedagogical technologies requires students and teachers to adjust their attitudes and practices. These sorts of adjustments of mind and action were clearly seen during the first-year pilot among participating instructors. In the current phase of research, even though the number of TAs who have taken up e-portfolios has not increased significantly, we have observed even more profound changes in attitudes and pedagogy. In addition, instructional practices surrounding e-portfolios are more widely discussed within the program as a whole.

Although use of e-portfolios is not yet a requirement, EWP offered all 2006/7 beginning composition instructors the option of teaching with the electronic or paper model in their sections. For our study this year, we have followed seven of the thirty new TAs as they made choices about the portfolio format for their courses each quarter. Like the TAs from the e-portfolio pilot, these TAs expressed a range of interest in and comfort with technology. During fall quarter two of the seven TAs chose to teach with e-portfolios, in winter four opted for the electronic version, and we anticipate that in spring the number using e-portfolios will rise to five or six. Although we have not yet finished collecting and analyzing study data, we have noted in our interviews to date significant advances in how TAs integrate e-portfolios into their courses. These include: the use of midterm e-portfolios, adjustments to other course assignments to prepare students for the e-portfolio, integration of other technologies into the course (course Web sites, discussion boards, blogs, and online assignment turn-in areas), and experimentation with new methods of giving feedback. We are also collecting paper and electronic portfolios in the sections taught by participating TAs and will be analyzing the portfolios for differences in student performance.

On a wider scale, EWP and the English department as a whole have taken a greater role in promoting e-portfolios. All new TAs in EWP gained personal experience with Catalyst *Portfolio* during their first quarter. The director of EWP and a fellow professor agreed to teach with e-portfolios in the required composition theory course, asking each TA to construct a teaching portfolio using the Catalyst software. TAs and professors underwent the same negotiations of attitude and practice that students and TAs experienced in the classroom during the pilot study. In this context, however, professors were able to expand on the “lifelong learning” benefits of portfolios, emphasizing to TAs their value as tools for reflection and for self-promotion on the job market. Confessing minimal experience teaching with technology at the start, both professors came away at the end of the quarter delighted with the results of their experiment and enthusiastic about promoting more systematic e-portfolio use next year. Additional structures within the department—formal and informal—also helped to advance best practices with e-portfolios. Catalyst and EWP together conducted only one information session early in the year to discuss technical and pedagogical strategies associated with successful integration of the technology. Later discussion of “best practices” happened informally, as TAs in shared offices talked about their experiences and innovative assignments using e-portfolios. Extending beyond the program, the implementation of e-portfolios in the curriculum was also a topic of Practical Pedagogy roundtables hosted by the Department of English.

Further change is evident in the department’s computer classrooms. Computer-Integrated Courses (CIC) has become involved in the implementation of e-portfolios in all 100- and 200-level English courses. The CIC program now houses the e-portfolio guidelines and templates on their Web page and provides support to any instructors wishing to use e-portfolios, services which were provided by Catalyst during the e-portfolio pilot. In CIC’s quarterly training seminars, the CIC director and assistants introduce instructors who are often new to teaching with technology to the potential educational benefits of multiple tools, including e-portfolios. The close connection between e-portfolios and other Catalyst tools (i.e. electronic peer review, online discussion) becomes clear to new instructors as they witness the compatibility between various computer technologies that may be used inside or outside of the classroom to enhance student learning. With CIC promoting their use, e-portfolios are extending to courses beyond beginning composition and being more tightly integrated with other technologies; several CIC instructors over this

last year have expressed enthusiasm about “going paperless” in their classes. More sophisticated uses of e-portfolios (for example, students creating their own portfolios without the help of a template) may also be possible and appropriate in intermediate or advanced writing classes.

From where we stand now, we anticipate that the English department will continue to advance on a trajectory of more effective and sophisticated use of e-portfolios, with teaching assistants and CIC playing a major role. Further down the path, we expect to see TAs who once taught beginning composition adapting e-portfolio use in other courses in EWP, as well as in introductory literature and creative writing courses. EWP and CIC will continue to gather additional resources and models of effective use and be able to disseminate these through their trainings. We also expect that as demand increases and English becomes known as a technologically savvy department, access to technology will also change—perhaps with more appropriately equipped classrooms, or additional computer labs. And finally, we anticipate that EWP’s course outcomes may change over time, more directly reflecting new conceptions of what it means to “compose,” influenced by what is possible in an online environment.

### **Implications for Other Institutions**

Other institutions that are embarking on the implementation journey need to remember that true transformation takes time. Unlocking the full potential of new technology, such as e-portfolios, requires a series of changes, many of which will not be obvious until the technology has been introduced. For EWP, our study of the e-portfolio pilot made visible early changes in practice and identified areas where changes will need to be made as the journey continues. One valuable aspect of our research study was that it provided an opportunity for those participating in the e-portfolio pilot to reflect on their experiences. More importantly, we provided a means of communicating the lessons from that reflection. Venues for reflection and communication are important components of any technology implementation, since the experiences and ideas of early participants can help shape future steps in the process. Other institutions may not follow the same path that we traced in this paper, but this case identifies variables to consider as they chart their own progress.

Within the e-portfolio community it is important to recognize the slow and gradual pace of transformation, in addition to focusing on the long-term goals for this technology. While e-portfolios do have the potential to promote lifelong learning, making this future viable will require an extended series of minor transformations in instructional practice and departmental and institutional culture, as well as expanding awareness within social and professional spheres.

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