

ASSESSING AND MONITORING STUDENT PROGRESS IN E-LEARNING ENVIRONMENTS

EDWARD L. MEYEN¹, RONALD J. AUST², YVONNE N. BUI, & ROBERT E. ISAACSON*

Abstract

E-learning has emerged as a form of pedagogy and as a delivery system with broad implications for meeting personnel needs nationally in special education. At present, it is important to make investments in research and development to ensure that this new pedagogy becomes fully developed and is appropriately applied. Assessment and monitoring of student progress in e-learning environments is an important element of this new form of pedagogy that requires research attention to maximize the effectiveness of e-learning when applied to teacher education. The authors draw upon their personal online teaching experience in addressing strategies for assessing student performance and using electronic portfolios in e-learning environments, both presented as integral aspects of e-learning instructional process. Perspectives from the literature and lessons learned from the authors' own experience are shared.

INTRODUCTION

With the advent of the Internet a new form of pedagogy has emerged that has unprecedented potential for expanding access to and improving the effectiveness of personnel preparation programs in meeting national needs in special education. This new form of instruction has spawned many questions related to effectiveness, responsiveness of adult learners, appropriateness for teacher education, and viability for the future. A brief look at what is occurring will help build a perspective on e-learning in personnel preparation.

In the United States, 97 percent of full-time faculty and staff at two – and four-year institutions of higher education have access to the Internet, and 40 percent use Web sites to post course-related information (U.S. Department of Education, 2001). In recent years, virtual universities, with no prior education

¹ elm@ukans.edu

² aust@ukans.edu

* The University of Kansas – e-Learning Design Lab, USA.

histories, have come into being, attracting large enrollments. This has contributed to universities responding by placing courses and degrees online. For example, the Online Academy, a project funded by the Office of Special Education Programs (OSEP), produced 22 online modules for teacher education that were adopted by over 160 universities (Meyen, 2000). Nearly 710,000 students in 1998 were enrolled in at least one online course. In the general-use market some industry estimates predict that the number of users worldwide will pass the one billion mark by 2005 (United States Internet Council, 2000). Similarly, the corporate e-learning market is expected to surpass the \$23 billion mark by 2004, up from \$2 billion in 1999 (IDC, 2001).

Questions related to the capacity to deliver e-learning and the acceptance by adult learners in the professions of this new mode of instruction have been sufficiently validated to warrant investing in research and development of e-learning in teacher education. The growing need for special education teachers and for professional development on the part of practicing professionals in special education is well documented (Higher Education Consortium for Special Education, 2001). What is not clear is the level of commitment by agencies and teacher education programs to research and development as a way to build on what is known about teaching and learning in maximizing the power of e-learning for adults. This is essential if we are to leverage this new capacity in meeting national personnel needs. While funding agencies such as OSEP have demonstrated leadership by supporting e-learning projects, they have tended to support initiatives that result in content-based programs. However important these programs are, support is needed of work targeted at improving instructional designs, expanded features, e-learning teaching/development tools, maximizing emerging technologies to personnel preparation applications, instructional management options for e-learning environments, and research on matching the attributes of adult learners with the instructional and assessment features of e-learning.

We are not talking here about replacing traditional approaches to personnel preparation with e-learning strategies. Rather, we are proposing that major attention be paid to exploring how to make this new form of pedagogy, with all its potential and shortcomings, maximally effective in the shortest period of time while also generalizing the best features to face-to-face instruction. Since it may become the dominant methodology for adult learners in the future, it should be made as powerful as possible. This requires attending to what we know about the principles of teaching and learning and determining how these principles generalize to e-learning as well as focusing on techniques that are unique to e-learning. In these efforts, it is important that the knowledge base and experimentation with applying this knowledge base in e-learning environments drive new designs and applications in personnel preparation rather than allowing technology alone to do so, which currently seems to be the case. Unless research and validated practices drive the use of technology in personnel preparation, we risk the development of models that are less than optimal or, even worse, that fail to achieve their potential. E-learning is a very young pedagogy and warrants the benefits of reasoned inquiry and controlled experimentation that comes with research.

