

# Designing Digital Portfolios for Technology Support Students

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## Abstract

Technology education faces multiple challenges in the new millennium. In light of an increasing, overlapping and widening spectrum of technological fields of study, it has become imperative for students to be able to articulate their course of study and for technology departments to be able to assess the intended outcome of their program of study. The traditional approach of teaching one course at a time and assessing independently does not fully accomplish the requirements that educational regulations are mandating. Thus, a new direction is required in teaching the students how to articulate their education and for the academic departments to be able to provide assessment tools for measuring the cumulative performance of their students.

This study describes the preliminary experience of one technology department in introducing digital portfolio as a requirement for their students. The Technology Support and Training (TST) program - Eberly College of Business and Information Technology (ECOBIT) at Indiana University of Pennsylvania (IUP) now requires students to prepare a digital portfolio during their capstone course. This paper explains the steps that this department has taken to implement using digital portfolio as a requirement for their graduating students. While this work is at the earliest stages, the author of this paper acknowledges that more work needs to be done in order to further implement the requirement of the digital portfolio for their students. Thus, the authors plan another study that further tackles the issues highlighted in this paper.

**Keywords:** Electronic portfolio, E-Portfolio, Digital Portfolio, Student digital portfolio.

## Introduction

Using digital or electronic portfolios has been increasing at a rapid rate and also has been capturing the attention of many in academia. Batson (2002) for example, described the development of digital portfolios as “the biggest thing in technology innovation on campus (p. 1)”. Love, McKean and Gatheroc (2004) described Webfolios (a type of digital portfolio) as “the most significant effect on education since the introduction of formal schooling” (p. 24).

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Despite all the developments regarding digital portfolios in education, only a few majors such English, Art and Journalism are taking the lead to introducing them to their curriculum (Batson, 2002). At the same time technology programs are not proceeding at the same pace in

introducing the same portfolios for their students (Ritzpaugh & Singh, 2006).

This study is intended to conduct an investigation regarding introducing digital portfolios to technology programs. It illustrates the experience of the Technology Support and Training (TST) department at Indiana University of Pennsylvania (IUP) and describes the preliminary steps that have been taken in this regard by faculty members in this department to implement the requirement of digital portfolio for their students.

The remainder of the paper is divided into four sections. The first section describes portfolios in general and digital portfolios in particular. The second section discusses the advantages and uses of developing portfolios for students. The third section elaborates on the considerations that may need to be taken into account before introducing digital portfolios as a requirement for the students. The fourth section details the experience of the TST faculty and their students in developing the digital portfolios. A summary of the paper content and plan for future research is presented at the end.

### About Portfolios

Using portfolios for business applications is not something new; to the contrary, portfolios have been used in business for some time. Financial investors are known to hold a portfolio of their investments that shows different portions of their stocks and the contribution each made. Salespeople have been known for a long time to carry a binder or a folder with them on their trips to show their clients about the company they are representing and the products they are selling. Similar trends were noted in other fields such as graphic arts (Snadden & Thomas, 1998).

The use of portfolios in education is more recent and followed a number of developments that created a need for a comprehensive assessment tool to evaluate students' knowledge over longer period of time than just one course. Worthington (2000) noted that "We need methods much closer to narrative that shows where a student stands with respect to the long art of learning" (p. 242). Snadden and Thomas (1998) on the other hand indicated the main purpose of developing portfolios in learning and education is "the collection of evidence that learning has taken place" (p. 192).

In regards to the specific time portfolios began to be adopted in academia, Dubinsky (2003) explained that the use of portfolios in academia began to gain a foothold in the early to mid 1980s by some teachers in English composition and writing. Dubinsky further added about the increasing usage of portfolios by composition teachers:

"Adopted them as an alternative assessment strategy, one that could show students' development (in terms of writing ability) over time and permit students to have a say in the ways in which their work organized and presented. Since then according to Vavrus (1990), teachers have continued to use portfolios in systematic ways to monitor growth of the students' knowledge, skills and attitudes" (quoted in Cole, Ryan, Kick, & Mathies, 1995, p. 9)

The use of portfolio in education was limited to assessing student work initially. Abernica (2005) associated "assessment" with "portfolio" and provided a general definition of student portfolio as "a meaningful and purposeful collection of student work that tells of the story of student's efforts, progress and achievement in a given area (p. 1)".

