

Digital portfolios: capturing and demonstrating skills and levels of performance. (electronic validation of individual teacher performance)

Terry L. Wiedmer

04/01/1998

Phi Delta Kappan

586

COPYRIGHT 1998 Phi Delta Kappa Inc.

Reported benefits of the electronic portfolio development process are similar to those that have been recorded for developing the hard-copy portfolio, but the enhanced medium offers additional ways to display unique talents and abilities, Ms. Wiedmer points out.

The use of electronic portfolios is gaining popularity as educators and businesspeople alike are discovering their benefits as a means of validating individual performance. Aided by technology, individuals can develop portfolios by electronic means and create, store, and manage both products and processes for inclusion in working, showcase, documentation, and process portfolios. The new technologies make it possible to show, in ways that were not available before, what students and professionals working in the field know and can do.

For the past few years, a team from the Annenberg Institute for School Reform and the Coalition of Essential Schools, with the support of IBM, has been studying the development of digital student portfolios. Digital portfolio software can be used to create a multimedia collection of student work and to connect that work to performance standards.(1) **Digital portfolios** are more than just electronic file cabinets. The technological enhancements add markedly to the value of a portfolio.

What Is a Digital Portfolio?

By definition, a digital or electronic portfolio is a purposeful collection of work, captured by electronic means, that serves as an exhibit of individual efforts, progress, and achievements in one or more areas. The concept for the digital portfolio grew out of the Exhibitions Project, an effort of the Coalition of Essential Schools that examined how schools began to use authentic assessments in the early 1990s. Complete with sound and text, **digital portfolios** display an individual's growth over time through diagrams and drawings or other snapshots of processes and products. They also include digital video/audio testimonies or explanations by the portfolio developer or other persons. Moreover, electronic portfolios can make use of such effects as animation, voice-over explanations of areas of performance, and scanned images that show completed projects or products.

The CD-ROM format provides an ideal medium for storage and display of electronic portfolios. A CD-ROM can store up to 650 megabytes and costs about \$2 when purchased in lots of 100. It weighs practically nothing, is virtually indestructible, and is small enough to put in an overnight delivery envelope. Because the data cannot be erased, a CD-ROM is excellent for storing critical data in an incorruptible format. And any CD-ROM drive can read any CD-ROM because the data-encoding process is standardized.

CD-ROMs offer portfolio compilers the chance to include digital versions of the usual artifacts, such as assessments, awards, certificates, evaluations, pictures, projects, and testimonials. Indeed, many of the items that appear in a standard portfolio can be enhanced by the skillful use of video and audio clips.

Benefits of Digital Portfolios

One of the primary benefits of developing any portfolio is the depth of an individual's involvement in the selection and design processes. The development of a digital portfolio requires active participation from the very beginning of the process. Individuals must determine the exact media to use to capture special events and must determine the most appropriate software for managing files for present and future use. Since the main menu of **digital portfolios** provides viewers opportunities to examine a portfolio by clicking on buttons, the individual creator must decide the most effective ways to allow the viewer to see, hear, and review the artifacts that illustrate the creator's performance. Decisions about what to include as hard copy and what to include in video or audio format require serious reflection on the part of the creator of the portfolio.

Reported benefits of the electronic portfolio development process are similar to those that have been recorded for developing the hard-copy portfolio, but the enhanced medium offers additional ways to display unique talents and abilities. For students, positive results of portfolio use include a stronger sense of personal responsibility for learning, increased motivation to achieve results and reach goals, and heightened interest in learning.(2) This electronic methodology enables students to document performance over time and helps them see and hear their own personal growth through audio and video clips.

Teachers and administrators who compile their own professional portfolios cite growth in self-confidence, increased

collegiality, and an overall improved sense of personal empowerment. The electronic process of portfolio development condenses the collection of data and artifacts and reduces the quantity of paper that must be handled and stored in a typical hard-copy portfolio. Teachers and administrators report that the electronic mode has helped them identify areas of strength and isolate areas for possible improvement. The process fosters professionalism and collaboration when one asks colleagues for their testimony about one's personal attributes and professional performance. Teachers and administrators who have used electronic portfolios report that they make it possible to convey one's educational philosophy. The electronic format permits one to summarize primary beliefs and attitudes by condensing lifelong experiences into a compact and portable product. Viewing their own electronic portfolios allows teachers and administrators the chance to reflect on their philosophies, their methods of learning and teaching, and their management and leadership of others.