The present article on assessing performance and monitoring student progress via electronic portfolios is based on the authors' personal experience. Meyen has taught asynchronous online courses employing streaming media full time since 1996. Aust has been using Web-based supports and varied versions of enhancing access to and management of student work in his courses for an equal period of time. In addition, both served in leadership roles when creating the instructional design and the development tool for the Online Academy (Meyen, Skrtic, Deshler, Lenz, Sailor & Chaffin, 2000). They are now part of the e-Learning Design Lab involving researchers from the departments of engineering and education. Examples will be used to illustrate the practices described. The intent is to focus on experiences in online instruction and web-based supports in providing examples of how the pedagogy of e-learning accommodates good teaching practices and the contributions of employing sound assessment practices and the use of electronic portfolios in building a more powerful pedagogy of e-learning.

A LITERATURE PERSPECTIVE ON E-LEARNING ASSESSMENTS AND STUDENT PERFORMANCE

The following discussion of assessment of student performance in e-learning environments for personnel preparation is based on our conviction that assessment is integral to instruction, and that it must be continuous and maximize feedback.

Principles of Assessment

While the underlying principles of assessing the performance of adult learners do not change when applied to e-learning, the e-learning environment does differ significantly from traditional modes of instruction. The e-learning environment creates opportunities for and possibly demands more intensive assessment. That is, while technology adds a level of efficiency to assessment in e-learning environments, it must also compensate for the lack of easy access to personal observation. Pennsylvania State University (1998) has developed a set of principles to guide assessment of e-learning in distance education and has published a guide for translating them into practice. These principles reinforce the importance of integrating assessment with instruction. They are as follows:

1. Assessment instruments and activities should be congruent with the learning goals and skills required of the learner throughout a distance education program or course.
2. Assessment and management strategies should be integral parts of the learning experience, enabling learners to assess their progress, to identify areas of review, and to reestablish immediate learning or lesson goals.

3. Assessment and measurement strategies should accommodate the special needs, characteristics, and situations of the distance learner.

In discussing assessment of student performance online, Kibby (1999) sees assessment as central to the teaching learning process and as part of the management system. Assessments should measure student performance and result in feedback to students about their performance. Kibby goes on to detail nine decisions to be made when developing assessments for Web-based instruction.

1. Which perspectives of learning are going to be assessed, cognitive (acquisition of knowledge), behavioral (skill development), or humanistic (values and attitudes)?
2. Who is going to make the assessment, the student, their peers, or the instructor?
3. Will assessment strategies be learning experiences in themselves?
4. Is the assessment to be formative (providing feedback during learning) or summative (measuring learning at the end of the process)?
5. Are judgments of performance to be made against peer standards (norm referenced) or established criteria (criterion referenced)?
6. How can assessment provide a balance between structure and freedom?
7. Will the assessment be authentic, related to real life situations?
8. Will the assessment be integrated, testing a range of knowledge and skills?
9. How can reliability and validity of assessment be assured?

Related to networked learning, McConnell (1999) observes that assessment may be one of the last remaining bastions of academic life in that in a formal course it is usually the one element where the learner has no, or very little, say or control. The instructor usually carries out the assessment unilaterally with the final decision about learner performance being their personal perspective. While this may be driven by the professional responsibility of the instructor for determining proficiency in skills or knowledge of the subject matter, assessment can be made a more integral part of the e-learning teaching/learning process. In doing so, it becomes feasible to design assessments that permit the learners to allow their performance to influence subsequent assessments. This is particularly true in e-learning where technology allows for frequent and varied assessments. The key in assessing the performance of students in e-learning is to remain focused on the learner's attainment of the instructor's stated goals and objectives. In doing so it is important to resist opportunities to impose assessments merely because technology facilitates the process.

E-Learning Design Implications

Because e-learning largely requires that courses are designed in advance of teaching, the instructor as the developer has an opportunity to not only plan situations

to embed assessments in the instruction, but also to review the instructional content and planned experiences prior to implementation of the e-learning program. This can ensure the validity of the assessments. The development requirement of e-learning requires that the instructor (assuming he or she is also the course content developer) employs the full range of instructional skills in the teaching e-learning process. They cannot rely on interpersonal skills during teaching to compensate for weaknesses of organization in the course or the lack substance or timeliness of the content, as is possible in traditional course. Nor can well-structured learning experiences compensate for a lack of communication skills in the e-learning teaching process. All elements of the instruction must be in place in advance. For this reason there is no excuse for assessments not coinciding with the content or the emphasis of the instruction. Thus, e-learning holds instructors to the validity of their assessments. There is also no denying what has been taught in e-learning due to its public and replicable nature. This increases accountability from the perspective of the consumer (i.e., the student). Additionally, the communications capabilities of asynchronous e-learning allow for greater sampling of student performance, thus opening the door to opportunities for learners to influence the type and range of assessments made of their performance.

