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## Digitized Student Portfolios

by Kathleen Blake Yancey

A sophomore majoring in packaging science has come to my office. A good student who likes his major, Steve is excited about applying for a co-op experience required by that major. Not quite sure how to make his qualifications and interests known to potential employers, he thinks an electronic portfolio might work. He created a print portfolio in our composition class last year, so he understands something about how to create one to showcase his progress as a student and his potential as a co-op employee. This year for a general education computer class, for which he received an A, he created an electronic portfolio. Steve wonders whether he needs an electronic portfolio to secure a co-op position. Should he delete some material in his current electronic portfolio, including cartoon clips and humorous stories? Should he explain more about the samples of schoolwork he has included so that potential employers will understand about the value of that work? "Good questions," I respond. "Why don't we take a look at the portfolio?" He gives me his URL, I open his Web page on my computer screen, and together we look at it on-line.

Welcome to the world of digitized student portfolios.

### An Introduction to Print and Electronic Student Portfolios

About 15 years ago, all across the country and at institutions of every kind, faculty began asking students to compile something new: a record of their work called *portfolios*. To create portfolios, students engaged in three primary processes. First, students *collected* all their work. Second, they *selected* from this archive samples of work to share with others. Third, and perhaps most important, students *reflected* on that work — to think about what they had learned, to assess which of their exhibits was the strongest and why, or to use their review of the entire portfolio to plan future activities. Portfolios also began serving different purposes. Sometimes they were like Steve's in my writing class: a vehicle

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for classroom learning and assessment. Other times, they crossed classroom boundaries, such as for securing a co-op position. And still other times, portfolios were used for program assessment.

Portfolios, then, are unified as a construct. Created by the three principal activities of collection, selection, and reflection, student portfolios can be succinctly defined as collections of work selected from a larger archive of work, upon which the student has reflected. Portfolios can be created in many different contexts, serve various purposes, and speak to multiple audiences.

Within the last five years, student portfolios have begun to go electronic. To talk about this shift in portfolios, we need to consider many questions. What do we mean by the expression *electronic portfolio*? Is it simply a digitized version of the more familiar print portfolio? Or is it something completely different? Why are students, faculty, and institutions interested in electronic portfolios? To answer these questions, a quick explanation of print portfolios — their contents, processes, and types — provides a useful context for understanding how print and electronic portfolios compare and what electronic portfolios offer. After a review of six critical issues surrounding electronic portfolios, we hear from six faculty and administrators who have used electronic student portfolios for diverse purposes and with varying degrees of success. Moving then beyond individual models, we consider when electronic portfolios are the appropriate choice and how they can best be designed.

## Classroom Portfolios

The first student portfolios appeared in print; they served diverse purposes and took a variety of forms. In general, they can be categorized as classroom portfolios and program portfolios.

Classroom portfolios vary as much as classrooms themselves do. In a first-year composition class, for example, each of the students might compile and reflect on several writings to serve several purposes:

- to show how they have improved as writers during a term;
- to demonstrate their competence in a variety of genres (such as lab reports, essays, resumes, and research-based arguments); and
- to show their ability to revise texts for different purposes and audiences.

In an honors class on economic systems, each of the students might include a midterm test, a project summary, three journal entries, and printouts of a PowerPoint presentation. The portfolios then culminate in final reflective essays in which the students refer to these exhibits as they assess and comment on:

- their understanding of the key concepts in the course;
- their ability to apply those concepts in both global and local contexts; and
- their development over the course of the term, including the ability to use reflection and self-assessment to improve their work.

In yet another class, an undergraduate class on research methods in psychology, students open their portfolio with a reflective synthesis of enclosed materials as well as a statement of the materials' relevance to their development of an independent research project. Other exhibits include a statement of progress on the independent project, a write-up of one experiment, a peer review of that write-up, and other materials (homework assignments and summaries of class readings, for example) chosen by the student.

