

Assessment and E-Folios: An Overview of the Field

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Abstract: This overview summarizes current trends in the field of assessment technology and electronic portfolios, reviews innovative research, briefly outlines research agendas in both areas, presents a call for SITE 2006 conference proposals, and provides a list of resources for potential authors.

Introduction

Assessment has become a pressing issue for states, school districts, colleges of education, and other professional organizations in this era of accountability. Policyholders have shifted from their emphasis from instructional technologies to technologies for managing assessment data (*Technology Counts*, 2005). The emphasis on assessment and assessment technologies is spurring the development of new online and desktop systems for collecting, analyzing, and reporting information about student achievement. Electronic portfolios have become ubiquitous in teacher education as a tool for assessment and for learning, and are being rapidly adopted within other professions, at all levels of education, by private individuals, and even by states.

In keeping with the Society for Information Technology and Teacher Education's (SITE's) mission to support the creation and dissemination of knowledge about information technology in teacher education, the SITE Assessment and E-Folios Group provides a forum for sharing information concerning assessment technologies and e-portfolios, guiding and disseminating research, exchanging information about implementation, and collaborating on new projects to integrate technology into sound assessment practices.

This section introduction summarizes trends in the fields of assessment and e-portfolios, offers recommendations related to potential research agendas, and provides references and resources for those who may be considering submitting a proposal for the assessment and efolio area of interest within the SITE annual conference.

Assessment and Accountability—*Data-driven Decision-Making*

Financial incentives and accountability concerns are prompting new interest and investment in assessment technologies, especially those that support the aggregation and analysis of student performance data. Data-driven decision-making is a primary goal at all levels of education.

Many states and school districts, under pressure by the *No Child Left Behind Act* (U.S. Department of Education, 2003) are spending millions of dollars on large-scale online data collection systems (Hoff, 2005) that will allow them to fulfill NCLB reporting requirements, more closely monitor individual student performance, and use student performance data to improve achievement. Inservice teachers are being asked to develop the skills to use data warehouse technologies in support of their classroom assessment practices. The U.S. Department of Education *National Educational Technology Plan* (2005) recommends that states, districts, and schools “ensure that every teacher knows how to use data to personalize instruction. This is marked by the ability to interpret data to understand student progress and challenges, drive daily decisions and design instructional interventions to customize instruction for every student's unique needs.” Districts seeking to improve student achievement are allocating resources to teacher professional development for data-driven decision-making (e.g. Pan, Rudo & Jones, 2004).

Schools, colleges and departments of education (SCDEs) are, likewise, under pressure to collect data on preservice teacher performance and use it for making decisions about candidate licensure and program improvement (National Council for Accreditation of Teacher Education, 2002). Teacher education performance standards identify the ability to use P-12 student performance data to create effective learning environments and design appropriate instructional remediation as essential teacher competency (Interstate New Teacher Assessment and Support Consortium, 1992).

Assessment Technology Types

A range of technologies support data-driven decision-making; Robinson, Carney and Kieper (2005) have advanced a *Taxonomy of Assessment Technologies*, suggesting there are seven main tool categories to accomplish the following assessment functions:

- **Production and Creation** tools help teachers create tests or other measures of student knowledge. This technology ranges from off-the-shelf software tools for word-processing to online resources for creating assessments and rubrics. These devices enable a teacher to embed movies files, sounds and images, allow students to take a test online, and provide feedback to students and teacher.
- **Graphing, Grading and Reporting** tools assist with the complex task of constructing meaning and assigning value to information collected about student performance. The category includes spreadsheet software that allows a user to easily convert data to graphs and programs for grading and reporting.
- **Criterion-Referenced Assessment** tools help in measuring specific skills and competencies. Many educational software programs and assessments provided by textbook publishers have these functions.
- **Normative Comparison** tools enable teachers and other stakeholders to determine how a particular student performs in comparison to grade level or other norms. Examples include such reading assessments as the Woodcock Johnson Revised (WJR-III) or S.T.A.R. Reading.
- **Ongoing Progress Monitoring** tools are used to detect subtle changes in learning and indicate skill areas in need of remediation. Some curriculum-based measures assess progress through specific curriculum—short online probes are given at key points in time and student scores are graphed. Other CBM tools utilize what are sometimes referred to as *general outcome measures*.
- **Situated-Performance Assessment** tools aid in evaluating complex student performances, often in authentic contexts. They include interactive tasks and simulations (including gaming) as well as the electronic portfolio.
- **Data Warehousing and Aggregation** tools are used to store and manage large quantities of assessment data, often from multiple assessments or databases. Software of this type provides a broad picture of individual student achievement, facilitates analysis and evaluation, and allows for the disaggregation of data based on such characteristics as ethnicity, gender and socio-economic status.