Although using portfolios in academia started with English and writing departments for assessment purposes, but this did not stay the same for long. Instead, portfolios started to be used in other academic programs like the medical and nursing fields (Snadden & Thomas, 1998), journalism (Ritzhaupt & Singh, 2006) history (Dougan, 1996), psychology (Cerbin, 2001), art and graphic design (Batson, 2002) as well as other fields.

This increase in the number of academic departments using portfolios was accompanied also by increasing the purpose of their development. The use of portfolios did not become restricted to assessment only; instead they were developed for different purposes. For example, some educators used portfolios to document their strategies, philosophies as well the courses they teach (Batson, 2002). Furthermore, at various occasions, portfolios were used for marketing purposes, reflection on experiences and also for professional growth (Hartnell-Young & Morris, 2007), accreditation and career tracking (Batson, 2002), for professional development planning and university or college admission (Hartnell-Young & Morris, 2007). All these developments led to increase usage of portfolios in education. However the introduction of computer technology and their increasing use had a much lasting impact on using portfolio in academia: it simplified developing portfolios and broadened what may be included in them.

### ***About Digital Portfolios***

Prior to the proliferation of computers in education, the development of portfolios was limited to displaying them in printed format and little else. A few articles, accompanied by charts, then added to photos and all put together in a binder that makes a portfolio.

The increasing use of computers in the classroom has added a new twist to developing portfolios in a new format that combines technology media and printed documents. Moreover, the advancement of computer applications (including media-generated applications) and the ease at which these applications can be transferred among platforms simplified employing technology in the development of portfolios. Worthington (2000) noted that “technology has facilitated the easy capture, storage, display and retrieval of any/all information and materials to be included. Technology has enabled the portfolio to be cross-platform, accessible via Mac or Windows or other Internet environments through the use of a browser” (p. 244).

The combination of technology in developing portfolios is what is termed today as “digital portfolio”, “electronic portfolio” or “ePortfolio”. Although the three terms may give the impression that they may mean different things, but a closer look at their definitions reveals that these three terms have a lot more in common both in terms of functionality.

Baron (2004) used the term “digital portfolio” and defined it as a “collection of creative assets distributed via computer based media” (p. xx). Ritzhaupt and Singh (2006) utilized the terminology ePortfolio in their study and defined it broadly as

“A collection of authentic and diverse evidence from a larger archive representing what a person or organizations has learned over time on which the person or organization has reflected, and designed for presentation to one or more audiences for a particular rhetorical purposes” (p. 152).

Abrenica (2005) on the other hand used the term Electronic Portfolio and defined it as “Simply means that the portfolio is technology based” (p. 1). There are many different types of electronic portfolios, most allows for flexibility, so that the teacher or facilitator can focus and or measure a specific skill or concept.

Digital portfolio can be developed for students and for faculty at the same time. When developed for faculty, it commonly reflects their course work, their syllabus, philosophies of teaching, research agendas and others. Students’ portfolios on the other hand can be developed for various purposes that are dictated by the institution, the program of study and the faculty teaching the course(s) where the portfolio is required.

In this paper, the author uses the three terms—digital portfolio, electronic portfolio, and e-portfolio to mean the same thing: A portfolio developed digitally, in electronic form or using computer technology. This paper limits the discussion to student portfolios or the portfolios that

are developed by students only. The paper does not include other type of portfolios in the discussion such as teaching or business portfolios.

## **Digital Portfolios – Uses and Benefits**

Developing digital portfolios can draw benefits to the students themselves as well as to the college or university they are enrolled in. The range of benefits can vary and it is dependent on the complexity of the portfolio and the extensive tools included in it. Nevertheless, writers in this field agree that developing a portfolio digitally brings advantages and has certain uses.

Hartell-Young and Morris (2007) described digital portfolios as a “powerful tool” and identified two distinct advantages for developing them: For promoting professional growth and for reflection. Ritzhaupt and Singh (2006) were more elaborate in describing the potential benefits from developing ePortfolios. They looked at digital portfolios from the viewpoint of the student as well as the institution and identified benefits and uses from four perspectives: Industry participation, Student Development, Faculty Development and Administration.