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*Before this semester I had never done any exploratory writing. "Writing History: What Are the Central Issues?" taught me how to think on paper. It was the first time I was actually forced to organize my thoughts in such a way. Writing history can be looked at from several different perspectives. I had to take these ideas that were floating around and put them in some semblance of order on the page. I did this by breaking it into sections.*

Greg Mathews, student

As these examples suggest, classroom portfolios can vary considerably, especially when we think about them along four parameters or dimensions: (1) type and level of class (in general education or in the major, for example); (2) purpose of the portfolio; (3) audience for the portfolio; and (4) criteria for assessment. Regardless of the diversity of portfolio models, however, they all make the same request: that students assume responsibility for documenting and interpreting their own learning. This responsibility extends through collection, selection, and reflection. Students archive all their work — homework, class projects, journals, lab reports, spreadsheets, notes for presentations, drafts of assignments, peer review notes, and so on. At a designated time — sometimes at midterm, often at the end of a term — students select from this archive exhibits that demonstrate stipulated criteria: development, best work, understanding of concepts, critical thinking, or connection to other classes. Often, they are asked to revisit or revise their work. For example, students may rewrite incorrect answers from a midterm exam, indicating not only how the new answers are correct but also how the student would not create the same incorrect answer again. Revisiting past work, students often improve the earlier work but also comment in a way that demonstrates their thinking around that work. In such a reflective text, *students make their thinking visible.*

### **Reflection: The Key Portfolio Piece**

Most portfolio advocates choose portfolios because of their understanding that reflection enhances learning. Basically, reflection is the process by which we think about how we learn.

Collectively, Dewey, Vygotsky, and Polyani define reflection as a process by which we think: *reviewing*, as we think about the products we create and the ends we produce, but also about the means we use to get to those ends; and *projecting*, as we plan for the learning we want to control and accordingly, manage, contextualize, understand. We learn to reflect as we learn to talk: in the company of others. To reflect, as to learn (since reflection is a kind of learning), we set a problem for ourselves, we try to conceptualize

that problem from diverse perspectives — the scientific and the spontaneous — for it is in seeing something from divergent perspectives that we see it fully. Along the way, we check and confirm, as we seek to reach goals that we have set for ourselves. Reflection becomes a habit, one that transforms. (Yancey, 1998, pp. 11-12)

A reflection can take a variety of forms:

- a *letter* synthesizing purpose and introducing the collected texts to a reader;
- *annotations on individual pieces* commenting quite specifically on each text;
- an *essay* whose purpose is to conclude the collected text in some evaluative way;
- an *independent document* covering one of several topics or one of multiple genres seeking to summarize, interpret, and evaluate the work/learning/understanding of a term; or
- all these genres, seeking to embody all these purposes.

A reflection can also serve a variety of purposes. Sometimes students principally assess their own work. How do they evaluate the contents of their own portfolio? How do they evaluate their own learning? How do they evaluate their own learning relative to their own goals? In other situations, students are asked to synthesize material in the portfolios and comment on the significance of it, and/or to connect the learning from the portfolio course to the learning in another course or to learning taking place outside of school. And in some instances students are asked to project into their own future, in part by looking back at what they have accomplished to date.

How we ask for reflection, what genre we prefer, and how we respond to reflection are key issues surrounding portfolios.

### **Program Portfolios**

A second type of student portfolio is the program portfolio, which is a model that draws from several classes, from extracurricular activities, and/or from internships, service-learning, and other experiential learning. Two similar examples of program portfolios include the writing-across-the-curriculum program portfolio model at Eckerd College, which students must “pass” to graduate, and the rising junior writing portfolio at Washington State University (<http://www.wsu.edu:8080/~bcondon/portpage.html>), which students must “pass” before matriculating in a required writing-in-the-disciplines course in their major. Both these program portfolios, created at very different kinds of institutions — one a small, private liberal arts institution, the other a large research institution — draw on work completed in the classroom. At the same time, the purpose for these portfolios transcends the classroom; it is more cumulative in nature. Students create these portfolios to satisfy outside readers (typically faculty from the campus) that they are competent writers, defined in the first case as the writing performance of a college graduate and in the

second as preparation to take on the more sophisticated writing tasks associated with writing in the major.

Another program portfolio that provides a variation on this theme is the Missouri Western State College capstone portfolio. Like the Eckerd model, this portfolio functions as an exit portfolio, but it is located within a discipline and its purpose is twofold. First, students are asked to provide evidence of their disciplinary competence by providing documents attesting to it; the portfolio is reviewed by faculty who pass or fail the portfolio. Second, students use the portfolio to acquire a job. Its opening document, a resume, is thus a work-related text that acts as a bridge between the college curriculum and the world beyond college.

Finally, a more generalized program portfolio is one targeted toward advising students as they progress through their academic career. The Department of Consumer and Family Science at the University of Wyoming, for example, asks students to keep a portfolio as they complete their first two years of school. Advisers meet with students to ensure that they are acquiring the skills and competencies they will need to succeed in school and beyond. Like its counterparts elsewhere — at Kalamazoo College, for instance, and at Olivet College — this portfolio invites each student to reflect on past learning as he or she plans courses, internships, and other academic experiences. This portfolio, then, is oriented toward the future as much as toward the past. And more generally, portfolios bring with them three key characteristics:

- They function as a means of both review and planning.
- They are social in nature.
- They are grounded in reflection.

