Inter/National Coalition for Electronic Portfolio Research
Final Report
Penn State University

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Background and Assumptions

Penn State became formally involved in the promotion, support, monitoring and research of electronic portfolios when it launched its e-Portfolio Initiative in the Spring of 2002. Guiding this effort has been the vision of a university culture centered on students' evidence of, and reflections upon, their curricular and co-curricular achievements. Early data demonstrated that usage of e-portfolios increased over time despite dependence on an e-portfolio system that relied on the use of open personal Web space and, hence, required students to master basic Web publishing skills. Without a standardized e-portfolio template, individual students and academic programs began developing e-portfolio formats that best suited their own academic program goals. Annual survey data showed a consistent but low level of inclusion of evidence of co-curricular experiences or reflective narratives about those experiences. As a result, we became interested in looking for ways to expand and enhance the inclusion of co-curricular achievements in students' e-portfolios (Johnson & DiBiase, 2004).

Parallel with these efforts were the initiatives of Penn State's Coordinating Committee on University Assessment, which was convened as a result of the Middle States accreditation process. Part of the work of this committee was to define the "co-curriculum" and to develop co-curricular learning outcomes which have now become a central focus of our electronic portfolio research. (http://www.edge.psu.edu/cocurricular.shtml)

The major assumptions about learning that underlie our research on electronic portfolios include:

- Communicating high expectations contributes to learning and is a principle of good practice for undergraduate education (ACPA & NASPA; 1997; Chickering & Gamson, 1987).
- Any educational practice that increases students' engagement in learning, both quantitatively and qualitatively, also increases learning (Astin, 1984; ACPA & NASPA; 1997; Chickering & Gamson, 1987).
- Important in improving undergraduate education and advancing life-long learning are promoting self-authorship (the ability to reflect upon one's beliefs and organize experiences; Kegan, 1994) and intellectual or epistemological development through a constructive-developmental view of learning (Baxter Magolda, 1999).
- Encouraging learning partnerships where student contributions are valued and coaches students to take an increasing degree of responsibility for their own learning (Pizzolato & Ozaki, 2007).
- Students value learning skills that allow them to publish on the web (Johnson, Hsieh & Kidwai, 2007) and web-based learning portfolios can help students grasp the learning process and enhance learning outcomes (Chang, 2001).

These assumptions informed all of our e-portfolio projects and led to the following research question:

> What is the impact of a structured e-portfolio system (designed to communicate high expectations and intended learning outcomes) on student engagement and on co-curricular learning?

Included in this question are the ways in which e-portfolios assist students in: 1) understanding intended learning outcomes, 2) being intentional about their out of class experiences, 3) increasing awareness of interventions or experiences that Penn State offers, 4) developing career planning skills, and 5) extending their co-curricular learning.

Early Stages: HTML

Early work with electronic portfolios involved getting students to take advantage of the information technology infrastructure that was already in place at Penn State. To create and maintain personal Web sites the only option for students was to master basic Web publishing skills including HTML document editing, graphics processing, and file transfer and management. Students upload and download files to and from their Web space accounts using one of several secure file transfer tools and the e-portfolio Web site (http://portfolio.psu.edu) provides guidance on how students can develop these skills, along with a gallery of e-portfolio examples and commentary on the rationale on which the initiative is based. The university currently provides up to 5 GB of personal Web space to any student upon request.

Under this format, no standardized e-portfolio template is imposed. Rather, individual students and academic programs have been encouraged to develop e-portfolio formats that best suit their particular goals. Consequently, while the results are sometimes wonderfully robust, in monitoring students' usage of personal Web space accounts through semi-annual surveys we found that most e-portfolios focused on academic achievements.

Spring 2007 Pilot: ANGEL ePortfolio

To remedy the lack of co-curricular evidence and encourage students to reflect upon learning outside of the classroom, our research question encouraged us to investigate other e-portfolio solutions that would allow us to apply interventions within the system itself. Rather than presenting students with an open, blank space within which to design their e-portfolios, we were looking instead to provide a means of informing and reminding students of the intended learning outcomes as well as a means for communicating the expectations for how and why they should include co-curricular achievements in their e-portfolios.

In the months leading up to the Spring of 2007, ANGEL Learning Inc. was in the process of developing their ANGEL ePortfolio software solution. Since ANGEL is the course management system used at Penn State, it was natural for us to gravitate towards its use. Consequently, students in a Spring 2007 first-year seminar class were required to use the blog functions embedded in the software as a tool to journal for the class. In addition, they were asked to create a matrix that listed Penn State's first-year learning outcomes and attach artifacts that would demonstrate their learning.

