

Electronic Portfolios (EP): A “How To” Guide

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Abstract: This paper is provided to motivate and assist readers in establishing an electronic portfolio (EP) based on a guiding principle: Virtually anything can be represented electronically. This is not a step-by-step procedural or reference document as much as it is an explanation of important technical issues in the development of an EP. The value of an EP is discussed and compared to traditional formats, including helpful information for constructing and maintaining a professional portfolio in an electronic, technology-based format.

Introduction

Considering today’s trends toward competencies over courses, as teachers must document and demonstrate those competencies, a portfolio is becoming almost more important than a transcript. As we evolve toward portfolios, so too must teachers adapt to a computerized environment – thus, electronic portfolios (herein called EP).

Virtually every pre and inservice teacher should have an EP. Warner and Maureen (1999) suggest that by developing an EP, teachers will learn important computing skills and knowledge that can directly impact integration into the classroom. But, it is believed that, frequently, a lack of understanding or knowledge of computing prompts teachers to compromise or settle for something less than ideal technological achievement. And, without reliable or sound leadership from advisors and faculty, inexperienced teachers are likely to weaken or undermine their goal of an electronic portfolio. Many faculty advisors in higher education are still not technology users and will likely fail to motivate and lead, let alone actually guide teachers to create an EP.

This paper is therefore provided to motivate and assist readers in establishing their EP (Campbell, Cignetti, Melenzyer, Nettles, & Wyman, 1997; Dampier Australia Primary School, 2000). This is not a step-by-step procedural or reference document as much as it is an explanation of important issues in the development of an EP.

What Value Is An EP?

It is a mistake to ignore the value and usefulness of an EP. A common phenomenon among most users of technology, benefits are discovered as a result of being users of technology that may not be initially obvious. Kind of a “being in the right place at the right time” notion. For those who already maintain a technological lifestyle it may be that an EP is a natural extension of their daily life and may be easily established. However, most teachers are not yet that involved and may need more awareness of the benefits provided by an EP.

Its useful to compare with non-electronic formats. Papers, documents, class assignments, tests, instructional materials, etc., can all be packaged in a variety of traditional ways. For example, common methods include ring-binders, folders, even boxes for storing large quantities of papers. Photographs are sometimes placed in photo albums or their original envelopes from developing labs. Video tapes, usually VHS format, are also included in storage boxes often large enough to hold all of these kinds of materials. So, with such a large collection of bulk, regardless of the convenience of binders and plastic containers and convenience products of all sorts, consider the following comparisons with this more traditional approach:

(a) Distribution. Consider applying for a job in another city, or providing one’s portfolio to various agencies or organizations. Without the use of UPS, Federal Express or DHL, how does one quickly distribute such bulk to the interested parties? Too, with only one “original,” once delivered it may be permanently gone. Retrieving the materials can be as difficult as giving them out. This may seem overly dramatized for portfolios made up of little more than a single ring binder. Not so. Although, possibly less significant, the problem is the same. A zip disk or CD-ROM containing a complete EP can be easily reproduced and quickly distributed as often as desired without any

need for retrieval at all. Even easier would be a Web-based EP that can be provided to interested parties as quickly as a word over the phone or a simple email message over any distance.

(b) Quantity/Economy. There is always some cost involved in reproduction of anything. Computer media has diminished in cost considerably. At the time of this writing, zip disks are under \$10, blank CDRs are around a \$1 each, all without buying in large quantities. Any comparison with photocopying paper portfolios shows the economy and practicality of an EP. A Web site is in many cases completely free. In some cases, where a base fee is required, expansion and addition to the site costs nothing extra. None of these factors are true for traditional formats.

(c) Replication. It's much easier to make multiple copies for distribution. Both zip and CD media will hold large amounts of information of all types and they can be easily replicated. Computer files can be copied as easily as drag & drop. CD's are even easier to recreate once a CD "image" is created and saved. A new CD of a complete EP can be created with as little as two or three clicks. On the other hand, a Web page doesn't require any replication at all and is readily accessible to the whole world.

(d) Size. This is the most obvious advantage. The amount of material that can be placed on a zip disk or CD is equivalent to many binders or boxes and yet takes up virtually no space at all. Today, it is literally possible to walk around with a complete library in your pocket.

(e) Security. A computer file is far from secure. Any computer file can be easily lost either through oversight and error to more technical media failure. But, combined with the ease and economy of replication, backup copies can be easily created and stored in different places. The permanence and security of an EP is in the numbers. By producing a sufficient number of backup and storage copies, quickly and easily done, an EP can be maintained securely forever.