### **The Role of Portfolios in Fostering and Enhancing Learning**

A final aspect of student portfolios is their emphasis on two dimensions of the learning environments where they are produced. First, precisely because they make learning visible, portfolios allow both faculty and students to focus on learning in a new way. Portfolios bring together visibility, process, and reflection as students chart and interpret their own learning. Students are responsible for telling their own stories of learning: for explaining what they did and did not learn, for assessing their own strengths and weaknesses as learners, for evaluating their products and performances, for showing how that learning connects with other kinds of learning (in the classroom and without), and for using the review of the past to think about paths for future learning.

Likewise, because of the portfolio's design — its inclusion of many entries of different kinds — the portfolio reader, whether student or faculty member, has access to multiple kinds of materials. Reviewing those materials can help readers see patterns within and

across them. A key question, then, is what those patterns are and how they might be interpreted. And not least, in the reflection, the student can speak to the individual entries, to the patterns of several entries, and to other learning experiences in ways the review of no other single vehicle — homework assignment, journal, lab report, or research paper — permits. In terms of assessment, portfolios provide rich material for formative assessment, which is in part why they are often associated with learner-centered education and with increased student responsibility for learning.

Second, again in part because portfolios can include such a rich mix of students' work, they are often used in summative assessment, some institutional and some life-based, as when portfolios are used in a job search. Sometimes, the institutional assessment takes place within the classroom, particularly when portfolios are graded. Again, practice here varies: Sometimes the portfolio carries the major grade in a course, and other times it counts as an exam grade. (And often the grading is facilitated by use of a scoring guide.) Portfolio advocates have often argued that grading a set of work at the end of the term permits a more accurate reading of a student's performance. They point out that because the portfolio includes so many samples of a student's performance, because it is finally sampled at the conclusion of a course, and because it includes the student's interpretation of the experience, a portfolio is an especially rich means of assessment. Portfolios permit other kinds of summative assessment as well, however, as we see in the student who compiles one for a rising junior portfolio or for a job interview.

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*Precisely because they make learning visible, portfolios allow both faculty and students to focus on learning in a new way.*

### **The Electronic Portfolio**

What happens to portfolios when we introduce the electronic into the portfolio mix? In some ways, nothing changes; yet changes in key features — especially the addition of linking — seem to make the electronic portfolio a different kind of portfolio altogether, a difference almost of kind rather than degree. Key to this difference is the role that interactivity plays in students' digital portfolios, the interactivity both of the digital medium and of social action.


Like their paper counterparts, electronic portfolios are governed by purpose and audience. They allow students, for instance, to showcase their best work for an employer (as shown in the Dartmouth model). Alternatively, they allow students to document learning for their teachers that takes place in a course (as the portfolio design from California State University Monterey Bay suggests). Electronic portfolios are created through the same basic processes used for print portfolios: collection, selection, and reflection.

At the same time, electronic portfolios are quite different from print portfolios. Consider, for example, how we learn about each. In general, if we want to learn about print portfolios, we go to physical representations in print, such as journals and books. If we want to

Dartmouth College's student portfolio program site

Quick Links: Choose...

## Dartmouth Portfolios



**What's New?**

Calendar of Events

Feeling Lost?

Internships

Career Links & Information

Handouts

Merit-Based Scholarships

Graduate Advising

Entry-Level Jobs

Credentials

Portfolios

Employers

**Purpose**  
This is an "electronic house" that will store documentation of competencies that you are developing, recognizing, tracking and learning to articulate in college. You will want to use this site to document competencies and capabilities that you develop as you pursue internships, leadership and community development opportunities, coursework, and field-based study or research experiences.

**Why Start A Portfolio?**

- 1. Increases your confidence and planning in Senior Year.**  
Seniors have consistently reported being anxious and unsure about how to develop a focus for employment or graduate school planning.
- 2. Allows you to analyze your Dartmouth experiences so you can describe them.**  
Seniors report wishing that they had identified earlier their accomplishments, skills acquisition and interests so they could be better prepared.