We must move away from viewing assessment from the perspective of periodic exams and graded activities, the results of which may or may not be discussed with the class, to considering it in the context of e-learning where students come to view their relationship with the instructor as one-on-one instruction. As this occurs, assessment can become a continuous process, much like formative evaluation in improvement of a course. It has been our experience that students truly value the personal focus on their work and the obvious efforts to enhance their performance as they progress through the instructional experiences at their own pace. The flexibility of time and place valued by students in asynchronous e-learning facilitates the use of assessment strategies as integral aspects of instruction. In face-to-face instruction, the same level of assessment may be viewed by instructors and/or students as excessively time consuming and even detracting from instruction.

Assessment Options

In viewing the range of assessment options available through e-learning, it is easy to say that they are little different from those routinely employed in face to face instruction. For example, Morgan and O'Reilly (1999) describe five different types of assessment activities that are familiar:

- Ungraded activities and feedback built into study materials
- Self-assessment quizzes and tests that allow learners to check their own learning
- Formal feedback on assignments from instructors, peers, or work place colleagues or mentors

- Informal dialogue with instructors, peers or others
- Ungraded tests that prepare learners for formal graded assessments

While these are familiar and not unique to e-learning the difference is in how technology makes them more feasible and possibly more effective to plan and execute.

Feedback

In the online courses taught by Meyen (Meyen, Lian & Tangen, 1997) assessments typically include a mid-term plus a final exam, a literature review exercise, a collaborative project, and approximately 30 activities, all embedded or strategically placed in the course. With the exception of the exams, these are constructivist activities that engage students in demonstrating continuous progress, and each provides the instructor an opportunity to intervene, as necessary, via reinforcement, directions, and/or correction through feedback. By comparison, when teaching the same course in a traditional format one day a week, Meyen was unable to provide the same level of feedback or strategically deliver the feedback at a time when the student was engaged in the activity. The submission of activities as independent learning experiences or as a vehicle for the structuring collaborative projects and the return of responses by email is seen by students as adding significantly to the usefulness of feedback.

Indeed, it is the capacity for timely and frequent feedback that transforms an assessment experience into an instructional opportunity. Wiggins (1998) defines feedback as providing a person information on how he or she performed in light of what he or she attempted. A critical factor in providing meaningful feedback is the closeness of the feedback to the task that is the focus of the feedback. That is, if students are to maximally benefit from the feedback they must be able to relate the feedback to the logic they employed in generating their response. In discussing instructor support for facilitating feedback in a Web environment, Collis, De Boar, and Slotman (2000) refer to the practical implications of feedback in the context of time expenditures, clarity of expectations for students, and efficiency of managing the overall submission and feedback process. Collis and colleagues go on to describe TeleTOP, a Web-based, support system. Inherent in the system is the capability to link to types of responses, thus reducing demands on the instructor while maintaining effective feedback to the students. Examples of links include:

- Example 1. Personal feedback by the instructor to an individual assignment
- Example 2. Model-answer provided by the instructor
- Example 3. Peer evaluation provided by the student(s)
- Example 4. Automatic direct feedback provided by the computer

If assessment is to be integral to instruction, feedback is central to the assessment process. E-learning makes this more achievable than traditional forms of instruction when factors of time and access to information are concerned.

In discussing continuous assessment in Web-based environments, Kerka and Wonacott (2000) stress the importance of pacing, feedback, and learning quality, arguing that pacing and feedback directly affect whether learners study and learn and how effectively they do so. These are features that are central to e-learning and easily accommodated in e-learning environments due to the ease of using electronic communications.

LESSONS LEARNED FROM ASSESSING STUDENT PERFORMANCE IN E-LEARNING ENVIRONMENTS

In assessing student performance through e-learning we have capitalized on the capabilities of e-learning in integrating assessments into the instructional process. Electronic communications combined with the development processes required to place a course in an e-learning format facilitate the integration of assessments into the structuring of the content, assignments, collaborative projects, creation of products and evaluation procedures. We have found that in e-learning assessments can be made less obtrusive and transformed to instructional strategies in a manner that causes students to view assessments as opportunities to demonstrate what is being learned rather than as evidence for grading.

