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ABSTRACT

This document contains two papers on fine arts from the SITE (Society for Information Technology & Teacher Education) 2002 conference. "Expanding the Boundaries of the Music Education of the Elementary Teacher Classroom with Information Technology" (Cheryl Jackson) reports on how information technology is used in a music methods course for elementary education majors at Eastern Kentucky University. "The Convergence of Teacher Education, Art Museums and Instructional Technology: Goals, Insights, and Recommendations" (Phyllis Hecht, Julie Springer, Natalie Milman, Bernard R. Robin, Beth B. Schneider, Sara Wilson McKay, Sara G. McNeil, and Donna Odle Smith) describes programs that education specialists from the National Gallery of Art and the Museum of Fine Arts, Houston (Texas), along with educators from the University of Houston (Texas) and George Washington University (District of Columbia), are creating. The benefits, challenges, and lessons learned from these collaborations are discussed. (MES)

Fine Arts (SITE 2002 Section)

Bernard Robin. Ed.

SECTION EDITOR:

Bernard Robin, University of Houston

For those of you who have been involved in technology and teacher education for a number of years, you may remember the days of the text-only Internet. It was less than ten years ago that there was no World Wide Web (do we even call it that anymore?), there were few if any pictures to access electronically, and multimedia files being available online was but a dream of futuristic things to come. What a difference a decade and a couple of billion web pages make! Today's Internet users are bombarded with an almost endless stream of images, animations and ever more sophisticated multimedia resources. And the prediction is that we have only seen the beginning. According to the Consumer Electronics Association, the DVD is the fastest-growing consumer electronics product of all time. Digital cameras are being sold in record numbers and in the U.S., digital television sales are estimated to exceed 10 million within the next five years. Recent surveys indicate that almost one fourth of the U.S. population over the age of 12 has downloaded music from the Internet and the number is growing.

Since the first graphical web browser became widely available in 1993, the text-only Internet has become increasingly less useful and less interesting. Emerging technologies, rich with media of all types and description, are converging in numerous and unanticipated ways that capture our imaginations and engage all types of learners. The opportunities for educators interested in taking advantage of these technologies are likewise growing but many challenges will arise for teacher education programs that understand that they cannot ignore the technological revolution that is part of our world.

With this year's SITE conference, a new strand has been added to showcase the convergence of the art education, technology and teacher education. With this addition, we hope to begin a series of dialogues and encourage an exchange of ideas on issues related to the coming together of art and music education, museums, technology and teacher education. With this first attempt, we focus primarily on educational projects involving museums of art. Museums in general, and art museums, specifically, are already enthusiastic technology users and providers of educational content on the web. In 1995, only about 120 museums had a web site, but by 1997, that number had increased ten times to 1200. Today, just about every major museum in the world has some type of online presence but the work now has shifted to adding quality and not just quantity. Museums are participating in partnerships with other organizations and collaborations with schools and universities are helping shape the use of new technologies to support teachers, students and all learners. Projects that have already been developed from such partnerships include the creation of virtual exhibitions, the writing of lesson plans that use museum content and the implementation of programs that bring teachers and students to museums for workshops, seminars and special projects.

The number of articles in this section is understandably small this first year but already, they reflect the diversity of programs already underway. We feel certain that in time, the convergence of the arts, art education, technology and teacher education, in all of its possible variations, will expand to include even more components. We hope to bring together art and music educators, museum education staff, technology specialists and teacher educators who can help re-design existing programs and create innovative new ones. We invite all others interested in these ideas, including K-12 teachers, researchers, and other community partners, to join us and share our excitement as we announce this new section for SITE.

Expanding the Boundaries of the Music Education for the Elementary Teacher Classroom with Information Technology

Dr. Cheryl Jackson
Music Education
College of Education
Eastern Kentucky University
United States
Cheryl.Jackson@eku.edu

Abstract: This paper is a report on how information technology is used in a music methods course for elementary education majors. The National Council for Accreditation of Teacher Education (NCATE), the National Association of Schools of Music (NASM), and the Kentucky Department of Education: New Teacher Standards call for teacher educators to address issues of teaching with technology. Information technology is incorporated into the Music Education for the Elementary Classroom Teacher course, especially through the use of *Blackboard 5*. Each student enrolled in the course has access to the course syllabus, project guides and other important information. To be able to use *Blackboard*, each student must be familiar with the Internet, email, and simple word processing. Effective uses of technology are modeled as sources of information, aids to effective teaching and learning, and a starting point for knowledge and the advancement of pedagogical skills.

