



Chapter One: Introduction to Electronic Portfolios

Education Reform Themes: Standards - Assessment - Technology

Education reform documents published in the 1990's focused on the importance of rigorous **standards** for the students and teachers, authentic **assessment** aligned to these standards, and the use of **technology** as a potential tool for assessing these standards. The National Board for Professional Teaching Standards (NBPTS) emphasized rigorous standards for teachers and encourages the use of portfolios in assessment. The U. S. Department of Education stated that technology can potentially facilitate the storage and retrieval of student work within the portfolio assessment processes and products. The possibility of using technology to preserve and present authentic evidence of achievement is being explored in schools throughout the United States, as well as in other countries - particularly the UK, Canada, and Australia.

Three themes of significance converge in education reform documents:

1. Teacher accountability to professional content and certification standards
2. Performance-based authentic assessment for both teachers and students
3. The need for educators to have technological expertise

Public education reform was triggered a decade earlier by a report, *A Nation at Risk*, which claimed that U.S. students generally achieved at lower skill levels than those of other industrialized nations (National Commission on Excellence in Education, 1983). The Goals 2000: Educate America Act enacted by Congress in 1994, provided the framework for education reform for the 21st Century. This legislation called for the establishment of high-quality, internationally competitive content and performance standards for all students, promoted the use of technology to enable all students to achieve national goals, and emphasized the need for teacher education and professional development. Teachers were to be given the opportunity to acquire the knowledge and skills needed to instruct and prepare students for the next century.

Standards

The Goals 2000: Educate America Act was enacted in 1994 to promote research, consensus building, and systemic changes for the improvement of learning and teaching in the United States. A significant part of this legislation was the development of a voluntary national system of skill standards and certifications. Goals 2000 legislation

supported the development of rigorous academic standards for all students. Academic content standards described what every student should know and be able to do within an academic content area. These standards should apply equally to students of all races and ethnicities, with and without special learning needs, and from all linguistic and cultural backgrounds (IASA, 1996, Spring). Performance standards referred to how students demonstrate their proficiency, indicating whether they meet or exceed content standards. Meeting content standards and achieving performance proficiency in student learning required quality teaching (IASA, 1997, April). The Goals 2000: Educate America Act encouraged states to coordinate their own standards reform efforts and provided funds to states and school districts for better teacher training and professional development. Federal grant programs building on the previous emphasis on dissemination of technology into the schools are now focusing on using technology for academic achievement.

Current federal technology grants including Enhancing Education through Technology (EETT) emphasize the following goals:

1. Technology is used to improve student academic achievement.
2. Assist students in crossing the digital divide with Students (by the end of 8th grade) becoming technologically literate.
3. Encourage the effective integration of technology with teacher training and curriculum development
4. Establish successful research-based instructional methods using technology - <http://www.ed.gov/programs/edtech/index.html>

In California, the Challenge school district reform initiative called for fundamental changes needed to move to a high-performance, standards-based system of public instruction for all students (California Department of Education, 1998). The draft of the Education Technology Master Plan for California has provided a vision for California on "how to effectively use and support educational technology to improve student achievement, close the gaps in access to educational technology, and move California schools to at least parity with or exceed the level of technology integration in other states." This documents lists the goals for the state in "Vision for California - Closing the Gap" and providing access to "rigorous and effective digital content aligned to the State Academic Content Standards and fully integrated into curriculum, instruction, and assessment in order to ensure that all students are prepared to meet the present and future needs of California" (California Master Plan - <http://www.cde.ca.gov/ctl/recommendedmasterplanjan03.pdf>).

- Students and educators will have ubiquitous access and the ability to utilize rigorous and effective digital content.

- All educators will fully integrate into their practice appropriate educational technology and rigorous and effective digital content to promote mastery of the State Academic Content Standards by all students.
 - All students will develop information and technology literacy skills that enable them to meet and exceed the demands for an information and technologically literate workforce.
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Assessment

The assessment reform movement is necessarily linked to the demand for accountability to standards. Roeber (1995) stated that new content standards may require different assessment methods. Researchers indicated that educators have been looking for assessments that promote the type of instruction encouraged by new content standards (IASA, 1996a). The Office of Educational Research and Improvement (OERI) said that performance assessments were to augment or replace norm-referenced multiple-choice tests on all educational levels (April, 1997). Performance assessment was described as testing students through the performance of tasks rather than to selecting answers from a ready-made list (OERI, 1993, September). Performance assessment methods that have been used successfully included open-ended or extended response exercises that require an oral or written response, extended tasks carried out over a long period of time, and portfolios which may include works in progress, as well as final products (OERI, 1993a).

