July 5, 2008

Memo to ASU Polytechnic Leadership

From: ASU I/NCEPR (Inter/National Consortium for Electronic Portfolio Research) Cohort 3 Team

Re: e-Portfolios at ASU

In 2005 a broadly representative committee of faculty and staff from the Polytechnic campus met to develop a set of core competencies for graduates. After nearly a year of work, a set of eight "core competencies" was adopted by the campus Academic Assembly. An electronic portfolio was envisioned as an important tool in implementing and assessing these eight competencies.

After these competencies were adopted, this same large committee, consisting mostly of faculty, met to develop a set of criteria and objectives for an e-portfolio system. The committee developed a set of nine desired objectives for such a tool.

The committee looked at several software packages and invited vendors to make presentations to the group. After much deliberation, the group consensus was to try to move forward with the help of the ALT^I unit of the University Technology Office (UTO), which was developing an eportfolio using the open- source software SAKAI and OSP (Open Source Portfolio) as part of a statewide grant project. The economics of "piggybacking" on an existing project was compelling. The Applied Learning Technologies Institute (alt^I) brings together faculty, researchers, students, and professionals, working hand in hand with programmers, engineers, designers, and support staff, toward a common goal; ensuring the success of all learners. The ALT^I leadership encouraged us to work with them on this project.

In the Spring of 2006, Academic Affairs and Student Affairs at the Polytechnic campus joined forces and applied to become a member of the Inter/National Consortium for Electronic Portfolio Research. ASU was accepted as a member of Cohort 3 of I/NCEPR and attended our first meeting of the group in the early summer of 2006.

The ASU I/NCEPR team was formed to benefit from five different perspectives. It consisted of a representative from the Vice Provost for Academic Affairs; a representative from Student Affairs; the chair of Engineering, whose department was already heavily involved with alternative forms of assessing student competencies; the head of Humanities, Arts and English (who was also president of the academic senate); and the Director of the Polytechnic Office of the University Technology Office.

The original plan of the I/NCEPR research team was to conduct a pilot study of the OSP portfolio for both classroom and out-of-classroom student assessment using the eight core competencies during the Fall of 2007 or Spring of 2007. Two major events prevented this from happening.

First, UTO was never able to get the software working in a usable way despite the efforts of many people from multiple units devoting much time, effort, and resources to developing the open-source software.

Second, in the Spring of 2007 the University underwent a major reorganization decentralizing academic functions to each of the 23 schools and colleges and centralizing most non-academic functions. The notion of "campus" was deemphasized and the notion of school or college was emphasized. Campus-

level administrative units were disbanded. Along with the reorganization, the University was initiating a review of its General Studies program placing greater emphasis on Learning Outcomes, and planned to include the Polytechnic core competencies into that process. Development of a campus-wide e-portfolio system was put on hold so that the organizational, programmatic, and technical issues related to e-portfolios and core competencies could be addressed by the University.

Attached are a set of recommendations based on what we learned in working on this project for the past three years, documents written from the perspective of each team member, a statement of the core competencies, and a listing of the criteria for software developed by the faculty committee.

We wish to thank both Academic Affairs and Student Affairs for their support in this endeavor, and we especially wish to express thanks for the strong support from all of the members of I/NCEPR and especially the 13 universities from around the world who comprised Cohort 3.

Despite the team's frustration for the past three years over not being able to move forward to successfully implement an e-portfolio system, we are convinced, individually and as a team, that electronic portfolios offer tremendous promise to improving undergraduate and graduate education both in and out of the classroom. We strongly encourage academic and student affairs leadership in the schools and colleges to take a serious look at not just the work we have done but the work that is being done internationally in this area. We believe that there is much promise in the use of electronic portfolios at the New American University and in the schools and college at the Polytechnic campus in particular.

Gary Kleemann

Michael Mader

Duane Roen

Chell Roberts

Kati Weingartner

Lessons Learned and Recommendations

As a result of our three years of engagement with e-portfolios we have come to understand the importance of the following items.

1. **Student Learning Outcomes** are key and are used less often than they should be. Whether students are doing portfolios or not, student learning outcomes are important tools in effective pedagogy and assessment inside and outside the classroom.

2. **Core competencies or other criteria** are helpful for developing the rubrics or scaffolding needed in the development of meaningful portfolios. It is useful to have a standard set of rubrics across all academic and non-academic units.

3. **Student Affairs professionals involvement is crucial** in all aspects of these efforts. Learning occurs in many places in and outside of the classroom, across the university. Being able to capture that out-of-class learning is one of the important promises of e-portfolios.

4. **Standardized yet highly customizable and easy to use software** is crucial. Facebook and MySpace offer examples of standardized yet highly customizable interfaces. Much of our team's frustration came from not having usable software. We can recommend three software products for consideration: OSP, Pebble Pad and eFolio Minnesota. Each has its own strengths and weaknesses, but we believe that these are the three most effective products to explore for the future. We also recommend that the e-portfolio systems at LaGuardia Community College (www.eportfolio.lagcc.cuny.edu/) and at Queensland University of Technology (www.studenteportfolio.qut.edu.au/) be reviewed as these most closely match the needs of ASU.

5. **Ongoing central administrative vision and support** from Academic Affairs, Student Affairs and UTO are essential. While deans, department chairs and individual faculty and student affairs professionals can (and some currently do) implement portfolios as learning and assessment tools, for an e-portfolio system to realize its potential it must have ongoing support from the central administration.

A website (http://www.poly.asu.edu/eportfolio/) has been established as a repository for this report and other information we have collected. It includes a Resources section.

A History of eportfolio Development in the Department of Engineering at ASU Polytechnic

Chell Roberts

The engineering program at ASU's Polytechnic campus is a brand-new multi-disciplinary B.S.E. program. The –new cross- B.S.E. program is a carefully crafted, thorough and innovative redesign of the traditional bachelor's program in engineering – a redesign that is entirely relevant to the needs of our rapidly changing and increasingly technical world. A team of faculty members created this program from a clean slate over a two-year planning period.

Polytechnic engineering was modeled after a handful of the nations' top undergraduate engineering programs giving us many of the features of a private school environment. We found that most people learn better when they are engaged in their own learning, thus much of our learning takes place in engineering studios, not lecture halls, where we work on increasingly realistic projects every semester. Polytechnic engineering provides a flexible curriculum unlike most traditional engineering programs. Our students build on an interdisciplinary engineering foundation by selecting two concentration areas of study, and one of the concentrations does not need to be engineering. Polytechnic engineering was also developed to focus on the individual. All students have faculty mentors who guide them throughout their education and we desire to use electronic portfolios to document individual outcomes, which may be attained inside or outside of a traditional classroom experience. The need for electronic portfolios was determined as a means to documenting and assessing learning outcomes and for the purpose of students presenting their learning to the other audiences.

Engineering Outcomes and the Need for Portfolios

Development of program student outcomes was a significant part of the program design process. Our goal is that students and faculty naturally and systematically use these outcomes to structure the educational experience. The outcomes are designed to provide a common language that facilitates a focus on student achievement. To this end, the number of outcomes has been limited to eight and each outcome has a short descriptive title (as opposed to the single letter designation used in the 13 ABET Criterion 3 outcomes).

The outcomes reflect the developmental nature of student growth as they progress through the curriculum. In the past, many engineering curricula have been designed according to a conventional wisdom that "suggested that after first teaching a vast body of fundamental mathematics and science – which students absorbed like sponges – [faculty] were free to teach engineering principles, drawing as necessary on the deep well of basic knowledge internalized by the students. This was (and is) a lovely idea, but depressingly unrealistic." This approach ignores the developmental nature of student learning. In contrast, the engineering program has designed outcomes that explicitly address student development. In this respect, the engineering program outcomes are similar to the competencies developed at Olin College. Each outcome has four associated developmental levels that describe student progress in achieving the outcome.

The developmental levels are similar to the model developed by Alverno College . It is expected that students will typically progress from lower to higher levels, but that this progression will not always be linear or proceed at a constant rate. The primary approach to assess student progress in the outcomes is the requirement that students demonstrate achievement of several specific levels in each course. Generally, students are required to demonstrate achievement of a given outcome level in multiple contexts or settings (e.g. courses), insuring that their learning will be generalizable and transferable to new contexts.

The developmental levels associated with each outcome describe a possible path for a student to achieve mastery of that outcome. A critical part of the assessment process for each student is to track their development through the levels as they progress through the program. The mechanism used to track student development is that each outcome level is mapped to one or more courses in the curriculum, and that student achievement of these levels is assessed in the corresponding courses. A student can pass a given course (and proceed forward in the curriculum) only after demonstrating mastery of all of the outcome levels associated with the course. Each course is designed to support student mastery of the levels associated with that course

The primary source of data for assessment of individual student progress will be student work that is collected and assessed by course instructors and project mentors using relevant components of the student outcome component rubrics. This work will be organized into a student portfolio that covers the student's entire time in the department. The portfolio will thus provide an assessment of students' progress at multiple points through the curriculum and from multiple sources (e.g. project courses, content modules, etc.). Aggregated student portfolios will also be a primary source of data in the other three assessment loops. These portfolios may be augmented by other assessment data (e.g. protocol analysis of recorded team interactions). Additional data will come from student surveys administered by the department and by ASU's Office of University Evaluation. Also, industry participation in assessing student performance (particularly in projects) will be solicited through the industrial advisory board.

In the first year of portfolio development we began a dialog with campus administration on our needs for assessing student outcomes and our desire to use electronic portfolios. Concurrently, a campus team was initiated to begin the development of a core set of learning objectives for the entire campus. The result of the teams work was a set of Polytechnic learning outcomes. The engineering department recognized that there were great similarities in the core outcomes with the department outcomes and that there was a shared need to assess and document these outcomes.

A campus team was soon after assembled to address the need for electronic portfolios. The team went through a process of developing a set of functional and operational requirements for the envisioned ePortfolios. Once complete, the team then began the evaluation of potential solutions, including a number of off-the shelf systems. The team became excited about an open source project that was being conducted on another campus at ASU that included a potential framework for the development of ePortfolios. We soon after began the process of using the open source environment to develop an assessment system for both the Polytechnic core outcomes and for the department of engineering core outcomes. Though not highly funded, this process continued for well over a year

until campus reorganization removed a number of the resources that were being deployed in the development of the system.

About that time, Kathleen Yancey came to the Polytechnic campus and held a portfolio workshop providing a heuristic for the design and creation of student electronic portfolios which asks several questions. Below are some of the questions from the heuristic and some potential answers.

<u>What are the purposes?</u>

To help students achieve the departmental objectives and eight departmental outcomes

- by supporting, documenting and enhancing student learning through reflection.

- by giving students a platform to market themselves (to us, potential employers, graduate schools, their families, etc.)

-To provide data and a framework to document and assess student achievement of the objectives and eight outcomes.

-The portfolio could document the secondary concentration.

<u>Who wants to create an electronic portfolio and why?</u>

-The faculty want students to create portfolios to assess the students learning.

We should ask students why (if?) they would like to create an electronic portfolio.

<u>Who wants to read it and why?</u>

-Faculty want to look at it to assess student learning.

- We should ask the industrial advisory board why (if?) they would like to examine student portfolios.

Why electronic?

How will the portfolio be reviewed?

What skills will students need to develop to implement the portfolio?

We have begun to answer these questions and follow the heuristic and have reinitiated the development project. However, the resources are still limited and we anticipate testing next semester.

The Development of e-Portfolios at the ASU Polytechnic Campus

An Academic Administrator Perspective

Gary Kleemann

The importance of academic leadership having a vision was a critical first step in the development of a project like this. Our first campus Provost, Chuck Backus had a vision for the development of a campus in East Mesa. Vice Provost for Academic Affairs David Schwalm served as the chief architect for that vision working with the Deans and other campus leaders to design a curriculum focused on "practical" majors and preparing students for careers. The campus offered its first classes to students in 1996 when almost 1,000 enrolled that first semester. In 2002, Michael Crow became the new ASU President. Shortly after President Crow's arrival, he declared the East campus of ASU as the Polytechnic. Provost Backus' successor, Gerry Jakubowski, built upon the foundation that Chuck had laid. Both men shared a vision of providing a practical and applicable education to help prepare students for the world of work.