[www.dartmouth.edu/~csrc/students/portfolios/welcome.shtml](http://www.dartmouth.edu/~csrc/students/portfolios/welcome.shtml)

A student portfolio for a California State University Monterey Bay social and behavioral sciences course

*Portfolio Contents*

You will turn in all of your work for SBSC 212 in the form of a Portfolio. You will need a loose-leaf binder for hardcopies. It should have a title page with your name, the number of the course and the semester. This should be followed by a table of contents indicating the order in which you have placed material in the portfolio. Your formal written assignments may be submitted in the form of a set of linked web pages. In this case you need to submit these assignments on a disk placed in the front pocket of your portfolio and provide me with the address on the web where I can find it online. Your binder will then only contain the in-class work.

- I Title Page
- II Foots Essay/Family History
- III Report on Political Project with Historical Context and Personal Reflection
- IV Appendices
  - A. Description of, and personal response to, origin myths
  - B. Description of and personal response to, philosophies that underlie the United States Constitution
  - C. Brief essay defining what politics means to you
  - D. Written evaluation of the philosophies that underlie the California Constitutions of 1850 and 1879
  - E. Personal reflections on, and evaluations of, readings, videos & class discussions through March 3
  - F. One-page description of your political project (March 15)
  - G. Personal response to Rosa and Rockefeller

<http://www.monterey.edu/academic/centers/sbsc/sbsc212/portfolio.html>

learn about electronic portfolios, however, we can use an electronic medium such as the Web or the electronic database assembled by AAHE ([www.aahe.org](http://www.aahe.org)). And a quick trip on the Web, delivered in print, will show us electronic models that look quite different from their print predecessors.

### Migrating From Print or Starting Anew

Some digital portfolio programs have migrated from print to digital. Alverno College, for instance, has long been recognized for its work with student self-assessment. Now, by means of a digitized portfolio, that work is taking an electronic turn. The Alverno portfolio, used as an advising tool, includes three kinds of exhibits or contents: (1) descriptions of "key performances," or learning experiences, that take place within and outside courses; (2) self-assessments of the key performances; and (3) feedback on them.

Alverno College's "Diagnostic Digital Portfolio Program" site

**Alverno**  
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[Diagnostic Digital Portfolio](#)
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[Demonstration DDP](#)
[DDP Directions](#)
[DDP Development](#)
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### Overview

The Diagnostic Digital Portfolio was developed by Alverno faculty and staff over a period of several years in response to the need for students to see their academic progress in a more concrete format. The Diagnostic Digital Portfolio is a web-based electronic tool that allows the student, faculty, and academic staff to upload assignments and assessments, feedback and self assessments for review on a regular basis, anytime, anywhere. In this way a student and her faculty can track her growing development as a learner in her general education, major and support area courses and help her develop strategies for improvement. Thus, the accessibility of data makes possible more effective advising of students.

The Diagnostic Digital Portfolio is designed to include **key performances** that a student completes in selected courses, internships and volunteer work. A key performance is simply an assignment, internship, assessment or independent learning experience that a student completes as part of her degree program.

In most cases, the digital portfolio will not include the actual performance, but the feedback and self-assessments a student does as part of that key performance. However, there will be a description of each key performance so she will be reminded of the context and nature of the performance.

<http://www.ddp.alverno.edu/>

Interestingly, representations of the key performances themselves are not included: Rather, what is valued here is what is learned from them.

A similar model, tied specifically to general education reform, is being developed at Babson College. As Carolyn Meghan explains, the new curriculum is conceptualized in terms of competencies:



Babson has just completed the first cycle of its new curriculum. The goal of the curriculum is to create student-centered learning built around a set of competencies. The competencies cover a broad range from Numeracy and Rhetoric to Leadership and Multi-Cultural Awareness. As part of the curriculum, students have three gateposts, or moments of reflection, during the first three years. As the close of the first year, students write a self-reflective statement and then meet with a faculty adviser to discuss and reflect on the first year experience. During the sophomore year, students meet with an administrator to create a Learning Plan — a document that narrates the expected course of study for the final two years at Babson. During the junior year, the student meets with a faculty adviser to finalize the Learning Plan. These, as well as other supportive structures, encourage the student to take responsibility for what he/she is learning and to partake in meaningful dialogue about the nature of learning. (personal communication, August 2000)

Although the project is still in development, the value of the electronic portfolio, according to Meghan, lies in the portfolio's ability to prompt dialogue:

It raises the dialogue and discussion around learning — students are clearer about the competencies and in turn ask professors how assignments relate to the competencies. It addresses a need for more creativity on campus and yet is embedded in a [technological] venue that our students feel comfortable in using. (personal communication, August 2000)