The ERIC Digest Series included numerous electronic documents on the general topic of alternative assessment, sometimes called authentic assessment, performance-based assessment, portfolio assessment, direct assessment, or developmentally appropriate assessment. Bowers (1989) discussed the problems of standardized testing which has brought about the trend toward new alternatives in assessment. He stated that many school districts have adopted a "test-driven curriculum" and have been "teaching to the test." He supported a criterion-referenced approach that would reflect mastery of skills being tested, rather than a norm-referenced approach. Sweet and Zimmerman (1992) presented methods that have been used successfully to assess performance. Because performance assessments require students to actively demonstrate what they know, these authors felt that performance assessment may be a more valid indicator of students' knowledge and abilities.

Authentic and performance-based assessment grew out of developments in cognitive research on how people learn. In his book, *Frames of Mind* (1983), Gardner stated that our culture has defined intelligence too narrowly. The measure of intelligence has been based on the verbal/linguistic or logical/mathematical intelligences, with emphasis on the highly verbal intelligence test developed in 1904 by Binet and the later developmental examinations of logical/linguistic problem-solving skills presented by Piaget in the 1920's. Gardner developed the theory of multiple intelligences, including seven categories of intelligences or "frames of mind." He believed that each person possesses all seven intelligences but these intelligences function in ways unique to each person. In

his discussion of Project Spectrum, Gardner pointed out that once these intelligences have been identified, they need to be assessed in a valid way, taking into account each student's individual differences (1993, pp. 88-89).

In his book, *Multiple Intelligences - the Theory in Practice* (1993), Gardner described Arts PROPEL, a project aimed at a new approach to curriculum and assessment in the arts: music, visual art, and imaginative writing. He devised curriculum modules called domain projects and linked them to a set of assessment instruments to document artistic learning during the elementary and high school years. The intent was to involve students in meaningful, engaging, exciting, and useful projects. Gardner believed that students should not include only finished works but works in process, rough drafts, critiques of themselves, and works of others that relate to the current project. These "processfolios" were evaluated qualitatively in three areas: production (thinking in the domain), reflection (thinking about the domain), and perception (perceiving in the domain).

The Office of Research in Education presented the ARTS PROPEL research project as an example of successful work in the area of portfolio assessment (1993b). Portfolios were described as selected collections of a variety of performance-based work, including a student's "best pieces" and the student's evaluation of the strengths and weakness of particular pieces. Works in progress were included to show improvements the student made over time (1993a). Grace (1992) promoted the portfolio as realistic, instructionally, and developmentally appropriate assessment. The portfolio was an appropriate evaluation when it compared the student's current work to his or her earlier work. The portfolio was not to be used for comparing students to each other. Instead, the evaluation indicated the student's progression toward a standard of performance that was consistent with the curriculum and appropriate developmental expectations.

Portfolios supported instruction by informing students of the criteria of quality performance so they could monitor their own learning, engage in activities that result in products to be shared with others, and provide a channel of communication between students and teachers focused on student work (OERI, 1993c, p.1). For administrative purposes, portfolios were being used for accountability reporting and program evaluation. The questions concerning the value of portfolios for administrative decision making related to technical adequacy, comprehensiveness, validity, reliability, and generalizability to other curriculum areas.

According to an IASA newsletter on issues of school reform, the success of portfolio assessment has not been determined. Research on classroom instruction in two states using portfolio assessment, Kentucky and Vermont, indicated that "teachers spend more time training students to think critically and solve complex problems that they did previously" (IASA, 1996a, p.1). The Arizona Student Assessment Program reported little instructional change in most schools due to lack of state support for teachers trying to change their teaching strategies (IASA, 1996a). Research on the Arizona program demonstrated that alternative assessment has not been effective in closing the gap between white and minority students. Remedial and lower track classes included a larger proportion of racial and ethnic minorities due to lower standardized test scores. As a

result, more classroom time was spent on test preparation and learning basic skills rather than on higher-order thinking skills addressed with higher performing students. Attempts were being made at establishing greater equity by providing every student with the support and resources that were needed to master higher level content. An additional complication with alternative assessment was the higher cost of performance-based assessments in comparison to the multiple-choice tests that could be scored electronically. (IASA, 1996a, p.3)

