Electronic Portfolios in Teacher Education:
Forging a Middle Ground

Neal Strudler

University of Nevada, Las Vegas

Keith Wetzel

Arizona State University

Abstract

At a time when implementation of electronic portfolios (EPs) is expanding, the issues of clarifying their purposes continue to plague teacher education programs. Are student-centered uses of EPs compatible with program assessment and accreditation efforts? Is this an either/or situation, or can a productive middle ground be forged? This article reviews the compatibility of key purposes for EPs in light of the changing landscape of their use in teacher education. It explores theoretical perspectives, analyzes policy implications and challenges, and provides recommendations that support current adoption and implementation decisions. It concludes that it is possible to effectively use EPs for varied purposes and provides specific recommendations for doing so. (Keywords: electronic portfolio, e-portfolio, technology, teacher education, assessment, accreditation)

Electronic portfolios (EPs) have been implemented in teacher education programs to support teacher candidates' reflection and learning, enhance their job searches, and provide data for program assessment and accreditation. Although portfolios—print-based and electronic—have had a long tradition as student-centered endeavors, the proliferation of EPs as data sources for program assessment and accreditation is a relatively new phenomenon (Wetzel, Strudler, Addis, & Luz, 2009; Baston, 2010). Commercial applications that initially supported student uses of EPs have morphed into systems with greater emphasis on accreditation management. Some authors have noted this trend and have argued that use of EPs for both program accreditation (assessment purposes) and student learning may not be compatible (Barrett, 2004; Buckridge, 2008; Carney, 2002). If EPs are used for multiple purposes, they maintain, none will be done well.

This article revisits these concerns in light of the changing landscape of EP use in teacher education. At a time when implementation of EPs is expanding (Wetzel, Strudler, Addis, & Luz, 2009; Batson, 2010), the issues of clarifying their purposes continue to plague teacher education programs. Are student-centered uses of EPs compatible with program assessment and accreditation concerns? Is this an either/or situation, as some have argued, or can we forge a productive middle ground?

We begin by exploring the theoretical perspectives of various approaches to EP use. After reviewing existing literature, we conclude with a discussion of policy implications for teacher education programs and provide recommendations that support current adoption and implementation decisions.

Theoretical Perspectives

Portfolios rest on a continuum from more objectivist to more subjectivist philosophical approaches. The objectivist approach is based on the belief that outcomes can be precisely described and that an independent evaluator can measure observable behaviors. The subjectivist perspective is based on the belief that learning is complex, situated, and individual and must be judged by experts directly involved in teaching and learning (Gray, 2002). The objectivist approach lends itself to a skills-based assessment, and the subjectivist approach is more constructivist in nature and lends itself to a reflective practitioner model (Schon, 1983). The former emphasizes the assessment of learning, and the latter emphasizes the assessment for learning (Stiggins, 2002).

Aligned with the subjectivist philosophy, the developmental/learning portfolio writer is describing content that is not quite known (Buckridge, 2008). Here the teachers' writing is based on ideal philosophy, reflection, action in teaching, and refinement that allows teachers to further construct their knowledge base for teaching. Aligned with the objectivist philosophy, the assessment portfolio writer describes successful practices that meet agreed-upon criteria. The developmental/learning portfolio, hereafter referred to as the learning portfolio, focuses on the teachers' thinking; the assessment portfolio focuses on evaluative evidence and success.

Learning Portfolios

Shulman (1998), an early proponent of educational portfolios, defines the teacher's working portfolio as a "structured documentary history of a set of coached or mentored acts of teaching, substantiated by samples of student portfolios, and fully realized only through reflective writing, deliberation, and conversation" (p. 37). Preservice student portfolios document their journey in becoming a teacher as they select, share, and reflect on artifacts such as educational philosophies, classroom management plans, unit and lesson plans, plans to meet the needs of diverse and special-needs pupils, and video clips of practice teaching. Portfolios make learning visible, and thus faculty and students focus on learning in new ways (Yancey, 2001). Darling-

Hammond and Baratz-Snowden (2007) point out that "the use of authentic classroom materials enables student teachers and teacher educators jointly to examine and analyze a 'common text' to which all have access" (p. 126).