Following are examples of assessment techniques that have been employed successfully over 12 consecutive semesters in fully online asynchronous graduate-level courses. The courses are structured around 16 lessons in which the instruction primarily consists of multimedia lectures involving streaming media in combination with access to selected resources in the form of readings, research summaries, and lists of URLs. Each lesson is accompanied by at least one activity requiring a response from students to demonstrate their understanding of the lesson content. Formative data are also collected on each lesson as input for the instructor in improving the lessons and the course. Finally, at the completion of the course students provide feedback via an instrument designed to assess teaching effectiveness. This is the same instrument as used institutionwide to assess instruction. These formative techniques encourage students to view assessment as a cooperative enterprise in that the instruction is being evaluated in addition to their performance. The lesson and course evaluations are returned anonymously to a third-party email address.

The following section includes examples of assessments that have been employed in fully online asynchronous e-learning courses by the authors.

Activities

An example of a lesson activity in the course on curriculum development entails the creating a design for a curriculum project the student is working on. Specifically, the student is required to illustrate the design graphically and provide a narrative explanation.

If a student lacks the necessary skills to submit the response in a graphic form he or she is allowed to fax the responses. This is a complex activity, in most cases necessitating two or three exchanges of communications via email between the instructor and the student before the student achieves a functional design. In addition to helping the student, the process allows the instructor to observe the level at which the students are in the initial activity and how they respond to the feedback provided. The feedback is provided within 24 hours to enhance the student's work in the refinement process.

This is a critical activity for the course being (on curriculum development), as it is important to observe the student's incremental progress in addition to the final product. In experimenting with grading we have found that it does not appear to make much difference in students' performance whether an activity is graded or not, as long as long as they are held to applying what is being learned through the activity in either exams or in projects. What is important is that the students clearly know if they have fully satisfied the instructor's expectations for their performance on a given activity.

Literature Review Activity

As a way to expand students' knowledge of the literature on the subject of the course, each student is assigned to do what is referred to as Focus Presentations – basically reviews of the published literature. Students are informed in advance that their reviews will be shared with all other students in the course. The result is that each student is creating resources for other students and the mutual benefit is that each student has access to large number of reviews developed by peers in the course. Selections must be approved in advance and cannot replicate any resource included in the structured part of the course. Knowing that their reports will be shared contributes to the quality of students' work and adds meaning to both the assignment and the assessment of their work. The instructor is provided a sample of the students work as well as their perspective on what they consider literature that is relevant to the course. The quality of the writing and the substance of the review are considered in the grading.

Collaborative Projects

Each course also includes a collaborative team project. Students are required to form teams by communicating with peers from the course roster and subsequently select their own team leader. Team membership and project topics are subject to approval by the instructor, who clearly defines how the project relates to the course. The project results in a product such as a curriculum prototype for the curriculum development course. Instructions on the projects are embedded in five to six sequential multimedia lessons with accompanying activities. Teams work through the lessons and complete the activities as a collaborative effort. The instructor provides feedback to the team leader, who is responsible for sharing the feedback with team members. Each activity response

is reviewed by the instructor as an independent element of the project. Teams may follow up with the instructor on feedback pertaining to any activity response to ensure that they understand the respective element of the project covered in the activity. After completing the activities associated with the project, the team integrates the feedback into a revision of the project and then submits it as a cohesive product for evaluation. The number of email communications between the instructor and the team leader averages about 15 plus feedback on the graded project. Since team work is one of the goals of the course, each student receives that same grade on the project. This approach to assessing performance works well when an e-learning course involves a substantive outcome that is applied in nature and to be effective in real life involves a group process. Evaluation is based primarily on how effectively the team meets the requirements of each element of the project and the extent to which they use the instructor's feedback to improve on the final project as a useful product.

In e-learning courses where the project assignment has been used, the evaluation of the project contributes about 30 percent to the course grade. In only two incidences have students reported that a team member did not contribute equally to the group effort. Students largely use electronic resources to carry out the project, but they also meet face to face if circumstances permit but it is not required. The response to the collaborative projects has been very positive. The most difficult aspect of the project process appears to be searching out team members and reaching an agreement on the project topic. This is viewed as an important outcome in itself.