In the fall of 2004, newly appointed campus Provost Gerald Jakubowski appointed a committee chaired by Professor Duane Roen with broad faculty representation to develop a statement about what it might mean to be a Polytechnic graduate. The committee, after much deliberation developed a statement that included two clusters of four competencies each which would distinguish a Polytechnic graduate. A key element of the committee's plan was the implementation of an e-portfolio system for all schools and colleges to help capture student learning.

At the Polytechnic students were offered opportunities to:

- integrate practical and theoretical study;
- develop an understanding of ethical issues in a high-tech society;
- develop 21st-century knowledge and competence in science and technology;
- gain a sophisticated level of information literacy;
- engage in critical thinking, team work, problem solving, project-based activities, laboratories, and work experience;
- establish a solid academic base in the liberal arts and sciences;
- engage in research that emphasizes applied knowledge and solutions to problems;
- explore diversity, creativity, community, and work.

The Polytechnic campus sought to differentiate itself with:

- Emphasis on professional, technical, and applied programs with direct connections to employment opportunities
- Hands-on, project-based approach to learning in all fields
- Conscious distribution of students across programs by maintaining at least 75% of enrollment in professional and technical majors
- Polytechnic Core curriculum for all students
- Campus environment (e.g., smaller, rural/suburban)

The PolyTechCompetent core was a common set of outcomes and experiences for all students in all programs at the Polytechnic campus:

- Outcomes focused curriculum design:
  Learning experiences in courses at all levels will be tracked to core outcomes

- Outcomes focused co-curriculum:
  Co-curricular activities will support and reinforce academic core outcomes

- Reflective learning:
  Students assess their progress in achieving core outcomes through e-portfolios

- Rigorous Assessment:
  Student achievement of core outcomes assessed through capstone experiences

The core was designed to include common student outcomes that support career success and a life of learning:

- Solid academic foundations in the liberal arts and sciences
- Understanding of ethical issues in a high tech society that informs ethically sound judgments in all aspects of life
- Sophisticated competency in information literacy: accessing, evaluating, and understanding information
- High degree of knowledge about science, technology, and mathematics and their practical applications
- Ability to think critically and solve problems creatively, to integrate practical and theoretical study, and to communicate effectively in writing and in speech
- Social and leadership skills developed through team work, project based activities, and work experience
- Understanding of the realities and expectations of the work environment
- Appreciation of diversity and community

Polytechnic faculty are encouraged to use instructional methods that reflect polytechnic approaches—active learning, collaborative/cooperative learning, problem-based learning. A very active and well received faculty development program operated to assist Polytechnic faculty.

Student Learning Outcomes/Objectives were key elements of the plan. The expectation was that each program demonstrate student learning outcomes. The Polytechnic campus schools and college and student affairs would facilitate the development of programs, courses, materials, and in and out of classroom experiences that would satisfy the expected outcomes. Each academic program chooses either to have students take campus-wide courses developed for that purpose or to construct their own experiences and/or courses that address the student learning objectives.

The Core Curriculum: An Overview

The Core Curriculum consists of two clusters of skills and knowledge. The lessons learned in each of these clusters define education on the Polytechnic campus.

- The clusters enrich the academic arena of life, as well as the civic, professional, and personal areas of life.

- For each cluster, there are specific learning outcomes or goals that have been defined, three levels of performance defined, and examples of typical sites for developing and demonstrating specified competencies.

The Competencies

Human Interaction Competencies

- Communication
- Leadership & Society
- Ethics
- Global Awareness

Problem Solving Competencies

- Critical Thinking
- Information Literacy
- Science and Technology
- Quantitative Reasoning

The impact of a faculty committee coupled with strong administrative support from both academic affairs and student affairs had a huge positive impact. Because the process that was used to develop the competencies was truly a "bottom up" effort supported from the "top down" wide spread buy-in by both faculty and administrative leaders was obtained. E-portfolios were/are seen as an important and integral part of the needed infrastructure for the schools and college at the Polytechnic campus.

The same faculty committee that developed the core was asked to continue its work to help develop the objectives and list of criteria for an e-portfolio system. It developed the following objectives for an e-portfolio system:

Compatibility with existing tools
Flexibility/Structure
Student tool
Faculty tool
Campus tool
Secure documentation
Assessment

Training Issues (Student and Faculty)
Cost Issues

Compatibility with existing tools

1. Highly compatible with Blackboard and other software that we use for teaching and learning
2. What I don't want: Another requirement for my overworked adjunct faculty—keep to something that ASU already uses (like Blackboard or a simple web design)
3. We should minimize the number of tools (user interfaces) that students, faculty and support personnel must have to learn, use and support
4. The e-portfolio tool selected should integrate with tools for on-line course delivery and accreditation. Integration or support of other related tools would be useful - course and instructor evaluation, curriculum evolution (ACRES), or whatever else
5. The system should be inexpensive to purchase/license. The preferable solution would be an open-source solution that would allow ASU IT the ability to tailor the system to other ASU computer systems. Open-source solutions should be given preference despite other potential deficiencies such as immature user interface or minimal performance advantages
6. Support instruction and development
    a. Links to course delivery tools e.g. e-learning
    b. Organizes information such that it can be found rapidly
    c. Web Services based
    d. Interoperability – prefer open source and open architecture
    e. Extensible
    f. Scalable
7. Aesthetics --> the look and feel
8. Compatibility with MCCCD system
9. ADA Access Issues are important
10. Persistence and maintenance issues need to be considered and addressed
11. How structured/unstructured do we want the portfolio "system" to be?

Flexibility/Structure

1. Flexible enough to contain any kind of student artifacts (e.g., visual representations of physical models, streaming video of oral presentations)
2. The e-portfolio tool selected should integrate with tools for on-line course delivery and accreditation. Integration or support of other related tools would be useful - course and instructor evaluation, curriculum evolution (ACRES), or whatever else
3. Support instruction and development
    a. Links to course delivery tools e.g. e-learning
    b. Organizes information such that it can be found rapidly
    c. Web Services based
    d. Interoperability – prefer open source and open architecture
    e. Extensible
    f. Scalable
4. Customizable / user preferences

5. Aesthetics --> the look and feel
6. Compatibility with MCCCD system
7. ADA Access Issues are important
8. Persistence and maintenance issues need to be considered and addressed
9. How structured/unstructured do we want the portfolio "system" to be?

Student tool

1. User-friendly
2. To provide students a tool that enables documentation of their learning achievement and to assess it against stated criterion measures and rubrics
3. To prepare students for completion of similar documents within their own professional organizations; e.g. the American Dietetic Association credential process mandates professional portfolios; I am sure other disciplines have similar requirements. This would allow each discipline to "personalize" the process
4. I don't know how to concisely state this as a goal per se but I would also like to see students use this process as a means of exploring how their education has prepared them for a variety of positions. In other words, even if the student starts out with professional goal "X", he/she may end up in position "Y" and the portfolio might help in understanding how their academic program did, in fact, prepare them for "Y"
5. To be a place for students to collect documents which could form the basis of a job application
6. To be a place for students to collect a file of information to serve as evidence for having met the objectives of a particular course
7. To facilitate assessment and monitoring of progress on the polytechnic core during the student's college career
8. To be secure, easy to use, persistent, permit transport of contents to another software or medium
    a. "Persistent" is something less than permanent -- perhaps five years after graduation, or about the time your first job becomes the more important reference. "Secure" means accessible only by authorized persons authorized by the portfolio owner [the student should be the owner -- this is important: it's the student's presentation, choice, the argument the student is making] or persons within the university needing access for analysis or advisement
9. Provide a tool that can enhance students' interview experience
10. Enhance students' reflection on professional practice
11. Transportability—students need to easily pack this up and take it with them into their career
12. Authenticity—students can apply this tool to their experiences outside of ASU
13. Ease of use
14. There should be adequate benefit to students to use the e-portfolio tool selected so as to motivate appropriate use of the tool. This may require support conversion to/from a variety of formats, importing and exporting so that students can easily take their electronic assets with them when they leave (join) the university. A tool that is web-based without explicit import and export capability will probably not satisfy this requirement
15. An easy to use tool for promoting a student's career goals
16. Assessment of individual student progress
    a. Track achievement of developmental levels in eight outcomes
        i. "Objective assessments"-grades, scores, etc.

ii. Narrative assessments linked to work products
iii. Student self-assessment

b. Store and organize selected student performances
i. Students can submit material directly
ii. All formats for assignments are supported-documents (electronic and paper submission), audio, video, what else?

c. Allow students to organize (Web accessible) compilations of their work

17. ADA Access Issues are important

Faculty tool

1. User-friendly
2. What I don't want: Another requirement for my overworked adjunct faculty—keep to something that ASU already uses (like Blackboard or a simple web design)
3. Makes it easy for faculty to access students' artifacts (evidence that learning has occurred) so that we can to program and campus-wide assessment
4. To facilitate assessment and monitoring of progress on the polytechnic core during the student's college career
5. To be secure, easy to use, persistent, permit transport of contents to another software or medium
    a. "Persistent" is something less than permanent -- perhaps five years after graduation, or about the time your first job becomes the more important reference. "Secure" means accessible only by authorized persons authorized by the portfolio owner [the student should be the owner -- this is important: it's the student's presentation, choice, the argument the student is making] or persons within the university needing access for analysis or advisement
6. Demonstrate and document proficiency in the AZ Professional Teaching Standards
7. We should select an e-portfolio tool that minimizes faculty and administrative time, placing a majority of the burden for entry and maintenance of portfolio information on students
8. An easy to use tool for collecting and assessing student work
9. An easy to use tool for collecting faculty work to be used in the P&T process
10. A tool that will serve as an aid in helping faculty collectively discover what learning outcomes students are actually learning and what areas need additional work
11. Assessment of individual student progress
    a. Track achievement of developmental levels in eight outcomes
        i. "Objective assessments"-grades, scores, etc.
        ii. Narrative assessments linked to work products
        iii. Student self-assessment
    b. Store and organize selected student performances
        i. Students can submit material directly
        ii. All formats for assignments are supported-documents (electronic and paper submission), audio, video, what else?
    c. Allow students to organize (web accessible) compilations of their work
12. Support department assessment and improvement
    a. Derive department-level information from aggregated student performances
    b. Support identification of strengths and weaknesses in curriculum and department processes
    c. Support accreditation
    d. Support pedagogical research

13. Support instruction and development
    a. Links to course delivery tools e.g. e-learning
    b. Organizes information such that it can be found rapidly
    c. Web Services based
    d. Interoperability – prefer open source and open architecture
    e. Extensible
    f. Scalable
14. ADA Access Issues are important

Campus tool

1. User-friendly
2. To have a source of academic program data from both a latitudinal and longitudinal perspective that can be used in benchmarking and program marketing
3. To facilitate assessment and monitoring of progress on the polytechnic core during the student's college career
4. We should select an e-portfolio tool that minimizes faculty and administrative time, placing a majority of the burden for entry and maintenance of portfolio information on students
5. There should be mechanisms to enter and report on traceability information within the system. That is, relations between components or aspects of a portfolio and specific learning objectives. There should also be traceability (entry and reporting) between formal course descriptions and learning objectives
6. An easy to use tool for collecting faculty work to be used in the P&T process
7. A tool that will serve as an aid in helping faculty collectively discover what learning outcomes students are actually learning and what areas need additional work
8. Support department assessment and improvement
    a. Derive department-level information from aggregated student performances
    b. Support identification of strengths and weaknesses in curriculum and department processes
    c. Support accreditation
    d. Support pedagogical research
9. Support instruction and development
    a. Links to course delivery tools e.g. e-learning
    b. Organizes information such that it can be found rapidly
    c. Web Services based
    d. Interoperability – prefer open source and open architecture
    e. Extensible
    f. Scalable
10. ADA Access Issues are important
11. How structured/unstructured do we want the portfolio "system" to be?