In general, such learning portfolios are based on a constructivist philosophy. Students may be expected to take responsibility for selecting artifacts, making connections to standards, and interpreting their own learning. In a study of 144 preservice teachers and 15 supervisors using portfolios in Germany, Imhof and Picard (2009) found that the learning portfolio process resulted in a "more elaborate style of reflecting on the professional development ... and more productive and independent group processes among preservice teachers" (p. 153).

Assessment Portfolios

Other approaches to portfolios, based on an objectivist philosophy, are primarily designed to meet the needs of the programs or institutions (Barrett 2004; Fagin, Hand, & Boyd, 2003). Here students are expected to provide artifacts that demonstrate that they meet state and national performance standards. Instructors often use rubrics to evaluate the prescribed items. Individual artifacts in the portfolio or the portfolio as a whole may be required to address not just the top-level standards, but also sub-elements consisting of an array of performance objectives. Willis (2009) refers to this as an atomistic approach.

In such assessment portfolios, standards and evaluation rubrics provide direction for artifact selection and organization of the EP. Students thus create these portfolios to satisfy outside readers. Colleges of education aggregate and disaggregate the evaluation data to demonstrate that teacher candidates within the program are meeting the necessary standards. They also use the data to inform where improvements may be required.

Multipurpose Portfolios

In a self-study of their university adapting EPs for wide-scale assessment to meet state teacher education requirements, Reis and Villaume (2002) found that student-centered practices, such as choice of artifacts to include in the EP, were in tension, and increased standardization of components was needed to improve scoring consistency among raters. Ma and Rada (2006) studied the use of EPs designed to balance the learning focus and accountability. Their EP system allowed candidates to collect artifacts in multiple formats, modify them, critically reflect on their practices, and align evidence to standards. Survey results of a stratified sample of 31 students from four teacher education programs revealed that students expressed positive attitudes toward the use of the EP to facilitate learning but less-positive attitudes toward the assessment of the prescribed artifacts. Others have highlighted this tension as well (Barrett, 2004; Buckridge, 2008; Carney, 2002; Mitchell, Allen, & Ehrenburg, 2006; Wilkerson & Lang, 2003).

Granberg (2010) noted three distinct uses of EPs that a Swedish teacher education program implemented. A longitudinal study based on interviews with 25 faculty members and a survey of an additional 42 faculty identified three types of EPs: the filing portfolio, the assessment portfolio, and the learning and assessment portfolio. The content and processes of the learning and assessment portfolio include student teachers publishing their assignments in the portfolio along with their reflections and evaluations of their work. The teacher candidates begin by describing their prior knowledge and goals for learning. During the course, they reflect on assignments and how one relates to another. At the end of the course, they reflect on their progress from their initial statement of prior knowledge and goals. Teacher educators provide formative and summative feedback. During the course, they supported the students' reflective learning by providing feedback, and at the end of the course, they sum up the students' achievement holistically and provide the course grade. The author points out:

> This way of blending formative and summative assessments is not seen as problematic by the interviewees advocating e-portfolios for learning and assessment. They do not find this situation unique for e-portfolios. As Amy [a faculty member] explained: "As a teacher you always have this two-faced role, to support your pupils [formative feedback] and assess them [summative feedback]." (p. 319)

Implementation Factors

The viability of EPs in teacher education depends on a range of implementation factors and costs and benefits as perceived by the stakeholders. A multisite case design (Yin, 1989) was employed to investigate the use of EPs within six teacher education programs (Strudler & Wetzel, 2005; Strudler & Wetzel, 2008; Wetzel & Strudler, 2005; Wetzel & Strudler, 2006). Across all sites, various factors influenced the implementation of EPs including whether the programs had previously used paper portfolios, the degree of pressure for standards-based assessment, and leadership and governance issues. Variations in program implementation included areas such as the EP tool employed, artifact selection, evaluation of student work, and the role of reflection. Findings suggest that amidst the common themes across programs, there are numerous variations in approaches to EP use.

Across the spectrum of EP use, research suggests that programs need to have a clear vision or purpose for portfolio implementation. Imhof and Picard (2009) found that clarity of purpose was a key to effective use of EPs. Students said they wanted to have "a clear idea of the formalities, content, and a well-communicated rationale for the portfolios" (p. 152). The authors concluded that: "… a lack of clear understanding of the purpose and ownership of a portfolio constitutes a serious flaw in the process" (p. 153).