#### **Petition to Major Portfolio**

##### Table of Contents

1. Statement of Intent
2. Career Aspirations and  
Personal History Statement  
(Assignment I)
3. Professional Resume / CV
4. Annotated List of SBS  
Classes taken
5. Transcripts
6. Writing Sample (Sample of  
Best Works)
7. Individual Learning Plan  
(ILP)  
Description of the ILP and ILP  
Worksheet (required in  
portfolio)
8. Supporting Documentation

A model at a different kind of school — Rose-Hulman, a four-year engineering school — also relies on a construction of curriculum oriented to what students know and can do, what Rose-Hulman calls “objectives”: ethics, contemporary issues, global issues, teams, communication, engineering practices, interpreting data, experiments, design, and career services. Like their counterparts at Babson and Alverno, students chart their own progress and accomplishments so that the portfolio becomes a prompt for discussions with advisers about their academic experiences.

Yet another portfolio model, this one at California State University Monterey Bay, takes the approach one additional step. There, students intending to major in social and behavioral science are asked to submit a portfolio (see left) as part of their application process for permission to major in the field.

Like the advising models, this electronic portfolio asks students to look forward — to plan — as much to look backward. We see the intent to plan in documents such as the resume and the statement of intent.

Not every model of electronic portfolio, however, is oriented toward students' immediate use. For instance, Stanford University is developing a student portfolio so that the insti-

### Excerpts from the Stanford Learning Lab E-Folio website

#### E-folios are used by:

- individual students to capture, organize, integrate and reuse the results of their formal and informal learning experiences over time, as well as allowing students to take advantage of this accumulated information to plan and assess the progress of their learning careers with peers, faculty advisors and future employers;
- educators to assess students and share teaching resources in order to provide students with guidance and rich learning opportunities within appropriate and innovative pedagogical frameworks; . . .

#### The current E-Folio prototype offers the following features:

- E-Folio is easily accessible both on campus and off campus.
- E-Folio is by default private.
- The data in E-Folio can be organized and cross-referenced according to multiple categories.
- The E-Folio supports the sharing of learning artifacts with other members of the Learning Careers community.
- As the content of the E-Folio grows, a summary of the contents ("what's new") will give an overview of the E-Folio at a glance.
- The E-Folio can store different forms of media including audio files, digital pictures, video, and text in one virtual space.
- The E-Folio keeps the most recent entries in a prominent location.
- The E-Folio supports reflective activities.
- E-folios support the learning process by facilitating the reuse, reflection, integration (synthesis) and sharing of knowledge, and the development of life-long learning skills and attitudes.

tution can track how students learn. Specifically, through students' collection of data and reflection on them, Stanford hopes to answer the following questions (excerpted from <http://sll.stanford.edu/projects/hlc.exploration.htm>):

1. How do exploratory changes like those introduced in The Word and the World [a general education course] relate to other experiences in the humanities and in general education as a whole?
2. How do these changes influence an individual undergraduate's subsequent academic experience and contribute to his/her intellectual and professional development?
3. How are various kinds of formal and informal learning woven together to produce "an individual undergraduate experience"?

Digital portfolios, like their print counterparts, can do very different kinds of intellectual work.

### Patterns in Digital Portfolios

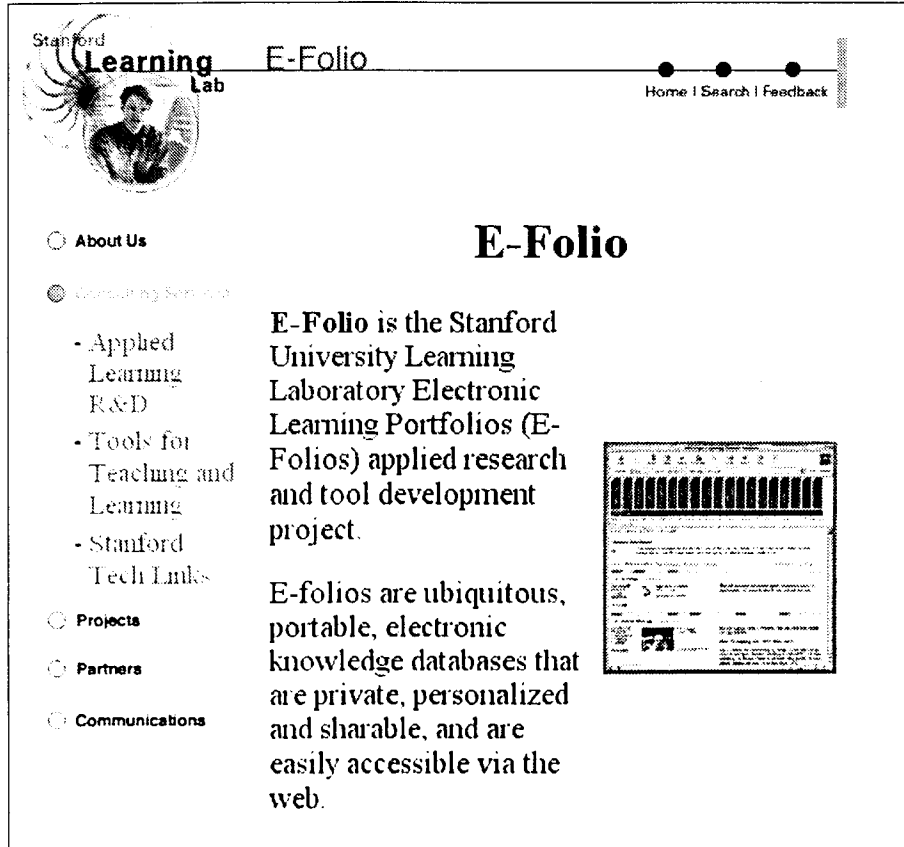
In general, even very different electronic portfolios point to consistent patterns.