Secure documentation

1. To have a source of academic program data from both a latitudinal and longitudinal perspective that can be used in benchmarking and program marketing
2. There should be mechanisms to enter and report on traceability information within the system. That is, relations between components or aspects of a portfolio and specific learning

objectives. There should also be traceability (entry and reporting) between formal course descriptions and learning objectives
3. An easy to use tool for collecting faculty work to be used in the P&T process
4. Good levels of security
5. Privacy and Intellectual Property issues need to be considered and addressed
6. Public access to "showcase" portfolios behind ASU firewall issues need to be considered and addressed

Assessment

1. To provide for latitudinal and longitudinal cataloging of program standards and outcomes to aid in the ABET accreditation continuous improvement process
2. There should be mechanisms to enter and report on traceability information within the system. That is, relations between components or aspects of a portfolio and specific learning objectives. There should also be traceability (entry and reporting) between formal course descriptions and learning objectives
3. Assessment of individual student progress
    a. Track achievement of developmental levels in eight outcomes
        i. "Objective assessments"-grades, scores, etc.
        ii. Narrative assessments linked to work products
        iii. Student self-assessment
    b. Store and organize selected student performances
        i. Students can submit material directly
        ii. All formats for assignments are supported-documents (electronic and paper submission), audio, video, what else?
    c. Allow students to organize (web accessible) compilations of their work
4. Compatibility with MCCCD system

Training Issues (Student and Faculty)

1. What I don't want: Another requirement for my overworked adjunct faculty—keep to something that ASU already uses (like Blackboard or a simple Web design)
2. We should minimize the number of tools (user interfaces) that students, faculty and support personnel must have to learn, use and support
3. We should select an e-portfolio tool that minimizes faculty and administrative time, placing a majority of the burden for entry and maintenance of portfolio information on students
4. Good support / training

Cost Issues

1. The system should be inexpensive to purchase/license. The preferable solution would be an open-source solution that would allow ASU IT the ability to tailor the system to other ASU computer systems. Open-source solutions should be given preference despite other potential deficiencies such as immature user interface or minimal performance advantages.

In 2006, sponsored by the Vice Provost for Academic Affairs and the Dean of Students, Academic Affairs and Student Affairs joined together to apply to become a member of the Inter/National Consortium for Electronic Portfolio Research. We were accepted into the third cohort of 13

universities from across the United States, Canada and Great Britain. This three year commitment involved doing a research project and attending two meetings per year. ASU's I/NCEPR representatives were Gary Kleemann, Academic Affairs, Kati Weingartner, University Technology Office Polytechnic, Duane Roen, Faculty, Humanities, Michael Mader, Student Affairs and Chell Roberts, Faculty, Engineering.

Support from the leadership of the Polytechnic University Technology Office (Information Technology) was critical in moving this project forward. With extremely limited resources, the Poly UTO staff managed to make significant progress in the development of appropriate software. The challenge was that the project, for a variety of reasons beyond the control of Poly UTO, was not been able to move as fast as we would have liked. Polytechnic staff, central UTO staff and Alt^I staff worked together to try to develop a working e-portfolio system. The project made slow but significant progress.

In the Spring of 2007, the University underwent a major reorganization decentralizing academic units and centralizing most non-academic services. This impacted many, many things, including this project. We now hope that a centralized UTO, with strong support from the schools and colleges, will pick up the banner for a University e-portfolio system.

Developing the PolyTechCompetencies

Duane Roen

In the summer of 2004, the new campus provost, Jerry Jakubowski worked with David Schwalm, Vice Provost for Academic Affairs, and other campus administrators to craft a series of documents describing the mission for the ASU's East Campus which was being transformed into ASU at the Polytechnic campus. The mission statement indicated that the Polytechnic campus should offer students opportunities to do the following:

- integrate practical and theoretical study;
- develop an understanding of ethical issues in a high tech society;
- develop 21st century knowledge and competence in science and technology;
- gain a sophisticated level of information literacy;
- engage in critical thinking, team work, problem solving, project-based activities, laboratories, and work experience;
- establish a solid academic base in the liberal arts and sciences;
- engage in research that emphasizes applied knowledge and solutions to problems;
- explore diversity, creativity, community, and work.

Further, Polytechnic instructional approaches should include active learning, collaborative/cooperative learning, and problem-based learning.

To transform the mission statement into curricular and pedagogical action, Jakubowski and Schwalm appointed a campus-wide committee in October 2005 to develop a "Polytechnic core curriculum." Chaired by Duane Roen, Head of Humanities and Arts, the committee also included Linda Vaughn, Chair of Nutrition; Bette Bergeron, Head of Education; Chell Roberts, Chair of Engineering; Thomas Schildgen, Chair of Technology Management; Roger Hutt, Head of Business Administration, Cynthia Boglin, Director of Academic Programs and Services; Charles Brownson, Director of the Library; ark Manfredo, Assistant Professor in the Morrison School of Agribusiness and Resource Management; and Marybeth Mason, an English faculty member from Chandler-Gilbert Community College.

By December 2004, the Polytechnic Core Committee had drafted a set of recommendations. After discussions with the provost, vice provost, and other members of the campus community, the Polytechnic Core Committee also developed implementation plans for the Core. The expanded recommendations, completed in June 2005, included the following:

In this document we repeat the curricular recommendations that we offered on December 14, 2004. For each of those recommendations, we have added recommendations for implementation

Polytechnic Mission: During our conversations we have carefully considered how the core curriculum might reflect the polytechnic mission by offering students opportunities to

- integrate practical and theoretical study;
- develop an understanding of ethical issues in a high-tech society;
- develop 21st-century knowledge and competence in science and technology;
- gain a sophisticated level of information literacy;
- engage in critical thinking, team work, problem solving, project-based activities, laboratories, and work experience;
- establish a solid academic base in the liberal arts and sciences;
- engage in research that emphasizes applied knowledge and solutions to problems;
- explore diversity, creativity, community, and work.

Teaching Methods: We suggest that instructional methods in the core courses should reflect polytechnic approaches—active learning, collaborative/cooperative learning, problem-based learning.

Outcomes: In general, we are recommending that ASU East establish expected student outcomes that each program should demonstrate. Although we suggest some possible strategies for supporting and accessing these outcomes, we recommend that the provost facilitate the development of courses and/or materials that would satisfy the expected outcomes. Under this flexible scenario each program could then choose either to have students take campus-wide courses developed for that purpose or to construct their own experiences and/or courses that meet the objectives.

As noted in the draft language for the pamphlet for the polytechnic campus, "Graduates of programs at the polytechnic campus share many academic experiences and are expected to achieve the following ten outcomes as the combined result of all aspects of their education:

- They achieve or exceed *levels of knowledge and competence in their areas of specialization* set by accreditation standards, disciplinary standards, and expectations of faculty and employers.
- They have a *high level of information literacy,* including a conscious understanding of the different domains of knowledge and of what counts as knowledge in their own disciplines, of alternative methods of inquiry, and of strategies for accessing and validating information.
- They have a high degree of *scientific and technological knowledge and competency* so that they can thrive in the high tech environment of the 21st century. Graduates have a high level of technical savvy and are facile in the use of technology in their chosen fields.
- They have *quantitative competencies* necessary for general daily use and for the demands of their professions.
- They are *able to communicate effectively* to multiple and diverse audiences in both writing and speech on topics of general interest and on topics specific to their professional program or academic discipline.
- They are *able to think critically* about personal and public issues as well as issues in their professional or academic discipline.
- The have a solid base in the liberal arts and sciences.
- They have *developed social and leadership skills* and an *appreciation of diversity* that that are necessary for effective teamwork and that will help them to succeed in a diverse work environment and in the world of educated adults.

- They are acquainted with the most important *ethical issues* in their careers and professional lives.
- They have *knowledge of the realities and expectations of the workplace* in order to ease the transitions from university to career
- They have all *completed a significant project* demonstrating that they can apply the knowledge they have been learning to real problems and issues."

Flexibility: In making the following recommendations, we suggest that there be as much flexibility as feasible. For instance, while some programs will find it advantageous to develop new courses to achieve specific goals and objectives, others may wish to modify existing courses or to rely on courses offered by other programs. Alternatively, some programs already offer courses and other experiences that meet the goals and objectives implied here.

Degree Requirements: The following recommendations are not intended to expand degree requirements. To the extent possible, any courses that result from the following recommendations, should fit program requirements for majors and/or ASU's General Studies requirements.

Transfer Students: In implementing the following recommendations, ASU East needs to accommodate transfer students. For instance, the campus should consider exempting transfer students from lower-division courses that are part of the polytechnic core curriculum

Library Support: To facilitate the following recommendations, East Campus librarians should be empowered to support programs and faculty as they implement the recommendations. Faculty who need library support should be encouraged to work closely with the library staff as they plan for instruction.

Grant Support: To help implement the following recommendations, campus units might seek grant funding from agencies such as the National Science Foundation, the Fund for Improvement of Postsecondary Education, and the Arizona Board of Regents.

Other Support: As ASU East implements the following recommendations, we might use resources available in the Greater Expectations program (http://www.greaterexpectations.org/) sponsored by the American Association for Colleges and Universities (AAC&U). The program offers models of education for the next century—models that fit our polytechnic mission well.

With these considerations in mind, we offer the following recommendations:

Recommendation 1: All programs must demonstrate that their students have a broad understanding of contemporary technology and science, including understanding outside their fields of study. This recommendation is consistent with the polytechnic mission that "students on our campus should be familiar with 21st-century science and technology."

To implement this recommendation, programs might ask students to construct electronic portfolios that they begin earlier in their programs and complete late in their programs. In a such a portfolio, a student would argue, "Here's what I have learned, and here's the evidence that I have learned it well enough to apply it in my professional, civic, and or/personal life." In such a portfolio, students could include various projects demonstrating relevant learning.

Implementing Recommendation 1

- By Fall 2006, academic programs should have in place procedures for using electronic portfolios to measure learning, defined by pre-established learning outcomes for courses and degree programs.
- By Fall 2006, programs should have in place a capstone experience for seniors.
- By Fall 2006, the East Campus should offer core courses that include attention to science and technology.
- By Fall 2005, Academic Programs and Services should offer activities that foster experiences with science and technology.

Recommendation 2: Students should preferably acquire a foundational understanding in contemporary technology and science in their early university experience. A formative foundation will provide a context for the development of ethical and societal relevance developed throughout the university experience.

There may be many ways to help students demonstrate such understanding. For instance, ASU East might offer an introductory course (perhaps titled How Things Work), that would examine relationships between science and technology by encouraging students to explore the science behind the technology. In such a course, students would study recent and emerging technological trends that shape our lives—information technology, bio-technology and life sciences, energy and the environment. In such a course, students would consider questions such as the following: How do medicines work? What relationships exist between nutrition and wellness? How does gene therapy work? How does DNA matching work? How does an airplane work? How does a computer processor work? Because the course would include a broad array of fields in science and technology, it should be a team-taught interdisciplinary course.

A second possibility would be for students to complete courses in science and/or technology outside of their fields. For instance, a student in Mechanical Engineering Technology might take a course in Human Health Studies; a student in Applied Biological Sciences might take a course in Food and Nutrition Management; a student in Agribusiness Management might take a course in Graphic Information Technology. Each student could work with an academic advisor to choose a course that would best fit the student's career goals.