Abrenica (2005) compared using electronic portfolios with traditional paper portfolios and explained that electronic portfolios have the following benefits:

- They take less physical space than the boxes, tapes and binders by which traditional portfolios were developed.
- Hold a great deal of information from pictures, art work and others in electronic format.
- The work that is saved electronically can be retrieved, sorted and organized with minimum effort.
- Once the work of the student is organized in digital format, it can be enhanced with the addition of sound, music, pictures, graphics and video.

Baron (2004) identified two specific advantages of developing portfolios electronically: convenience and flexibility. Baron further noted about the benefits of a well organized digital portfolio

“A well organized digital file lets you shift elements in and out for multiple presentations almost as easily as you might slide something into and out of a binder. Even nicer, the work you collect in one format can become the basis for a more comprehensive and sophisticated portfolio as your technical knowledge broadens and your body of work increases” (p. 59).

Regardless of the source, it is obvious that developing a digital portfolio has certain uses and benefits. The remainder of this section elaborates on some of these potential uses and benefits from developing digital portfolios. It addresses these benefits in three steps; first it explains the potential benefits for a portfolio in general. Second, it discusses the perspective added advantages that computer technology brings to it and third it explains about the specifics for students in the technology field regarding the benefit being discussed.

### ***Digital Portfolio as a Marketing Tool***

Educators and writers of portfolio development note that student portfolios may be used for purposes other than just assessment. They agree that portfolios in general and digital portfolios in particular can be used as a marketing tool for the students when they seek employment and/or when they apply for admission to graduate programs or transfer to other institutions.

Writers further note that portfolios may be used for purposes other than marketing as well. Dougan (1996) for example identified four purposes for developing student portfolios: Student showcase their ability, self evaluation by student, student evaluation by the faculty, and ready-made

presentation for an employer or graduate committee. Batson (2002) associated digital portfolios with evaluation, accreditation, reflection, and career tracking. Ritzhaupt and Singh (2006, p.152) on another aspect identified four “constructs” related to ePortfolios from a student perspective: employment, visibility, assessment and learning.

To put it in a clearer perspective, portfolios can help students in a number of ways including the following:

- It serves as a reflective device of the students’ skills and knowledge as they swiftly evolve over time (Ritzaupt & Sing, 2006, p. 152)
- It helps articulate student accomplishment over the duration of study (Dubinsky, 2003).
- It prepares the student for possible questions and answers during interviews (Batson, 2002).

Developing portfolios electronically (or using computers to develop portfolios) can have added advantages to the list mentioned above. Baron (2004) explained some of the benefits that students can gain from developing their portfolios electronically:

“Students seem most interested in the ways ePortfolios can flash out their resumes, both before and after graduation. In internship or potential employers can see an online resume that includes views of a student’s actual work, that student may be more likely to obtain the position. Students also want to see where they are in their college career regarding requirements, ePortfolios can facilitate this. When students study for a test, they can review their own work and read the instructor’s comments on their work. ePortfolios will make this easier to do, especially over multiple semesters. If a student wants to transfer, ePortfolio data may ease the process of articulation with other college or university. After graduation, having their work still available to them in a university-supported environment will provide value and help sustain relationship with their alma mater” (p. 3).

Electronic advancement in the computer technology field provides added advantages for developing portfolios digitally. In particular, three specific benefits can be realized from developing such portfolios electronically: First, it helps enhance or fine tune the portfolio in a number of ways. The availability of multimedia devices including video, audio and screen capture lead to highlight or present more fully certain element of the resume. Second, the presentation of the portfolio can be organized in a fashion that makes it easier to follow a certain sequence of the resume. In normal life, no resume can be totally linear. In other words, not all resumes can be displayed in sequence one after another. In terms of digital portfolios, the organization of the resume can be designed in a way that makes it more suitable or directed to a particular audience. Third, digital portfolios can work a showcase to demonstrate the ability of the applicant. Through the use of various software and technology, students are able to demonstrate their skills and provide evidence of their talents. These skills and talents can be exhibited more fully with the assistant of the technology itself.

The benefits of preparing portfolios digitally can be further realized for students majoring in technology fields for a number of reasons: First, developing such a portfolio using computer hardware and software provides them with a platform for showing their skills and talents that may not be able to present them otherwise.

Technology majors can give a number of examples to display their skills depending on their field of study and intended concentration. Take for example students concentrating in programming majors. Using digital portfolios, such students may be able to demonstrate their proficiency in writing programs by showing their execution and interaction. While the student may not be able

to fully explain the execution of the program on paper, computers on the other hand help with demonstrating it and provide evidence of their appropriate work and their knowledge of it.

