

Chapter I

Instructional Roles of Electronic Portfolios

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ABSTRACT

This chapter presents an overview of 11 different ways in which electronic portfolios (ePortfolios) can support the teaching and learning process. Too often, discussion about the general instructional nature of ePortfolios is reduced to two distinct roles: portfolios as a means of assessing specific student performance, and portfolios as a showcase for outstanding student accomplishments. This chapter summarizes how ePortfolios can contribute to the design and implementation of effective instruction in many ways by assuming a variety of roles that go beyond a traditional approach to portfolio use in the classroom. These roles include artifact creation as meaningful context, goal-setting, practice with a purpose, examples and non-examples, assessment, reflection, communication, instructor planning and management tool, learner organization tool, interdisciplinary teaching and learning, and historical records/stories as role models. Examples of portfolio requirements and assessment strategies from a higher education teacher preparation program are used to illustrate these different roles.

INTRODUCTION

Electronic portfolios (ePortfolios) can play a variety of roles within any given educational environment. Teachers might use ePortfolios as a means of assessing student achievement by designing portfolio artifact requirements that

reflect the successful learning and application of specific skills. Similarly, ePortfolios can be used to showcase outstanding student achievement in general if the required portfolio artifacts are designed to communicate the “best work” of students rather than the learning of specific outcomes. And because ePortfolio ar-

tifacts can be accessible via computer networks, the portfolio development experience can be used to ensure learner accountability as teachers, other students, parents, and even total strangers examine specific portfolio content.

Assessment, showcasing best practice, and learner accountability constitute some of the more common ways in which ePortfolios can be used within an educational environment. But these different roles represent just a small sample of the many different ways in which ePortfolios can support student learning. After designing and implementing ePortfolio requirements for different teacher education programs throughout the past 10 years, I have discovered that the true value of ePortfolios lies in the variety of ways portfolio artifact requirements can support the instructional process by defining effective general as well as specific instructional strategies.

The purpose of this chapter is to present a broad picture regarding how ePortfolios might be used to help facilitate learning within typical K-12 or higher education environments. In most cases, the roles presented in this chapter represent the application of instructional strategies designed to facilitate the learning of specific outcomes. The instructional strategies described within each role are consistent with those presented in many instructional design models, including the essential elements of effective instruction (Hunter, 1982), the systematic design of instruction (Dick & Carey, 1996), the conditions for learning (Gagné & Driscoll, 1988), and the constructivist-oriented models of Jonassen, Peck, and Wilson (1999).

Each of the following sections presents a single role along with a description of how portfolios playing such roles can be used to support effective instruction. Additionally, examples from the application of ePortfolio requirements within a preservice-teacher educa-

tion program are provided to clarify specifically how ePortfolios might be used within typical instructional settings.

ROLES

Role 1: Artifact Creation as Instructional Context

Regardless of what role an ePortfolio might play within a typical learning experience, there is one thing that all ePortfolios have in common: the learners must *create* portfolio elements or artifacts to be presented within the portfolio itself. Artifacts might be developed specifically for an electronic format (like a Web page with annotated hyperlinks), or the artifacts might initially represent specific things that were not developed for inclusion in an electronic environment, such as a science project involving living organisms. In a case such as this, learners might communicate the essence of the science project within an electronic environment by capturing a series of digital images, generating digital graphs and charts, developing electronic documents that detail the design and data collection procedures, and so forth. But whether or not a learner decides to configure a piece of non-digital work to be displayed within an ePortfolio or develop something specifically for electronic delivery, the actual act of creating something for inclusion in an ePortfolio becomes a context for learning and applying a variety of skills.