A challenge for teacher educators is to **model** the wise use of these assessment technologies so that the next generation of teachers has the ability to use those tools to enhance P-12 student achievement. A challenge for SITE, as a community, is to execute research focused upon these emerging technologies, evaluating their effectiveness as devices for formative and summative assessment, and determining what types of professional development are necessary for teachers and school systems to use a range of assessment technologies for data-driven instructional decision-making.

Assessment Technology Research

Although research on assessment technologies has been limited, efforts are underway. The Center for Children and Technology (URL below) has undertaken a two-and-a-half year project to build an evaluation framework, based on the theory and methodology of systems thinking and focused on data-driven instructional decision-making (Heinze & Rivas, 2003). The project is examining three applications: handheld diagnostic assessment web- and print-based student data reporting, and a large-scale data warehouse

Wayman and Stringfield (2005) report research on three schools exhibiting exemplary practices in the use of student data systems for instructional improvement. They identify *systemic supports*, a *culture of data use*, and *effective technology* as critical elements for a sustainable district data initiative. Their analysis of the various practices and methods from these schools may inform others who seek to support a data-initiative. An extensive review of the commercially-produced software available for analyzing student data was completed by Wayman, Stringfield and Yakimowski (2004).

With significant funds now being poured into assessment technologies (Quality Education Data, 2005), the effect of assessment technologies upon instructional practices and high-stakes decisions often determined by the results, it is essential that more research be focus upon specific applications and the systems within which assessment technologies are implemented.

A Call for Proposals: Assessment Technologies

Are you involved in a project that implements assessment technologies in P-12 or higher education? SITE participants are encouraged to submit proposals that suggest how technology can be implemented so as to efficiently collect and manage information on student competencies, analyze that assessment data, and employ it to design instruction. How is your teacher education program preparing preservice teachers to implement data-driven instructional decision-making? Research and implementation reports focused upon projects in schools will help us deduce principles for effective professional development.

Assessment and Learning: eFolios

While high-stakes accountability concerns may be driving the interest in assessment technologies, we must not lose sight of the powerful impact of assessment on learning. Strong formative evaluation and assessment can significantly improve student performance (Black & Wiliam, 1998, 2005). Further, there is a need to better understand how technology can be used to support not only assessment *of* learning, but assessment *for* learning (Stiggins, 2002). Electronic portfolios support assessment *for* learning (Barrett, 2005), as students critically reflect upon artifacts related to their own learning process and set new learning goals for themselves.

E-Portfolio Definition and Use

Although the portfolio originated in fields such as art and writing, the device is currently most prevalent in teacher education, where it is used both for assessment and learning purposes. The teacher portfolio was most commonly a paper-based product when first introduced, but the advantages of digital format are causing most programs to move toward e-portfolios. An e-portfolio is defined as “a digitized collection of artifacts, including demonstrations, resources, and accomplishments...comprised of text-based, graphic, or multimedia elements archived on a web site or on other electronic media such as a CD-ROM or DVD (Lorenzo & Ittleson, 2005).

First widely implemented in teacher education, the e-portfolio is now rapidly spreading throughout higher education. The 2004 Campus Computing Project (Green, 2004) reports that nearly 30% of public universities and 18% of private universities across the country provide electronic portfolio systems to students and faculty.