A similar example may be given regarding developing a web site, creating a network platform, using operating systems, or using technology media to enhance or fine-tune a presentation. Such skills can be more fully demonstrated in digital portfolios, thus giving the student an advantage to showcase their talents in these fields.

Another advantage that can be gained for technology majors for developing portfolios electronically is to show their mastery of the tools they used to prepare the portfolio. Developing a sophisticated digital portfolio that contain different technological aspects such as web pages, programs written in various languages, flash, database and other technology may give the impression of technological proficiency superior than those plain text display of the portfolio.

### ***Digital Portfolio for Reflection***

During the design of digital portfolios, it is essential that students go back and reflect on their learning. In a course that teaches portfolios, Worthington (2000) for example stressed this issue of reflection by giving the students three assignments to reflect on their work as part of the process to design their own digital portfolios. Writers in this field also stressed the benefits and the learning opportunities that can be gained from reflection during the development of digital portfolios. Hartnell-Young and Morris (2007) explained that reflection during the development stages of digital portfolios contribute to promoting professional growth of the individual. Snadden and Thomas (1998) identified three categories that can be learned from reflection when designing portfolios: “what has been learned, what still has to be learned and plans for new learning to be tackled” (p. 192).

To illustrate the benefits of using reflection in designing portfolios, Batson (2002) gave his students a number of writing assignments and one last comprehensive writing assignment at the end. During this last assignment, Batson gave the same students the option to go back to the previous assignments and fix the errors and submit them again. Most of the students selected this last option, they went back and fixed the error in their earlier assignments and submitted their work again. The students realized how easy it was to go back and fix what was not so easy to them at the time when they wrote their earlier papers. In other words, the students realized from their reflection what they have learned in terms of the assignment they completed, what they still needed to learn at that time in order to complete the assignment and then what they still have to learn in term of future work.

Technology advancement made this reflection easier to demonstrate. Through the use of various technologies, students are able to show what they have learned, what still have to be learned and the plans to incorporate their new learning. A program saved on one drive, a web page created for one purpose in earlier semester and a network platform that worked on in a previous environment were all able to be saved, organized and reflected on through the use of technology. Additionally, the use of technology helps in demonstrating this kind of reflection. Various presentation software tools, including media software can assist in demonstrating this reflection.

Batson's example listed above was intended for the students to reflect on their progress in the course, to show how far they progressed by reviewing their earlier assignments. Similar practice may be employed for technology majors and comparative benefits may be realized from their experience. Students in technology field can reflect on the programs they wrote, the cases they solved, the databases they built, the web pages they created and so on. Reviewing all of this reveals a pattern that the student may notice how much progress they made and how fluent they became in their field of study. What was a difficult task to them writing their first simple program ended up to be much easier task writing longer programs at a later time during the course of

study. By the same token, creating simple text-based web page was difficult enough for them at the beginning, later they realize that what used to puzzle them from the beginning no longer poses problem to them.

### ***Digital Portfolio as an Assessment Tool***

Assessment is a word that is increasingly being repeated at colleges and universities. College administrators use the words “Outcome assessment” to refer to a set of procedures that are administered to ensure that students have learned what is intended of them to learn. At the heart of the assessment is a set of “program competencies” that students are suppose to have mastered prior to obtaining their degrees.

Dougan (1996) noted that assessment is a “loaded word” in academia and used the word “accountability” also to describe adherence of the student learning to “program objectives”. Using this word “accountability” by Dougan was meant to illustrate that programs are accountable to ensure the students’ learning. Dougan further noted that a particular emphasis may need to be placed more on exit assessment or the assessment of students before or at time of graduation. Worthington (2000) explained additionally that “traditional teaching marks, tests and assesses the output of students in a single moment of time” (p. 242) is not sufficient to evaluate the overall student learning in the program.

Some academic programs require certificate exams or standardized state license exams to serve the purpose that the learning has taken place according to specified objectives. But for technology-based academic programs, the certifications in most cases are specific to certain industry or vendor and academic programs are reluctant to design programs based on specific industry criteria (Ali & Kohun, 2004). Take for example Cisco certification or Microsoft numerous exams and licenses are just examples of vendor or product specific licenses. Academic program are hesitant to design programs that exclusively teach these products. Thus, providing a strategy for assessing the overall student learning remains problematic for technology-based programs.