Exams

Viewing assessment as integral to instruction opens up many opportunities for sampling student performance. Minimum use is made of quizzes, and exams are limited to the traditional mid-term and final exams. Exams are given online, with students having the option of submitting their responses online, by fax or delivering them to the instructor. The exams are a mixture of essay and objective items depending on the nature of the course content. Since the courses are self-paced, students take the exams at different times. To maximize the instructional value of the exams, detailed feedback is given on each item. Exams are graded in sets to help the instructor maintain a frame of reference for the expected performance.

In teaching online, there is always the issue of security and whether the student enrolled is actually the person completing the exams. In the future technology will help solve that problem. The courses reported here include an average of over 30 samples of student performance apart from the exams. Given the large number of opportunities to respond, it is unlikely that the probability of cheating is any greater than they would be in a traditional course. Nevertheless, instructors need to be alert to indicators suggesting cheating. This can be controlled partially in the design of the course and in the structuring of what is assessed via exams and other samples of student work. Proctored exams represent another option.

Student Reports in Real Time

A vehicle for assessing student performance that has proven to be helpful in evaluating performance in e-learning is the team report. To be effective, this requires a synchronous experience. For that reason, we have not used it in the asynchronous courses but have tried it in an online seminar that mixes synchronous with asynchronous techniques. Teams are formed to research a particular topic on which they are to prepare a narrative report. A Power Point presentation and use of an audio resource are used to make a live presentation. The Power Point presentation is posted in advance of the scheduled report time so other students enrolled in the class can review it prior to the session and also have the presentation on their desk top when the team reports. Students need not be at the same place to participate, but arrangements are made for group sites if members wish to be in small groups; otherwise they can participate individually from wherever they are able to access a computer and a telephone. It is important for team members to participate in all aspects of preparing and presenting the report. Creating the Power Point display is one exception as some team members may be more experienced in the use of Power Point.

This technique not only allows instructors to observe behaviors that are not evident when assessing text – and product – type responses, it also allows the instructor to probe individual team members using the audio capabilities. The key is to structure sufficient time for the interaction versus the presentation. We have allowed the final narrative report to be submitted following feedback on the report. We have experimented with peer evaluations with varied results. Students do differentiate in their assessments of peers. One concern has been students' varied background knowledge on the topics of the reports. It is not clear that more knowledge necessarily contributes to a more objective assessment. Our approach to the peer evaluations has been to play down the quality of the presentations and to focus on the substance of the reports as students tend to be impressed with the quality of presentations, often overlooking weaknesses in the substance. However, we believe that peer evaluations in the right context can be effective and can add to the instructional value of the experience. In this situation the emphasis is on reviewing and reporting research so the organization and presentations of information as perceived by others in a reasonable aspect of performance assessment.

Journal Entries

Because e-learning is still a new experience for most students, we have found that it is beneficial to engage them in reflection. Thus, students are asked to maintain a journal of their experiences as they progress through the course. The guidelines are very general – they are instructed merely to record their thoughts about the instructional experience. This need not occur each day but should happen on a regular basis. The entries may range from comments about an activity, to the lack of clarity of a lecture,

the time required to access a resource, or students' personal reaction to the mode of instruction. The intent is to make them aware of the different features of e-learning on the assumption that they personally may become engaged in developing e-learning in the future and/or will be enrolled in additional e-learning classes. The reaction has been especially positive from first-time students, whereas students experienced in e-learning find the process less useful. While this does not contribute to assessment from the perspective of judging performance in the realm of grading, it contributes to knowledge of student performance and thus serves as a formative feature for the instructor. These journal entries are best shared at the conclusion of the course following grading.

LITERATURE PERSPECTIVE ON ELECTRONIC PORTFOLIOS IN MONITORING STUDENT PROGRESS

The monitoring of student progress via electronic portfolio development facilitates two primary types of evaluation, formative and summative. Formative evaluation can be used to identify strengths that can be built upon and weaknesses that need prescriptive feedback that will encourage both instructor and student reflection on ways to improve professional development and training. Summative evaluation serves more of a retrospective function in that it is a documentation of achievements and professional skills. Traditionally, portfolios have been widely used in both the visual and performing arts as a means to provide a showcase of select pieces of an artist's work. The use of portfolios and performance-based assessments have become a standard practice in business and various professions in recent years. Portfolios usually contain select samples of work that represents the student's or job candidate's strengths and weaknesses. In addition, when used in this manner, portfolio assessment provides a more accurate means of measuring academic and professional skills. Essentially, portfolio and performance based assessment are both ways of evaluating activities or products that are representative of skills applied to a performance task, whether that task is job related or associated with a series of instructional goals and objectives. In addition to providing evidence of depth and breadth of knowledge and skills, the professional portfolio when done thoughtfully, can serve as a "knowledge resource" for future reference. With the emergence of e-learning, the portfolio has evolved as a management tool for instructors and students. Thru the use of technology, the electronic portfolio in hypermedia format can become a "personal/professional information management" system that contributes significantly to the pedagogy of e-learning in higher education in addition to professional development and as a tool for K-12 students.