Other factors influencing student and faculty satisfaction with electronic portfolios are the clarity of guidelines, student perceptions of faculty feedback

on their portfolios, and the amount of time and effort involved (these will be discussed under Benefits and Costs). The innovation implementation literature is consistent in reporting that the initial response of educators faced with implementing a change is to ask questions about how it will affect them personally, followed by questions about how to manage the particular tasks (Hall & Hord, 2001). Both of these levels of concern are clearly present as faculty members reflect on the time required to manage the electronic portfolio process.

Benefits and Costs

Benefits that teacher candidates, faculty, and administrators cite included opportunities to reflect and better understanding of teaching standards (Strudler & Wetzel, 2005; Strudler & Wetzel, 2008; Wetzel & Strudler, 2006). Additional benefits unique to teacher candidates were better access to and organization of professional documents, and increased technology skills (Wetzel & Strudler, 2006). Additional benefits unique to faculty and administrators were better faculty access for assessing student work, increased faculty communication with students, and improved tracking of student performance for purposes of accreditation and program improvement (Strudler & Wetzel, 2008).

The costs or disadvantages that teacher candidates, faculty, and administrators cite included issues pertaining to program implementation, access to and reliability of the technology, and issues of time and effort expended (Strudler & Wetzel, 2005; Strudler & Wetzel, 2008; Wetzel & Strudler, 2006). Similarly, in a pilot project to encourage reflective practice in preservice teacher education, Cunningham (2002) noted that the process requires a great deal of effort, during which faculty need to work in concert over time. Lind (2007) also noted that EP implementation required an immense amount of faculty and student interaction and that using portfolios in larger programs would be challenging. Additional disadvantages unique to faculty and administrators were the lack of compatibility with faculty members' beliefs, values, and needs. As one might expect, for those faculty expected to conduct research and publish, EPs may not readily fit into their professional goals, especially if they perceive that EPs will require their additional time and effort (Strudler & Wetzel, 2008). Furthermore, as Pulin (2004) explained, "… the recent press to reform teacher education programs presents a challenge to faculty members' views that they should have autonomy to make independent determinations about curriculum, course content, and grading …"(p. 302).

Overall, we concluded that faculty satisfaction with EPs appears strongly associated with their values for student-centered teacher education and, in some cases, their willingness to sacrifice individual preferences to accomplish program goals.

Trajectory of EP Use

In higher education, EPs are increasingly being used for a variety of purposes across academic disciplines (Batson, 2010), including assessment and accreditation in teacher education (Strudler & Wetzel, 2005). In one study, faculty leaders and administrators identified streamlining requirements and planning for data aggregation and program evaluation as next steps for their respective programs (Wetzel & Strudler, 2005). To see how programs have begun to use EPs for these purposes, the authors examined National Council for the Accreditation of Teacher Education (NCATE) Board of Examiners reports over several years (Wetzel, Strudler, Addis, & Luz, 2009). They found that there was significantly greater use of EPs as a data source to address NCATE standards and far greater use of EPs via commercially available, portfolio and data analysis systems.

Discussion: Policy Analysis

Our overarching policy question is if student-centered uses of EPs are compatible with program assessment and accreditation concerns and if a productive middle ground can be forged between the multiple purposes for EP use. We will address these questions through the framework of our review of literature. We will focus on analyzing the key purposes of portfolios—student learning/reflection and accountability/accreditation, followed by another purpose cited in the literature—employment. The discussion will include an analysis of costs and benefits as perceived by the various stakeholders.

Student Engagement and Learning

As previously noted, the use of EPs in teacher education emanates from the constructivist tradition of using portfolios to foster deep student reflection and learning. As one might expect, deep learning is not easily achieved, and the highest goals of employing EPs require much time and effort from both teacher candidates and faculty. Table 1 delineates some of the choices programs have in how they implement EPs, along with what research suggests are potentially the low and high impacts on student engagement and learning.