E-Portfolio Types

Although e-portfolios are used for a variety of purposes, three broad categories are most common: student e-portfolios, teacher e-portfolios, and institutional e-portfolios (Lorenzo & Ittleson, 2005). Two basic software approaches are available for authoring e-portfolios (Gibson & Barrett, 2002): the *common tools approach*; and, the *customized server-based system*. The common tools approach uses off-the-shelf software to support portfolio development: productivity and multimedia tools, HTML editors, or even blog software. Organizations that choose the server-based e-portfolio route have the choice of developing a home-grown system [e.g., [University of Denver Portfolio Community](#), [University of Washington Catalyst Portfolio](#)], using a commercial product [e.g., [Taskstream](#), [LiveText](#)] or adopting an Open Source system [e.g., [OSPI](#)]. Another option is a hybrid type of software, such as Ball State's [rGrade](#), which sets up a server-based assessment management system that can draw artifacts from a common-tools portfolio.

E-Portfolios Issues and Research

Are portfolios effective devices for learning and assessment? Despite their rapid adoption by educational organizations, many of the claims for portfolios have not yet been validated by formal research. A number of observers have commented on the scarcity of empirical evidence to confirm the effectiveness of portfolios for learning (Carney, 2004; Herman & Winters, 1994; Lyons, 1998; Zeichner & Wray 2001), and measurement experts have pointed out the risks of using them for assessment (Wilkerson & Lang, 2004).

E-portfolios bring with them a host of new challenges and dilemmas. In a recent EDUCAUSE Learning Initiative white paper, Lorenzo and Ittleson (2005) have pointed out some of those issues: ownership, validity and reliability, copyright and privacy, complexity and scope, and questions about how to properly scaffold the portfolio development process to encourage critical reflection. Other more technical implementation issues confront organizations as they consider e-portfolio software systems.

If e-portfolios are to be a lasting educational innovation, we need rigorous research to establish their theoretical soundness. For e-portfolios to be practical, we need implementation reports showing how the issues and challenges

associated with student, teacher and institutional e-portfolios can be resolved. Certain basic questions ought to be pursued:

- Do e-portfolios enhance learning and, if so, under what conditions?
- Are e-portfolios effective assessment devices, and if so, under what conditions?
- How do particular software tools impact assessment and learning with portfolios?
- What organizational and technical conditions are necessary for e-portfolio effectiveness?
- How are we to resolve the many issues and implementation challenges associated with large-scale e-portfolio systems?

Although numerous efforts to do systematic research on electronic portfolios are underway, three nationwide initiatives are worthy of special note here.

National Coalition on Electronic Portfolio Learning

This three-year project led by Barbara Cambridge and Kathleen Blake Yancey aims to bring together faculty from up to 30 institutions across the country to research the learning that takes place inside of and around digital portfolios. The project's first cohort of 10 schools has focused on the research question, "How does reflection supported by electronic portfolios influence student learning?"

A Study of Accomplished Users

Research is underway to understand the diffusion of e-portfolios in schools, colleges, and departments of education (Strudler & Wetzel, 2005). Beginning with a survey completed by 23 institutions thought to be mature users of the technology, Strudler and Wetzel chose six institutions from across the country for in-depth study. Data collection includes site visits and more than 80 interviews.

The REFLECT Initiative

The Researching Electronic Portfolios: Learning, Engagement, Collaboration through Technology (REFLECT) initiative, led by Helen Barrett and underwritten by Taskstream, is researching the use of web-based electronic portfolios among secondary students. This 18-month action-research project (Barrett, 2005), which may involve up to 50,000 secondary students, is focused on the impact of e-portfolios on student learning, motivation, and engagement.

A Call for Proposals : e-Portfolios

SITE proposals that further our understanding of e-portfolios as assessment and learning devices are invited. Presentations of systematic research are strongly encouraged—especially studies with the characteristics of scientifically-based evidence:

- *robust theoretical frameworks and models*
- *clear and important questions*
- *clearly defined rigorous methods*
- *well-designed instruments validated for their purpose*
- *possibility for replication*
- *relevant predictions and careful generalizations (Thompson, 2005, p. 333).*

To fully make the case for teacher e-portfolios, we need research showing the impact of preservice and inservice teacher e-portfolios on teachers' classroom practices, and evidence of enhanced P-12 student learning resulting from those changes in practice. More studies ought to include careful analysis of P-12 student work samples and/or other measures of achievement.