Unfortunately, problems with the interface and a lack of functionality within the system outweighed any positive comments that students had about the experience. In general, focus group comments suggested that while students liked the ability to connect activities and assignments to learning outcomes, and that for most a clear connection between out of class activities to their first year seminar class was made more obvious, the difficulty of illustrating these connections efficiently in the online e-portfolio environment detracted from its value. As a

result, we searched for a more user-friendly e-portfolio solution within which to apply our research question.

Summer 2007 Pilot: PebblePad

Two first year seminar classes of students new to Penn State were our initial target population. Using PebblePad, a webfolio was created which incorporated Penn State's First Year Learning Outcomes along with some ideas and examples of experiences and resources students could use to demonstrate their progress on each outcome. Students in the first group (*n*=22) were asked to take the template webfolio and modify it to create a personal eportfolio that connected both curricular and co-curricular experiences to the learning outcomes and reflect on their first semester experiences as a course requirement. A second section of students (*n*=16) received a copy of the learning outcomes, had the same course content but did not create an eportfolio. Post-test surveys as well as a content analysis of student narratives were used to assess the impact of the e-portfolio system in promoting positive engagement in the First Year Learning Outcomes.

Overall, there were no significant differences between the e-portfolio group and the control group. Average scores generated by multiple raters using a rubric to evaluate the degree to which students effectively communicated that an outcome had been achieved, were nearly the same. Student comments about the intervention were perhaps more telling. Students from both classes appreciated having the list of learning outcomes: "didn't realize you were doing them until afterward..", "didn't think she would get as much out of them as she did…", "helped me realize what I have to do in college…", "didn't know it would be important to accomplish them, but realized the importance as the 6 weeks went on…". In some ways it seemed that the technology got in the way of what students were asked to do.

Summer 2007 Pilot with Residence Life: PebblePad

In a second project, a similar methodology was followed on a voluntary basis in the residence halls with an e-portfolio being created in a strictly co-curricular learning setting. In this case, there was no academic requirement to complete the eportfolio. Several residence life staff were given PebblePad training and worked with the students to promote the project. An information session was established to introduce students to the project and to the PebblePad software. The effort had only minimal participation with less than 10% of the students agreeing to participate. The only conclusions that we might draw were that the attractiveness of the software has only a minimal effect on student engagement in settings void of academic requirements.

Summer Engineering Coop Program

In general, positive outcomes of experiential education have been well documented, however, the literature does not show any rigorous studies of the learning that occurs during work experiences such as internships. Therefore, getting a better understanding of the learning that takes place during these work experiences will maximize their potential, and can serve as an initial step toward building a knowledge base for understanding this particular type of co-curricular learning. With this goal in mind, a third project was planned to take place during the summer of 2007 with groups of Engineering students.

The first part would involve students in two sections of Engineering Design (EDG100, a first year engineering course) were to be asked to create an e-portfolio and provide evidence for the following World Class Engineer Attributes (WCEA): Solidly Grounded, Technically Broad, and Effective in Teams. We offered students an HTML template that they could use to publish this in their Penn State Personal Web space for this purpose. The goal was to identify which prompts embedded in the template students would respond positively towards and provide the better evidence of these attributes during a co-op assignment.

Consequent to this, a second project would focus on students who were involved in internships. Engineering co-op and internship students randomly would be assigned to one of two groups, students who create an e-portfolio (experimental group) and students who write a traditional end report (control group). An equal number of students in each group would be on their first co-op assignment, another equal sized group would be on their third co-op assignment. The College of Engineering's WCEA would be shared with students and six assignments designed to gather input about opportunities for enhancing these WCEA would be required. For each group an HTML template/matrix was created for students to use to map their internship experiences to the attributes of a World Class Engineer.

Unfortunately, the principal investigator for these projects is no longer at the university. However, in addition to the design groundwork laid for collecting data with these students, we believe that the utilization of the Moveable Type web publishing interface will enhance student engagement in this project as plans are made to follow through on these project goals.

Spring 2008 Pilot: Moveable Type

One issue that we have continued to struggle with at Penn State is the implementation of an e-portfolio system solution. To date, we have had very limited success with applications that have either not been functional enough or do not appeal to students. Beginning Spring semester 2008, Information Technology Services deployed a blogging tool that allows for the creation of a website of static web pages and an accompanying blog. This software's interface flattens the learning curve for all users, requires no additional software, and writes directly into a user's Penn State web space.

Also, as discussed at previous NCEPR meetings, **integrative learning** implies that, "… Engagement on campus both academically as well as socially both have value in shaping the understandings and values of students... " Taken a step farther, our understanding of integrated learning necessarily involves experiences which presuppose purpose, involve reflection and personal connection and imply an understanding of what the important attributes, values and understandings are. As a result of our discussions with cohort colleagues we have begun to look in new ways at our original research question. In order to communicate high expectations and intended learning outcomes would integrative approaches make more sense? Our College Student Affairs Master's program provided us with a rich context for gathering data.