Although teacher candidates can certainly learn via submitting prescribed artifacts and organizing them into an EP, studies reviewed (Ma & Rada 2006; Reis & Villaume 2002; Strudler & Wetzel, 2008; Wetzel & Strudler, 2006) suggest that students are more engaged when choosing their best evidence of what they've learned and accomplished. And as one might expect, both faculty and students agree that substantive reflections, when thoughtfully implemented, lead to greater learning. Students found portfolio reflections to be more meaningful if faculty provided more in-depth and timely feedback on their work. Furthermore, faculty reported that student learning increased if students used a theory of reflection and reflected at a deeper level (Imhof & Picard, 2009; Strudler & Wetzel, 2008; Wetzel & Strudler, 2006).

Table 1. Factors Impacting Student Engagement and Learning

Factors	Lower Impact	Higher Impact
Selection of artifacts	Prescribed	Students choose
Nature of student reflections	Cursory	Substantive
Rigor of evaluation	Surface level	Rigorous evaluation
Faculty feedback	Minimal	Detailed

Consistently across many studies (Cunningham, 2002; Imhof & Picard, 2009; Lind, 2007; Strudler & Wetzel, 2008; Wetzel & Strudler, 2006), both students and faculty expressed concerns about the amount of time required to construct reflective portfolios, guide the student process, and provide substantive feedback on student work. Similarly rigorous evaluation and detailed faculty feedback contribute to greater student learning as well as a greater degree of satisfaction derived by both students and faculty (Imhof & Picard, 2009; Strudler & Wetzel, 2008; Wetzel & Strudler, 2006).

The costs of achieving the higher end of these goals are obvious. They require a great deal in terms of time and effort by both students and faculty. Findings suggest, however, that when implemented well, many students and faculty believe that the benefits derived do justify the costs (Strudler & Wetzel, 2008; Wetzel & Strudler, 2006), particularly when there is a clarity of purpose and a commitment to constructivist, student-centered learning (Imhof & Picard, 2009).

Accountability and Accreditation

EPs are increasingly being adopted and implemented as a strategy to support programs' need to gather data on candidate performance and use that data as evidence to inform program improvement and accreditation. Unfortunately, the factors that may work best for implementing portfolios for accountability and accreditation may conflict with those best suited for student-centered learning outlined in Table 1. Table 2 (p. 168) delineates factors that tend to be most supportive of efforts toward accountability, program improvement, and ultimately accreditation.

Although the constructivist tradition promotes student choice of artifacts, prescribed artifacts allow for more focused and specific rubrics and potentially more consistency and rigor in the evaluations. The "gold standard" for fair and consistent evaluation, inter-rater reliability is most readily achieved through the evaluation of common artifacts. Student choice in artifacts, while supporting student reflection and growth, presents challenges for establishing fair and consistent evaluation of candidates' knowledge and skills (Mitchell et. al., 2006; Wilkerson & Lang, 2003).

There are also important differences in student and faculty member perspectives. Both students and faculty acknowledge the importance of standards, but some faculty tend to be concerned about the implications of standards-based portfolios, driven by accreditation needs. For example,

Table 2. Factors Impacting Usefulness of Data for Program Accountability and Accreditation

Factors	Less Useful	More Useful
Selection of artifacts	Students choose	Prescribed
Rigor of evaluation	Surface level, checklists	Rigorous, detailed rubrics
Inter-rater reliability	Not established	Established

program accountability and accreditation efforts typically encourage the creation of assignments and rubrics that are implemented consistently across a program, including multiple sections of the same course. This involves a possible infringement on faculty's academic freedom, particularly pertaining to what some saw as the prescriptive nature of the EP program. In one study (Strudler & Wetzel, 2008), a faculty member, who was supportive of accountability for outcomes in teacher education, took issue with how that translated into practice. He explained, "I personally think we're violating academic freedom, where they're telling us now that we have to use a rubric to evaluate the assignment. Who's to say that the rubric was the best approach…. You know, it's a one size fits all" (p.140).