Portfolio development has been suggested as a viable option for assessing student learning (Baron, 2004; Batson, 2002; Ritzhaupt & Singh, 2006; Worthington, 2000). Developing student portfolios have different characteristics that make it an option to be considered when discussing overall assessment tool for students. For example listing intended program outcome and requiring students to demonstrate competence for each outcome may be one method of using portfolio to assess student learning.

Digital portfolio makes this process of assessment easier: students have more tools at their disposal to demonstrate competency at certain fields. Matching program intended outcome with specific skills the students acquired during their learning was made easier because of using the technology. Artifacts that are collected for this purpose may be put in a meaningful pattern to provide evidence that such learning has taken place.

Technology programs can use digital portfolio to demonstrate proficiency in the objectives or competencies specified by the program. Take for example specific intended outcome such as “learning object oriented programming” or “design data-driven web sites” and their learning can be demonstrated through employing various software tools that can be incorporated in the digital portfolio. A parallel example can be given in other technology fields such as networking, system security, media design and others.

## **Digital Portfolios – Challenges and Considerations**

The introduction of digital portfolios as a requirement for academic programs faces a number of challenges. Different considerations may need to be taken into account before implementing the

requirement of portfolios in the programs. Batson (2002) sums up the difficulties and considerations for introducing digital portfolios into academic programs:

“Moving beyond the familiar from one-semester/one-class limits of managing student learning artifacts gets us into unfamiliar territory. How do we alter the curriculum to integrate portfolios? How do we deal with the long-term storage? What about the interoperability among platforms so student can move to new campus upon transfer?” p. 2

Dougan (1996) pointed that the following list of factors needs to be considered by academic departments prior to introducing portfolios for their students:

- Determining whether the portfolio is a suitable means of assessment for the students
- Determining the purpose of the portfolio
- Determining the content of the portfolio
- Determining when and how the portfolio will be presented for evaluation
- Determining the evaluation criteria

The remainder of this section discusses these factors and considerations that may need to be taken into account when introducing digital portfolios to academic programs.

### ***Evaluation of Digital Portfolios***

Evaluating digital portfolio is dependent on a number of factors, some which are:

- Whether the portfolio is completed over one semester or longer than one semester.
- If the portfolio is going to be evaluated by one faculty or more than one faculty.
- The content and requirement of the portfolio
- The decision to include peer evaluation in this process.
- Presentation of the portfolio and criteria for the presentation.
- The level of learning the technological tools used to develop the portfolio.

These questions may need to be addressed prior to including digital portfolios in academic programs. Grading procedure for a portfolio developed in one semester may depend solely on the faculty teaching that course. However, teaching it across more than one semester may involve more than one faculty member in the grading process. Also, if the portfolio is used for assessing of program outcome, then the entire faculty members in the program may need to participate in the evaluation of the portfolio.

Defining the content of the digital portfolio may help in the evaluation process. However, even this definition of content may help very little. The entire faculty may not proficient in the technical fields that are supposed to be included in the portfolio. For example, if a requirement about learning object oriented programming is included in the portfolio and if there is faculty member that is not knowledgeable about these terms, then it will be difficult to include such faculty in the grading process.

Presentation of the portfolio is valuable and may help prepare the student for a potential interview. Also, receiving input from peers of the student may be helpful. However, the question of factoring all of this in the grading process may not simple to achieve. Developing a rubric (or grading criteria) is suggested by Dougan (1996) to help establish some baseline or understanding



for grading such a portfolio. However, a decision by the entire department may be agreed on prior to implementing such a rubric.

### ***Content and Timing***

What will be included in a digital portfolio? When in the program should it be introduced? Should it be limited to one semester or should it continue to more than one semester. How to facilitate the teaching/grading if the portfolio is taught across multiple semesters? These are questions that may need to be addressed prior to introducing digital portfolio into the program. The answer to these questions may not always be straight forward so it would be helpful reviewing some literature in this regard.

Regarding the timing in the curriculum of requiring or introducing digital portfolio to the students, Ritzhaupt and Singh (2006) noted that digital portfolio takes a long time to develop and may span over years. The same authors noted that the best time to for the student complete the portfolios and to present them is during their last capstone course. The question that may be posed regarding this issue is whether the institution supports this idea of continuing the evaluation process though more than one course and by more than one faculty.