One of the recent trends in the field of professional development for teachers has been the use of the professional teaching electronic portfolio. The electronic portfolio is a way to encourage and show cases the professional development of teachers and their teaching skills. For pre-service students, it provides an excellent addition to a resume or

curriculum vitae and is a valuable tool for marketing oneself to future employers. The portfolio is an excellent format for presenting one's professional goals and philosophy of teaching to others. Additionally, and most exciting, the portfolio can be used as a personal information management system during pre-service education that can ultimately provide an index of resources that will be used in one's future teaching practice such as lesson plans, multimedia presentations, bookmarks of favorite educational websites, handouts, and various other professional development resources. In this context it become a tool for use in courses to record and organize examples of what is being learned while generalizing to a product that can be employed when they begin teaching. In this sense, an electronic portfolio transforms from a management system while and student to later being a "teaching toolbox" that allows all of ones professional resources to be indexed into one self-contained system that can be stored in a variety of formats, whether CD or DVD-ROM or on any number of external hard disk storage devices. It is also an excellent way to develop and showcase one's knowledge of the use of technology for instructional purposes. By using electronic portfolios, students are developing their technology skills.

Electronic portfolios, like traditional portfolios, are selective representational collections of student work that are made available in electronic form, on CD-ROM or on the World Wide Web in the form of hypermedia (Barrett, 1994). What makes electronic portfolios more engaging is the use of various forms of multimedia that can include audio, graphics, photographs, text, and video. Recently, a number of software packages have been developed for use in both K-12 and higher education, which allow teachers and students to create electronic portfolios that help to document student classroom achievement. One such program is Aurbach's "Grady Profile" (Grady, 1991) that provides a template that allows various items to be entered and stored including work samples, test scores, and oral presentations. Other commercially available software programs such as Roger Wagner (1993) Publishing's "HyperStudio" and Claris' "FileMaker Pro," (Brewer, 1994) provide the means for teachers to develop their own templates for portfolio assessment. While these software programs can be used to create customized portfolios they are all proprietary solutions and therefore the trade off is ease of use for the costs associated with the initial purchase of the software program. The open standards of hypertext mark-up language (HTML) offers the most flexible and least costly approach to the creation of electronic portfolios.

The use of HTML format allows users to take full advantage of the community publishing capabilities of the World Wide Web. User friendly HTML authoring tools are available that make web page creation simple, even for the most novice computer user. Advantages of bringing portfolios into the web environment include the ability to create media rich records of accomplishments or performances such as a video of a dance recital or sports event. Moreover, the web facilitates the seamless integration of the portfolio's media components into a cohesive and readily accessible framework. Instead of creating a "portfolio box" with papers photos video and audio cassettes that require several days to mail, students can now create personal web portfolio sites that can be

accessed and updated instantly by anyone at anytime with all media components of the portfolio only a click away.

LESSONS LEARNED FROM USING ELECTRONIC PORTFOLIOS

In several of our courses students are required to create and manage their own personal course portfolio web site. At our university, students gain access to 10 megabytes of free server storage when they register to receive their email account. Their web address is based on their email so it is easy to locate. For example, a student with the email patsmith@ku.edu website would also have a website called <http://people.ku.edu/~patsmith>. We provide basic HTML templates that students can use in creating their web site. The students then use readily available web development tools such as DreamWeaver and to create their portfolio website.

Student Owned Electronic Portfolios

There are several advantages to the approach of students use general web development tools to manage their own portfolio development and maintenance. Information technologies are continuing to evolve at an exponential rate and new or improved web development tools are emerging every few months. Some universities are using HTML and or XML as the primary underlying technology while others are using Adobe's Acrobat, Flash, MediaPlayer or RealPlayer. It may be too early in the evolution of these technologies to lock in to proprietary portfolio management tools if they restrict access to emerging information technologies.