Employment

Employment EPs often include elements of both learning and assessment portfolios. Aligning with the learning portfolio, students often reflect on what they learned from a particular activity and tailor the portfolio to show them in the best light. However, the EP will also contain assignments that have been evaluated using standards-based rubrics and revised based on faculty feedback. Although using EPs directly for interviews for teaching positions is seldom the primary purpose of the EP, some programs have attempted to use them to showcase students' skills and knowledge (Hallman, 2007; Painter & Wetzel, 2005). Students, however, have reported that employers did not have the time, interest, or technology skills to examine them (Wetzel & Strudler, 2006). Additionally, in focus groups of principals and human resource (HR) directors, Painter and Wetzel (2005) found that principals were not interested in full EPs but would consider a scaled-down portfolio that contained video of their student teaching and evidence that they could use data to plan curriculum.

HR directors also expressed concerns regarding their procedures. As they did not have the portfolio as a requirement for the application and interview process, some applicants may have them and others may not, raising fairness questions. Further, although most principals were not interested in reviewing full portfolios, they agreed that EPs could be important to students because the process of reviewing and selecting evidence would prepare them to answer oral questions in an interview. However, Kitchenham (2008) found that teacher candidates reported that principals did look at their EPs, and their e-portfolios were major contributors to being hired.

Overall, PK–12 schools do not appear to have a culture that makes it easy to introduce EPs in the interview process (Painter & Wetzel, 2005), thus limiting employment as a compelling rationale for student creation of EPs. However, some programs continue to suggest that students use EPs for employment purposes (e.g., An & Wilder, 2010), especially as it is relatively easy to repurpose a completed learning or accreditation EP or create a parallel portfolio for employment.

Conclusions

Our position on the debate regarding the compatibility of multiple purposes for EPs is that although it's a challenge, it is possible and advisable to use EPs for varied purposes. Stated differently, we should seek to forge a productive middle ground. Toward that end, we make the following recommendations.

1. Clarify Your Purposes and Seek Buy-In

Research has shown that clarifying the purpose(s) for EP use is critical for effective implementation and user satisfaction (Imhof & Picard, 2009; Strudler & Wetzel, 2005; Strudler & Wetzel, 2008; Wetzel & Strudler, 2006). Faculty members and administrators must buy into the purposes, and administrators must allocate resources to implement EP programs. Adequate resources are crucial to success (Strudler & Wetzel, 2005). To clarify the purpose, faculty members and administrators may engage in a process of discussion, leading to a substantial consensus regarding the priorities. Although EPs based on different traditions (subjectivist and objectivist) and related purposes (learning and assessment) may appear to be in opposition, we agree that "As a teacher you always have this two-faced role, to support your pupils [formative feedback] and assess them [summative feedback]" (Granberg, 2010, p. 319).

2. Avoid Atomization of Professional Standards

While teaching standards should guide portfolio development, the standards should be at the top level rather than at a subpart or element level that provides increasing specificity. Although such specificity can be helpful, we agree with Willis (2009) that the atomization of standards and performance objectives may be detrimental to achieving deep and enduring learning. The top level of teaching standards, however, provides a helpful guide for the demonstration of student learning.

3. Balance Prescribed and Self-Selection of Artifacts

With respect to the selection of artifacts, programs should consider having a few key prescribed assignments with rubrics that are common to all EPs within the area of specialization. Program-prescribed artifacts provide evidence of mastery of state and national teaching standards and

may be used for required transition point assessments (e.g., a detailed unit plan that is assessed prior to beginning clinical practice). Inter-rater training can be employed to achieve fair and consistent evaluation of these assignments. However, concurrently, students should also be able to select a number of artifacts to demonstrate their learning and their progress toward the standards. Students should select artifacts that provide persuasive evidence of growth and proficiency. Candidate reflections on these artifacts should be purposeful and help them become aware of issues in teaching, areas of improvement, and insights into the teaching process. In both program- and student-selected artifacts, faculty should emphasize a theory-based cycle to enhance student reflection on their learning.

4. Provide Feedback Commensurate with the Scope of Student Work

With regard to the amount and substance of faculty feedback, we believe that programs should set a clear expectation that faculty will provide substantial formative feedback. All evidence reviewed pointed toward enhanced satisfaction of both faculty and students when feedback was timely, ongoing, and substantive. Programs that reduced feedback to marks on checklists or attention primarily to grammar and writing skills were not received well by students or faculty. Obviously, a high bar will require more time and effort on the part of faculty and students, but students' critical reflection and faculty's considered feedback are at the heart of the learning process. If we are unwilling to commit to this level of time and effort, we question whether EPs are worthwhile learning tools. Under ideal circumstances, most faculty support a higher bar for feedback, but often teaching loads make it a challenge to meet. Programs must provide resources to achieve the desired outcomes.