But even if the development of the portfolio takes more than one semester, where does it start? Starting to develop digital portfolios from the beginning may give the student a head start on collecting artifacts and organizing their materials. But in many cases, the students do not make up their mind about their majors from the beginning. So a decision may be made as to what artifacts to collect and during what semester to collect them.

In other cases, some courses are taken by students from the major and from outside of the major. The question that is repeated in these cases also is how to handle the cases when the students from outside the major are taking the same course. Would it be possible to require these students to collect artifacts about digital portfolio if their major does not require the development or presentation of such a portfolio in their programs.

### ***Media and Technology***

The media and technology referenced here contain both storage media and the technology that is used to prepare the content of digital portfolio. This includes the hardware used for saving the portfolio and the software utilized to develop it.

Regarding the software or tools used to develop digital portfolios, these technological tools are abundant and some of them require training in order to understand their functionality. Barrett (2000) listed the following generic software tools that may be used for developing electronic portfolios:

- 1- Relational databases
- 2- Hypermedia “card” software
- 3- Multimedia authoring software
- 4- World wide web (HTML) pages
- 5- Adobe Acrobat (PDF files)
- 6- Multimedia slideshows
- 7- Video (digital and analog)

The question that may be asked regarding the above list is whether it is important to teach the students all the software tools that are listed above in the portfolio course or not. If teaching these

tools is deemed essential to developing the digital portfolio, then teaching them again create duplicate with other courses that have taught the same content. Software tools such as relational databases, web pages and others in the list may be taught in other courses prior to the students taking the portfolio course. On the other hands, some students may not have taken these same courses; thus not teaching them in the portfolio course may put these students a disadvantage compared to others who have learned them before.

The media or the hardware on which the portfolio is saved is another issue to tackle with in this regard. Baron (2004) listed some of the media that a digital portfolio may be saved on: Zip disks, CDs, Mini CDs, DVD, Laptop, personal web site, group gallery, and group resource book. Added to this list may be network drive supported by the academic institution.

The list of hardware for saving portfolios includes both portable devices (CDs, DVD) and fixed devices (web site, network drive). The portable devices may be more flexible, but they are more subject to damage, loss of data and the limited space they provide. The web site and the network drive provide more long-term solution for the storage. However, the academic institution may need to make this available to the students prior to requiring digital portfolios in their programs. Also the issue may become more complicated if the students want to keep these media available to them after graduation. The question that may be asked about the extent the academic institution will allow the availability of such a service for their alums and transferred students.

### **Presentation**

Most agree that presenting the digital portfolio benefit the students. It gives the students a forum for which they can present their portfolio and get ideas back from the instructor and their peers. But the question is whether to invite experts or students from other departments or invite faculty from the same department to the presentation.

Hill, Kamber and Norwick (1994) suggested widening the audience in and including peers in the presentation of the portfolio:

“By widening a portfolio’s audience, you ensure that it is connected to the daily learning of the classroom, and you harness a powerful natural resource – the standards that develop among peers and that motivate students to learn (p. 120)”.

When inviting other faculty and peer to the presentation, the issue that would be brought up is whether it would be appropriate to include the faculty in the evaluation process or not. Also what will be the weight or the portion of grading for the participants in the presentation? These questions may need to be factored in the process before deciding on the audience for presenting the portfolio by the students. One possible interim solution would be to provide a rubric sheet that sets some guidelines about the grading of the presentation.

## **Developing Digital Portfolios in a Technology Program**

The Technology Support and Training (TST) department in the Eberly College of Business and Information Technology (ECOBIT) at Indiana University of Pennsylvania (IUP) offer two bachelor degrees and one associate degree. The first bachelor degree is in business technology support while the second is in business education. The associate degree is in computer and information technology.

The TST department is one of three departments at IUP that offers a computer technology related degree. The other two are Computer Science (CS) and Management Information Systems (MIS). There are other departments that teach some components of technology such as Communication Media and Marketing. But in general, the three departments of CS, MIS, and TST offer degrees specifically in the computer related field.