The Office of Research in Education indicated that many existing student portfolios did not contain sufficient information for administrative uses (1993c, p. 3). Recommendations for improvement of the portfolio assessment process included: the use of multiple measures of assessment as a evidence of student accomplishment; development of general criteria encompassing a wide variety of projects and products; inclusion of "on-demand" tasks that all students complete as part of their portfolio collection; and use of more than one rater for each portfolio. Researchers have determined that using at least 10 tasks to assess a student's understanding of a particular subject area added to the generalizability of the portfolio assessment (OERI, 1993c, p.4). If the purpose of the portfolio was to provide instructional support, students would have greater flexibility in content and creativity. However, the administrative use of portfolios required greater standardization (OERI, 1993c, p.5).

In April of 1997, the U.S. Department of Education Studies of Education Reform published a research report on 16 school sites that were developing and implementing performance assessments for students. The purposes of performance assessment were stated as: monitoring student progress, holding schools and teachers accountable for student achievement, certifying student skills and capabilities, achieving better alignment of curriculum, instruction, and assessment, and informing and influencing curriculum and instructional practice. Performance assessment was defined as including alternative assessment, authentic assessment, and performance assessment. Alternative assessment was distinguished from traditional multiple-choice testing, authentic assessment involved real world tasks and contexts, and performance assessment referred to student demonstration, performance, or product development. Portfolios, described as collections of student's work and developmental products, were included among the possible authentic assessment tasks (U.S. Department of Education, 1997).

Technology

The U.S. Department of Education stated that technology offered "numerous possibilities for integrating assessment into the daily life of the classroom" (1997, April, p. 6). Technological innovations made the collection of multidimensional artifacts increasingly more manageable due to the development of digital scanning and photography. Not only were visual capabilities expanding, but multimedia audio/video digitizing was more accessible to the common consumer. Electronic storage capabilities grew every year with the newest developments in the computer industry. Educational access to the latest technology grew along with the industry, thanks to federal and private grant funding that focused on providing equal access for all students. As a part of the 1993 U.S. Education

Reform Studies, a document entitled "Using Technology to Support Education Reform" reviewed ways in which technology and educational reform fit together. This study reinforced the belief that using technologies in education supported constructivist forms of authentic and active learning. According to this study, "technology can support the assessment of student work in ways that are useful for guiding instruction. Specifically, technology facilitates (1) obtaining a trace of student thinking processes, (2) collecting real-time feedback from multiple students, (3) storing and retrieving student work and associated comments, and (4) setting individual goals and managing instruction" (U.S. Department of Education, 1993, chap. 4, p. 2).

Research in the use of technology as a tool for performance assessment, particularly in the form of the electronic portfolio, has been seriously lacking at all levels of education (U.S. Department of Education, 1997). Future teachers have been required to carry out educational reform in the classrooms of the future by being technologically literate, accountable to rigorous standards, and knowledgeable in the use of performance assessment integrated with instruction. However, the school reform study on assessment of student performance (1997) emphasized that knowledge of how to use technology in performance assessment has been lagging behind (p. 5). The NCATE task force challenged teachers to experiment and incorporate technology into their teaching and learning, even when future technology is impossible to anticipate (p. 10).

According to the 1997 U.S. Department of Education Studies of Education Reform, "the potential for applying new information and communications technology to performance assessment remains unrealized at all levels of education" (p.7). The report stated that technology offers possibilities for integrating assessment into the classroom, but knowledge in how to use technology in conjunction with performance assessment is lacking. The report described the problem as a "lack of technology experience and equipment, coupled with a lack of knowledge about how to develop and implement performance assessments" (p. 6).



Electronic Portfolio Assessment

Why develop electronic portfolios?

See Carla Piper's Electronic Web Dissertation - <http://www.chapman.edu/soe/faculty/piper/EPWeb/> for the bibliography and additional background information (optional).