5. Select Tools that Work for Your Purpose and Needs

Teacher educators must consider needs and consider the affordances of applications and then make their best choice. When considering accreditation requirements, we need to drill beyond perceptions of what some believe is necessary and focus on the current requirements. For example, NCATE (2011) unit standards stated, "Technology should play an increasingly important role in data gathering and analysis," but it does not specify the types of technology to employ. While commercial systems certainly include the requisite technologies to address assessment needs, free Web-based applications (for example, see Barrett, 2011) and commonly available productivity tools also provide viable solutions. Commercial EP systems often are funded directly by students, a consideration in this era of tight university budgets. However, shifting costs of the EP system to students increases the pressure that the tool provides value in terms of student learning and development. Regardless of the tools employed, we recommend analyzing data from as-

signments, coupled with a qualitative analysis of student reflections and faculty feedback to inform program improvement and accreditation. It should be noted that the habit of mind regarding continuous improvement is likely more important than the technologies employed to do the analysis or display the reports.

6. Prepare Students to be Shapeshifters

We agree with Hillman (2007) that students and faculty need to adopt a view of EPs where candidates tailor a portfolio for more than one audience. Here we believe that teacher candidates should become shapeshifters in that they gain the ability to change the shape of their electronic portfolios and tailor it for multiple views and audiences. For example, there may be a view of the EP for accreditation purposes and another view that is repurposed for employment. Students have expressed concerns about revealing their struggles and questioning their progress rather than communicating an image of a knowledgeable and confident teacher (Hillman, 2007). An affordance of technologies such as Web sites, blogs, or wikis, as well as large-scale commercial systems, is that they readily allow tailoring of portfolios for multiple purposes.

7. Ensure that the EP Process Is Doable

The most labor-intensive implementation of EPs has led many to call for streamlining demands placed on both students and faculty, and this may be required to sustain this innovation for a large majority of programs. As one university administrator noted, "If it's too much work for the students to complete on time, and it's too much work for us to evaluate on time, then it's probably too much work" (Strudler & Wetzel, 2008, p. 139) Streamlining could take many tacks, and one multi-faceted assignment could be used to meet several standards, rather than requiring a separate artifact as evidence for each standard. Alternately, evidence could be based on particular stages or transition points in a program rather than from all courses throughout the program. This would streamline procedures and support the notion that more is often not better when it comes to the quantity of standards and artifacts.

Overall, decisions about whether and how to implement EPs should begin with clarifying the goals for implementation and analyzing the costs and benefits involved. While it is clear that these seven recommendations do not provide a sure-fire formula, we believe they will help programs avoid some predictable pitfalls and lead to effective implementation to achieve multiple goals. We believe that achieving stakeholder consensus on EP purposes, the number of standards and sub-elements, the number of required and self-selected artifacts, the extensiveness of the student reflections, and the expectations for faculty feedback can help produce a doable and ultimately more valuable EP system for all concerned.

Author Notes

Neal Strudler is a professor of educational technology in the Department of Teaching and Learning at the University of Nevada, Las Vegas. His research interests include the implementation of electronic portfolios, online learning, and mobile devices in teacher education and K–12 schools. Please address correspondence regarding this article to Neal Strudler, Department of Teaching and Learning, University of Nevada, Las Vegas, 4505 S. Maryland Parkway, Las Vegas, NV 89154-3005. E-mail: strudler@unlv.nevada.edu

Keith Wetzel is professor of educational technology at Arizona State University. His research interests include professional development, electronic portfolios, the viability of the required educational technology course in initial certification programs, and the STEAM (science, technology, engineering, arts, and math) curriculum in early childhood programs. Please address correspondence regarding this article to Keith Wetzel, Arizona State University, 4701 W. Thunderbird Rd., Glendale, AZ 85306. E-mail: keith.wetzel@asu.edu

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