1. Learning tends to be constructed inside *and* outside the "classroom box." Whether conceptualized as key performances or competencies or outcomes, the curriculum includes the classroom but is not constrained by it. Accordingly, space is provided for many kinds of learning experiences, among them internships and extracurricular activities. Likewise, nonschool exhibits — such as resumes — are included as well.
2. Students are asked to look backward at past experiences of all kinds and to think about them in terms of what they contributed to learning and what story they tell about the ways the students learn.
3. Students are expected to use this review of their own learning to plan for the future, whether classes for next year or a career.
4. Electronic portfolios are social. They are used as a vehicle for dialogue among students and faculty, between students and advisers.
5. Electronic portfolios are live texts. They inform the students' choices, and they continue over time.

### Six Critical Issues

Making the portfolio electronic requires planning, regardless of whether the model under consideration is a new invention such as Babson's or a migrated model such as Alverno's. Specifically, digital portfolio developers speak in terms of a planning process that attends to six critical issues:

- identifying the "place" where the portfolio will be accessed: on a disk, on the Web;



Stanford Learning Lab E-Folio

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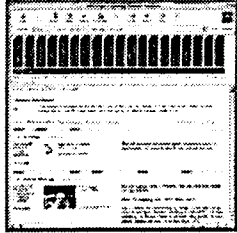
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## E-Folio

E-Folio is the Stanford University Learning Laboratory Electronic Learning Portfolios (E-Folios) applied research and tool development project.

E-folios are ubiquitous, portable, electronic knowledge databases that are private, personalized and sharable, and are easily accessible via the web.



<http://sll.stanford.edu/consulting/tools/efolio/>

- exploiting appropriately the potential of the electronic environment, including hyperlinks, design of pathways for different purposes and audiences, and use of multiple kinds of information, such as graphics, sound, and video;
- deciding how much technological skill will be required of students and faculty and what, if any, pedagogical changes will be entailed;
- considering the role, if any, that design will play, including the design of interactivity;
- deciding when faculty will read and review the portfolios — and why;
- defining options as to the “life cycle” of the electronic portfolio.

### Storing the portfolio

In some ways, the question about location may seem trivial, but it can be the most important one. And it is a question with several variables.

One variable is purpose. Suppose, for instance, that the purpose of the portfolio is to help a student in applying for a job. Is it better to have the portfolio on a CD and take it to

the interview, where the student can walk the potential employer through it? Or is it wiser to include the Web-based portfolio's URL in a letter of application?

A second variable is access to information. If the portfolio is housed on a CD or Zip disk, then its creator can exercise a fair measure of control over who sees it. Web-based access can be controlled, but the student's access to the Web may cease if he or she drops out of school or graduates. For institutions with highly transient populations, format can be a significant factor: What commitment can the institution make to students as they move in and out of school? Related to access to information is security. Is it desirable to have students post identifying information on the Web?

A third factor is the allocation of resources. Especially for institutions with minimal resources, it might be best to begin a project with students supplying the CDs and disks, with the understanding that the risk of losing data is higher.

### **Exploiting the potential of the electronic environment**

The electronic environment, whether a disk or a Web page, offers multiple opportunities for representing learning. Students can include performances through sound and video; they can show multiple ways of understanding through graphical, numerical, and verbal representations of data; they can link these representations one to the next or all at once; and they can provide multiple points of entry for different audiences into the various exhibits. As Emily Springfield points out later in this section, however, the fact that a student *can* link two exhibits does not ensure that a substantial connection has been made. In other words, it is true that the digital environment offers new ways of working for both students and faculty. But what it actually *means* — in terms of connecting and synthesizing information, for instance — is still an open question. Accordingly, building a portfolio model that permits collaborative exploration of this question will benefit students and faculty.