Implementing Recommendation 2

- By Fall 2006, academic programs should have in place procedures for using electronic portfolios to measure learning, defined by pre-established learning outcomes for courses and degree programs.
- By Fall 2006, the East Campus should offer core courses that include attention to science and technology. Such courses should carry a "T" designation, which will be assigned by ECAPC.
- By Fall 2005, Academic Programs and Services should offer activities that foster experiences with science and technology.

Recommendation 3: All programs should demonstrate that their students have a broad understanding of the ethical issues in a high-technology society, including issues outside of their fields of study. This recommendation is consistent with the polytechnic mission that "students have opportunities to develop an understanding of ethical issues in a high-tech society."

To demonstrate such understanding, students might address ethical issues in the aforementioned electronic portfolios. Alternatively or additionally, faculty might routinely ask students to reflect on the ethical issues surrounding projects that they complete in major courses, especially capstone courses.

Implementing Recommendation 3

- By Fall 2006, academic programs should have in place procedures for using electronic portfolios to measure learning, defined by pre-established learning outcomes for courses and degree programs.
- By Fall 2006, programs should have in place a capstone experience for seniors.
- By Fall 2006, the East Campus should offer core courses that include attention to ethics. Such courses should carry an "E" designation, which will be assigned by ECAPC or some other oversight committee.
- By Fall 2005, Academic Programs and Services should offer activities that foster experiences with ethics.

Recommendation 4: Students should be introduced to ethical and societal issues throughout their university experience and should have a focused experience in the junior or senior year. A formative experience is more likely to be effective after students have learned to think critically and have acquired a broad understanding of contemporary technology and science.

The focused experience could have many forms. For instance, students might complete PHI 306, Applied Ethics, or they might take a highly focused ethics course offered in their own programs—a course such as ITM 430, Ethical Issues in Technology. Another possibility would be to include ethics as a substantial focus during the capstone experience.

Implementing Recommendation 4

- PHI 306 and ITM 430 are already offered.
- By Fall 2006, the campus should offer courses that have substantial ethical components; course titles should reflect this focus.
- Beginning with the graduating class of 2008, students should complete one course with "ethics" in the title or two courses with the "E" designation. Alternatively, a program may meet this criterion by demonstrating that the requirement is integral to the degree program.
- By Fall 2005, Academic Programs and Services should offer experiences that foster ethical practices (e.g., Service Learning).

Recommendation 5: Students on our campus should complete a capstone experience in which they apply their degree work to contexts external to the university. Although the contexts would be external to the university, students might or might not leave campus to complete the capstone experience.

The capstone experience should be flexible to fit the diverse needs of programs and students. For instance, as they do now, students in Elementary Education would work off-campus to complete the student-teaching internship, which is an ideal capstone experience. In Engineering, students might identify and solve an engineering problem that exists in Iraq, but they would not travel to Iraq to solve the problem. To apply their knowledge in these contexts, students would necessarily meld the practical and the theoretical.

Implementing Recommendation 5

- The 2006 *Catalogue* should include descriptions.

Recommendation 6: Polytechnic Campus should develop courses/materials that satisfy the demonstration requirements. While programs may choose to develop their own materials or courses to satisfy these requirements, some courses could be available to students from many

programs. For instance, as noted above, East College currently offers PHI 306: Applied Ethics, which is open to all students. Similarly, the College of Technology and Applied Sciences offers an ethics course that is also open to all students—ITM 430, Ethical Issues in Technology.

Implementing Recommendation 6

- Programs should examine course titles during Fall 2005.
- "T" and "E" course designations should be in place by Fall 2006

Recommendation 7: Polytechnic Campus should develop a process for development, continuous improvement, and assessment of East Campus student learning outcomes. In some cases, the foundation for this kind of assessment already exists. For example, in Elementary Education students routinely maintain electronic portfolios. In addition to demonstrating what students have learned, such portfolios can also provide programs with information that they can use to improve curriculum and instruction.

A committee should oversee these activities.

Implementing Recommendation 7

- E-portfolio data should be available by Spring 2007.
- During Fall 2005, programs should work with the Office of University Evaluation to revise current institutionally required assessment plans.
- Include a student and a staff member from Academic Programs and Services in the assessment process.
- An oversight committee should be in place by Fall 2005.
    - Among other things, the committee should determine the level of information literacy that is appropriate for students completing degrees on a polytechnic campus. That is, how well should polytechnic students be prepared to find, evaluate, process, and use information?
    - The committee should also specify ways in which the library can adequately support the core curriculum.

Recommendation 8: To implement the aforementioned curricular recommendations, East Campus should provide faculty-development in the following pedagogical approaches: active learning, collaborative/cooperative learning, problem-based learning.

Implementing Recommendation 8

- Continue working with E-Learning to offer faculty-development workshops.
- Work with Vinette Williams to offer workshops during the August orientation for faculty.

Recommendation 9: The offering of courses to meet the science (General Studies) requirement should be broadened to include science-based courses in a variety of degree programs, including those in the department of the student's major. Criteria will need to be developed. Courses not currently meeting science-course criteria will be included. This recommendation will require university approval. Initially, we might seek permission to implement this recommendation as an experiment and collect data longitudinally for a few years followed by an assessment of learning. As an example, under this recommendation, a nutrition student would have the opportunity to use a nutrition course to meet the university's science requirement.

Implementing Recommendation 9

Work with the General Studies redesign group to broaden what counts as General Studies.

Audit existing Polytechnic Campus courses to determine science content.

In the summer of 2005, Jerry Jakubowski encouraged the committee to develop a name for the Polytechnic Core. After consulting with Thom Brodeur, a local business executive with expertise in name, branding, the committee recommended the adjective form of the brand be "PolyTechCompetent" and the noun form be "PolyTechCompetencies." These terms, Brodeur noted in a meeting on December 16, 2005, would focus on the outcomes of the learning—the benefits of the product.

In late December 2005, the committee drafted a document explaining what it means to be PolyTechCompetent. A few months later, the committee invited program chairs, heads, and directors to augment the document by explaining how their academic units would help students to become PolyTechCompetent. That document reads as follows:

Arizona State University at the Polytechnic campus

PolyTechCompetent

PolyTechCompetent students possess skills and knowledge for success in the professional, civic, and personal arenas of life. They are well equipped to apply PolyTechCompetencies to thrive in the global community.

The Polytechnic Core Curriculum

Students become PolyTechCompetent by directing academic and co-curricular experiences on a well delineated set of polytechnic learning outcomes. Besides developing disciplinary knowledge and skills in their areas of specialization, as well as General Studies competencies, students in all disciplines at the Polytechnic campus are expected to demonstrate competency in the following core areas:

Competencies for Human Interaction

- Communication: The ability to communicate effectively
- Leadership and Society: The ability to socially participate and effectively lead.
- Ethics: The ability to effectively apply ethics in decision-making.
- Global Awareness: The ability to participate in a global community.

Competencies for Problem Solving

- Critical Thinking: The ability to conceptualize, analyze, apply, synthesize, and evaluate ideas and information.
- Information Literacy: The ability to acquire and validate information.
- Science and Technology: The ability to apply science and technology to problem solving.
- Quantitative Reasoning: The ability to quantitatively model and reason.

Although students are introduced to these areas early in their years on the Polytechnic campus, they continue to develop PolyTechCompetencies throughout their years at ASU. Students have opportunities to enhance their learning in these areas through the following kinds of experiences: general studies courses, courses in the major, units and projects within major courses, internships, capstone courses, and co-curricular programs.

Students develop PolyTechCompetencies in typical ways: university courses, projects, study in other countries, and through their civic, social, and work activities. Students demonstrate that they have attained the competencies by identifying and documenting their learning experiences. Typical ways of demonstrating competency attainment are through regular course examinations, writing projects, oral presentations, capstone projects, and electronic portfolios. Polytechnic students construct and maintain electronic portfolios during their years at the Polytechnic campus. In each portfolio a student will make the following case: "Given the learning outcomes in my major and in the seven core areas, here are the knowledge sets and skills that I have developed to date, and here is the evidence to demonstrate that learning."

The Polytechnic Core Curriculum: An Overview

The Polytechnic Core Curriculum consists of two clusters of skills and knowledge. The lessons learned in each of these clusters defines education on the Polytechnic campus. The clusters enrich the academic arena of life, as well as the civic, professional, and personal areas of life. For each cluster, there are specific learning outcomes or goals (PolyTechCompetencies), three levels of performance, and typical sites for developing and demonstrating specified competencies.

Cluster One: Competencies for Human Interaction

- Communication
    - Learning Outcomes
      PolyTechCompetent students are able to communicate effectively to multiple and diverse audiences in both writing and speech on topics of general interest and on topics specific to their professional program or academic discipline.

    - Levels of Performance
      Introductory: Describes own strengths and weaknesses in writing, speaking, and listening.

      Proficient: Applies written, oral, and listening communication processes. Writes, speaks, and listens effectively in academic and social settings.

      Advanced: Purposefully and effectively uses communication processes to address the needs of their audience. Writes, speaks, and listens effectively in professional settings.

- Typical Sites where a student might develop the communication competencies for documentation in their Electronic Portfolio:

  - ENG 101, ENG 102
  - Selected L, SB, and HU General Studies Courses
  - Capstone and Project Courses
  - Internships

- Leadership and Society

  - Learning Outcomes
    PolyTechCompetent students have developed social and leadership skills and an appreciation of diversity that that are necessary for effective teamwork and that will help them to succeed in a diverse work environment and in the world of educated adults.

  - Levels of Performance
    Introductory: Articulates leadership philosophies and processes. Describes own strengths and weaknesses in social and leadership skills.

    Proficient: Applies a leadership philosophy and process. Demonstrates social and leadership skills appropriate for academic settings.

    Advanced: Evaluates leadership process and performances. Demonstrates social and leadership skills appropriate for professional settings.

  - Typical Sites where a student might develop the social and leadership competencies for documentation in their Electronic Portfolio:
    - Electronic Portfolio
    - Service Learning
    - Co-Curricular Activities
    - Senior Capstone Project
    - Internship

- Ethics
  - Learning Outcomes
    PolyTechCompetent students are acquainted with the most important ethical issues in their careers and professional lives.

  - Levels of Performance
    Introductory: Articulates ethical responsibilities pertaining to daily life. Articulates the negative effects of unethical behavior.

Proficient: Applies an ethical framework (e.g., standards, moral theory, criteria) in making decisions in academic and social settings.

Advanced: Evaluates and applies personal values in making ethical decisions. Makes ethical choices in professional settings.

- Typical Sites where a student might develop ethics competencies for documentation in their Electronic Portfolio:
  - Selected HU General Studies Courses
  - PHI 306
  - Most Major Courses
  - Senior Capstone Project
  - Internship

- Global Awareness
  - Learning Outcomes
    PolyTechCompetent students develop skills and knowledge that equip them to participate in the global community.

  - Levels of Performance
    Introductory: Articulates features of other cultures.

    Proficient: Applies knowledge of other cultures and globalization in academic settings. Can articulate personal values in relation to diversity.

    Advanced: Evaluates and applies knowledge of globalization in professional settings. Demonstrates conversational skills in at least one language other than English.

  - Typical Sites where a student might develop global awareness competencies for documentation in their Electronic Portfolio:
    - Selected G General Studies Courses
    - Language Courses
    - Selected Major Courses
    - Study in Other Countries
    - Senior Capstone Project
    - Internship

Cluster Two: Competencies for Problem Solving

- Critical Thinking
  - Learning Outcomes
    PolyTechCompetent students are able to think critically about personal and public issues as well as issues in their professional or academic disciplines.

- Levels of Performance
  Introductory: Articulates the features of critical thinking processes. Uses aspects of critical thinking to solve problems in daily life .

  Proficient: Identifies assumptions, criteria, and evidence to make informed decisions. Uses critical thinking to solve problems in range of academic settings.

  Advanced: Evaluates alternative perspectives, contexts, and the quality of evidence in making informed judgments. Uses critical thinking to solve problems in professional settings.