A good illustration of how the act of creation can help define meaningful learning environments can be found in a closer examination of the requirements for a teacher preparation portfolio. Figure 1 presents an example of some ePortfolio requirements that could be used within a teacher preparation program. These sample ePortfolio requirements were designed to docu-

ment and communicate the learning of skills reflected in a number of national standards for professional educators, such as the Interstate New Teacher Assessment and Support Consortium's (INTASC's) core teacher education standards (see <http://www.ccsso.org>) and the International Society for Technology in Education's (ISTE's) national educational technology standards for teachers (see <http://cnets.iste.org/teachers>). Today, many pre-service teachers must develop such portfolios in order to communicate their accomplishments throughout their teacher preparation programs. One common artifact in this type of portfolio is a lesson plan or unit study (an example of this is presented in "Portfolio Component 7: Problem-Based Learning Instructional Material" within Figure 1). This type of artifact might include a description of the lesson plan itself, copies of instructional materials developed, and possibly a report detailing how effective the lesson was after being implemented within a field experience assignment. Initially, a portfolio artifact like this might consist of a word-processed lesson plan, materials developed from a variety of media, and a separate report that presents achievement data in tabular form. Creating an ePortfolio artifact that presents this information might involve scanning documents to create digital pictures, converting word-processed pages to Web pages, and taking digital pictures of non-digital material. And all this information would need to be organized and stored within some type of digital media environment, such as a Web site or CD-ROM. This act of "creation" would necessitate the learning and/or application of a variety of skills related to the use of the technologies needed to make it all happen.

If you examine the list of basic skills that all teachers should be able to perform as recommended by ISTE, you would find that the act of successfully creating such electronic artifacts

from existing teacher education material would provide evidence that the teacher candidate had mastered all the skills inherent in the "Technology Operations and Concepts" category. And more importantly, these skills would have been learned and/or applied within an environment that was meaningful for the learners—that is, to successfully communicate their lesson or unit plans to their supervisors and possibly peers.

Role 2: Goal-Setting/Instructional Scaffolding

If providing a concrete creation-oriented context for the learning of specific skills is one of the most important roles that ePortfolios can serve within the teaching and learning process, then using ePortfolio requirements as a means of setting personal learning goals would probably rank a close second in terms of instructional importance. Clearly articulating the goals of a new learning experience constitutes one of the most important instructional strategies that should be included within any instruction. And providing learners with a detailed picture of all the artifacts that are expected to be included in an ePortfolio represents a very comprehensive way to communicate instructional goals. For example, professional education students who are expected to develop an ePortfolio based on the artifacts presented in Figure 1 are not only provided with a clear picture of what their portfolios should include, but the descriptions of each artifact also provide some direction with respect to individual assignments that will eventually lead to the creation of specific artifacts.

In order to develop an artifact that meets minimum design criteria, learners often require a more detailed development rubric or guideline. An example of this is presented in Figure 2. This chart presents criteria for the creation of material that will be projected (i.e., Microsoft

PowerPoint presentations). These guidelines would be used to evaluate an artifact corresponding to the “Portfolio Component 4: Professional Presentations” in Figure 1. Understanding the specific requirements of an assignment in clear detail not only helps support learners by clarifying instructional goals, but the design requirements themselves can act as instructional support mechanisms for learners, providing them with opportunities to compare their progress to the project requirements. This type of support, often referred to as “metacognitive scaffolding” (Hannafin, Land, & Oliver, 1999), in combination with clear instructional goals, constitutes very effective instructional strategies for learners of all ages.

Role 3: Practice with a Purpose

Another important instructional role that an ePortfolio might play within any given learning experience relates closely to the first role (providing a context for learning and applying specific skills). If teachers require portfolios to be electronic in order to provide a context for learning and applying technology-related skills, then the act of successfully creating digital artifacts will no doubt require practice using various types of technology to successfully accomplish all required tasks. Lots of practice. Instead of assigning word-processing, scanning, and Web development lessons simply for the sake of learning how to scan or use a word processor, the journey toward successful portfolio development can be rich with practice using technology for a very definite purpose.

Role 4: Examples and Non-Examples

One of the most important instructional strategies for learning both knowledge and procedural skills is the availability of examples as

well as non-examples that illustrate information, concepts, and rules (Gagné & Driscoll, 1988; Merrill & Tennyson, 1994). And one of the greatest strengths of ePortfolios is the ability to access portfolio content relatively easily. Most teachers and students appreciate the ability to have samples of unacceptable, acceptable, and outstanding work associated with specific assignments. ePortfolios provide teachers with the opportunity to easily collect and organize copies of specific artifact samples that have been evaluated and categorized. Because the artifacts are electronic, they can be readily edited to remove personal identifying information. These artifacts can then be made available to students during class by projecting them onto a screen when needed, or they can be accessed from computer via the Internet.