Introduction

The Music Education for the Elementary Classroom Teacher course is required of all elementary education majors at Eastern Kentucky University. The trepidation of some of the students in the music education course is evident. Some are fearful of the music class, in general. Some are fearful of using the web-enhanced component of the course. Many of the elementary generalist education majors in the music education course are non-traditional students. Therefore, some of them have not had a great deal of experience in using computers. The author can understand this fear. Several years ago when the author began teaching in the public school system, the audio system that was used to play recordings, or an electronic keyboard, or other electronically amplified musical instrument were considered as using technology in the music classroom. The definition and scope of technology in the music and general classrooms has been significantly augmented. The National Council for Accreditation of Teacher Education (NCATE), National Association of Schools of Music (NASM), and the Kentucky Department of Education in the New Teacher Standards direct teacher educators to address issues of teaching with technology. Due to the importance of music and technology in the curriculum, future teachers must have many opportunities to develop and strengthen their skills in both areas.

A review of literature yielded very few articles that specifically addressed the use of technology with music education methods courses. As stated in the summary of agreements made at the Housewright Symposium on the Future of Music Education, held in Tallahassee, Florida, September 23-26, 1999, "Societal and technological changes will have an enormous impact for the future of music education." It is imperative that all persons are enabled to "participate fully in the best music experiences possible (National Association for Music Education, 1999)." Kimberly C. Walls' article (2000) presents some ideas for addressing technology competency in music education courses. Typical music education courses must include a great deal of information in a very short period of time. Therefore, the content of the course can be extremely condensed. This fact is especially true of the Music Education for the Elementary Classroom Teacher. The fundamentals of music are presented during the first half of the semester, leaving the remainder of the semester for elementary classroom instrument music performance skills, music teaching techniques, and other culminating activities. Information technology should enhance the course objectives rather than merely adding to them. As suggested by Walls, technology may be easily integrated into a music education methods course through the use of email assignments and on-line course materials (19).

Perhaps one of the most attractive features of using the web-enhanced component of the music methods course is the ability to access assignments and course documents from one's own home or computer laboratory any time day or night. Many of the music education students in the current report would agree with one of the subjects in the Bauer study, "I like being able to access course materials at a time that suits my own schedule and preferences." Bauer's study also addressed the attitude of the students toward web-enhanced learning experiences. "The degree of accessibility to Internet resources, along with the individual characteristics of students who use these resources, may be related to student attitudes toward this instructional methodology (Bauer, 1999)." As the web-enhanced component becomes user-friendlier and as the students' skills are strengthened, the attitudes toward the web-enhanced assignments may become more positive. On the other hand, as stated in the Bauer and Daugherty 2001 study, "Students indicated that they would not like to take a course that was conducted entirely over the Internet" (32). The course content of the Music Education for the Elementary Classroom Teacher would not lend itself to being taught entirely on-line. The success of many of the activities and assignments relies upon on-site classroom instruction with face-to-face communication to achieve some of the course objectives.

Blackboard

At Eastern Kentucky University the use of *Blackboard* has increased since it was placed into service. Since the music methods course includes a great deal of hands-on activities, one may not realize the benefits of an on-line component upon first glance of the course. However, the incorporation of *Blackboard* has enhanced the course objectives and has proven to be a great classroom aid to the students and the instructor. '*Blackboard 5* is a comprehensive and flexible e-Learning software platform that delivers a course management system, and, with a Level Two or Level Three license, a customizable institution-wide portal and online communities." (Blackboard Inc. 2001).

The course syllabus, course calendar, and project guides are all posted on *Blackboard* to which each student enrolled in Music Education for the Elementary Classroom Teacher course has access. Each student may access the information from the comfort of his or her own home or from one of the computer laboratories on campus. To be able to use *Blackboard*, each student must be familiar with the Internet, email, and simple word processing. The following features in *Blackboard* are used for the music education course: (a) Announcements, (b) Syllabus, (c) Assignments, (d) Communication, (e) Discussion Boards, (f) Digital Drop Box, and (g) Online Gradebook.

The Announcements page is the opening page. When the instructor needs to communicate an announcement to all students enrolled in the course, then the message is posted on that page. As previously mentioned, the Syllabus section includes the course syllabus, course calendar, and project guides with scoring rubrics. The students are enabled to retrieve these important documents at any time during the semester. The on-line availability of the course documents serves as a timesaving and cost-effective method of distributing materials to students.

The Assignments page is used to post coursework that needs particular explanation. For example, one of the requirements of the course includes each student teaching a mini music lesson in a mock elementary setting to his or her peers. A comprehensive Peer Teaching Lab informational packet is posted to the Assignments section. The Communication section is handy for sending messages to individual students about exemplary projects or missing projects.

