

# Technology

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## Creating a Living Portfolio: Documenting Student Growth With Electronic Portfolios

One popular strategy for documenting students' learning and accomplishments is the student portfolio. A portfolio of student work across time can provide an invaluable snapshot of a student's current skills, as well as provide an opportunity for the student to reflect on his or her growth as a learner.

However, managing the sheer volume of material that might be collected over 12 years of school may become unwieldy. In addition, many student products include artwork, videos, and other performance accomplishments. This is particularly true for gifted students. Three-dimensional objects and musical and dramatic performances are student accomplishments that can be difficult and cumbersome to include in a traditional file folder portfolio. One possible solution to this dilemma is to create electronic portfolios.

Today's technology makes creating electronic portfolios easy and inexpensive. For the past two years, a colleague and I have been assisting a school progress toward establishing electronic student portfolios for each student. The purpose of this column is to share that experience, provide tips for creating electronic portfolios, and demonstrate how those portfolios can be used to create a school art and literature electronic magazine.

### Possible Storage Media

The first decision in creating an electronic portfolio is to select an electronic storage medium. In most schools, four options exist: floppy disks, zip disks, CD-ROMs, and the school/district server. There are advantages and disadvantages to each.

Floppy disks are convenient and inexpensive, but storage space is limited. Floppy disks do not have sufficient memory capacity to hold large video or audio files. Floppy disks may fill long before the student graduates from school.

Depending on the disk drive installed on a computer, zip disks can store from 70 to 170 times as much information as floppy disks. They are more expensive than a floppy disk. Purchased in quantity, the price ranges from \$8–\$10 per disk. These can comfortably store several minutes of video and audio.

CD-ROMs are inexpensive and have almost 500 times more storage capacity than floppy disks. In quantity, blank CDs cost less than 30 cents each. CD-ROMs come in two forms, those that can be rewritten and those that can be recorded only once. Most new computers come with rewritable CD-ROM drives. Student work can continually be added to rewritable CD-ROMs. A disadvantage is that rewritable disks can only be read in rewritable drives while the option to write to the disk is available.

Saving student portfolios on a school or district server usually doesn't involve any additional expense. However, schools often restrict student access to their servers and another storage device is needed to share the portfolios with parents and students.

## File Formats to Consider

A second issue is the type of files to use when storing student work. Graphic files can be saved in a variety of file formats. PICT files are restricted to Macintosh computers while bitmap (BMP) files are restricted to Windows-based computers. TIF files can be used with either platform but required a large amount of storage space. GIF and JPG are two popular graphic file types used with the Internet. They require less space than PICT, BMP, and TIF and can be displayed on either Macintosh or Windows platforms.

Video clips can also be saved in an electronic portfolio. Two popular formats for saving video are QuickTime and MPEG. For under \$100, users can purchase the hardware and software to digitalize videos. One such program is Dazzle Video Creator™ (<http://www.dazzle.com>). This product includes software and a small box with one connection for the user's computer and another connection for a VCR. Any videotape can be digitalized, edited, and saved on a computer disk. While the user plays a videotape, the video and sound are captured on the computer's hard drive. The captured video can be edited and combined with other video images. The software requires a few minutes to master, but is easily worth the time. With Dazzle™ and a standard video recorder, student performances can easily be included on students' portfolios.

Audio files can be stored as WAV or MP-3. WAV files are about 11 times larger than MP-3 files, so MP-3 files are preferable. Students have been using the MP-3 music format for several years. Most computer sound cards feature an audio input that can be used to digitalize student recordings. Audio files can be edited and converted from one format to another with inexpensive audio editing software, such as Goldwave™ ([\[www.goldwave.com\]\(http://www.goldwave.com\)\). Unlike audio files that require a large amount of disk storage space, MIDI files feature synthesized sounds and require very little storage space. Student musical compositions could be saved in their portfolios in the MIDI format. Students can use an inexpensive program, such as Music Masterworks™ \(<http://www.musicmasterworks.com>\) to compose, arrange, print, and play MIDI music. Unfortunately, video and sound \(with the exception of MIDI\) require massive amounts of disk storage. These files need to be saved on zip disks or CD-ROMs.](http://</a></p></div><div data-bbox=)

## Steps to Creating an Electronic Portfolio

Start collecting student work early in the fall. Share with students how to select items worthy of including in their portfolios. If students have access to rewritable CD-ROM drives, I would recommend using them. Many schools have been successful using floppy disks for some of the data storage when CD-ROM storage was not universally available. Early in the fall, provide each student with a disk to store outstanding work for the year. These disks should be stored in the classroom in an accessible location. The goal should be to have students regularly select items to include in their portfolios and to save those items on their disks. Students might set a goal of selecting at least one item each month.