### **Defining technological skills and pedagogical changes required**

Some models of the e-portfolio seem fairly high tech, and in disciplines where electronic technology is already part of the skill set, the technological leap may be fairly easily made. (Whether or not the associated leap in active learning and reflective discourse can be made as easily is another question.) Other models of digital portfolios, such as the model discussed by Rich Rice later in this section, are lower tech. By definition, however, an electronic portfolio requires technological skill of both faculty members and students. Identifying how much and what kinds of skills are needed for both stakeholders is a key consideration. Likewise, electronic portfolios are connected to changes in pedagogy. Sometimes, as in the case of the Hartwick nursing portfolios (as described by Peggy Jenkins), they come after the e-portfolio is introduced; sometimes, as in the case of the

Hartwick management portfolios (as described by Katrina Zalatan), they come before the introduction.

### **Defining the role of design in students' electronic portfolios**

Some situations seem to call for templated design. At the beginning of a course or program portfolio, for example, a template might make expectations clear. The design itself, however, is key to the electronic portfolio. For instance, design includes audience issues and thus navigational issues. Likewise, hyperlinking is itself a design issue. Is the linking straightforward and analytical or is it associative? Even when templates are provided, students might well be asked to provide two kinds of links: internal, to exhibits created by the student and within the portfolio itself; and external, to items outside the immediate portfolio of student work. Building into the design both kinds of links works to ensure that at least two contexts are included: internal and external.

### **Deciding when faculty will read and review the portfolios**

In some situations, faculty clearly will review electronic portfolios: during the class in the case of classroom portfolios, for example. But will portfolios be reviewed before they are submitted? Will others review them? Or will they be reviewed only once? In team-teaching or during program assessment, how will the review be structured, especially if multiple pathways are possible? Are faculty in fact reading and reviewing the same portfolio? And once they are read, how will the portfolios be used? Faculty are likely to generate these kinds of questions, questions that need at least tentative answers before a plan is implemented.

### **Determining the "life cycle" of an electronic portfolio**

Eventually, mythology suggests, print items are discarded — or sent to rare book rooms. Not so for digital portfolios: In theory, given enough Web space and time, they can last into the next decade — or millennium. As important, because of hyperlinking and their tendency to move beyond one setting, electronic portfolios have a special potential for durability. That, of course, is part of their appeal. Ironically, the number of dead links increases with time, as well. It is therefore useful to think in terms of the "life cycle" of an electronic portfolio: when it is introduced, how it is developed, and when it comes to completion.

## **Specific Models of Digital Portfolios**

Another way to think about electronic portfolios is to consider specific portfolio models and the lessons learned from them. The work at many institutions — from two-year schools to liberal arts colleges to research institutions — can help us think about how electronic portfolios can change both learning and teaching. This volume's selected samples of experience represent a wide range of institutional type, geographical location, stu-

dent body, and purpose. The general intent in this representation is, first, to include a diverse set of electronic portfolios. This set shows both common principles and, concurrently, variations in practice. Second, even within those variations, we can discern patterns among practices. In other words, through reviewing these individual models of classroom and program portfolios, we will be able to talk more generally and synthetically about the kinds of models being developed, their key features, their benefits, and their risks.

The seven contributions in this section fall into two general categories. The first category is portfolios for students in the classroom, the second for beyond the classroom. Thus, for classroom electronic portfolios, we move from a focus on the teacher, in Donna Reiss's account, to a focus on the student, in Rich Rice's, to a focus on curriculum, in Katrina Zalatan's. For program electronic portfolios, we move from Emily Springfield's cautionary tale of a portfolio used for advising, to Chris Hult's explanation of an electronic portfolio used for program assessment, to Peggy Jenkins's discussion about digital career portfolio development motivating major curricular reforms. And not least, Emily Springfield's culminating contribution examines a key question: Given a perceived need for portfolios, why print and why electronic?

### **The Portfolio Models in Brief**

A brief introduction to each of the seven contributions can help us see different aspects of electronic portfolios. In the first contribution, "Reflective Webfolios in a Humanities Course," Donna Reiss provides an account of why and how she took a humanities class at a two-year college on-line to electronic portfolios. Motivated to find a vehicle to showcase students' work that is congruent with a learner-centered pedagogy, Reiss suggests that basic Web technology is sufficient. And she makes a claim that we will see repeated: that the electronic medium is particularly suited to two needs of portfolio users. First, it provides a place to house students' work. And second, through hyperlinking, it invites students to make connections between and among classes, experiences, and observations.