(f) Maintenance. Most electronic material can be easily modified. Certainly, any records can be updated with new material but some records are considered permanent. Generally, electronic computerized material is more easily modified and maintained. Of course, a video or sound clip, aside from minor editing and enhancements, is naturally limited to the original sampling. Quality can sometimes be modified whereas content is permanent. Nevertheless, the simple matter of copying, organizing, modifying and storing electronic material far exceeds the efficacy and utility of traditional hard materials.

(g) Versatility. Electronic media is obviously more versatile than traditional hard materials. That is, a ring binder of material is much more difficult to convert to an electronic format than to produce a hard copy from an electronic version. Even to directly replicate a set of hardcopy materials into additional hardcopies (photo copying) is still more difficult and costly than producing a hard copy from an electronic original. I.e., having an EP means you have both whereas having only a hardcopy version limits one, because of obvious practicalities, to only the one original.

(h) Quality. Certainly not the least concern is the higher quality provided by modern computerized formats. Research has shown that even hand-written material is evaluated higher than typed material – but neither is considered as professional or high quality as computer-generated products. Video, sound and photo material, even when transferred to hardcopy, has improved to rival original/traditional formats.

Electronic Documentation

A guiding principle is suggested: Virtually anything can be represented electronically. It must be assumed that a given entry can be represented in electronic form – even if not originally created in that form – so one addresses how to achieve proper form and structure rather than to resist or deny the objective. I.e., it is important to pursue a complete portfolio, with virtually any desired component included, in a form that would, for example, fit entirely on a CD-ROM. Note that even a fully posted Web site can usually fit on a single CD.

How to begin? An electronic portfolio can be very difficult to generate from scratch to accommodate previously stored material, documents, events and historical notes or products. It is very important to start early and generate portfolio artifacts in an electronic format from the beginning and to continue that processes throughout all subsequent work. While every student should have an EP, it is up to the individuals to do it themselves so the

student or teacher must take the initiative, invest the time and do the work. Working one step at a time, generate and/or store the materials yourself. Specific strategies are suggested in Figure 1:

1. Virtually every single experience or product can exist and should be documented electronically.
2. Identify specific artifacts that denote accomplishments for each and every standard.
3. Produce the appropriate abstract or summary of each artifact when its identified as a portfolio entry.
4. Gather or develop electronic artifacts EA. when you first complete the project - don't procrastinate.
5. Distinguish between a developing portfolio DP. – work in progress – and the final or professional EP.
6. Organize a developing portfolio DP. according to the standards or principles of your program.
7. Store all electronic artifacts EA together with backups safely stored in completely separate location.
8. Frequently review the organization of your EP - every 2-3 months, or whatever is manageable.
9. Regularly review and update file formats for each EA to stay compatible with developing software.
10. Regularly review and update the media used for storage to stay technologically current.

Figure 1: Electronic portfolio (EP) development and maintenance strategies.

There are obviously more common sense notions about caring for computerized material but these 10 guiding principles will help facilitate transformation into an electronic lifestyle. Some of the implications and details for these strategies are discussed in a more concrete fashion below.

Details

An EP can be very difficult to create from scratch. It is very important to start early and generate portfolio artifacts in an electronic format immediately and to continue that processes thereafter. While every teacher should have an EP, only the teacher can do it. Take the initiative and, one step at a time, generate the materials needed. Start now and do the work for each potential artifact as they're created or as they occur.

EP Formats

Your final EP can exist in various media formats and will likely need to change formats from time to time. One reason is to stay current (see Strategy #9, Figure 1) and the other would be to provide material to a target audience in the format they need. Consider the following:

Floppy Diskette holds only very little (1.44 megabytes). This is not practical as a storage medium. In many instances, floppy drives are no longer included on today's machines. Too, many single graphic files and certainly sound and video files are much larger than a floppy's full capacity. Still, for smaller files, floppy diskettes are still useful for transferring and moving information.

Zip disk holds a lot of information in one of two common formats: 100 or 250 megabytes. It is conceivable that some EPs could contain more than 100mb. For example, in the case of numerous video or sound files. It would not be likely for mere print media (word processed files) to fill this much space. In any event, two 100mb zip disks could be used and information arranged in a fashion to make it user-friendly – for example, placing all print media on one and audio/video on the second.

Jaz disk wow, holds a great deal of information (1 gigabyte) but is not likely to be widely available. It is not practical to send a EP to an administrator or program director (maybe when applying for a job) if they do not have a compatible device.