Throughout the year students type their favorite stories and store them on their disks. Selected artwork can be scanned onto the disk. Three dimensional artwork and project can be photographed with a digital camera, and the images can be stored on the student's disk. Economical digital cameras costs less than \$200, and most have close-up capabilities that allow artwork to be photographed as an alternative to flatbed scanning. Flatbed scanners produce higher quality images,

but scans are limited to two-dimensional drawings on standard size paper. Digital cameras, which directly store images on floppy disks, can be convenient. With these cameras, students can place their floppy disks in the camera and photograph their favorite visual projects. This system keeps all of the students' work organized on one disk.

Another concern is how to display the collected student work for the electronic portfolio. There are two advantages to presenting the student portfolios as Web pages. First, most computers include Web-browser software, so students should be able to view their portfolios on any computer. Free Web-browser software is available for those who do not have it on their computers. Second, Web pages are not platform specific. In other words, Web pages display as easily on a Macintosh platform as a Windows platform. By displaying the portfolio as a Web page, students can view it on any computer with a Web browser. Since the portfolio Web pages are stored on disks and not posted on the Internet, the students' privacy is protected.

Each year, students can create a single Web page that features their best work for the year. Students enjoy creating their electronic portfolios and a single floppy disk can easily hold 100 pages of text and a dozen graphic images (provided they were saved in lower resolution in GIF or JPG format). Unfortunately, the floppy disk will eventually fill. If student work were saved on zip disks or rewritable CDs, then the portfolio could continue to grow from year to year with each student having an individual zip or CD disk.

An alternative is to transfer the students' portfolios each year from their floppy disks to CD-ROMs. CD-ROMs have become a popular data storage medium. Most new computers now contain a drive that creates CD-ROMs. While educators have been slow to

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embrace saving data on CD-ROMs, students have been saving their favorite music on CD-ROMs for the past half-decade, and they are quite comfortable with the medium. It is economical to dedicate a separate CD for each student to use from year to year. One rewritable CD-ROM drive is sufficient. The students can take turns recording their Web pages to their CDs at the end of each year.

The days of solely creating Web pages using HTML code are past. If students can use word processing programs, they can create Web pages. Microsoft Word, a popular word processing program often found in schools, allows users to save their documents as Web pages. Students can type all their favorite stories and insert their favorite artwork in a single word-processing file. At any time, the document can easily be saved as a Web page by selecting SAVE AS from the FILE menu. The SAVE AS dialog box provides options to save files in a variety of formats—one of which is a Web page. The student simply clicks on the pull down menu for SAVE AS TYPE and selects WEB PAGE. This saves the file as HTML code for a Web page.

Rather than having students type in Word, they can type their stories and create their electronic portfolios in Netscape Communicator, which includes a Web page authoring program. With the Netscape browser open, students can select NEW from the FILE menu followed by BLANK PAGE. Netscape Composer will open. Web pages are easily created within this program. In fact, this program functions much like most word-processing programs—complete with spell check.

## Art and Literature Electronic Magazine

One school staff created an unusual twist to electronic portfolio by producing an art and literature electronic mag-