PT³ projects with e-portfolio programs have available a large body of evaluation data that could be analyzed and reported. A summit of PT³ leaders (Thompson, 2005) has called for PT³ projects to synthesize this data and engage in meta-analysis. SITE would welcome proposals for collaborative efforts of this type. PT³ projects with long-term e-portfolio programs are invited to share information that can help other organizations deal with the implementation issues they themselves have successfully managed.

Implementation reports that shed light on the issues associated with student, teacher and institutional e-portfolios outside of teacher education are also sought.

New Trends in Assessment with Technology

Although the entire field of assessment and e-portfolio technology is developing rapidly, several areas are attracting particular attention: gaming and simulations; network-based assessment; and, universal design for assessment. Gaming and simulation technologies are advocated as powerful learning tools for a new generation of digital natives (Prensky, 2001; Shaffer, Squire, Halverson, & Gee, 2005) and a way to unobtrusively assess a learner's abilities (Gibson, 2003). Network-based assessment is theorized to offer fundamentally new possibilities for assessing student knowledge (Gibson, 2003). As more high-stakes assessments move towards online and other digital formats, universal design for assessment becomes critical.

Gaming and Simulations

Simulations and online case-based learning environments can become assessment platforms as students and teachers engage in problem-based learning in realistic settings. SimSchool (URL below) and its eTIPS partner project provide examples of how classroom simulators can engage teachers in analyzing student differences, adapting instruction to individual learner needs, gathering data about the impacts of instruction, and seeing the results of their teaching. Gibson and Halverson (2004) assert that "initial work on these applications provides evidence that both formative and summative assessment can be enhanced through simulations and case-based e-learning applications that utilize network-based assessment methods" (p. 3).

Network-based Assessment

In contrast to traditional perspectives on assessment as "tests" of knowledge, new forms of problem-based, online assessment build a body of evidence showing the learners' usable knowledge in natural settings. This technology may have the potential to develop adaptive expertise in learners and expand methodologies for assessing the range of learners' knowledge and skill (Gibson, 2003).

Universal Design for Assessment

Universal design is a process of ensuring that a product is useful to the broadest possible array of people (Rose & Meyer, 2002). As states and other organizations increase assessment activity, creating many of these new tests for technology-based environments, it becomes ever more important that researchers and educators attend to accessibility issues when investigating, designing, or implementing assessment technologies.

A Call for Proposals: Emerging Assessment Trends

Are you involved in research or development of new technologies that expand our assessment methodologies? Submit a SITE proposal to explore how technology might enable us to assess student knowledge less obtrusively and more accurately, bridge the gap between formative and summative assessment, and/or integrate assessment and instruction. SITE also welcomes proposals that investigate emerging trends in e-portfolios (e.g., blogs).

Resources

Prospective authors may find the online resources below helpful.

Data-driven Decision Making

- The *Center for Children & Technology* studies technology-based applications focused on data-driven instructional decision-making.
http://www2.edc.org/cct/projects_summary.asp?numProjectId=3023
- The *Center for Social Organization of Schools* at Johns Hopkins University provides a website with links to published research on data-driven decision making.
<http://www.csos.jhu.edu/datause/publications.htm>
- The *Consortium for School Networking* launched the *Data-driven Decision Making Initiative: Vision to Know and Do*, to provide information for educators on collecting, understanding and using data effectively. Although the initiative is directed toward K-12 leaders, resources on the site are valuable for teacher educators who seek to prepare teacher candidates who are knowledgeable about data-driven decision making.
<http://3d2know.cosn.org/>
- *Heartland Area Education Agency* has been implementing a data-based instructional problem-solving model for over ten years; their site contains links to various tools for data analysis, professional

development resources, implementation sites, and journal articles.