College Student Affairs Master's Program

With the program's six learning outcomes as its foundation, the culminating project of the College Student Affairs M.Ed. program is a learning portfolio. "The Learning Portfolio is an analysis of the student's experiences in the College Student Affairs Program through presentation of (1) reflective papers and (2) artifacts. Artifacts represent the student's work in a variety of settings: the classroom, assistantships, internships, professional organizations, and local leadership." Reflections include course reflections, an initial reflection, a mid-point reflection, and a culminating reflection and these materials are now being displayed using Penn

State's e-portfolio platform, Moveable Type.
(https://www.ed.psu.edu/educ/eps/csa/curriculum/learning-outcomes)

At first, student reactions to completing this requirement were driven by the need to complete assignments. In addition, the HTML environment in which they were publishing did not lend itself or provide the mechanisms that facilitated the type of 'connections' or 'meaning-making' that was intended. Two things changed in the curricular approach to this project. First, this project along with coursework and other aspects in this program coalesced around the program's learning outcomes where reflection and self-authorship were integrated throughout. The program made it clear to students that they wanted them to bridge across the various aspects of what they were learning and experiences, in-class and out. Second, the Moveable Type application facilitated the writing about, documenting, publishing and sharing of ideas and this process helped to push students' thinking. Examples from student's writing provide evidence of this shift of ownership in students' approach to learning.

Master's student Megan O'Rourke on self-authorship, "For me, the idea of self-authorship is moving away from never questioning beliefs, values and knowledge and defining these for self. In terms of education and in particular my graduate program in College Student Affairs, it was an intentional course of action for me to take charge of my education, to challenge myself and make sense of my identities."

Next Steps: ePortfolio Development Within the CSA Master's Program

- During the first semester, teach the key concepts of "meaning making", "self-authorship" along with reflective writing skills
- Require students to begin the creation of ePortfolios during their first semester
- Require reflection on the six intended outcomes from the start of the program (self-reported competencies pre and post)
- Encourage all students to utilize modified versions of their ePortfolios in the job search process
- Complete the task of mapping all required course learning outcomes to the overall program outcomes
- Refine the evaluation rubric to include more detailed measures related to the depth and quality of the reflections
- Explore strategies to use the completed ePortfolios for academic program assessment ~ especially via self-reported gains aligned with the program outcomes

Having worked with three cohorts of students using these learning outcomes, the infrastructure is now in place to begin the next stage of evaluation including the use of e-portfolios to assess the effectiveness of the program, to evaluate the appropriateness of the learning outcomes, and to make adjustments to the program to enhance the educational outcomes for students.

Spring and Summer 2008: Music Education Impact Study

The goal of this study was to examine our methods for supporting, by means of e-portfolios, both short-term learning outcomes such as organization and planning, attainment of skills and concepts, familiarity with instructional technologies, and engagement and motivation, as well as developmental attributes such as self-esteem, creativity, personalization of self, and preparation for life-long learning. Consistent with learning outcomes of the co-curriculum, these long-term outcomes are too important to be ignored, yet too easily overlooked. Consequently, we incorporated this project into the scope of our INCEPR work.

The Music Education program at Penn State has accumulated significant experience working with and researching the use of electronic portfolios as a part of their academic program. In fact, Music Education is a unique example of the integration of this instructional technology at a programmatic level. While it is generally believed that e-portfolios are playing a positive role within the program, little evidence has been collected to examine the nature and extent of their influence. Six stakeholder populations were identified: underclassmen (n=37), seniors (n=14), alumni (n=12), faculty (n=5), mentor teachers (n=18), employers (n=6). Surveys were sent to these stakeholder groups in Spring and Summer of 2008.

The purpose of the e-portfolio is no longer limited to showcasing student work, rather the focus has shifted to the use of this particular technology as a means of preparing students for a life in teaching. In fact, the program's approach to e-portfolio use now emphasizes assessment *for* learning over assessment *of* learning — in other words the focus has shifted to the use of e-portfolios as a means of encouraging students to become life-long reflective learners and teachers.

We began this research by identifying key indicators of student learning, the service that the program provides its students, and the overall quality of the program. Although not all of these attributes are directly related to the use of e-portfolios, most of them are impacted by them. The attributes that were identified are 1) short term student learning outcomes such as the ability to collect and organize information, attainment of skills and concepts related to music education, familiarity with Web technologies that are used in the development of e-portfolios, and the ability to reflect; 2) long-term developmental traits such as creativity in teaching methods, self-esteem, personalization of self, and preparation for life-long learning, and 3) program-level factors such as a mechanism for providing feedback, collaboration and advising opportunities with faculty, presentation and publishing of student achievements, student retention rates, overall faculty satisfaction and workload, and cost effectiveness of implementation.