The TST department teaches a final course for their students called (BTST480 – Seminar in Technology Support) which represents the capstone course for students enrolled in this major. In previous years, students who took this course were required to complete a service project that was supervised by the faculty teaching this course. During the service project, each student had to work 10 hours a week, keep a daily journal, and submit a final report at the conclusion of the project. In addition the supervisor of the service project completed an evaluation form on the student's performance. Most of the service projects were conducted and supervised by staff at the help desk support of the university.

During the 2007-2008 academic year; IUP went through restructuring and redesign of their technology service department. As a result of this ongoing redesign process, it became difficult to initiate campus wide service projects for the students enrolled in the BTST480 seminar capstone course. The faculty teaching the capstone course decided to select an alternative to the service project requirement.

Among the two degrees that the BTST offers (Technology support and Business Education), only the business education major require the students to complete a digital portfolio. The BTST480 seminar course is required only by students majoring in the technology support program. Thus, in order to better understand what other students in the department are doing regarding digital portfolio, the faculty member teaching the BTST480 reviewed this requirement for the business education major.

After a thorough review of the requirement of the other major that is offered at the BTST department and how they implemented the use of digital portfolio in their course, the faculty teaching BTST480 course decided to integrate a digital portfolio requirement into the capstone course. It is worthy to note that this change of requirement took place quickly on an ad-hoc basis and the faculty member had to react on the selection of an alternative to the previously practiced service project for this course. Thus a further review of this content of digital portfolio may be necessary after completing teaching it the first time.

After discussing the subject with other faculty in the department regarding alternative content for the BTST480 capstone course, the consensus was to include a digital portfolio at this capstone course. The following explains about the selection of a digital portfolio for the BTST480 capstone course. It addresses the considerations that were discussed earlier in this paper and divides them into three categories: content, evaluation and media and presentation.

## **Content**

Students taking the BTST480 capstone course were asked to prepare a digital portfolio that satisfied three purposes: marketability, reflection and assessment.

Regarding the marketability requirement, students were asked to start the portfolio by presenting their vita or resume, talk about their accomplishments and also present different projects they have worked on throughout their college years as a major in the TST department. Students were guided to make their portfolio as marketable as possible and include certain multimedia products such as flash, animation, and other media.

The reflection requirement for the portfolio asked the students to replicate on their learning and experience in the program. They had the option to reflect on the program course-by-course that they have taken or they could also reflect on a year-by-year or semester-by-semester basis. Students were asked to describe their experience, elaborate on their learning and also discuss changes that may enhance the program.

A final component that the students are required to include in their digital portfolio is about assessment. The purpose here is twofold: first to assess their learning and meeting the objectives of

the programs and second for them to assess the program content and provide suggestions for enhancements and modifications. Students are asked to provide a cross list of the objectives of the programs and different course items that they took which helped them meet the objectives. Content of program objectives were made available to the students also.

### ***Evaluation***

This was the first time that this digital portfolio was introduced as a requirement for the BTST480 seminar course. Hence, there were no pre-planning steps that have been taken to coordinate with other faculty in the department for evaluating and grading the portfolio. However, future plans include the possibility of including other faculty members in the department in the planning and evaluating the digital portfolio for the students enrolled in this capstone course. Thus at this time, evaluating and grading the eportfolio in this course was completed by the faculty teaching the course.

A rubric was presented to the students regarding grading and evaluating different portions of the portfolio. The evaluation included aspects of marketability, reflection, presentation and extent of knowledge of the technology. Clarity and comprehensiveness of the presentation was emphasized and students were asked to be as professional in their presentation as possible so to receive comments and feedback to improve their presentations.

### ***Media and Presentation***

Students were required to prepare their digital portfolio on a CD and create a label for the CD to identify the CD and to make it more appealing and marketable. A copy of each student CD was retained by the faculty for review by the department for further refinement of the digital portfolio requirement. The CD is selected because of its media potential capability and its portability to transport by both the student and the faculty teaching the course. The university provided space for the students on their network drives. The students were able to utilize this space for the development phase of their portfolio, but they were still required to submit their portfolio on a CD.

Prior to taking this capstone course, students took different courses in web design and multimedia such as Flash and Dreamweaver, so the students were free to choose this technology or any other related technology regarding the interface and presentation of the portfolio. Students taking this BTST480 course have little experience with Database technology, thus the course wanted to fill this gap and introduce the students to the fundamentals of database technology.