Bennett and Hawkins (1993) discussed the use of technology as having "unique capabilities that would make crucial contributions to the creation of workable and meaningful forms of alternative assessment." They stated that computers and video records offered potential for collecting and storing records of students' work. Lankes (1995) discussed the use of computer technology as a "likely solution" to the problem of creating, managing, and storing portfolios. Electronic or computer-based portfolios were considered similar to traditional paper portfolios, but information was collected, stored,

and managed electronically with computerized text, graphics, sound, and video. Lankes (1995) stated that computer-based portfolios provided authentic demonstrations of accomplishments and motivated students to take responsibility for their own work.

Niguidula (1993a) defended the idea behind portfolio assessment as a means of understanding a student's abilities and accomplishments. However, he asked the question, "What are we going to do with ALL THIS STUFF?" (p. 1). He discussed the "logistical nightmare of thousands of papers turning brittle and collecting dust" (p. 1). He presented two other drawbacks to traditional portfolios: performance evidence may not be on paper and the materials for presentation may not be easily manageable. He proposed that we create a tool using computer technology that allows us to create a richer picture of what a student can know and do (p. 2). Niguidula has been working on developing ways to create a digital portfolio through The Exhibitions Project at the Coalition of Essential Schools and the IBM Corporation.

The Digital Portfolio was a hypermedia project that presented the portfolio as a set of screens linked by interactive buttons. The left side of the screen contained six learning goals based on what the student was required to know and be able to do in a content area. The student demonstrated a skill or knowledge through an assessment "exhibition" which provided an authentic performance meeting the criteria of each learning goal. Niguidula stated that one advantage of the digital portfolio was the ability to store multiple media such as graphics, video, and audio. Evidence could include assignments, research projects, oral and written presentations, tests, and seminars stored in multiple media. Teachers, students, or other judges served as evaluators, providing comments or using rubrics to assess student work. Niguidula emphasized that the goal of the digital portfolio project was not to demonstrate technology, but to show more effectively what students were capable of doing in a content area.

Niguidula discussed the issues of implementing digital portfolios, outlining five areas a school needs to address: a school's vision, assessment system, use of technology, logistics issues, and overall culture (1993b, p. 4). A school must determine a vision by deciding what capabilities they wanted their graduates to possess. The school must set the standards for what is good for the determined audience and then decide how the students should demonstrate the vision and collect work. Decisions had to be made concerning what hardware, software, and networking is needed. The logistics of how to digitize information, select student work, and reflect on the work must be determined. Time must be provided for student reflection. Public demonstrations, presentations, or celebrations needed to be planned or the digital portfolio may be no different from a paper portfolio locked away in a cabinet (1993b, p. 7). Unless the school culture emphasized developing strong relationships between students and teachers, Niguidula believed the process of creating digital portfolios would not help in the understanding of student abilities. The school community must be open to tuning standards, discussing student work and allowing teachers, students, and others to reflect on what they have done (1993b, p. 7). The advantages of digital portfolios included bringing a school's vision and standards to life and having the students take ownership of their work. Digital portfolios made

communication more effective and information easier to transmit than using paper portfolios (Niguidula, 1993b, p. 8).

The International Society for Technology in Education (ISTE) prepared a report for The Road Ahead (1995-1997), a program of the National Foundation for the Improvement of Education (NFIE). Technology was described as providing new assessment tools including computer-based self-scoring tests, electronic gradebooks, and computer-based student portfolios. Multimedia databases provided a more compact, storable, and retrievable tool for student portfolios (pp. 7-8). ISTE reported that information technologies "added new dimensions to portfolio assessment" (p. 17). Computer editing could facilitate the arrangement of the portfolio items, allowing for one presentation to be used for a variety of purposes. Evidence in the form of pictures, graphics, sound, and text could be digitized and stored. ISTE recommended the use of interactive multimedia stacks and Web pages to develop portfolio products. Science simulations, synthesized music, and complex mathematical software could be demonstrated through an interactive computer program. Physical products could be edited, stored, and moved to another computer or copied from one software program to another (p. 17). ISTE stated that information technologies are becoming more important in schools. The use of technology would allow students to take on authentic projects that are "more real-world in nature" (p. 18).