<http://www.aea11.k12.ia.us/Schrader/datadriven.html>

- The *VIPER Project* is a collaboration of the Pittsburgh Public Schools, Office of Information and Technology (OIT) and the University of Pittsburgh's Visual Information Systems Center (VISIC). The aim of the project is to develop, test, and validate a new generation of software for visualizing student data.
<http://visc.sis.pitt.edu/ppp/viper.html>

E-Portfolios

- *Helen Barrett's* website contains a wealth of materials about electronic portfolios. Follow the link to her "Online Portfolio Adventure," where she pilots and evaluates 18 e-portfolio software tools.
<http://electronicportfolios.org/>
- *EDUCAUSE Learning Initiative (ELI)* coordinates a group exploring e-portfolios as a learning technology. The ELI website provides links to e-portfolio models, tools, presentations, and publications.
<http://www.educause.edu/E%2DPortfolios/5524>
- The *Journal of Computing in Teacher Education* will soon publish a special issue on e-portfolios that includes a range of current research and proposes a research agenda for the field.
http://www.iste.org/Content/NavigationMenu/Membership/SIGs/SIGTE_Teacher_Educators_/JCTE/Past_Issues2/Volume_21/Number_4_Summer_2005/Summer_2005.htm

Other Assessment Technologies

- *SimSchool* provides a portal with links to online simulation and game resources.
<http://simschool.org/simPortal.htm>
- *The Center for Applied Special Technology (CAST)* provides resources on universal design for learning and assessment.
<http://www.cast.org/>

References

- Barrett, H. (2005). Electronic portfolios as digital stories of deep learning. [Retrieved August 8, 2005, from: <http://electronicportfolios.org/digistory/epstory.html>]
- Black, P., and Wiliam, D. (1998). "Inside the Black Box: Raising Standards Through Classroom Assessment." *Phi Delta Kappan*, October 1998. [Retrieved June 10, 2004 from: <http://www.pdkintl.org/kappan/kbla9810.htm>]
- Black, P., and Wiliam, D. (2005). The formative purpose: Assessment must first promote learning. In Wilson, M. (Ed.) *Towards coherence between classroom assessment and accountability*. Chicago, IL: The University of Chicago Press.
- Carney, J. (2004). Setting an agenda for electronic portfolio research: A framework for evaluating portfolio literature. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.
- Heinze, C., & Rivas, L. (2003). Creating an Evaluation Framework for Data-Driven Instructional Decision-Making. [Retrieved November 8, 2005 from: http://www2.edc.org/cct/projects_summary.asp?numProjectId=3023]
- Gibson, 2003. Network-based assessment in education. *Contemporary Issues in Technology and Teacher Education*, (3), 3. [Retrieved online August 8, 2005, from: <http://www.citejournal.org/vol3/iss3/general/article1.cfm>]
- Gibson, D. & Barrett, H. (2004). Directions in electronic portfolio development. *Contemporary Issues in Technology and Teacher Education*, 2,(4). [Retrieved online August 8, 2005, from: <http://www.citejournal.org/vol2/iss4/general/article3.cfm>]
- Gibson, D., & Halverson, B., (2004). Simulation as a framework for preservice assessment. Paper presented at the annual conference of the Society for Information Technology in Teacher Education. [Retrieved August 8, 2005, from: <http://simportal.edreform.net/resource/10385>]
- Herman, J. and L. Winters (1994). Portfolio research: A slim collection. *Educational Leadership* 52 (2). [Retrieved December 7, 2002, from <http://www.ascd.org/readingroom/edlead/9410/herman.html>].
- Hoff, D.J. (2005). NCLB focuses on data tools: The demands of the No Child Left Behind Act are spurring states to invest in data-management technologies. *EdWeek*, (24), 35, 1-2.