- Typical Sites where a student might develop critical thinking competencies for documentation in their Electronic Portfolio:
  - ENG 101, ENG 102
  - Service Learning
  - Senior Capstone Project
  - Internship

- Information Literacy
  - Learning Outcomes
    PolyTechCompetent students have a high level of information literacy, including a conscious understanding of the different domains of knowledge and of what counts as knowledge in their own disciplines, of alternative methods of inquiry, and of strategies for accessing and validating information.

  - Levels of Performance
    Introductory: Defines and articulates the need for information and identifies a variety of types and formats of potential sources for information. Uses appropriate methods for finding, evaluating, and using information in daily life.

    Proficient: Selects and applies the most appropriate methods or information retrieval systems for accessing the needed information. Uses information effectively in a full range of academic situations.

    Advanced: Articulates and applies criteria for evaluating both the information and its sources. Uses information effectively in professional settings,.

  - Typical Sites where a student might develop information literacy competencies for documentation in their Electronic Portfolio:
    - ENG 102
    - Selected L General Studies Courses
    - Senior Capstone Project
    - Internship

- Science and Technology

- Learning Outcomes
  PolyTechCompetent students have a high degree of scientific and technological competency so that they can thrive in the high-tech environment of the 21st century. Graduates have a high level of technical savvy and are facile in the use of technology in their chosen fields.

- Levels of Performance
  Introductory: Articulates a broad awareness of the human-designed world and our place in it. Uses technology effectively in daily life. Understands scientific discussions in popular media.

  Proficient: Applies scientific and technological knowledge and skills to solve problems. Applies scientific and technological knowledge and skills in a full range of academic settings.

  Advanced: Evaluates the impact of technology on people, society, and the environment. Applies scientific and technological knowledge and skills in professional settings.

- Typical Sites where a student might develop science and technology competencies for documentation in their Electronic Portfolio:
  - Selected SQ and MA and CS Courses
  - Senior Capstone Project
  - Internship

- Quantitative Reasoning
  - Learning Outcomes
    PolyTechCompetent students have quantitative competencies necessary for general daily use and for the demands of their professions.

  - Levels of Performance
    Introductory: Interprets mathematical models such as formulas, graphs, tables, and schematics and draw inferences from them. Effectively uses quantitative tools for personal activities and in lower-division courses.

    Proficient: Represents quantitative information (symbolically, visually, numerically, and verbally) and use mathematical methods to solve problems. Effectively uses appropriate quantitative tools for a full range of academic tasks.

    Advanced: Identifies and explains the limitations of quantitative methods. Effectively uses appropriate quantitative tools for professional activities.

  - Typical Sites where a student might develop quantitative reasoning competencies for documentation in their Electronic Portfolio:

- Selected MA and CS General Studies Courses
- Senior Capstone Project

PolyTechCompetencies in Specific Programs

PolyTechCompetencies in Aeronautical Management Technology

As a leader in commercial airline-focused aviation education, the Department of Aeronautical Management Technology (AMT) offers a curriculum that is based on the PolyTechCompetencies. The Department's two concentrations, Professional Flight and Air Transportation Management are enhanced because of the Department's aggressive affiliation efforts with the airline industry. Both concentrations are accredited by the Council on Aviation Accreditation which emphasis student outcomes assessment. The Air Transportation Management concentration is designed to prepare graduates for managerial and supervisory positions throughout the air transportation industry. It is interdisciplinary in nature, with a broad exposure to business and management courses. The implementation of the Airline Bridge Training Program for the Department's Professional Flight concentration is a distinctive innovation in collegiate aviation. This unique program provides airline specific academic education and flight training. The PolyTechCompetencies are critical to the success of our graduates in the demanding world of air transportation. Professional competencies are continually evaluated by the administration of FAA knowledge examinations, which insure the students are meeting and exceeding the standards expected in the aviation industry. The Airline Bridge Training Program prepares successful graduates for a guaranteed hiring interview with the Department's allied regional airlines, Mesa Air Group. These graduates of the ASU Profession Flight concentration are employable immediately by the airlines and are going directly into the right seat of a regional jet as First Officers, some with only 300 hours total flight time.

Students in AMT develop communication skills by taking TWC 400; further, almost all AMT classes include projects which require a writing a project report and an oral presentation. Students develop leadership and social skills by taking a capstone class (AMT 491 or AMT 490) in which they meet leaders of companies involved in the air transportation industry and work on real industry projects that prepare them for a position in the industry. Students develop skills in ethical decision making by taking a course in ethics (ITM 430 for the management students); the aviation professional class (required for all students) includes a project designed to help them develop skills in professionalism to examine ethics in the air transportation industry. Students develop the ability to participate in a global community by becoming aware of the global nature of the air transportation industry (AMT 308 is classified as a global course under the general education requirements; this course is required of all students as part of the AMT Core). Students develop the ability to think critically by analyzing, evaluating, and developing safe solutions to numerous problems in air navigation, flight operations, airport and airline management, aircraft design and logistics management, etc. Students develop the ability to acquire and validate information by

conducting research involving aerodynamics, aeronautical structures, materials, and systems, and power plants (AMT 280 & AMT 287), aircraft design and development (AMT 350) etc. Students develop the ability to apply science and technology to problem solving by designing airfoils, constructing airfoil section models and testing in the wind tunnel, designing and testing Unmanned Aeronautical Vehicles (UAV's) and developing and implementing a simulated Integrated Logistics Support Plan, etc. Students develop the ability to quantitatively model and reason by taking APM 301 Introductory Statistics, which is required for all students. Students learn real-life application of this information in the AMT 350 Aircraft Design and Logistics Management course. In this required course student calculate reliability functions in both serials and parallel logistics management situations and in the UAV project.

An important part of the Airline Bridge Training Program involves education and training in Mesa Air Group's airline equipment throughout their four-year Bachelor of Science curriculum. The Department negotiated with Mesa Air Group to install two, $13.5 million each, Regional Jet Simulators in the Department's facilities. These full motion-based flight simulators are used in part by the Department's flight students at the end of their program, to provide a capstone airline flight training experience. This level of flight simulator opportunity is unmatched in the United States.

PolyTechCompetencies in Applied Biological Sciences.

Competencies in problem solving are foundational to successful careers in the biological sciences. The courses in the core curriculum of each concentration in Applied Biological Sciences are designed to repeatedly address the issues of thinking critically, acquiring and validating scientific information, applying the scientific method and tools of technology to problem solving, and development of skills for quantitative representation and analysis of data. Successful completion of the core curriculum is evidence that students are at least proficient in the problem solving components of the PolyTechCompetencies. We also recognize the importance of the Human Interaction components of the PolyTechCompetencies and that technical abilities alone are not sufficient for successful, productive, and rewarding careers. Development of successful communication skills has long been recognized as a crucial element of the applied biological sciences tool-set and this competency is interwoven into the core curriculum of each concentration. Competencies in leadership, active participation in society, ethics and a global perspective are emphasized in both in the General Studies requirements and specific course work that addresses environmental and other biology related policy issues. These topics also receive special attention in the capstone experiences associated with each concentration. Applied Biological Science students are expected to demonstrate PolyTechCompetencies throughout their curriculum through hands-on learning in the laboratory and field, through class work, and through individual and group projects.

PolyTechCompetencies in Applied Psychology

The Applied Psychology program meshes naturally with PolyTechCompetencies. Not only do students learn about how people work through the study of psychology, but they also acquire skills in quantitative data analysis, effective thinking, and scientific method. The program emphasizes verbal and written communication through class presentations and technical writing. Computer skills are honed in communication activities, and there are many opportunities for students to become involved in research using a variety of technical equipment for data collection and analysis. The study of human-computer interaction is an important aspect of the program. Classes often have students working in groups, providing opportunities to learn leadership and interaction skills, and these topics are also studied in social psychology classes. Because of the applied focus of the program, students learn about and often work in real-world settings where they learn first hand about the applications of psychology.

PolyTechCompetencies in Business Administration

The Business Administration degree program provides challenging undergraduate education in business and management and prepares students for effective and ethical leadership in an ever-changing global economy. The context for teaching and learning is the recognition that life and work are carried out in a technology-rich, information-driven business and social environment. Further, mastery of problem solving skills is crucial to working effectively in this environment. The interdisciplinary curriculum offers students a multitude of opportunities for learning and understanding. Students will demonstrate proficiency in general studies, in business knowledge and skills area, and in PolyTechCompetencies. Through in-class presentations, team projects, and a variety targeted writing assignments, students develop and enhance their communication skills. Group assignments in business core courses are an effective laboratory for learning and refining the social and leadership skills so necessary in the global world of business and industry. As they progress through the program, students are introduced to the complex ethical issues leaders and managers encounter daily. Graduates of the business program, which is focused on PolyTechCompetencies, can be confident that what they are learning and how they are learning will enable them to bridge theory and practice in their professional lives.

PolyTechCompetencies in Computing Studies

Computing studies programs prepare students in the principles and practices that underlie development of computer solutions to today's problems. The Division of Computing Studies offers programs that are designed in the spirit of a Polytechnic campus to emphasize hands-on laboratory-rich and problem-based coursework. Students learn the concepts of computing in the context of the languages, methods and tools of computing best practices. Analysis, design, creation and evaluation of computer applications today involve a variety of complex work products that are developed and maintained by diverse teams of computing professionals, often working in geographically distributed locations. While technical knowledge in computing is important, human

interaction, leadership, ethical decision making and problem solving competencies dominate the professional lives of computer scientists. Reflecting this fact, Computing Studies programs build upon the polytechnic competencies. Over a student's tenure with Computing Studies, a variety of assessments establish outcomes including course exams, standardized professional tests, e-portfolio, as well as industry, graduate and alumni surveys.

PolyTechCompetencies in Educational Innovation and Teacher Preparation

The professional programs within the School of Educational Innovation and Teacher Preparation are directly aligned with the Arizona Professional Teaching Standards, as required by state accreditation. These standards define the characteristics of an effective teacher, and insure that graduates of the School's programs are "highly qualified" as teachers and future educational leaders in Arizona. As a culminating activity in all of the School's teacher preparation programs, students complete a Professional Portfolio that demonstrates their knowledge and proficiency in each of the state standards. To reflect the campus's vision to incorporate the Polytechnic core into each of its programs, the School's Professional Portfolio will be revised in order to align the campus core with the state's professional standards. This will allow students to see the connections between what is expected of them in their career—as demonstrated through the Professional Teaching Standards—and the more global aspects of professional competence as defined by the Polytechnic campus.

PolyTechCompetencies in Electronic Systems

Electronic systems touch every aspect of our lives, particularly when there is a need for greater efficiency, productivity or performance at lower cost. These outcomes depend on a multidisciplinary blend of skills and competencies that are developed interactively throughout the degree program. We are fortunate in having a close interaction with the large companies that are so important to Arizona's economy and also set the standards for world-class performance. They have helped us develop the balance between personal, business and technical skills that reflects the conditions for success in global operations. Students learn how to define problems and use quantitative reasoning to reach solutions that meet ever-increasing expectations for utility and performance at lower cost. The degree program gives all students a broad base in electronics followed by an opportunity to specialize in a more focused area. The outcomes are demonstrated in both team and individual projects and the results communicated in the format of a business case. Rapid change is the defining attribute of Electronic Systems and we aim to provide graduates with the competencies to prosper under these conditions.

PolyTechCompetencies in Engineering

Engineering at the Polytechnic campus provides a holistic approach to mastering competencies. We believe that competencies are developed and mastered over time, and that development will continue throughout the professional life of our graduates. Competencies are the focal point of the engineering program. We strive to make competencies the heart of the learner's orientation and purpose for learning. We strive to associate at least one competency with each assignment, project, and learning event. Since competency development can occur through many different activities, our learners are trained to self assess their learning activities in relation to competencies. Each

structured learning activity, as well as learning activities outside of class, represents opportunities for our learners to identify and demonstrate their own competency development. The engineering department is actively developing the tools and environment for students to become PolyTechCompetent including electronic portfolios, learner mentoring, assessment instruments and technology, internships, interdisciplinary projects, and opportunities to work on projects and solve problems for their communities.