The Discussion Board provides a forum for students to pose questions to their peers or the instructor. The instructor may set up a forum based on a particular topic. Many of the students in the music education class have had no, or very little, musical training. The Discussion Board allows the students to ask questions about the fundamental elements of music, and then, it allows their peers who *have* had musical training to answer their questions, thereby providing them with teaching moments.

The Digital Drop Box allows students to send their written projects to the instructor, and it provides a place to store their projects. The students have the option of sending written projects to the instructor via the Digital Drop Box instead of via email attachments. Sending the material by means of the Drop Box is more practical than filling the email inbox with a large quantity of messages. Many of the students at Eastern Kentucky University commute long distances; therefore, the ability to deliver written reports via *Blackboard*'s Digital Drop Box proves to be very handy. The Online Gradebook allows the students to check their grades at any time. It enables the instructor to organize the Gradebook entries and weight the various entries.

The web-enhanced component allows the students to take ownership of the course documents and information that is posted to *Blackboard*. Use of this component is a most efficient way of communicating with the students. The flexibility of anonymity *or* working with peers online serves as a very attractive feature.

Inconveniences with *Blackboard*

Although the Blackboard software has many advantages, a few inconveniences exist in the system. For example, some students have problems using the Digital Drop Box. When a student uses word processing software other than Microsoft Word, then the file may not come through at all. Word Perfect files will work, but the formatting may be changed. Also, the student must remember to *add* the file, and then to *send* the file. Often a student will not complete the final step. They also receive no confirmation that the file has actually been sent.

Three to four sections of the music education course are offered. One major drawback to the Online Gradebook is that it provides a single alphabetic listing of *all* the students. The students' names are not separated into individual sections. Each section may have from twenty-five to twenty-eight students. The creation of groups is tedious for sections of more than about ten students.

Entering large documents such as the course syllabus, for example, requires a very rudimentary knowledge of HTML. When first getting acquainted with *Blackboard*, importing documents can be somewhat problematic.

Eastern Kentucky University has updated the current version of *Blackboard 5* to *Blackboard 5.5*. Some of the new features include the following: (a) weighting grades in the Gradebook; (b) displaying Announcements; (c) Setting Release Dates; and (d) Setting the Entry Point for the course. "Weighting grades in the Gradebook" needs no further explanation and has been discussed earlier. Concerning the displaying of Announcements: in the older version, the instructor had to mark an announcement as "permanent" to have it show on the opening tab. Otherwise, the announcement would only be visible for one day. In the newer version, the Announcement is automatically displayed for one week. The "Setting Release Dates" feature allows the instructor to choose a period of time that the document will be available to the students. As previously mentioned, the Announcements panel was the opening page in *Blackboard 5*. In *Blackboard 5.5*, an instructor may select the area of the course to appear as the opening page.

Additional Strategies

In the Music Education for the Classroom Teacher course, the students design and construct a Music Materials Notebook. The project is a collection of music related materials that the generalist teacher may use in his or her classroom. Students are encouraged to search the Internet for songs, bulletin board ideas, lesson plan ideas, and many other items for use in the Notebook. One of the sections of the Notebook is a personal entry. The students are encouraged to use their creativity in including a comprehensive section that is of special interest to them. The following are among the choices (found on the Internet) that students have included: a list of web sites that relate to music instruction, music games, music worksheets (crossword puzzles, word search, fill-in-the-blank, etc.), or piggyback songs (new words to "old" tunes).

As previously mentioned, each student designs and implements a mini lesson that includes music in a mock elementary class setting. The Peer Teaching Lab allows each student to practice many of the acquired musical skills with his or her peers, as well as enables the student to practice teaching techniques discussed in class. Students are encouraged to retrieve ideas for lessons from various sources including the Internet. In addition, they are required to use technology in their mini lessons. Moreover, students have used compact disks that they have created to provide accompaniment or listening examples.

Special Education majors, who take the music education course, are encouraged to survey the National Association of Music Therapy Website for relevant information. This particular site is kept up to date and is very helpful not only for the Special Education majors, but also for the elementary education majors.

Conclusion

The students' skills are strengthened through technology-enhanced assignments. Moreover, the assignments will prove to be useful in the future teachers' classrooms. As a teacher of teachers, the instructor is expected to model effective uses of technology as sources of information, aids to effective teaching and learning, and a starting point for knowledge and the advancement of pedagogical skills. Therefore, the students will best be served by incorporating authentic and relevant technology-enhanced assignments.

Those teacher educators incorporating technology into music or other fine and performing arts methods courses should be sharing their insights and experiences. If we are to truly expand the boundaries of our methods classrooms, then strategies and technology-based activities must be reported and documented.