Areas to Be Addressed

For electronic portfolios to make a significant difference, five areas must be addressed and managed: 1) what the individual should know and be able to do, 2) how the individual can demonstrate his/her vision, 3) what types of hardware and software are needed and what is the reliability of these items, 4) what are the issues regarding the selection of artifacts and how they are to be used in the portfolio, and 5) what is the culture in which the portfolio will be reviewed.(3)

First, individuals must see themselves as choice makers when conveying their professional skills via electronic means.

Second, the use of technology provides multiple options for transforming and transferring experiences into exciting, interactive, and meaningful displays of performance. The manner in which an individual demonstrates his or her vision is limited only by the person's own creativity.

The third area to be addressed - hardware and software needs - requires that adequate time and effort be allocated to these matters up front because much time and money can be forfeited if either consideration is handled incorrectly. For example, if a school or district is acquiring software for multiple users who are creating portfolios, someone needs to see that licensing agreements are in order. Hardware needs include the essential equipment to supply two different types of stations needed for electronic portfolio development: a workstation and a multimedia production station. Standard equipment to support a multimedia production station might include a tape recorder, a microphone, an internal CD-ROM drive, a CD-ROM burner, a VCR, a laser videodisc player, a laser printer, a scanner, a camcorder, an external storage device for archiving or managing files, regular and digital cameras, and enough computer memory to allow for storing and manipulating video footage or movies.

A fourth area requiring attention during portfolio development is the logistics of selecting which artifacts to include. Because video clips take up a large volume of memory, for example, they should probably be saved for special artifacts that cannot be displayed as effectively in other ways.

The fifth and final area to be addressed during portfolio development is the culture in which the portfolio will be reviewed. Since electronic portfolios incorporate multimedia to help individuals present their work and reflect on what they have accomplished, reviewers of electronic portfolios must be willing to take the time to review the electronic portfolio. In addition, reviewers must be comfortable with the electronic mode of delivery. Well-trained reviewers know that the most attractive, impressive, well-written electronic portfolios do not necessarily identify the best person for the job and might simply be a product of a very creative individual. Therefore, reviewers of electronic portfolios must have predetermined criteria for evaluating portfolios.

Rubrics for Evaluation And Assessment

During the evaluation of electronic portfolios, it is important to remember not to focus too strongly on the appearance of the final product. The portfolio is not as important as the performance that is being displayed. Before beginning the review process, a reviewer must establish a list of standards, competencies, and proficiencies against which all portfolios will be judged. The primary factor a reviewer must keep in mind is an individual's mastery or nonmastery of expected standards, competencies, and proficiencies. After the review, the reviewer should offer the portfolio developer feedback from both formative and summative perspectives in order to help the individual fine-tune the portfolio.

A well-developed rubric for scoring electronic portfolios is essential and should be disseminated by reviewers to those intending to submit electronic portfolios for review. Rubrics usually provide for awarding points in such areas as the preparation of the portfolio, the types of documentation used, the content that shows performance over time, and the uses of multimedia hardware and software. There are three different types of rubrics that can be used in the evaluation process: an analytic rubric, which breaks the portfolio into parts and rates each part on a scale; a holistic rubric, which considers the whole portfolio and rates overriding skills without doing a small-scale analysis; and the primary trait rubric, which assesses the demonstrated performance in one or more major areas of emphasis.

CD-ROMs

Educational institutions have chosen CD-ROMs as cost-effective and efficient means of producing and storing electronic portfolios. CD-ROMs are deemed the most economical, easily accessed, and logical storage units for multimedia files. An entire multimedia workstation, which includes all the hardware and various software packages (e.g., HyperStudio, Microsoft Office, and Adobe Photoshop), complete with the capability of burning CD-ROMs, costs approximately \$6,000. And this price will continue to decrease in the coming years. Moreover, many institutions already own many of the items contributing to this price - the computer, the keyboard, and other requisite equipment.