PolyTechCompetencies in Exercise & Wellness

The Department of Exercise & Wellness undergraduate degree program has a strong polytechnic focus including practical, hands-on educational experiences. Exercise & Wellness has an existing set of programmatic competencies embedded within each course that are specifically designed for exercise & wellness and health promotion professionals. The competencies are "outcomes evaluated" and demonstrated through the development of the electronic portfolio and professional performance in the senior internship experience. Both the Exercise & Wellness programmatic competencies and the PolyTechCompetencies are met through a combination of specific exercise & wellness courses, general studies courses, the senior internship experience, and the electronic portfolio. Although the Exercise & Wellness competencies are far more extensive, both of those sets of competencies focus on: effective communication, social & leadership skills, ethics, global awareness, critical thinking, information literacy, scientific & technological knowledge & skills, and quantitative reasoning.

PolyTechCompetencies in Humanities and Arts

In Humanities and Arts courses and programs, students develop a range of PolyTechCompetencies. We especially emphasize written and spoken communication skills, information literacy, critical thinking, ethics, and social and leadership skills. All of our programs stress the practical uses of humanities study: cultural and historical knowledge is valued not only as an end in itself, but also as a way of encouraging critical thinking, ethical reflection, and informed decision-making. Our courses in art, theatre, music, and dance focus on creative communication and the exploration of the creative application of new technologies. Our language courses stress basic communication and language acquisition. In all fields, from philosophy to film study, we encourage a multi-media, technologically enhanced, approaches to teaching and learning. All Humanities and Arts programs are dedicated to expanding the connections between creativity and technology, between art and science, between intellectual contemplation and practical application. In addition, students will find opportunities to enhance their global awareness and quantitative reasoning, as well as their technological knowledge and skills. Students demonstrate PolyTechCompetencies via electronic portfolios, written and multimedia projects, internships, and capstone experiences.

PolyTechCompetencies in Mechanical & Manufacturing Engineering Technology

Mechanical and Manufacturing Engineering Technology (MMET) programs provide students with an education focused on applied engineering. Because engineering tools (scientific knowledge, software, etc.) and the global industrial environment are constantly evolving, students must be fully prepared to engage in lifelong learning and exploration. The MMET programs are accredited by the

Accreditation Board of Engineering and Technology [ABET], and students must demonstrate all ABET-required outcomes. Thus, oral and written communication, ethics, critical thinking, design and engineering knowledge and skills are core areas integrated into their courses. All students develop expertise in computerized design and manufacturing tools and utilize common software to develop and implement oral and written presentations. As seniors, students in the MMET Department have a two-semester capstone design project experience that typically involves an industry sponsor. These projects require students to integrate and apply the knowledge learned in the academic setting and apply it to an engineering project that includes both a design and build phase. The MMET Department is working to initiate a process by which students document their academic and personal growth through electronic portfolios and discipline-specific homework or projects.

PolyTechCompetencies in Multimedia Writing and Technical Communication

In the Multimedia Writing and Technical Communication program, students learn how to produce, design, and manage information using traditional and developing technologies. They learn how to communicate, both orally and in writing, across audiences and cultures and to have the ability to access and evaluate print, oral, and electronic sources. Students learn different methods of inquiry; to think critically about issues in organizing, managing, and presenting information as well as about social, cultural, historical, and economic issues related to information, writing, and technology. In addition, they study issues of ethics in technical communication as well as learning to have an awareness of the global nature of technical communication—both culturally and economically. Students study how to create persuasive and informative printed or digital texts using document design and usability principles, using appropriate media and technologies, and integrating graphics and sound. The curriculum also brings together rhetoric and writing, multimedia (graphics, sound, design, and media) and contemporary communication technology. Courses integrate group projects so that students learn collaboration and teamwork skills relevant to the workplace. In order to facilitate the applied nature of the program, students are encouraged to complete an internship. Finally, all students create and present an electronic portfolio of their work in the program which includes the creation of a reflective paper demonstrating how they've learned to apply the concepts and theories learned in the classroom to appropriate workplace communication.

PolyTechCompetencies in Nutrition

Nutrition is a relatively young and constantly evolving science, thus students in the Department of Nutrition must be fully prepared to engage in lifelong learning and exploration. The Dietetics program is accredited by the Commission on Accreditation of Dietetics Education [CADE] and students must demonstrate all CADE-defined competencies. Oral and written communication, professional leadership and ethics, critical thinking, and specified knowledge and skills are core areas integrated into Nutrition courses. Students in Human Nutrition, Food/Nutrition Management, and Nutrition Communication also demonstrate these same knowledge and skill sets. All students develop an expertise in computerized dietary assessment and related programs, utilize common software to develop and implement oral presentations, and use readily available technology to create brochures, menus, and other professional materials. As seniors, students in

the Department of Nutrition are placed in field experiences that allow them to fully apply the knowledge learned in the academic setting and apply it within a professional setting, including a range of community and nonprofit agencies. The Department of Nutrition is working to initiate a process by which students document their academic and personal growth through electronic portfolios and discipline specific capstone projects.

PolyTechCompetencies in Professional Golf Management

The Professional Golf Management degree program is unique in its content and application, using both internal and externals measures of the delivery of the PolyTechCompetencies. The program, accredited by the Professional Golfer's Association of America (PGA), combines a four-year business degree and sixteen months of real-world internship experience with the joint completion of the PGA's education program. The development of both Problem Solving and Human Interaction Competencies are measured in the classroom setting and then applied during one of three internship opportunities. During these internships, students complete the co-curricular educational requirements of the PGA of America. While competencies will be evaluated internally in the classroom setting, they are also externally evaluated at both the internship location as well as during the PGA's three independently administered testing checkpoints during the degree program. At the completion of the degree program, students have bridged the gap between theory and application because they have applied their learning during their internships and proven their competencies through written and oral assignments in the classroom as well as through the independent testing by the PGA.

PolyTechCompetencies in Technology Management

The different technology programs in the Department of Technology Management are accredited by outcomes assessment through the National Association of Industrial Technology (NAIT). The defined outcomes for each of the technical programs have been validated by their respective industry advisory boards and include the PolyTechCompetencies. The degree earned by a graduate of the Department of Technology Management is designed to add value to the employer day one, and create lifelong learners who embrace technological change, critical thinking, ethical decision making, and the social and leadership skills necessary to be successful in their careers. The curriculum addresses communication skills, a high level of information literacy, quantitative reasoning, and global awareness. Technology Management students demonstrate PolyTechCompetencies through problem-based learning, assignments involving service learning, a required senior project, and in laboratories that offer contextual learning environments.

Support for PolyTechCompetencies

Student Affairs Support for PolyTechCompetencies

Student Affairs at ASU's Polytechnic campus provides opportunities for students to develop professional and personal skills that will better prepare them for lives of leadership and service in a diverse and increasingly global community. Through its various departments, Student Affairs engages students through active participation in student organizations, student governance,

student activities, community service, and campus employment. Through these and other co-curricular activities, students will be able to apply theories in a variety of practical settings to solve complex problems and lead teams. Through these out of class experiences, students will learn social and leadership skills, improve written and oral communication abilities, enhance critical thinking skills, and develop moral and ethical values.

Library Support for the PolyTechCompetencies

The library at the Polytechnic campus provides electronic access to hundreds of databases and thousands of electronic journals, as well as an in-house print collection related to subjects taught on campus. These resources are supplemented with a vigorous document delivery service provided free of charge to Polytechnic campus affiliates. Library staff members are service-oriented and customer-driven, developing new programs and services or modifying existing ones to better meet the needs of faculty and students.

Librarians play a vital role in helping students become PolyTechCompetent, particularly in gaining critical thinking skills and information literacy. They do so through integrating information literacy across the curriculum, delivering tailored instruction, and providing individual reference assistance to students.

e-Learning Support for the PolyTechCompetencies

e-Learning at the Polytechnic campus is committed to providing support to faculty in the implementation of pedagogy supporting the polytechnic core. e-Learning is actively developing the tools and environment to support faculty teaching PolyTechCompetent students. We believe that learning should continue throughout the professional life of each person. Each learning activity represents an opportunity for faculty to identify and demonstrate their own competency development and improve their ability to teach more effectively. This leads to improved student learning – the end goal for a PolyTechCompetent graduate.

University College Support for the PolyTechCompetencies

University College at the Polytechnic campus strives to enhance the educational experiences of students, faculty, and staff by providing resources and services and fostering partnerships to promote academic success, build community, and create opportunities that encourage the application of knowledge inside and outside of the classroom.

The University College at the Polytechnic campus provides services in three areas of academic support: Center for Academic Advising, Academic Success and Engagement Programs, and the Academic Resource Center.

The University College Center for Academic Advising provides academic advising for exploratory/undeclared majors at Arizona State University. The mission of the University College Center for Academic Advising is to promote student development and success by helping students to identify, clarify, and achieve their academic goals. Through individualized professional advising

and teaching practices, University College academic advisors challenge and support students in their process of becoming self-directed lifelong learners.

The Academic Success and Engagement Programs office coordinates the UNV101: University Success courses, Voices of Discovery, and the National Society of Collegiate Scholars and works with students to facilitate leadership and service-learning experiences.

The Academic Resource Center provides free subject area tutoring on a walk-in basis, writing assistance on an appointment basis, academic success workshops, information on study abroad opportunities, access to the Barrett Honors College, and support for graduate students from the Division of Graduate Studies.

Since spring 2006, the committee has conducted workshops for faculty to assist them in integrating the PolyTechCompetencies into the their courses. Those workshops have also included discussions about using portfolios to assess students' grow in the eight areas of the PolyTechCompetencies.

A Very Brief Overview of e-Portfolio Development on the ASU Poly Campus

A Student Affairs Administrator's Point of View

Michael Mader

Very brief summary Statement

e-Portfolios and the Polytechnic Core at ASU Poly have been on a course to interface for well over two years. However, major university reorganization and restructuring have prevented this from happening.

Spring 2005

In the early part of Spring 2005, Cindy Boglin, Director of University College, informed the Student Affairs Directors of a committee that was developing a set of Polytechnic "Core Competencies" for the campus. This committee, convened by Jerry Jakubowski, our campus Provost at the time, was comprised of faculty across the campus and one academic affairs administrator (Cindy Boglin). Duane Roen in Humanities, Arts, and Sciences chaired this committee.

Throughout the Spring of 2005 there were various meetings among Deans and Directors about the Polytechnic core and its implementation across the campus. This set of competencies (which has been well-documented and distributed) was to become the benchmark for ASU Poly graduates. No matter what the major or school/college, ALL ASU Poly grads would be "Polytechcompetent." The Polytechnic core would be the common thread that ran through the curriculum; it would make ASU Poly distinct; and it would also differentiate our students within the ASU family, as well as add value to the ASU degree in the eyes of employers.

Student affairs professionals were invited to the "Polytechnic Core party" a bit late, but the set of competencies that were identified and the structure of the clusters were received very well by the directors in Student Affairs. As a leadership team, we felt that the competencies were in line with what we wanted students to learn in various leadership roles, student jobs on campus, and student activities outside of class. Areas we felt student affairs could be a major partner and contributor are: Communication; Leadership and Society; Ethics; Global Awareness; and Critical Thinking.

December 2005-Summer 2006

In December of 2005, Gary Kleemann approached the (then) Vice Provost for Academic Affairs and the Dean of Student Affairs regarding about a national coalition on e-Portfolio research that he felt would be very successful medium for students to demonstrate competency as it related to the developing Polytechnic core. Both the VP and Dean felt this was worthy of further research and effort, and ASU Poly applied to be part of the third cohort of the Inter-National Consortium for Electronic Portfolio research. In July of 2006 I attend my first I/NCEPR workshop in Fairfax, VA.