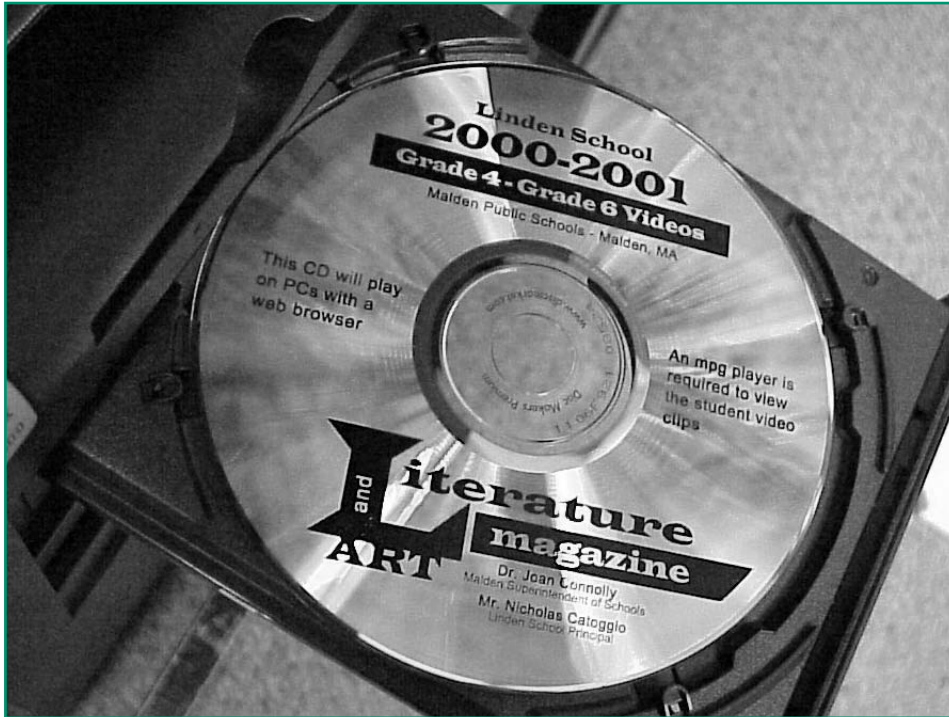
### Table 1 Helpful Tips

- ***Involve students in the process and practice division of labor.*** Thirty students each typing their own stories is more efficient than one teacher typing 30 student stories. Students gain a myriad of technology skills preparing their portfolios. Students select their own products to include in the portfolio making the portfolio more meaningful.
- ***Start students at an early age.*** Students begin using computers at an early age. Most gifted first graders are capable of typing simple stories with a word-processing program. They may need assistance photographing their artwork and inserting it into the their word processing document, but they generally are capable of typing and saving their stories with minimal assistance. By grade 3, students can quickly master using a digital camera and inserting and manipulating graphic images. Teachers who lack technology skills can call on technology proficient students in their classroom or upper-grade students to assist them. They can also invite parents to the classroom to teach students to perform these tasks or to assist students with them.
- ***Spread selection over time.*** Have students select one or two pieces each month to include in their portfolio. This enables students to document their growth across time. The students should create one master file and save the work for each year in that one file. While the document may become large, keeping track of one large file is much easier than a dozen smaller files.
- ***Back up the disks.*** Disks do fail. Periodically back up the student disks on a zip disk, CD-ROM, or hard drive.
- ***Download digital images to the disk.*** Have the students save their digital images on their disks. If a digital camera that stores images directly on a floppy disk is available, insert the student's floppy disk in the camera when photographing the artwork. With other camera types and scanners, download the images directly to the student's disk. This saves time transferring files.
- ***Keep visual files small.*** High resolution images aren't necessary when scanning or photographing most artwork. While fine detail is necessary if the images will be printed on a high resolution printer, images scanned at 100 dots per inch (dpi) are sufficient for viewing on computer monitors.

azine featuring work from the student portfolios. When the students left school for summer vacation last year, each took home a CD-ROM filled with student writing, artwork, and video clips. See Table 1 for a list of helpful tips for the production of an electronic portfolio. The CD-ROMs were commercially produced for less than \$2 per student.

The art and literature electronic magazine was born as a way to increase student self-esteem and illustrate what

students can do. Teachers collected two products from each student, original writing and artwork was accepted. Some students submitted two pieces of artwork, while others submitted a writing sample and a piece of artwork. Web pages were created with the student work, but rather than post the Web pages to the Internet, they created a CD-ROM with them. The best work in each student's electronic portfolio was selected for inclusion on the school's art



responsible for his or her contribution toward the final project.

## Just Do It

Electronic portfolios can be more meaningful than traditional portfolios for students because students actively participate in their creation. The process sharpens students' technology skills and heightens their sense of accomplishment. Once student work is digitally captured for the portfolio, students can keep the work. Multiple copies of the portfolio can be created for parents, the student, and the school file. While the ultimate is a file filled with stories, artwork, and video performances, a simple beginning with a few favorite stories typed and saved on a floppy disk is a great start. An ancient proverb states, "A journey of 1,000 miles begins with a single step." In the world of electronic portfolios, that single step is a student saving a favorite story on a disk. **GCT**

and literature electronic magazine. Because the student writing and artwork was already saved in digital format on the students' disks, creating the school electronic magazine was simply a matter of organizing the material.

To enhance student involvement, the students recorded on videotape why they selected the specific pieces of their work for the magazine. The Dazzle™ program was used to digitalize and edit the videos. These video clips became part of the art and literature electronic magazine. Taping and digitalizing an entire student body is time consuming, and educators who are new to electronic portfolios may wait to include videos until after they have successfully managed a set of electronic portfolios.

A key to the project was to invite each individ-

ual to complete his or her piece. While a few key individuals are responsible for the final assembly of the electronic magazine, each student and teacher can be