To illustrate what a student electronic portfolio looks like, Rich Rice focuses on the portfolio of a specific student in "Composing the Intranet-Based Electronic Portfolio Using 'Common' Tools." We see in student Sharon's words and Rice's analysis thinking both creative and critical. As important, through this focus and Rice's discussion, we see how the electronic dimension of the portfolio "works" — through Sharon's explanation of her navigation system, for example, which provides both pathways for portfolio readers and a central concept unifying Sharon's experiences. Similarly, the links that Sharon identifies animate her central concept. Not least, Rice also shows us how an electronic portfolio can be created from commonplace software.

In "Electronic Portfolios in a Management Major Curriculum," Katrina Zalatan outlines how electronic portfolios have functioned in the reform of a management curriculum at Hartwick College, especially as it begins to emphasize an "active learning culture." As a vehicle, portfolios seem appropriate, given their emphasis on making critical connections and their opportunity for students to assess their own learning and reflect on it. As in several other models of program portfolios, this Hartwick model emphasizes both course and curricular competencies. Also germane is the choice of medium: Students chose not to share their portfolios on the Web, so that they could keep their reflections confidential. Portfolios thus were submitted on a CD or disk (the latter of which was preferred).

In the fourth contribution, "A Major Redesign of the Kalamazoo Portfolio," Emily Springfield provides a cautionary tale about the use of a program portfolio, in this case an electronic portfolio to be used in advising, and what can go wrong. Intended as a "reflective document," the Kalamazoo e-portfolio required that students work in Netscape Composer — a common theme among contributors here — and Springfield shares a workshop format used to acclimate students to this software. She also reports that most users of the e-portfolio (students and advising faculty and staff) appreciated the portability that comes with an electronic portfolio. And, she notes, as the program continued, the quality of the portfolios improved. Still, the fact that it is electronic does not mean that the portfolio is reflective — or, as Springfield puts it, links themselves do not equal reflection. In fact, apart from some resistance to the technology and additional resistance to using advising as a genuinely reflective occasion, reflection itself — what it is, how we ask for it, and how we respond — seems to be a major challenge.

Christine Hult reports on a capstone portfolio program in "Using On-Line Portfolios to Assess English Majors at Utah State University." Motivated by issues related to accreditation, an entire department decides to review programs by asking students to collect and reflect on what they have accomplished in a culminating Web-based electronic portfolio. Like many other programs, this portfolio model required that faculty think in terms new for them — of outcomes and competencies that spanned the classroom experience. As important, a new piece of the curriculum was added — the capstone experience — so that students could create the portfolio. Annually, the faculty review the portfolios, discuss them in terms of how well they meet appropriate expectations, and revise curriculum based on their observations.

In "Development of Electronic Portfolios for Nursing Students," Peggy Jenkins explains that the creation of portfolios in her department was motivated by an interest in helping students move beyond the classroom to find jobs. The first model engaged students in creating CD-based portfolios that students took with them to job interviews, and administrators found that this model of portfolio provided a window into students' competencies that potential employers appreciated. At the same time, they found that asking students

to create this portfolio at the end of their academic careers was too little, too late. Consequently, the administrators designed another portfolio that would begin in the students' junior year. This portfolio, like the Kalamazoo portfolio, is primarily a vehicle for reflection, and because it builds on students' experiences in hospital practica where no computer support is available, it takes the form of print. One interesting observation, then, is that in this situation, the electronic portfolio used to get a job has motivated a redesigned focus on reflection in the curriculum that all agree makes for a better student and a better professional, even if it does necessarily take the form of print. In this situation, the result is neither electronic nor print, and it is not optional: It is both electronic and print.

How and whether to migrate the Hartwick print portfolio model to a digital model is a key question, one we have seen before — in the Kalamazoo reflective portfolio and the Alverno digitized portfolio, for example — and portfolio designers will want to think about the question carefully. Emily Springfield's "Comparing Electronic and Paper Portfolios," which includes observations and recommendations from the designers of several programs, addresses three key features that can help guide others: (1) the audience; (2) hardware and software availability and infrastructure; and (3) technological skills of both faculty and students.

#### **Reference**

Yancey, K.B. (1998). *Reflection in the Writing Classroom*. Logan, UT: Utah State University Press.