The components presented in Figure 1 offer many good examples of how previously developed portfolios might be used by teacher educators to help students learn specific skills related to teaching. Imagine you are a faculty member facilitating a methods class addressing important pedagogical topics, such as classroom management. Now suppose you assigned your students the task of developing a plan for improving the use of computers in the classrooms they were observing within their field experience placements. Students might include this assignment as part of their overall education portfolios, with the resulting work becoming a portfolio artifact in “Portfolio Component 2: Media as Tools of the Professional Educator” as presented in Figure 1. Specifically, the assignment might be included in “Subcomponent 2c: The One Computer Classroom.” As a teacher, part of the instruction for this assignment could focus on your presentation of cooperative learning strategies that address the need for role assignments when sharing limited resources (Johnson & Johnson, 1998). If you had access to previously submitted portfolio

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Figure 1. Sample professional education ePortfolio requirements

Portfolio Component	Sub-Component	Artifacts/Criteria
1. Web-Based Portfolio Shell	a. Personal Image	Create and present a personal image digital file that includes: <ul style="list-style-type: none"> Personal image scanned or obtained via digital camera Converted to .gif or .jpg Economic use of size/colors
	b. Links	Develop, at a minimum, a Web page presenting links that include: <ul style="list-style-type: none"> Grade-level/subject matter professional organizations and journals Employment opportunities Grade-level/subject matter resources and references Local-state-national standards for specific grade level and/or content area
	c. Instructional Web Site Reviews	Develop a Web page that presents an overview of at least three existing educational Web sites, including a description of how they might be useful in facilitating specific standards related to your future professional practice
	d. Personal Philosophy and "Best Practice" Showcase	Present clearly articulated personal educational philosophies (before and after field experience) Present a sample of work representing area of personal, professional "Best Practice"
	e. Résumé	Create a professionally formatted Word document including, at a minimum: <ul style="list-style-type: none"> Educational background Technological competencies Community service experiences Previous work experiences Personal and career goals
2. Media as Tools of the Professional Educator	a. Instructional Management Tools	Communicate strategies and examples illustrating successful use of electronic media to improve instructional management skills and procedures (grades, record-keeping, resource management, etc.)
	b. Communication Tools	Present strategies and examples illustrating successful use of electronic media to increase classroom communication with the outside (real) world
	c. The One-Computer Classroom	Present a clearly articulated description and examples of the effective use of a single or small number of computers in your specific grade level or content-area classroom (if applicable)
	d. Resource Access and Use	Present descriptions of how the following education-related resources were obtained from the Internet and used (legally and ethically) within your professional practice: <ul style="list-style-type: none"> Freeware/shareware Lesson planning resources Images/sound/video files
	e. Media as Context	Present specific ways in which you have used electronic media to increase the meaning and/or purpose of instructional experiences in your classroom
	f. Media in the Content Area	Present unique ways in which electronic media, particularly computers, are being utilized to improve the quality and effectiveness of specific content-area and/or grade-level instructional methods and strategies