Since CD-ROMs are now considered to be standard equipment for personal computers, it is only natural for individuals and institutions to produce their own CD-ROM disks. After all, this is a mature technology that offers about 600 Mb of on-line data on one removable disk. Stored information developed in this mode can be manipulated for present and future use, which is an added feature not shared by many types of media storage.

However, CD-ROM technology does have its limitations. If an individual updates data frequently, then the cost involved in burning several disks may become prohibitive. In addition, multiple copies of needed information are not feasible if one is on an extremely tight schedule, because it usually takes between 10 and 30 minutes to burn a single CD-ROM. Confidentiality of recorded information is also an issue when using the CD-ROM for storage. Access to an individual's personal information must be restricted, and individual privacy and confidentiality must be protected. To facilitate confidentiality and to protect personal information, identification numbers can be assigned to individuals. However, the use of such numbers does create the need for system administrators to oversee the process. Other concerns and considerations that need to be addressed include the ability of individuals and institutions to read/play the CD-ROMs produced and the need for data to be easily manipulated.

Educational Institutions Using CD-ROMs

Following experimentation with the development of hard-copy portfolios, some educational institutions have incorporated the electronic mode of portfolio development and review on a fairly large scale. For example, at East Syracuse-Minoa High School in East Syracuse, New York, students pursuing school-to-work career paths create electronic portfolios in order to prove workplace readiness to employers, and college-bound students develop portfolios for use in the college admissions process. At Wright State University in Dayton, Ohio, post-secondary students at all levels use technology and multimedia to create materials that support their professional work and allow for personal reflection and growth. And the Indiana State Department of Education (IDOE) has been working with electronic portfolio development since 1991.

The IDOE student portfolio project began when the Metropolitan School District of Wayne Township in Indianapolis was asked by the department of education to conduct a pilot project exploring the electronic storage of student work. During the 1991-92 school year, IDOE selected three sites, covering all grades, to take part in the pilot venture: Allisonville Elementary School, Westlake Middle School, and North Central High School. IDOE conducted training sessions to introduce participating educators from the three pilot schools to the multimedia equipment and to the overall project plan. These three schools engaged their students in learning about and using multimedia, while storing performance data in electronic portfolios for assessment purposes. Individuals within these schools picked up the new technology and ran with it, creating state-of-the-art and highly personalized products. A partnership involving the state department, General Telephone and Electric, Sony, and Apple Computer served to make the development of electronic portfolios on CD-ROMs a reality.

Since 1991-92, IDOE has continued working toward the development of a prototype of an electronic portfolio. A cross-platform model developed to document effort, progress, and achievement of K-12 students is now being used. IDOE's cross-platform development process ensures that work and data stored in an electronic portfolio can be viewed and reviewed on either Macintosh or PC hardware. As a part of its commitment to this project, IDOE has provided free training workshops for Indiana educators, providing them opportunities to work with multimedia hardware and software as they learn to develop electronic portfolios.

During the 1997-98 academic year, Ball State University in Muncie, Indiana, and the New Castle Area Vocational School (NCAVS) in New Castle, Indiana, partnered to obtain funding from the Indiana Department of Workforce Development (DWD) to conduct action research for the purpose of developing and maintaining electronic portfolios in vocational schools, adult education programs, and the post-secondary setting in general. Ball State and NCAVS, working in conjunction with the 47 vocational districts in Indiana through the Indiana Association of Area Vocational Districts (IAAVD), recently received funding from DWD to continue their research and development.

Templates for developing CD-ROM electronic portfolios for all levels of education (K-post-secondary) are scheduled to be created in 1998 to help individuals demonstrate skills learned in such settings as job-shadowing experiences, internships, vocational education programs, apprenticeship programs, and teacher education programs. These templates are to be made available, for a nominal fee, to educators at all levels of education in Indiana for the development of CD-ROM portfolios.