The results we obtained are mixed, but in general, the trend is encouraging. In certain areas the e-portfolio experience was positive, while in other areas perceptions were not as positive as was hoped. Preliminary results suggest the following:

1) Students' perception of the value of e-portfolio activity seems to have increased over the course of a student's education in terms of what they have learned in the program, documenting this effort, and the ability to be creative and personalize their experience.

2) At the same time the value of the e-portfolios to support employment searches decreased over this same time. It seems that initial optimism was based on unrealistic expectations.

3) Survey data also documents the lack of exposure and culture surrounding e-portfolios among school districts since few mentor teachers or administrators seem to have encounters with teacher candidate e-portfolios.

4) Technology continues to play a positive yet enigmatic role when it comes to e-portfolios. Tools have changed over time and while this moving target might have proved detrimental in students adopting habits of lifelong learning, alumni noted that the "practice working with technology" was appreciated. In general, students valued the e-portfolio experience even though they experienced problems with the process.

Summative Findings and Directions

Throughout our participation in coalition research on e-Portfolios at Penn State our research question has remained focused around cocurricular learning and the role that structured systems play in facilitating student engagement in specific learning outcomes. What has challenged our research endeavors has been changing technology within which we have had to conduct this activity. For various reasons we have moved from open web space and common web publishing tools to ANGEL ePortfolio to PebblePad and now to MovableType. While these changes in context have made it difficult to identify specific success factors, we have arrived at a few general conclusions about e-portfolios at Penn State.

1) Our initial plan for e-portfolios consisted of finding an enterprise system solution that would support learning for all students while at the same time providing an administrative 'back door' through which an aggregation of rich assessment data related to learning could be harvested. Such a hypothetical system is untenable.
2) Assessment of learning through the use of e-portfolio can be a powerful instructional activity and providing students with a structured list of learning outcomes can facilitate this engagement. This has refined our concept of requirements such that the use of templates for collecting and presenting evidence of learning has become an accepted practice.
3) Success seems to be dependent on the communication of learning outcomes and not the use of the tool itself. Hence, the use of tools should be transparent to users and should effectively remove barriers not create them.
4) We need to further our development efforts to focus on small web-based applications that will meet the assessment needs of individual programs.
5) The change that we are involved in affecting is significant and sizeable. Consequently, patience with our stakeholders, programs, and technology is an essential part of this process.

These conclusions have prompted the following new directions for our research on e-portfolios and the assessment of co-curricular learning at Penn State.

Program Specific Learning Outcomes Templates for Movable Type – Penn State's blogging tool provides us with a better system for supporting students' ability to take more responsibility for their own learning. It is our intention to re-focus our attention to the role of advising instead of thinking of e-portfolios as simply an enhanced resume. We want to support students' selection and justification of evidence towards program outcomes, revisit and reflect on their development over time, and engage in discussions surrounding the maturation of such evidence. At the same time this system will allow us to develop unobtrusive mechanisms that support this work, but also provide efficiencies for faculty who would like to take 'snapshots' of this work. This is currently taking place in the form of the Teacher Education Framework Template and the CSA Template within Movable Type.

Back-track to e-Portfolio from Student Resume Samples – A pessimistic (some may say realistic) view of undergraduates' motivation for engaging in e-portfolio development is because it is required. However, usually later in the program of study, self-promotion for the purposes of finding employment motivates student involvement. To date, our efforts have targeted required (or at least optional) practices tied to curriculum with an emphasis on reflective thinking and learning. Taking a credential-oriented approach, we have recently begun investigating the possibility of designing procedures for enhancing the interactiveness of the Penn State student

resume (a document every student needs to produce) as a means of encouraging higher levels of undergraduate involvement in e-portfolio type of activity, in this case, tying their collegiate experience to employment objectives. Within this template, it is hoped that the 'internal conversation', i.e., emphasis on reflective thinking about what they have learned, can be used to support the attainment of professional opportunities.

Assessment Management System – Penn State's e-Portfolio initiative early on sought a single e-portfolio system that would satisfy the needs of both learners and institutional assessment. We have abandoned hope that one system will succeed in meeting both of these conflicting requirements as well as the diverse needs of programs across the university. Taking a new direction, we have begun to focus our efforts on developing an assessment management system that faculty can use to select and tag representative examples of student work based on pre-determined assessment standards. These artifacts can then be stored in repositories where they can be efficiently retrieved for program evaluation purposes. This system is currently under development using WebLion, an open source Plone based web content management system customized for Penn State.

All three of these new directions might be seen as a subtle means of, "transforming teaching and learning away from submission of assignments and reaching out to find a dialog for understanding" (Yancey). Yes, this is an exciting change for all of us in higher education!

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