Figure 1. continued

<p>3. Educational Research and Evaluation</p>	<p>Develop a well-constructed narrative presenting educational research, evaluation, and/or assessment efforts; this <i>may</i> be a project and/or report successfully completed within an approved evaluation or research course</p> <p>Generate effective graphic data presentation where appropriate</p>	
<p>4. Professional Presentations</p>	<p>Create electronically projected material (such as PowerPoint) conforming to appropriate projected message design criteria of a presentation you have made to a group of students or professionals (building or district meeting, conference, etc.)</p>	
<p>5. Educational Material Evaluations</p>	<p>Evaluate instructional material (print, software, Web site, etc.) used to facilitate the learning of specific outcomes; evaluation report should include (but is <i>not</i> limited to addressing):</p> <ul style="list-style-type: none"> ▪ <i>Context:</i> Critical analysis of the learning context established ▪ <i>Components:</i> Identification and critique of instructional design components presented within the instructional material ▪ <i>Conditions:</i> Identification of outcomes addressed within the instruction, description of conditions and strategies implemented, critique of relationship between conditions/strategies and outcomes ▪ Evaluation of message display characteristics employed 	
<p>6. Content Area Conceptual “Big Pictures”</p>	<p>Create graphic concept map(s) depicting the relationships between distinct key ideas, skills, knowledge, concepts, and/or other important aspects of grade levels and/or content-area domains</p>	
<p>7. Problem-Based Learning Instructional Material</p>	<p>Plan, develop (author), implement, and evaluate instruction designed to facilitate the learning of specific standards/outcomes within a problem-based learning context. This learning experience should include, but is not limited to, the following elements:</p> <ul style="list-style-type: none"> ▪ Outcome(s) the program is designed to facilitate must be clearly stated and well written ▪ <i>Context:</i> Meaningful, purposeful problem-based learning context must be established ▪ <i>Components:</i> Appropriate instructional design components must be developed for context type ▪ <i>Conditions:</i> Appropriate strategies and conditions must be developed for outcome type(s) ▪ <i>Message Display:</i> Instructional messages and program usability must conform to appropriate standards <p>Evidence of student achievement must be included in the final evaluation of the material</p>	
<p>8. Instructional Design Project Management</p>	<p>Provide a record of design documents for one or more lesson-planning or instructional design projects: storyboards, instructional analyses, instructional strategy descriptions, formative evaluation procedures, summaries of any client/designer interactions, and functional specifications for the use of tools/media to solve particular lesson planning and instructional materials development problems</p>	
<p>9. Formative Evaluation Practices</p>	<p>Present plans and results from formative evaluation experiences conducted during your field experiences, including one-to-one evaluations, expert reviews, and field trials</p>	
<p>10. Strategies for Cultivating a Learner-Centered Classroom</p>	<p>a. Meaningful Learning Contexts</p>	<p>Provide evidence that lessons presented within meaningful contexts enable learners to set their own personal goals and relate to the learners’ personal lives</p>
	<p>b. Differentiated Instruction</p>	<p>Provide evidence of enrichment, remediation, and alternate means of implementing instructional strategies to facilitate the learning of specific outcomes</p>
	<p>c. Time Management</p>	<p>Provide evidence that specific lessons (particularly large project- or problem-based experiences) allow learners to schedule their time (day, week)</p>
	<p>d. Physical Classroom Arrangement</p>	<p>Provide evidence that the physical arrangement of the classroom in which you facilitated learning: (1) ensured that necessary classroom resources were readily available to the learners; and (2) accommodated all <i>learner-centered classroom</i> strategies</p>

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Figure 1. continued

	e. Adequate Instructional Scaffolds	Present adequate scaffolds for specific instructional experiences; such scaffolds might include procedural, conceptual, metacognitive, strategic, and/or interpersonal support mechanisms for individual learners
	f. Self-Assessment	Present evidence that you structured self-assessment experiences for your learners and provided analytic rubrics at the beginning of a problem or project-based learning experience
	g. Roles	Provide evidence that you assign specific roles to each member of learning teams and implement other appropriate forms of positive interdependence when grouping students
11. Multicultural Classroom Environment		Provide evidence that you: (1) identified biases in the instructional material used to facilitate learning and you communicated these to your learners; and (2) developed instructional experiences that foster positive attitudes toward human diversity
12. Field Experience Reflections		Present a variety of narratives documenting your personal insight and growth as you journey through your field experiences; these reflections should reference the feedback received from formal as well as informal evaluations conducted by cooperating teachers and university supervisors

artifacts in this category, you might be able to present actual digital pictures of students in local classrooms working in small groups around a single computer. Such examples might depict one student in a group recording information by using the computer keyboard, another group member reading aloud from a text-based resource, another student leaving the group as the designated “runner” to obtain additional resources, and another student (clipboard in hand) monitoring group activity to provide feedback over group member behaviors. Having such clear examples of role assignments would certainly help those students who were learning about formal cooperative learning strategies to acquire for the first time skills associated with the development of such strategies within their own lesson planning.