Students were required to provide of 10 minute presentation going through the different portions of their electronic portfolios, the marketability, reflection, assessment portions and also the technologies used for the development of the portfolio. Other students in the class provided feedback regarding the improvement of the presentation and the portfolio.

## **Summary and Future Plan**

This paper explained how to develop digital portfolios for students completing degrees in a technology support program. The paper started by describing portfolios in general...to describing digital or electronic portfolios in particular. It then shifted the discussion to the benefits and uses that can be gained from developing digital portfolios for students and the institution alike. In the section that followed, the paper described some of the considerations that may need to be taken into account when requiring digital portfolio for students enrolled in technology majors. Lastly, a more detailed explanation was introduced about the TST program, their degree, the BTST480 seminar course and how their faculty attempt to include digital portfolios into this seminar course.

This was the first time that digital portfolio was introduced as a requirement for the students enrolled in the BTST480 – Seminar in Technology Support – Capstone course. The introduction of this portfolio was done on an ad-hoc basis and the planning details were completed expeditiously to fill a gap that resulted from cancelling a content of service project in this course. Students taking this course have some but little exposure to developing digital portfolios, so more detailed explanation of the portfolio was necessary in this course.

Since this is the first time that digital portfolios were introduced to the TST students, the author realized that further refinement of this requirement of digital portfolio is necessary. The response from the students and other faculty in the department has been favorable in regards to requiring their students complete a digital portfolio prior to graduation. However, the author feels that further study and more planning is needed regarding this requirement. Thus the author is planning a follow-up comprehensive study that details this requirement of digital portfolio for the technology support and training (TST) students.

## References

- Abrenica, Y. (2005). *Electronic portfolios*. Retrieved November 3, 2005 from <http://edweb.sdsu.edu/courses/edtec596s/students/Arbenica>
- Ali, A. & Kohun, F. (2004). Teaching Microsoft certification at IS programs. *Issues in Information Systems*, V(2), 387-393.
- Baron, C. L. (2004). *Designing a digital portfolio*. Berkley, CA: New Riders.
- Barrett, H. (2000). Creating your own electronic portfolios: Using off-the-shelf software to showcase your own student work. *Learning & Leading with Technology*, April. Retrieved April 13, 2007 from <http://electronicportfolios.com/portfolios/iste2k.html>
- Batson, T. (2002, December) Electronic portfolio boom: What's it all about? *Syllabus*, 16, 5. Retrieved November 17, 2007 from <http://www.syllabus.com/article.asp?id=6984>
- Cerbin, W. (2001). The course portfolio. *APS Observer*, 14(4). Retrieved April 13, 2007 from <http://psychologicalscience.org/observer/0401/tips.html>
- Cole, D. J., Ryan, C. W., Kick, F., & Mathies, B. K. (Eds.). (1995). *Portfolios across the curriculum and beyond*. Thousand Oaks, CA: Corwin Press.
- Dougan, A. M. (1996). Student assessment by portfolio: One institution's journey. *The History Teacher*. 29 (2), 171-178. Retrieved November 15, 2007 from JSTOR <http://www.jstor.org/search>
- Dubinsky, J. (2003). Building and sharing electronic portfolios: Teaching professional writing. *Proceedings of the 2003 association for Business Communication Convention*.
- Hartnell-Young, E., & Morris, M. (2007). *Digital portfolios: Powerful tools for promoting professional growth*. Thousand Oaks, CA: Corwin Press.
- Hill, B. C., Kamper, P., & Norwick, L. (1994). 6 Ways to make student portfolios more meaningful & manageable. *Instructor*, July/August, 118-120.
- Love, D., McKean, G., & Gathercoal, P. (2004). Portfolio to Webfolios and beyond: Levels of maturation. *Educase Quarterly*, 2, 24-37.
- Ritzhaupt, A. D., & Singh, O. (2006). *Student perspectives of ePortfolios in computing education*. Retrieved October 24, 2007 from ACM Digital Library <http://acm.org/dl>
- Snadden, D., & Thomas, M. (1998). The use of portfolio in medical education. *Medical Teacher*, 20(3), 192-199.
- Worthington, P. (2000). *Technology support for authentic assessment in the new millennia: A case study on implementing digital portfolios*. Retrieved October 24, 2007 from ACM Digital Library <http://acm.org/dl> .

## Biography



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