Fall 2006 to Fall 2007

Upon returning from the Fairfax conference I was quite excited about the possibilities and was able to secure some time at the Student Affairs Directors retreat to discuss e-Portfolio efforts and possibilities at Poly. Gary Kleemann and Duane Roen gave a presentation that focused on how the medium of e-Portfolios can help student affairs professionals demonstrate how students learn outside of class, as well as serve as a catalyst for collaboration and partnership. Duane shared examples of written portfolios he assigns as part of his English composition course to give us a tangible grasp of portfolio work, and introduced the concept of reflective learning (a new concept for most of our group). I shared with the group my thoughts on how the Polytechnic Core curriculum overlaps with what we are trying to achieve in student affairs and e-Portfolios is an exciting medium for students to "show what they know" outside of class.

There was much enthusiasm about e-Portfolios coming into the 06-07 academic year, but major organizational change undercut much of our effort. Our Provost, Jerry Jakubowski, who was a champion of the e-Portfolio initiative at Poly, left to be President of Rose-Hulman Institute of Technology, a premier undergraduate engineering, math and science institution. Also, university reporting lines and budgets were restructured and realigned significantly, which made it difficult to know who to go to for support/permission. Despite this, discussions continued and our limited staff in IT (which became the University Technology Office) continued to work on software to meet our needs. Pilot groups were identified across campus (Engineering department and the Student Union, for example) in the hopes that early versions of the software could be tweaked and improved through use by small cohorts and then introduced on a broader scale subsequently.

Unfortunately, the software development phase never took off as we all had hoped. There was initial hope in Jan/Feb of 07 that our in-house staff could find the time to put something usable together utilizing open source software, but we simply did not have enough staff time, and we did not have the resources to buy a preferred package off the shelf.

In February of 2007 the ASU Poly and Tempe campuses hosted an e-Portfolio conference that attracted over 110 attendees from all over the state and region. This event was an academic affairs-student affairs collaboration (co-sponsored by NASPA and University Evaluation) that brought together a diverse group of faculty, staff, and assessment specialists from both community colleges and universities. Kathleen Yancey, a nationally-recognized expert on e-Portfolios, facilitated many of the workshops. There were panels, breakout groups, and Q and A throughout.

This conference was quickly followed by the next I/NCEPR cohort meeting in Omaha in March. As always, this was an informative meeting (although I was sick through most of it!). I learned that our frustration with software was shared by others (misery loves company), but that there were great products out there if we could find the resources. I have always found the cohort meetings to be great learning experiences, but I've been frustrated that our inability to make progress with regard to software usage is delaying this exciting project.

<u>Overall and What's Next</u>

I think the faculty and staff involvement in this project has been quite positive and we are all on the same page. I think a key puzzle piece that is missing is student input. We've had some graduate

students in IT give us some perspective on this, but we need to engage undergraduate students on the Polytechnic Core and the e-Portfolio software to make sure we are meeting direct user needs and interests. Also, I am encouraged that UTO is now paying more attention to our project and hope that this critical player in our success can help us proceed quickly and efficiently.

An Information Technology Review of the e-Portfolio Development Project by the University Technology Office, Polytechnic campus

Kati Weingartner

After initial academic discussions of portfolios, Information Technology (ITP) was invited to help investigate and work with the campus schools and colleges to develop an e-portfolio system.

As documented elsewhere in this report, the campus had several systems in place, working at various levels of success. Several vendors were approached for demonstrations, products and resources were reviewed, and finally, the decision was made to partner with the Alt^I group to utilize an existing Sakai / OSP environment supported by the university.

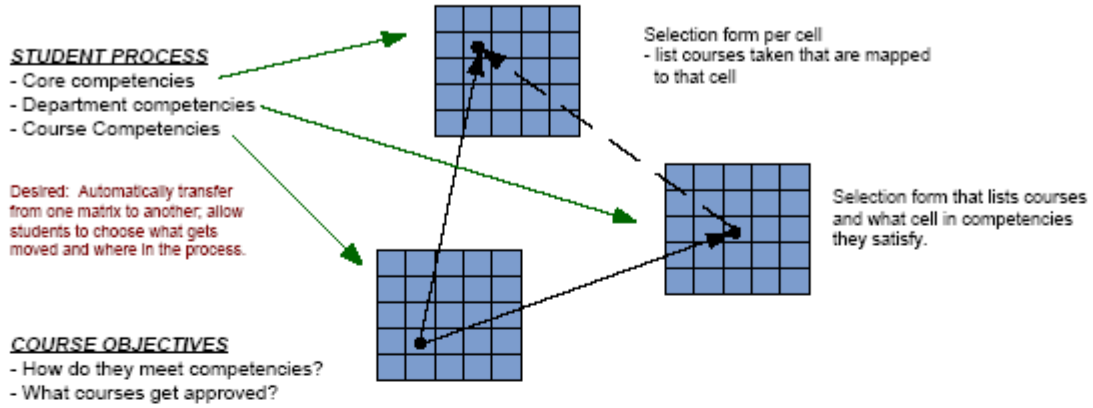
A Programmer / Project Manager was put in place to help develop a core competency matrix for the engineering program with the goal of implementing a pilot beta program in the Spring of 2007, rolling out to the full program in the Fall semester of 2007. A graduate student was hired to help development of the matrix templates, and learn the OSP software. https://portfolio.asu.edu was rolled out in September of 2006 for the development team.

The team worked with the engineering faculty and students to implement their Core learning competencies, see attached 'Brainstorming Session'. Through the Spring of 2007, as the work unfolded, it became apparent that the software was not ready to accommodate some of the advanced concepts the team was hoping to deploy. The amount of work required by faculty to get a course up and running was deemed too difficult for the average user. There were technical issues with the OSP software holding back the group's efforts.

A new version of the software, OSP 2.4 was scheduled for release in May of 2007, providing many of the things the team needed. A new development server was brought up, but never used by the team. With the centralization of the University Technology Office key staff members were reassigned and duties and priorities of others were changed. The team has recommended hiring an outside firm to do the development work, with the university retaining rights to the software. An RFP would be used to find an appropriate firm.

In retrospect, the university was unprepared for the amount effort required for this project, and didn't devote appropriate resources to the project. The players have changed, there is a new management team for the Polytechnic campus in place. It will be up to them to assemble new resources to restart the push for e-portfolios at ASU.

OSP – ePortfolio
Brainstorming Session w/Jeni



STUDENT PROCESS
- Core competencies
- Department competencies
- Course Competencies

Desired: Automatically transfer from one matrix to another; allow students to choose what gets moved and where in the process.

COURSE OBJECTIVES
- How do they meet competencies?
- What courses get approved?
- Who approves the courses?

REVIEW PROCESS
- Core competencies
- Department competencies
- Course Competencies

ISSUES
- One or multiple portfolios?
- What kind of reports, stats, tracking is desired/required?
- Who will pilot the Core Competency?
- Technical issues with OSP software functions

TIMELINE

ENGINEERING COMPETENCY PILOT
- Core competency
  - Matrix **[1] – 9/15/06**
  - Forms to support matrix cells **[2] – 9/29/06**
    - Reflection
    - Evaluation
- Reviewer process **[3] – 12/01/06**
  - Evaluator groups/roles
  - Human work flow [how it's done]

CORE COMPETENCY PILOT
- Core competency
  - Matrix **[4] – 9/15/06**
  - Forms to support matrix cells **[5] – 9/29/06**
    - Reflection
    - Evaluation
- Reviewer process **[6] – 12/1/06**
  - Evaluator groups/roles
  - Human work flow [how it's done]

STUDENT INTERFACE
- Portfolio template(s) **[7] – 12/01/06**
  - Core competencies
  - Department competencies
  - Course competencies
  - Employment/plublic view
- Resource upload and selection into matrices
- Human workflow process **[8] – 12/1/06**
- Autoload of templates

TESTING [9] – 12/1/06
- Pre-pilot "alpha" group
  - Define their role
    - Create a portfolio; upload resources; upload a matrix

DOCUMENTATION [10] – 12/22/06
- Instructions for faculty/instructors, evaluators
- Instructions for students
- System (technical) documentation
- Reports (how to generate)

MILESTONES

1. Matrix definitions for Engineering competency pilot
2. Supporting information for forms
3. Reviewer process definition and how competencies are met
4. Matrix definitions for Core competency pilot
5. Supporting information for forms
6. Reviewer process definition and how competencies are met
7. Templates defined and created
8. Human process workflow for students
9. Testing of the portfolio process (pre-pilot) using a small group of students from Engineering
10. Documentation

Objectives for e-portfolio system at the Polytechnic

(Grouped by topic)

Compatibility with existing tools

1) Highly compatible with Blackboard and other software that we use for teaching and learning
2) What I don't want: Another requirement for my overworked adjunct faculty—keep to something that ASU already uses (like Blackboard or a simple web design)
3) We should minimize the number of tools (user interfaces) that students, faculty and support personnel must have to learn, use and support.
4) The e-portfolio tool selected should integrate with tools for on-line course delivery and accreditation. Integration or support of other related tools would be useful - course and instructor evaluation, curriculum evolution (ACRES), or whatever else.
5) The system should be inexpensive to purchase/license. The preferable solution would be an open-source solution that would allow ASU IT the ability to tailor the system to other ASU computer systems. Open-source solutions should be given preference despite other potential deficiencies such as immature user interface or minimal performance advantages.
6) Support instruction and development
   a) Links to course delivery tools e.g. e-learning
   b) Organizes information such that it can be found rapidly
   c) Web Services based
   d) Interoperability – prefer open source and open architecture
   e) Extensible
   f) Scalable
7) Aesthetics -→ the look and feel
8) Compatibility with MCCCD system
9) ADA Access Issues are important
10) Persistence and maintenance issues need to be considered and addressed
11) How structured/unstructured do we want the portfolio "system" to be?

Flexibility/Structure

1) Flexible enough to contain any kind of student artifacts (e.g., visual representations of physical models, streaming video of oral presentations)
2) The e-portfolio tool selected should integrate with tools for on-line course delivery and accreditation. Integration or support of other related tools would be useful - course and instructor evaluation, curriculum evolution (ACRES), or whatever else.
3) Support instruction and development
   a) Links to course delivery tools e.g. e-learning
   b) Organizes information such that it can be found rapidly
   c) Web Services based
   d) Interoperability – prefer open source and open architecture
   e) Extensible
   f) Scalable
4) Customizable / user preferences
5) Aesthetics -→ the look and feel
6) Compatibility with MCCCD system
7) ADA Access Issues are important

8) Persistence and maintenance issues need to be considered and addressed
9) How structured/unstructured do we want the portfolio "system" to be?