The Beginnings Of the Indiana Project

The IAAVD/Ball State/NCAVS project was undertaken as a result of conversations with the American Welding Society (AWS) during the implementation of national standards for a competency-based welding curriculum at the New Castle Area Vocational School. Two NCAVS welding instructors wanted to incorporate the AWS national standards for welding certification into their curriculum. However, AWS approval for certification in spring 1997 required that individual performance be demonstrated on various types of welds and stored for up to two years following completion of the certification program. The physical space required to retain the welds for a large number of students was not available, so NCAVS personnel began researching other ways to prove and store performance results.

At the request of the NCAVS staff, personnel from Ball State researched the best methods available for capturing and retaining records of performance via state-of-the-art technology. The CD-ROM was determined to be a feasible storage medium, and electronic means were recommended for capturing condensed versions of individual efforts, progress, and achievement. Working in collaboration with NCAVS and Ball State, the AWS has agreed to review for clarity the completed CD-ROM version of the template developed during 1998, which will document individual performance and skill mastery. The AWS has also agreed to provide suggestions for process and product improvements.

As the first phase of the project develops during 1998, a sampling of high school students involved in the electronic portfolio project who wish to continue their education at the post-secondary level will produce and deliver completed electronic portfolios to two-year and four-year institutions in order to request advanced-standing credit in the areas of competency displayed in their electronic portfolios. Examples created by students from various levels of education will be reviewed by employers in the service area to determine the appropriateness of the electronic portfolio for their hiring and applicant-screening practices. During this first phase of the project, as individuals incorporate the templates into their own educational institutions, technical support for the electronic portfolio will be provided by Ball State personnel.

In Sum

A CD-ROM version of an electronic portfolio can serve as an overall indicator of one's professional expertise, talents, style, and accomplishments. It can also serve as a cumulative collection of artifacts that demonstrates growth and contributions over time. When effectively planned, designed, and developed, the CD-ROM portfolio provides valid and reliable information about an individual. The items included on the CD-ROM serve as evidence of what an individual knows, how the knowledge was acquired, how the knowledge has increased over time, how the individual has evolved, where the individual may be heading, what an individual's levels of personal and professional responsibility are and have been, what the individual's overall accomplishments are, and how the individual has applied skills in a career path. Unlike static objects, CD-ROM portfolios represent in multimedia format professional growth activities and processes and serve as impressive and comprehensive vehicles for ongoing authentic assessment and continued professional growth.

It is essential for the developers and designers of CD-ROM portfolios to take the time to ensure that stakeholders draw accurate conclusions about 1) what the portfolios show and how they are representative of performance, 2) how the portfolios employ clear criteria to represent what is valued in a model performance, and 3) when portfolios provide more authentic views of what individuals know and are capable of performing. The developers of electronic portfolios have an obligation and a professional responsibility to make sure that the story their portfolios tell reflects reality - that it represents a clear and accurate picture of performance. They must be careful not to use the high-tech format to distort reality.

Using technology as an alternative and more authentic method of portfolio development creates many interesting challenges. As involved and exciting as CD-ROM electronic portfolios can be, districts or schools that wish to introduce them must become knowledgeable regarding such potential problems as scheduling and use of the high-tech equipment, upgrading and maintaining the system, and ensuring confidentiality. However, those involved in the process only stand to gain as ever more sophisticated technology becomes available.

1. David Niguidula, "Picturing Performance with **Digital Portfolios**," Educational Leadership, November 1997, pp. 26-29.
2. Lindy Vizyak, "Student Portfolios: Building Self-Reflection in a First-Grade Classroom," Reading Teacher, vol. 48, 1994, pp. 362-67; Larry Buschman, "Portfolios: Windows on Learning," Learning 93, January 1993, pp. 22-25; and Steven Z. A. Athanases, "Teachers' Reports on the Effects of Preparing Portfolios of Literacy Instruction," Elementary School Journal, vol. 94, 1994, pp. 421-39.
3. Niguidula, p. 27.

TERRY L. WIEDMER is an assistant professor in the Department of Educational Leadership, Ball State University, Muncie, Ind.

illustration other

Copyright © 2000 Dow Jones & Company, Inc. All Rights Reserved.