- Interstate New Teacher Assessment and Support Consortium. (1992). Model standards for beginning teacher licensing, assessment and development: A resource for state dialogue. [Retrieved November 8, 2005 from: <http://www.ccsso.org/content/pdfs/corestrd.pdf>
- Lorenzo, G., & Ittleson, J. (2005). An overview of e-portfolios. *EDUCAUSE Learning Initiative*. [Retrieved August 8, 2005 from: <http://www.educause.edu/LibraryDetailPage/666?ID=ELI3001>]
- Lyons, N. (1998). Introduction. In N. Lyons (Ed.), *With portfolio in hand* (pp. 1-8). New York: Teachers College Press.
- National Council for Accreditation of Teacher Education. (2002). Professional Standards for the Accreditation of Schools, Colleges, and Departments of Education. [Retrieved November 8, 2005 from: http://www.ncate.org/documents/unit_stnds_2002.pdf
- Pan, D., Rudo, Z., & Jones, D.H. (2004). Allocating Resources in an Education Reform Environment: Findings from 12 School Districts. Paper presented at the Annual Meeting of the Southwest Educational Research Association, Dallas, TX, February 5-7.
- Prensky, M. (2001). Digital natives, digital immigrants. [Retrieved August 8, 2005 from: <http://www.marcprensky.com/writing/>].
- Quality Education Data. (2005). 2005-2006 National Technology Assessment. [Available online: <http://www.qeddata.com/MarketKno/ResearchReports/NTA.aspx>]
- Robinson, L., Carney, J., & Kieper, T. (2005). Technology tools for assessment and evaluation. Paper presented at the annual conference of the Society for Information Technology in Teacher Education in Phoenix, March.
- Rose, D. H., & Dolan, R. P. (2000). [Universal Design for Learning: Assessment](#). *Journal of Special Education Technology* 15(4). [Retrieved August 8, 2005 from: <http://jset.unlv.edu/15.4/asseds/rose.html>]
- Shaffer, D.W., Squire, K.R., Halverson, R. & Gee, J.D. (2005). Video games and the future of learning. *Phi Delta Kappan*, 87, (2).
- Stiggins, R. J. (2002). "Assessment Crisis: The Absence of Assessment FOR Learning." *Phi Delta Kappan*, June 2002. [Retrieved July 17, 2004 from: <http://www.pdkintl.org/kappan/k0206sti.htm>]
- Strudler, N. & Wetzel, K. (2005). The diffusion of electronic portfolios in teacher education: Issues of initiation and implementation. *Journal of Research on Technology in Education*, 37, (4), 411 – 433.
- Technology Counts 2005: Electronic transfer: Moving technology dollars in new directions (2005). *EdWeek*, (24), 35. [Retrieved August 8, 2005 from: <http://www.edweek.org/ew/toc/2005/05/05/index.html>]
- Thompson, A. (2005). Scientifically-based research: Establishing a research agenda for the technology in teacher education community. *Journal of Research on Technology in Education* (37), 4, pp. 331-337.
- United States Department of Education. (2003). No Child Left Behind home page. [Retrieved from: <http://www.ed.gov/nclb/landing.jhtml?src=pb>
- United States Department of Education. (2005). National Education Technology Plan: Toward a new golden age in American Education. [Retrieved November 8, 2005, from <http://www.nationaledtechplan.org/actionsteps.asp#imp>].
- Wayman, J. C., & Stringfield, S. (2005, April). "Teachers using data to improve instruction: Exemplary practices in using data warehouse and reporting systems." Paper presented at the 2005 Annual Meeting of the American Educational Research Association, Montreal, Canada.
- Wayman, J. C., Stringfield, S., & Yakimowski, M. (2004). Software enabling school improvement through the analysis of student data. Baltimore, MD: Johns Hopkins University Center for Research on the Education of Students Placed At Risk.
- Wilkerson, J. and W. S. Lang (2003). "Portfolio, the pied piper of teacher certification assessments: Legal and psychometric issues." *Education Policy Analysis Archives* 11(45). Retrieved 7/15/2005: <http://epaa.asu.edu/epaa/v11n45/>
- Zeichner, K. and S. Wray (2001). "The teaching portfolio in US teacher education programs: what we know and what we need to know. *Teaching and Teacher Education*, 17, 613-621.