Student tool

1) User-friendly
2) To provide students a tool that enables documentation of their learning achievement and to assess it against stated criterion measures and rubrics.
3) To prepare students for completion of similar documents within their own professional organizations; e.g. the American Dietetic Association credential process mandates professional portfolios; I am sure other disciplines have similar requirements. This would allow each discipline to "personalize" the process.
4) I don't know how to concisely state this as a goal per se but I would also like to see students use this process as a means of exploring how their education has prepared them for a variety of positions. In other words, even if the student starts out with professional goal "X", he/she may end up in position "Y" and the portfolio might help in understanding how their academic program did, in fact, prepare them for "y".
5) To be a place for students to collect documents which could form the basis of a job application
6) To be a place for students to collect a file of information to serve as evidence for having met the objectives of a particular course
7) To facilitate assessment and monitoring of progress on the polytechnic core during the student's college career
8) To be secure, easy to use, persistent, permit transport of contents to another software or medium.
    a) "Persistent" is something less than permanent -- perhaps five years after graduation, or about the time your first job becomes the more important reference. "Secure" means accessible only by authorized persons authorized by the portfolio owner [the student should be the owner -- this is important: it's the student's presentation, choice, the argument the student is making] or persons within the university needing access for analysis or advisement.
9) Provide a tool that can enhance students' interview experience
10) Enhance students' reflection on professional practice
11) Transportability—students need to easily pack this up and take it with them into their career
12) Authenticity—students can apply this tool to their experiences outside of ASU
13) Ease of use
14) There should be adequate benefit to students to use the e-portfolio tool selected so as to motivate appropriate use of the tool. This may require support conversion to/from a variety of formats, importing and exporting so that students can easily take their electronic assets with them when they leave (join) the university. A tool that is web-based without explicit import and export capability will probably not satisfy this requirement.
15) An easy to use tool for promoting a student's career goals.
16) Assessment of individual student progress
    a) Track achievement of developmental levels in eight outcomes.
        i) "Objective assessments"-grades, scores, etc.
        ii) Narrative assessments linked to work products
        iii) Student self-assessment
    b) Store and organize selected student performances.
        i) Students can submit material directly.

ii) All formats for assignments are supported-documents (electronic and paper submission), audio, video, what else?

c) Allow students to organize (web accessible) compilations of their work.

17) ADA Access Issues are important

Faculty tool

1) User-friendly
2) What I don't want: Another requirement for my overworked adjunct faculty—keep to something that ASU already uses (like Blackboard or a simple web design)
3) Makes it easy for faculty to access students' artifacts (evidence that learning has occurred) so that we can to program and campus-wide assessment
4) To facilitate assessment and monitoring of progress on the polytechnic core during the student's college career
5) To be secure, easy to use, persistent, permit transport of contents to another software or medium.
   a) "Persistent" is something less than permanent -- perhaps five years after graduation, or about the time your first job becomes the more important reference. "Secure" means accessible only by authorized persons authorized by the portfolio owner [the student should be the owner -- this is important: it's the student's presentation, choice, the argument the student is making] or persons within the university needing access for analysis or advisement.
6) Demonstrate and document proficiency in the AZ Professional Teaching Standards
7) We should select an e-portfolio tool that minimizes faculty and administrative time, placing a majority of the burden for entry and maintenance of portfolio information on students.
8) An easy to use tool for collecting and assessing student work.
9) An easy to use tool for collecting faculty work to be used in the P&T process.
10) A tool that will serve as an aid in helping faculty collectively discover what learning outcomes students are actually learning and what areas need additional work.
11) Assessment of individual student progress
   a) Track achievement of developmental levels in eight outcomes.
      i) "Objective assessments"-grades, scores, etc.
      ii) Narrative assessments linked to work products
      iii) Student self-assessment
   b) Store and organize selected student performances.
      i) Students can submit material directly.
      ii) All formats for assignments are supported-documents (electronic and paper submission), audio, video, what else?
   c) Allow students to organize (web accessible) compilations of their work.
12) Support department assessment and improvement
   a) Derive department-level information from aggregated student performances.
   b) Support identification of strengths and weaknesses in curriculum and department processes.
   c) Support accreditation.
   d) Support pedagogical research.
13) Support instruction and development
   a) Links to course delivery tools e.g. e-learning
   b) Organizes information such that it can be found rapidly

c) Web Services based
d) Interoperability – prefer open source and open architecture
e) Extensible
f) Scalable

14) ADA Access Issues are important

Campus tool

1) User-friendly
2) To have a source of academic program data from both a latitudinal and longitudinal perspective that can be used in benchmarking and program marketing.
3) To facilitate assessment and monitoring of progress on the polytechnic core during the student's college career
4) We should select an e-portfolio tool that minimizes faculty and administrative time, placing a majority of the burden for entry and maintenance of portfolio information on students.
5) There should be mechanisms to enter and report on traceability information within the system. That is, relations between components or aspects of a portfolio and specific learning objectives. There should also be traceability (entry and reporting) between formal course descriptions and learning objectives.
6) An easy to use tool for collecting faculty work to be used in the P&T process.
7) A tool that will serve as an aid in helping faculty collectively discover what learning outcomes students are actually learning and what areas need additional work.
8) Support department assessment and improvement
   a) Derive department-level information from aggregated student performances.
   b) Support identification of strengths and weaknesses in curriculum and department processes.
   c) Support accreditation.
   d) Support pedagogical research.
9) Support instruction and development
   a) Links to course delivery tools e.g. e-learning
   b) Organizes information such that it can be found rapidly
   c) Web Services based
   d) Interoperability – prefer open source and open architecture
   e) Extensible
   f) Scalable
10) ADA Access Issues are important
11) How structured/unstructured do we want the portfolio "system" to be?

Secure documentation

1) To have a source of academic program data from both a latitudinal and longitudinal perspective that can be used in benchmarking and program marketing.
2) There should be mechanisms to enter and report on traceability information within the system. That is, relations between components or aspects of a portfolio and specific learning objectives. There should also be traceability (entry and reporting) between formal course descriptions and learning objectives.
3) An easy to use tool for collecting faculty work to be used in the P&T process.

4) Good levels of security
5) Privacy and Intellectual Property issues need to be considered and addressed
6) Public access to "showcase" portfolios behind ASU firewall issues need to be considered and addressed

Assessment

1) To provide for latitudinal and longitudinal cataloging of program standards and outcomes to aid in the ABET accreditation continuous improvement process.
2) There should be mechanisms to enter and report on traceability information within the system. That is, relations between components or aspects of a portfolio and specific learning objectives. There should also be traceability (entry and reporting) between formal course descriptions and learning objectives.
3) Assessment of individual student progress
   a) Track achievement of developmental levels in eight outcomes.
      i) "Objective assessments"-grades, scores, etc.
      ii) Narrative assessments linked to work products
      iii) Student self-assessment
   b) Store and organize selected student performances.
      i) Students can submit material directly.
      ii) All formats for assignments are supported-documents (electronic and paper submission), audio, video, what else?
   c) Allow students to organize (web accessible) compilations of their work.
4) Compatibility with MCCCD system

Training Issues (Student and Faculty)

1) What I don't want: Another requirement for my overworked adjunct faculty—keep to something that ASU already uses (like Blackboard or a simple web design)
2) We should minimize the number of tools (user interfaces) that students, faculty and support personnel must have to learn, use and support.
3) We should select an e-portfolio tool that minimizes faculty and administrative time, placing a majority of the burden for entry and maintenance of portfolio information on students.
4) Good support / training

Cost Issues

1) The system should be inexpensive to purchase/license. The preferable solution would be an open-source solution that would allow ASU IT the ability to tailor the system to other ASU computer systems. Open-source solutions should be given preference despite other potential deficiencies such as immature user interface or minimal performance advantages.

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Objectives for e-portfolio system at the Polytechnic

(in no particular order)

1) Highly compatible with Blackboard and other software that we use for teaching and learning

2) User-friendly

3) Flexible enough to contain any kind of student artifacts (e.g., visual representations of physical models, streaming video of oral presentations)

4) Makes it easy for faculty to access students' artifacts (evidence that learning has occurred) so that we can to program and campus-wide assessment

5) To provide for latitudinal and longitudinal cataloging of program standards and outcomes to aid in the ABET accreditation continuous improvement process.

6) To provide students a tool that enables documentation of their learning achievement and to assess it against stated criterion measures and rubrics.

7) To have a source of academic program data from both a latitudinal and longitudinal perspective that can be used in benchmarking and program marketing.

8) To prepare students for completion of similar documents within their own professional organizations; e.g. the American Dietetic Association credential process mandates professional portfolios; I am sure other disciplines have similar requirements. This would allow each discipline to "personalize" the process.

9) I don't know how to concisely state this as a goal per se but I would also like to see students use this process as a means of exploring how their education has prepared them for a variety of positions. In other words, even if the student starts out with professional goal "X", he/she may end up in position "Y" and the portfolio might help in understanding how their academic program did, in fact, prepare them for "y".

10) To be a place for students to collect documents which could form the basis of a job application

11) To be a place for students to collect a file of information to serve as evidence for having met the objectives of a particular course

12) To facilitate assessment and monitoring of progress on the polytechnic core during the student's college career

13) To be secure, easy to use, persistent, permit transport of contents to another software or medium.

    a) "Persistent" is something less than permanent -- perhaps five years after graduation, or about the time your first job becomes the more important reference. "Secure" means accessible only by authorized persons authorized by the portfolio owner [the student should be the owner -- this is important: it's the student's presentation, choice, the argument the student is making] or persons within the university needing access for analysis or advisement.

14) Objectives:
    a) Demonstrate and document proficiency in the AZ Professional Teaching Standards
    b) Provide a tool that can enhance students' interview experience
    c) Enhance students' reflection on professional practice

15) What I'm looking for:
    a) Transportability—students need to easily pack this up and take it with them into their career
    b) Authenticity—students can apply this tool to their experiences outside of ASU
    c) Ease of use

16) What I don't want:
    a) Another requirement for my overworked adjunct faculty—keep to something that ASU already uses (like Blackboard or a simple web design)

17) We should minimize the number of tools (user interfaces) that students, faculty and support personnel must have to learn, use and support.

18) The e-portfolio tool selected should integrate with tools for on-line course delivery and accreditation. Integration or support of other related tools would be useful - course and instructor evaluation, curriculum evolution (ACRES), or whatever else.

19) We should select an e-portfolio tool that minimizes faculty and administrative time, placing a majority of the burden for entry and maintenance of portfolio information on students.

20) There should be mechanisms to enter and report on traceability information within the system. That is, relations between components or aspects of a portfolio and specific learning objectives.

There should also be traceability (entry and reporting) between formal course descriptions and learning objectives.

21) There should be adequate benefit to students to use the e-portfolio tool selected so as to motivate appropriate use of the tool. This may require support conversion to/from a variety of formats, importing and exporting so that students can easily take their electronic assets with them when they leave (join) the university. A tool that is web-based without explicit import and export capability will probably not satisfy this requirement.

22) The system should be inexpensive to purchase/license. The preferable solution would be an open-source solution that would allow ASU IT the ability to tailor the system to other ASU computer systems. Open-source solutions should be given preference despite other potential deficiencies such as immature user interface or minimal performance advantages.

23) An easy to use tool for collecting and assessing student work.

24) An easy to use tool for collecting faculty work to be used in the P&T process.

25) An easy to use tool for promoting a student's career goals.

26) A tool that will serve as an aid in helping faculty collectively discover what learning outcomes students are actually learning and what areas need additional work.

27) Assessment of individual student progress
   a) Track achievement of developmental levels in eight outcomes.
      i) "Objective assessments"-grades, scores, etc.
      ii) Narrative assessments linked to work products
      iii) Student self-assessment
   b) Store and organize selected student performances.
      i) Students can submit material directly.
      ii) All formats for assignments are supported-documents (electronic and paper submission), audio, video, what else?
   c) Allow students to organize (web accessible) compilations of their work.

28) Support department assessment and improvement
   a) Derive department-level information from aggregated student performances.
   b) Support identification of strengths and weaknesses in curriculum and department processes.
   c) Support accreditation.
   d) Support pedagogical research.

29) Support instruction and development
    a) Links to course delivery tools e.g. e-learning
    b) Organizes information such that it can be found rapidly
    c) Web Services based
    d) Interoperability – prefer open source and open architecture
    e) Extensible
    f) Scalable

30) Other
    a) Customizable / user preferences
    b) Good levels of security
    c) Good support / training

31) Aesthetics -→ the look and feel

32) Compatibility with MCCCD system

33) ADA Access Issues are important

34) Persistence and maintenance issues need to be considered and addressed

35) Privacy and Intellectual Property issues need to be considered and addressed

36) Costs

37) Public access to "showcase" portfolios behind ASU firewall issues need to be considered and addressed

38) How structured/unstructured do we want the portfolio "system" to be?