Another advantage to student owned portfolio website is that each student learns to control the use or misuse of the server space. At one time we provided space for student work within the course's server space. The problem with this approach was that students would continue to deposit version 1, 2, 3... of their media projects on the course's web server and quickly fill up available space. When students own their web site they are more rigorous in controlling what is on "their" space.

With the student owned portfolio approach the students are developing lifelong skills for managing their personal web space. They choose which work from their course portfolio to carry forward in their general portfolio and which work to exclude. The students are also responsible for managing accessibility to sensitive personal and academic information. This is a liability better left in the hands of the student than with the instructor or educational institution.

The Structure of Content in Online Course Portfolios

For many of our courses we provide generic HTML templates that list contact information including the student's name (required), email (required), photo, telephone

and address. Students are asked to write a brief (>150 word) descriptive statement that vary depending on the course content. For example in a research seminar students write a belief statement or philosophical perspective that provides the foundation for their research agenda. In other courses students provide a brief description of their current employment course expectations and/or career goals.

Other content varies with the course goals and pedagogy. Tailoring the course portfolio's structure is a matter of requiring additional links on the portfolio web site. In some cases these links are to other student created web sites. For example, some of our courses incorporate project base activities where students are creating media rich stories or reports that link to web sites. These projects integrate a wide variety of media including photos, diagrams, animations, streaming audio and video. For these project base activities we post the project requirements and assessment rubric. Students then develop the project and provide a link to the project web site from their course portfolio web site.

Some of the content for courses is best revealed in progressive manner. For example the course might involve a journaling activity where students are adding new information to a report each week that describes field observations, or new information that they have discovered. Ancillary web site development also works well for these progressive activities where students provide a link from their course portfolio web site to a web page that is updated each week.

Exams and Portfolios

Many of our examinations take the form of written documents that are most easily saved as a Microsoft Word (.doc) or Rich Text Format (.rtf) document. In these case the exams are posted at a given time and students are required to post or email their responses on or before the due period. Examinations provide somewhat more involved security requirements than other information in the students' course portfolio. In many cases the students simply email their exams to the instructor and refrain from posting the link to their course portfolio until after the due period. We have recently explored the use of electronic keys to provide access to sensitive materials. In this case the instructor creates a password for each student that the student uses to provide the instructor with access to the sensitive material in their web site.

Group Collaboration in Online Portfolios

Our courses often involve students working together in group activities to develop artifacts that reflect what they have learned. The artifacts for these activities may take the form of papers, PowerPoint slides, group presentations and/or media rich websites. Each member contributes to the artifacts in unique and group roles.

The online environment has proven particularly productive for these type of group activities. Many of our students are practicing professionals who live at considerable distance from each other. Student controlled web sites provide these students with an environment where they can contribute to product development from anyplace at anytime. For these group projects activities we ask each students to create a link from their course portfolio web site to a page that describes their role and how they benefited from the development of the group product. This page then links to their groups project.

SUMMARY

The newness of e-learning as a mode of instruction in personnel preparation makes reliance on shared personal experiences important in furthering the development of best practices. While the literature on instruction in e-learning environments is emerging through traditional forms of scholarly dissemination and web sites, much of what is occurring has not yet found its way into accessible sources. This is largely due to the time required to develop, employ and validate practices prior to sharing them. In the space available we have tried to provide perspectives on the literature while at the same time sharing from our personal experiences in e-learning over the past seven years. While the applications have been subjected to repeated use and evaluation over several years, they may not generalize to all e-learning environments. They are presented here in the context of the position that the emerging e-learning pedagogy enhances the opportunity to fully integrate assessment into the instructional process and implement instructional management systems for instructors and students in the form of electronic portfolios.

Following are web sites we have found to be useful.

Using Technology to Support Alternative Assessment and Electronic Portfolios

This website provides information regarding the use of technology to support alternative assessment and electronic portfolio development. It is maintained by Dr. Helen Barrett, Assistant Professor, Educational Technology, School of Education, University of Alaska Anchorage.

URL: <http://electronicportfolios.org/portfolios.html>

Assessing Students Online

This website focuses on various aspects of online assessment including the purpose of assessment, the advantages and disadvantages of online assessment, as well as providing links to resources for creating online assessments.