CD-ROM Virtually all computers today (some older may not) have the ability to at least read a CD-ROM. Acquiring access to a CD-"burner" for creating permanently Recordable (CD-R) or ReWritable (CD-RW) CDs is becoming more common. A CD-ROM at 650 megabytes would hold all

material for virtually any EP. The price is right. The size is right. The compatibility is right. Goldilocks would be happy.

Video Tape Traditional VHS tapes (analog video material) are still thought by many today to constitute a technological presence. That is, some believe that having portfolio material included on video tape (classroom teaching, presentations, etc.) constitutes having one's portfolio in a technological format. Even the newer digital formats (digital-8mm), while higher quality, still constitutes a non-computerized media and therefore has inherent limitations: hard to distribute, costly to reproduce, awkward to access. While such recordings are a natural part of recording events, such material should be viewed as raw data from which presentable excerpts are distilled – ultimately, digitized into computerized presentations.

There are other media available today including so-called super diskettes, portable/removable hard disks, and even "thumb"-drives. However, these items above are still the most commonly available media among average professionals.

A Beginning: Easy Stuff

The most obvious material that is EA ready would be any word processed document. It's already electronic. Certainly, the instructor may have required a paper version but keep the electronic version as well and transfer it quickly to your DP. That is, take each word processed artifact and copy it to your portfolio storage area (organized by the standards or principles to be demonstrated). This storage area or working portfolio is developmental (DP) would likely be modified regularly.

Create a word processed Table of Contents file (start one today) in which each EA is listed by file name. It should also show all related files together and where on the disk (or other media) the file(s) can be found (path). Not only is this of obvious use to other readers, after several semesters you too will be glad to have this guide. The format or style of this can be easily modified later but at least there will be a working DP and that's the most important thing.

Anything in Electronic Format? – Really!

Often students fail to realize that virtually anything can be represented electronically. Of course, it would be a big mistake to hand write your term paper and hire someone to type it on a typewriter leaving you no electronic format at all. But, even this can be scanned and stored on disk as an image file. The point is anything can be represented electronically.

OCR - *Optical Character Recognition*... means that scanning a document can recreate the material in a character-by-character format as if it was originally typed into a word processor. However, unless you are very, very proficient at using this type of software, it can be quite difficult and somewhat impractical. Scanning the document is fine but it will likely remain in a "picture" format.

Consider the following examples:

Example 1

Consider a possible worst-case example. Students in a mathematics class learn to cut and fold paper to produce dice then to be used to practice and reinforce mathematics concepts of probability and statistics. Even this can be included in your EP (even on a CD). A simple photograph or two of the materials, manipulatives, maybe including a student using the materials, could be scanned and stored electronically. The EA would include the electronic picture and maybe a word processed anecdote or announcement describing its design and use (like an extended caption for the photograph) and any data from pilot testing or suggestions for using the activity and manipulatives. In other words, anything can be represented electronically.

Example 2

You're teaching in a classroom and recording on videotape to document strategies, a lesson plan, classroom management or other issues. Often, videotape is considered a major part of an EP but its problems are described above. Videotape cassettes should become peripheral components of a portfolio that exist separately and in some other location. If your final EP is to be on CD then how can this format accommodate (and represent electronically) the video material from the videotape? A representative sample portion, 2-3 minute segment(s), could be digitized into a computer file playable by most video computer software and thereby included in the EP.

One format would be AVI format (audio/visual integration) and is very common. Today, a more condensed format that saves a great deal of space without sacrificing quality is MPEG formats. To do this, video-capture hardware and software are required and are usually add-on components to a traditional computer setup. Pure sound files would be WAV or the more compressed MP3 (mpeg) formats. Again, the point is clearly that virtually anything can be computerized – and should be if its to become part of the EP.

Filenames

Filenames can be an important factor in managing your system as quick and efficient file recognition can be important. Various products associated together should share similar filenames, including the summary or reflective abstract. For improved organization, name the abstract file similar to the artifact file(s). For example, if the artifact has a filename such as "Lesson Plan.Doc" then name the supporting abstract something like "Lesson Plan AB.Doc" Or, if the artifact has a filename like "Teaching Video.AVI" with a written summary named "Teaching Vid Sumry.Doc" then name the supporting abstract something like "Teaching Vid ABS.Doc" That way, sorting displays will keep the files close together in a list. Too, the reader can easily associate the files that go together and can find abstracts of other EA because the same style is used throughout the EP. For more information on filenames, see the section below on versatility.