Role 5: Assessment

As previously discussed, ePortfolios are often used as a platform for the presentation of “best practice” examples, and they are also commonly used as a means of collecting and orga-

nizing artifacts that represent evidence of achievement aligning with specific learning outcomes. In both cases, learners can use detailed portfolio requirement criteria (as well as examples of artifacts developed by other learners) to help them regulate their learning and assess their progress as they develop their own artifacts. More directly, portfolio artifacts can be used to measure the learning of outcomes that would be difficult to assess using more traditional testing procedures.

Once again, a good example of how an ePortfolio artifact could be used to measure the learning of a specific outcome is found within the portfolio requirements presented in Figure 1. The details of “Portfolio Component 6: Content Area Conceptual ‘Big Picture’” include the following:

Create graphic concept map[s] depicting the relationships between distinct key ideas, skills, knowledge, concepts, and/or other important aspects of grade levels and/or content-area domains.

Figure 2. Assessment criteria for designing projected message displays (visual literacy principles)

Assessment Category	Assessment Criteria*
General Message Display	Screen display should follow the horizontal-vertical and left-right organization that is common to the culture of the intended audience: typically left-to-right, up-to-down in American public school culture.
	Attention should be drawn to those parts of a message intended to stand in contrast to other screen elements.
	Contrasts used to draw attention should be abrupt, using one or more of the following display characteristics: <ul style="list-style-type: none"> ▪ Brightness (regular versus dimmed text and pictures) ▪ Volume (i.e., bolded font, larger font size, etc.) ▪ Color ▪ Use of graphic devices such as lines and arrows ▪ Animation
	Messages should not be obscured by too much non-critical detail. The universal rule of design should generally apply: KEEP IT SIMPLE.
	One strategy for “keeping it simple” is to limit the amount of text on the screen. This can be accomplished by bulleting key ideas, not entire sentences.
	Avoid backgrounds that fade from dark to light across the entire slide <i>or</i> present a picture or pattern with very distinct light and dark regions.
Text Use	Text and background contrast should be clear (i.e., black text on a white background, white text on a blue background, etc.).
	Use a plain, light-colored background with dark text, or a plain dark background with light-colored text.
	Standard text formatting (mixed upper and lower case letters following standard grammar) should be used throughout, even for titles, headings, etc.
	Limit the amount of text per slide! A good rule of thumb is the 6 X 6 rule: Six words per line, six lines per slide MAX.
	Usually, complete sentences use too many words. Consider presenting the key ideas as bulleted points.
	Sans serif fonts are generally easier to read than serif fonts when projected. Serif fonts have little hooks or “feet” along the edges of each character; sans serif fonts do not.
	Try not to use a font size smaller than 16 point. Generally, the bigger the better.
	Use consistent fonts throughout (do not mix too many font types).
	Keep text away from side edges and borders.

Successfully accomplishing this task would involve, at a minimum, the application of skills in the areas of developmentally specific content knowledge, concept mapping, and the use of software enabling the visual creation or representation of a concept map. Now consider an elementary education student who is expected to learn the skills indicated within the National Council for Accreditation of Teacher Education’s (NCATE) program standards for elementary teacher preparation, based on the

standards developed by the Association for Childhood Education International (AECI). One of the standards in the “Connections Across the Curriculum” category states:

Candidates know and understand the connections among concepts, procedures, and applications from content areas.

Assessing this outcome might be easily accomplished through exams within specific con-