URL: <http://www.newcastle.edu.au/services/teaching-learning/guide-teaching-/assessment/>

Creating Multimedia/Interactive Tests for the Internet in 10 Minutes

This paper explains ways that instructors can create multimedia/interactive tests, surveys, and assignments for the Internet using QuizPlease software.

URL: <http://www.aln.org/alnweb/magazine/issue2/rob.htm>

Rubrics for Web Lessons

This site focuses on authentic assessment and the use of rubrics with examples, templates, and links to other related resources.

URL: <http://edweb.sdsu.edu/webquest/rubrics/weblessons.htm>

MVCR Course on Student Assessment in Online Courses

This is an online course that focuses on various assessment formats and theories that can be used for evaluating students in online courses. Topics include: alternative assessment strategies, linking assessment with curriculum and instruction, assessment reliability and consistency, creating scoring rubrics, and strategies to minimize cheating online.

URL: <http://www.mvcr.org/Courses/C-CourseDetail.asp?course=4&textonly=false>

ADEC Distance Education Consortium

This is the website for the American Distance Education Consortium. This site provides a comprehensive list of general resources for distance education.

URL: <http://www.adec.edu/>

Center for Effective Teaching and Learning – The University of Texas at El Paso.

This site provides information and tools for developing and assessing teaching portfolios.

URL: <http://www.utep.edu/~cetal/portfoli/index.htm>

BIBLIOGRAFIA

- BARRETT, H. C. (1994), «Technology-supported assessment portfolios», *The Computing Teacher*, 21, March, pp. 9-12.
- BREWER, G. (1994), *FileMaker Pro* [Computer program]. Santa Clara, CA: Claris Corporation.
- COLLIS, B., De Boar, W. & Slotman, K., (2001), «Feedback for web-based assignments», *Journal of Computer Assisted Learning*, 17, 306-313.
- Financial Times* Business Education, 3 April 2000.
- GRADY, M. P. (1991), *Grady Profile* [Computer program], St. Louis, MO: Aurbach & Associates, Inc.
- Higher Education Consortium for Special Education, (2001), *Policy, Program, and Funding Recommendations for the Preparation of Qualified Personnel under Part D of IDEA*. A Position Paper of the Higher Education Consortium for Special Education. University of Kentucky. Lexington, KY

- IDC. (2001). IDC's worldwide corporate e-Learning market forecast and analysis, 1999-2004. Retrieved from <http://www.idc.com:8080/Services/press/PR/GSV022701pr.stm>
- KERKA, S., & Wonacott. M.E. (2000), *Assessing learners online: practitioner file*, Columbus: Ohio State University, ERIC Clearing House on Adult, Career, and Vocational Education Center on Education and Training for Employment.
- KIBBY, M. (1999), *Assessing students online*, The University of New Castle, Retrieved from <http://www.newcastle.edu.au/departament/so/assess.htm>
- Management Team for Innovations in Distance Education, (1988), Penn State University.
- MCCONNELL, D. (1999), Examining a collaborative assessment process in networked lifelong learning, *Journal of Computer Learning*, Vol. 15, 232-243.
- MEYEN, E.L. (2000), «Using technology to move research to practice: The Online Academy», In *Their World 2000*, New York: National Center for Learning Disabilities.
- MEYEN, E. L., Deshler, D., Skrtic, T. M., Lenz, B. K., Sailor, W., & Chaffin, J. D. (2001), *An academy: Report on linking teacher education to advances in research*, Lawrence, KS: Author. (OSEP PR/Award no. H029K73002).
- MEYEN, E.L, Lian, C.T., and Tangen, P. (1997), «Developing Online Instruction: One Model», *Focus on autism and other developmental disabilities*, 12, 159-165.
- MORGAN, C., & O'Reilly, M. (1999), *Assessing open and distance learners*, London: Kogan Page.
- United States Internet Council (2000), *State of the internet 2000*, Washington, DC: U.S. Government Printing Office.
- U.S. Department of Education, National Center for Education Statistics (2001), *The Condition of Education 2001*, Washington, DC: U.S. Government Printing Office.
- WAGNER, R. & O'Keefe, M. (1993-97), *Hyperstudio*, v. 3.1.3. [Computer software], San Diego, California: Roger Wagner Publishing.
- WIGGINS, G. (1998), *Educative assessment: designing assessments to reform and improve group performance*, San Francisco: Jossey Bass.