Sheingold and Frederiksen (1994) stated that technology could provide "the media through which students and teachers can have conversations that lead to shared understandings of the values and standards for student performance" (p. 112). Technology could help link assessment with reform by providing the following functions: support for student work in extended, authentic learning activities; portable, accessible and replayable copies of performances in multiple media; libraries of examples and interpretive tools; greater participation in the assessment process; and publication of works recognizing student accomplishments (p. 121). Technology could provide evidence of assessment beyond products that are text-based or activities that require the physical presence of the evaluator. Student work could be captured and preserved using interactive multimedia formats that integrate many forms of information on one computer disk (p. 122).

Technology could ultimately eliminate the need for physically transporting bulky paper portfolios, however Sheingold and Frederiksen emphasized that these performances must be "easily accessible to all parties" (p. 122). Schools must have appropriate recording technologies that are accessible and understandable to all potential users and group viewing systems that allow for the social activity of interpreting performances (p. 123). Through technology, different evaluators would not have to rely on varied recollections long after the actual performance. They could observe an assessment activity repeatedly and focus on interpretation (p. 123). The issue of ownership of the work produced by students would be solved by computer and video technologies because more than one copy of the work could exist (Sheingold & Frederickson, p. 124). The collaborative group approach to evaluation was recommended as a means of interpreting and scoring

performances, but an exemplar library of positive and negative examples and rationales should be included to guide assessment (p. 126).

Barrett (1998a) supported the use of portfolios for authentic assessment of student learning. She believed portfolio-based assessment was one of the most exciting developments in the school reform movement. She proposed that standards provide the basis for portfolio organization:

An electronic portfolio without clear links to standards is just a multimedia presentation or a fancy electronic resume or digital scrapbook. Without standards as the organizing basis for a portfolio, the collection becomes just that...a collection, haphazard and without structure; the purpose is lost in the noise, glitz and hype. High technology disconnected from a focus on curriculum standards will only exacerbate the lack of meaningful integration of technology to improve teaching and learning. (1998, Tel-Ed Abstract)

Barrett (1998b) suggested that a portfolio include the following elements: learner goals, guidelines for selecting materials, work samples, teacher feedback, student self-reflection, clear and appropriate criteria for evaluating work (rubrics based on standards), and standards with access to examples of good work. She believed that technology should be considered for creating portfolios for the following reasons:

1. Documents are generally created with a computer anyway.
2. Hypertext links allow clear connections between standards and portfolio artifacts.
3. Creating an electronic portfolio can develop skills in using multimedia technologies.
4. If teachers develop electronic portfolios, students may be more likely to do the same.
5. Electronic portfolios are fun and it is easier to manage the process, especially storage, presentation, and duplication.
6. Electronic portfolios make student work replayable, portable, examinable, reviewable, and widely distributable. (1998b, 1999)



Video Interview - Dr. Helen Barrett

For more on portfolio development, you may want to view videos featuring Dr. Helen Barrett of the University of Anchorage, Alaska. She is "the Guru of Electronic Portfolios." This Apple learning Interchange website on Electronic Portfolios is a wonderful resource - http://ali.apple.com/ali_sites/ali/exhibits/1000156/

Barrett's article, "Electronic Portfolio = Multimedia Development + Portfolio Development: The Electronic Portfolio Development Process," discusses the stages for portfolio development - <http://electronicportfolios.com/portfolios/EPDevProcess.html>.

Optional articles on alternative, authentic, and portfolio assessment.

- Alternative Assessment and Technology - http://www.ed.gov/databases/ERIC_Digests/ed365312.html
- Electronic Portfolios: A New Idea in Assessment. ERIC Digest. http://www.ed.gov/databases/ERIC_Digests/ed390377.html

Stages for Portfolio Development (Barrett, 2001)

Portfolio Development	Electronic Portfolio Development	Multimedia Development
<ul style="list-style-type: none"> • Purpose • Audience 	1. Defining the Portfolio	<ul style="list-style-type: none"> • Decide • Assess
<ul style="list-style-type: none"> • Collect • Interject 	2. The Working Portfolio	<ul style="list-style-type: none"> • Design • Plan
<ul style="list-style-type: none"> • Select • Reflect • Direct 	3. The Reflective Portfolio	<ul style="list-style-type: none"> • Develop
<ul style="list-style-type: none"> • Inspect • Perfect • Connect 	4. The Connected Portfolio	<ul style="list-style-type: none"> • Implement • Evaluate
<ul style="list-style-type: none"> • Respect 	5. The Presentation Portfolio	<ul style="list-style-type: none"> • Present • Publish