Figure 2. continued

Pictures and Illustrations	A picture's function on the slide should be clear (conceptual support, graphic organizer, lucid example, etc.).
	Pictures and illustrations should be closely related to the context of the text.
	Pictures designed to organize concepts and ideas should incorporate devices stressing temporal (time), conceptual, and/or spatial relationships: <ul style="list-style-type: none"> ▪ Storyboard layout ▪ Sequence emphasized by arrows, numbers, or labels ▪ Pictures in sequence presented one at a time in correct sequence (or video used to achieve same result) ▪ Spatial organization utilizes 3D diagrams or superimposition of features
	Pad the space around graphics (do not let text get too close to your pictures).
	Make the picture background transparent if it is different from slide background (or place a border around picture).
Diagrams, Charts, and Graphs	Diagrams and charts should be used to concisely communicate the relationship between related variables, especially variables that have numeric data presented in tables...
	...BUT concrete ideas might end up too abstract when presented in graphic form.
	Attention should be drawn to captions.
	The relative importance of elements should be represented by relative sizes in the diagram, thicker lines for stronger relationships, and so forth.
	Graphs depicting more precise amounts should utilize a Cartesian graph (x and y axis).
	Graphs depicting comparative amounts where precision is not important may utilize pie charts.
	Trends should generally be illustrated by line graphs.
	Comparisons may be illustrated by bar graphs or pie charts.
Because chart labels are often presented in smaller font, it is usually best to place graphs and charts on individual slides with completely white backgrounds.	

Note: Many of these visual design guidelines were adapted from Fleming and Levie (1993)

tent-area courses, though many higher education subject matter courses do not necessarily address content as it relates to specific grade levels. But even if exam results were obtained for individual students, a relationship would need to be established between specific test items and “ ... connections among concepts, procedures, and applications.” Compare this option with using the corresponding ePortfolio artifact requirement for the development of a conceptual “Big Picture” (Figure 1, Component 6). In this case, the portfolio artifact reflects a means of assessment that is easier to access and communicate among and between faculty,

and it represents a very effective way to measure the performance of those concepts indicated within the standard.

Role 6: Reflection

A very effective instructional strategy that applies to the learning of most types of skills is the facilitation of a review or closure experience within the instructional experience. Particularly for adult learners, some of the more effective review activities include ensuring that individual learners reflect on what they learned, and examine the strengths and areas for im-

provement regarding *how* they learned these new skills (Knowles, 1984).

Most ePortfolio environments include the ability to easily add comments and/or notes to works-in-progress as well as completed artifacts. This capability of ePortfolio systems makes it easy to include opportunities for reflection and self-evaluation into the portfolio requirements. Figure 1 includes an example of a formal reflection requirement for a teacher education portfolio (“Portfolio Component 12: Field Experience Reflections”). Additionally, artifact creation often involves the development of many different versions or drafts before a permanent portfolio fixture is produced. These drafts can help learners reflect on the process they personally engaged in as they developed a complete and acceptable artifact.

Role 7: Communication

Many ePortfolio development programs and service (such as LiveText or TaskStream) include Web-based communication features. In addition to easily sharing electronic artifacts with others by displaying the material in Web pages, most of these popular Web-based ePortfolio environments integrate e-mail features, the ability to post comments within an electronic bulletin board, and even the ability to communicate in real time within Web-based chat windows.

There are a variety of ways in which e-mail, bulletin boards, and chat capabilities can improve the overall efficacy of an instructional experience. First and foremost, these methods of communication can provide feedback for students who are trying to learn specific skills. Feedback can come from teachers, peers, or even outside experts who might be invited to participate in a review of material. Likewise, additional examples and non-examples can be provided by various members of a learning

community when a request for such support is made. This type of communication could also provide encouragement and motivation for learners as they engage in dialogue with others interested in their projects. And speaking of motivation, knowing that finished projects could be accessible to parents, peers, and/or potential employers can motivate some students to learn and perform at their best.

The ability to communicate with others also makes it possible to work on group projects more effectively. Today, computer users on a network can share files, work on the same file simultaneously, and communicate in real time with members of a learning community regardless of their physical location. These resources might encourage educators to include more collaborative exercises within a course, which could lead to more effective learning experiences for those students who flourish in socially rich learning environments.

Role 8: Instructor Planning and Management Tool

Perhaps one of the most overlooked roles that ePortfolios can play in the teaching and learning process is the support that portfolios provide in the planning and management of instructional experiences. ePortfolios can help teachers manage the instructional process by enabling them to view, track, and evaluate learner progress from a single networked computer. And the built-in communication features within many ePortfolio environments can simplify the process of informing students about various aspects of their project development.