Folders

While many arrangements can suffice, it is suggested that a series of folders be created which correspond to the standards or conceptual framework of the program. For example, the Indiana University Northwest, School of Education has a 9 part conceptual framework for its undergraduate program (Indiana University Northwest, 2000) and a 5 part framework for its graduate program. Maybe name specific folders for each standard or program areas and place EA within each of these folders. Of course, material could be further organized within those folders based on the nature of the EA itself. It might be advisable to describe the assessment/evaluation context and maybe include any associated evaluation rubrics. In any event, structuring your EA according to the standards or framework of your program may be important to convincingly support your achievements and competencies.

Good Habits

It is not acceptable to simply put each semester's data disk in a shoebox with all those of previous classes. There are a million ways to fail in developing your EP and none of them are technological. They are all a matter of organization, habits, commitment and procrastination. The files themselves must be copied to the storage area of your developing portfolio (DP). Ultimately, it doesn't matter if this is a zip disk or a hard disk folder so long as it is maintained and developed. Always have one central location for the DP - not a home computer for some things while other files are kept on your laptop computer.

All - repeat - ALL disks fail. If "Murphy's Law" ever had a home its in the world of technology. Don't wait for it to fail - save it early! Don't wait to lose it - back it up! Don't wait for it to disappear - keep a copy! DON'T PROCRASTINATE - REPLICATE!

Versatility

As technology changes in the future, any file may need to be readable by someone with slightly different technology. Most state-of-the-art word processors are cross-platform (works on PC's and Macs both) and will likely be available for years to come. While this author suggests Microsoft Office tools (word processor, database, spreadsheet, etc.) as the most versatile and reliable cross-platform software tools, many Word Perfect users might suggest Corel products. In any event, maintain files in a versatile and latest-version format. As new software products evolve from old, stored files in the DP may need to be updated or converted. Do not hesitate. This is part of the regular and frequent maintenance discussed above.

Sometimes files need to be in multiple formats. The filenames themselves denote specific file formats. For example, "Letter.Wpd" - the W.P.D. indicates that it is likely a Corel Word Perfect word processed data file. There are many ways to convert one file type into an alternative format - like changing a BMP file into a JPG file (both are graphics files). Figure 2 provides a list of very common file formats and the typical filename extension associated with that file type (of course there are many, many more). Remember, file formats can usually be converted from one to another with minimal loss of appearance or function. Some skills are involved but help resources are available on campus, on the Internet and more.

FILE.PDF	- Acrobat Reader File – Widely compatible, printable, searchable – Read only
FILE.DOC	- Microsoft - WORD word processed data file
FILE.WPD	- Corel Word Perfect word processed data file
FILE.RTF	- Rich Text File - Generic word processed file - some formatting
FILE.TXT	- Plain Text File - Generic data (text only) - NO formatting
FILE.XLS	- Microsoft - Spread Sheet data file
FILE.MDB	- Microsoft - Database data file
FILE.WK4	- Lotus 123 - Spread Sheet data file
FILE.BMP	- Bitmapped Graphics file
FILE.JPG	- Graphics file - suitable for pictures on the Internet
FILE.GIF	- Graphics file - suitable for clip art on the Internet
FILE.PICT	- Graphics file - typically a Macintosh file format
FILE.TIF	- Graphics file...
FILE.EPS	- Graphics file...
FILE.PPT	- Microsoft - Power Point Presentation file
FILE.STK	- HyperStudio Stack - file
FILE.HTM	- or .HTML - Web Page file for Netscape or Int. Explorer
FILE.MOV	- Movie file - QuickTime Video can include Sound
FILE.AVI	- Movie file - Video can include Sound
FILE.MPG	- Movie file – Mpeg - video & sound – high quality, small file ... Best
FILE.WAV	- Sound File - Various levels of quality & wide compatibility
FILE.MP3	- Sound File - extremely reduced file size with good quality ... Best

Figure 2: Filename extensions as indicators of file types.

Miscellaneous Notions

Material throughout the EP can be hyper-linked together (easy in Ms-Word) and to the table of contents to make viewing everything more convenient and efficient.

Use a digital camera to take pictures of products, events, situations and more that should be in the EP. You can also use any regular camera and then ask when developing that your photos be produced and returned on a disk or CD (already in electronic format). Or take the paper photos and scan them into a computer to be saved on disk.

For any "computer" tasks you're not able to perform yourself, help is available at campus computer services, from professors and friends and even your local Kinko's.

Other material beyond the EA that support program standards might not be prescribed by other portfolio outlines. Nevertheless, such peripheral and ancillary material can also be stored electronically and may even be included in the final EP (space permitting) under a head of "other."

References

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