In addition to helping manage the instructional process, all the decisions that educators must make about the type of artifacts to be included within student portfolios as well as the development of assessment rubrics and/or grading criteria to help guide student portfolio cre-

ation constitute very effective planning practices. For example, consider the thought processes that most likely went into developing just one of the portfolio requirements presented in Figure 1. Portfolio Component 10, for example, includes the artifact requirements for teacher education students in the area of cultivating a learner-centered classroom. These learner-centered strategy categories include: (a) meaningful learning contexts, (b) differentiated instruction, (c) time management, (d) physical classroom arrangement, (e) adequate instructional scaffolds, (f) self-assessment, and (g) roles. The descriptions included for each of these categories needed to be developed in an organized and clearly worded fashion. In fact, the wording of the descriptions could be regarded as instructional goals. And these goals were most likely formulated in accordance with a broader set of standards to which all teacher education students would be held accountable.

Examining one of the ACEI standards for elementary educators illustrates this point. The following represents one of ACEI's "Instruction" standards:

3d. Active engagement in learning—Candidates use their knowledge and understanding of individual and group motivation and behavior among students at the K-6 level to foster active engagement in learning, self-motivation, and positive social interaction and to create supportive learning environments.

The connection between this standard and the individual strategy categories included in Portfolio Component 10 appears fairly direct. Education faculty members who might be responsible for ensuring that students involved in field experience activities develop portfolio artifacts in compliance with Portfolio Component 10 already have their instructional goals estab-

lished, and these goals are already aligned with national professional standards. In addition to established goals, education faculty members may also have easy access to Portfolio Component 10 artifacts from previous students. As indicated earlier in this chapter, such resources can be invaluable resources in the development and implementation of effective instruction.

Role 9: Learner Organization Tool

In addition to helping educators plan and manage the instructional process, ePortfolios can also play an important role in organizing the learning process for students. Portfolio requirements can be used as a conceptual "Big Picture" throughout students' courses and projects. This can help learners make connections between new skills they are learning and those skills they have already learned. Likewise, this "Big Picture" can be a constant reminder of the overall instructional goals that learners would be expected to achieve within a course, grade level, or program. And access to portfolio components and artifacts that have been developed by other learners can be used as a means of ensuring that the instructional goals are clearly understood by each learner.

Clearly defined goals can help learners mentally organize many aspects of an instructional experience. But portfolios can also help learners remain organized in other, more concrete ways. Because ePortfolios include a variety of computer file types that comprise the resources used to develop a particular artifact, learners must organize their work according to the conventions of typical computer environments. Figure 3 presents an example of the types of folders and files that might be included in a computer workspace used by individual students in the process of developing ePortfolio artifacts. Generally speaking, experienced computer users learn that complex projects involv-

ing many different types of files require an organized file structure on their computer in order to manage and keep track of everything. By encouraging learners to develop an organized structure like the one used in Figure 3, teachers can model metacognitive strategies. And for teacher education students, this type of modeling might also impact their ability to establish procedures for structuring learner-centered classrooms.

Modeling an organized way to manage the portfolio development process is an important means of helping students learn and apply project management skills. Another form of support, or scaffolding, is inherent in the use of detailed assessment rubrics or grading criteria for each artifact. These rubrics can be used by students to regulate their own learning and plan

the steps needed to successfully accomplish each task.

Role 10: Interdisciplinary Teaching and Learning

One thing that becomes very apparent after closely examining the requirements presented in the teacher education portfolio sample in Figure 1 is the fact that, as a whole, the portfolio is much bigger than any single course could address. Indeed, teacher education students hoping to develop all the artifacts for their portfolio would need to apply and repurpose material from a variety of courses, field experience assignments, and personal experiences. This is a prime example of interdisciplinary teaching and learning. Skills and experiences

Figure 3. Typical computer file structure for supporting the development of electronic portfolio artifacts

Folder	Sub Folders	File Descriptions
Assignments	Portfolio Requirements	This folder might include a document that details the requirements for the overall portfolio (similar to Figure 1).
	Artifact Rubrics	Rubrics or assessment criteria for each artifact could be included in this folder (documents similar to Figure 2).
	Calendars and Timelines	Project management information, such as calendars, timelines, task lists, and so forth, could be included in this folder.
In Progress	Project 1 Folder	This folder would include documents related to one specific project/artifact. Word processing documents, Web page files, video clips, and so forth could be included in this folder.
	Project 2 Folder	A separate folder for each project could be developed to organize the files that will contribute to the final product for each artifact or project.
	Images	Image files to be used throughout the various projects could be stored in one folder in order to make it easier to keep track of them. This folder might include two sub-folders, one for the images in their pre-edit phase, and the other with images that are ready to be used in Web pages.
	Resource Files	Additional resource files that might be used throughout the portfolio development process could be included in this folder, including a file that keeps track of all references used throughout the different projects, files that include resource information obtained from various sources, and raw artifacts such as course research papers that might be used in other projects.
Completed	Project 1 Folder	This folder might include all the files constituting a completed artifact, including Web pages, images, video clips, and so forth.
	Project 2 Folder	Separate folders for each completed project should be established. These folders could be labeled with the same numbering convention used in the overall portfolio requirements document. For example, the numbering and labels used in Figure 1 might result in a completed projects folder with the label "artifact_10c."
	Checklists	This folder would include the checklists used to keep track of the status of various projects.

from one course might need to be directly applied to projects in another course, and assignments for specific courses might need to be directly tied to the general portfolio requirements, ensuring that a broad set of standards are learned across courses. And the challenges associated with evaluating portfolio artifacts throughout an individual student's journey through a teacher education program would necessitate the need for faculty members to work closely together in order to maintain consistency, quality, and accountability.

Role 11: Historical Records and Stories as Role Models

The final ePortfolio role addressed is a very good role on which to end this chapter. When comprehensive, programmatic portfolios like the one presented in Figure 1 are completed, the learners leave behind an official, historic record of their experiences within the program. Collectively, the portfolio tells a detailed story of personal achievement. Portfolios can also provide the opportunity to get inside the mind of learners as they faced the many challenges associated with learning important things. And the personal nature of these stories can be used by educators to help novice learners acquire positive attitudes about learning those skills that other students have learned before them.

CONCLUSION

ePortfolios are not always designed to support the instructional process. As previously indicated, portfolios can be used as a means of communicating the best practice of students, or more commonly they can be used simply as a means of assessing student achievement. But ePortfolios can also be used to support the instructional process in a number of effective

and creative ways, as illustrated by the 11 different roles presented in this chapter. Today, the options available to educators in the area of ePortfolios are tremendous. There are numerous Web-based services that provide students with computer-based products and services designed to help them develop portfolio material in digital form to be organized and delivered via the Internet. Most school districts and institutions of higher education provide students with the resources needed to store digital information in a variety of formats. And as more homes become networked, the opportunities for learners to extend their portfolio development efforts into their lives outside school expands the possibilities of using ePortfolios to establish meaning, purpose, and personal relevance to the activities that occur within the classroom. Also, when students graduate and move on to bigger and better things, they leave behind stories and examples that can be used to support instruction for future learners.

Setting an example is not the main means of influencing another; it is the only means.

—Albert Einstein

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KEY TERMS

Assessment: Measurement of the degree to which a learner acquired the skills, knowledge, and/or attitudes that a learning experience was designed to facilitate.

Instructional Context: All the factors external to learners within an instructional environment that provide meaning for the messages they receive. These are the factors that influence and define what, when, where, how, why, and with whom individual learners learn from instruction.

Instructional Design: Process of deciding how a learning environment should be arranged (specifying specific instructional events and learning conditions) in order to maximize the probability that targeted learners will acquire specified skills, knowledge, and/or attitudes.

Instructional Scaffolding: Support mechanisms included within a learning environment designed to help individual learners successfully accomplish their learning goals.

Instructional Strategies: Activities specifically designed to achieve instructional goals. Generally, the most effective strategies used within an instructional experience depend on the types of skills, knowledge, and/or attitudes facilitated.

Media: Physical elements within a person's environment that communicate messages.

Metacognitive Strategies: Plans or approaches learners use to accomplish difficult cognitive tasks such as problem solving.

Reflection: Activities related to specific learning experiences in which learners think about what they are learning, how new things being learned relate to their preexisting knowledge, and how they are personally learning the new skills, knowledge, and/or attitudes.