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The Convergence of Teacher Education, Art Museums and Instructional Technology: Goals, Insights, and Recommendations

National Gallery of Art/George Washington University Team:
Phyllis Hecht, Web Manager, National Gallery of Art p-hecht@nga.gov
Julie Springer, Coordinator, Teacher Programs, National Gallery of Art j-springer@nga.gov
Natalie Milman, Assistant Professor, George Washington University nmilman@gwis2.circ.gwu.edu

University of Houston/Museum of Fine Arts Houston Team:
Bernard R. Robin, University of Houston, Instructional Technology Program brobin@uh.edu
Beth B. Schneider, Education Director, Museum of Fine Arts, Houston bschneid@mfah.org
Sara Wilson McKay, University of Houston, Art Education Programswilsonmckay@uh.edu
Sara G. McNeil, University of Houston, Instructional Technology Program smcneil@uh.edu
Donna Odle Smith, University of Houston, Instructional Technology Program odlsmith@uh.edu

Abstract: The focus of this panel discussion is to examine how art museums are creating partnerships with schools, universities, and teachers to design and develop technology-based instructional resources that can be used by students, in-service teachers, pre-service teachers, and the general public. Education specialists from the National Gallery of Art and the Museum of Fine Arts, Houston, along with educators from the University of Houston and George Washington University, will describe the programs they are creating and discuss the benefits, challenges, and lessons learned from these collaborations. The panelist will explore the role of museum educators and their institutions as they embrace and utilize technology as part of their mission to work with teachers and schools. University faculty and students will also discuss the challenges involved in creating and taking graduate level courses that utilize museum content and resources.

The National Gallery of Art's Project: 2001: A Cyberspace Odyssey

Phyllis Hecht, Web Manager, National Gallery of Art
Julie Springer, Coordinator, Teacher Programs, National Gallery of Art
Natalie Milman, Assistant Professor, George Washington University

This education initiative at the National Gallery of Art was the first of two annual programs designed to explore online technologies as tools for studying and teaching art. Open to teachers nationwide, participants began to plan and develop online programs that will integrate K-12 curriculum content, constructivist learning theories, and the art collections of the Gallery. The technology initiative was the most recent incarnation of a professional development seminar, The National Teacher Institute, that has been offered every summer at the Gallery since 1989. The Institute was established with the belief that the best teachers are those who make time to renew their skills and rededicate themselves to lifelong learning.

The goals of the 2001 program were two-fold: to strengthen teachers' skills and comfort levels using online technologies and to help them develop Web resources that they or their students could use in the classroom or during independent research. A select number of the final projects will be edited and published on the National Gallery's Web site for use by the online community of K-12 educators.

A major challenge was how best to establish certain parameters for the content and design of the projects, while allowing for the inventiveness and creativity of individual teams. We also wanted to ensure that finished products met teachers' specific curriculum and instructional needs, while constituting useful resources for the wide variety of K-12 educators who would be accessing them through the National Gallery's Web site (http://www.nga.gov).

We also realized that many of the teachers selected to participate, although experienced in writing lessons or curricula, would not have sophisticated skills writing or designing for the visually-based, dynamic

medium of the Web. The six-day program was thus framed to facilitate understanding of effective Web use, and good Web site design and writing. We began by introducing teachers to the collections of the National Gallery by showing them how to use the Gallery's Web site search engines in order to find the best objects to support their curriculum projects. Reading assignments and critiques of select Web sites done prior to their arrival in Washington helped prepare them for selecting the best activity structures and design features for their projects. Armed with these insights, teams were then asked to refine or refocus their original proposals for brief presentations at week's end.

Another challenge was how to support teachers once they left Washington and keep them motivated and working once they returned to teaching full-time. Each team was assigned two mentors with whom they could brainstorm and problem-solve through e-mail and phone communications. One mentor was qualified to advise on the content development of their project; the other on the technology and software issues faced in building their projects. A listserv was established to facilitate communication among the teams and Gallery staff members. A password-protected Web site was also established to allow easy reference to project guidelines and deadlines, links to educational resources and software tutorials, and to provide work spaces to build their individual projects.

Recommendations from the Museum of Fine Arts, Houston Education Department

Beth B. Schneider, Education Director, Museum of Fine Arts, Houston

Since 1997, the Museum of Fine Arts, Houston (MFAH) has collaborated with the Program in Instructional Technology in the College of Education at the University of Houston (UH) to design a series of Web site components. These include the Bayou Bend Web site for the Bayou Bend Collection and Gardens (http://www.bayoubend.uh.edu), the American decorative arts (1640-1880) wing of the MFAH; a temporary traveling exhibition Web site for *The Grandeur of Viceregal Mexico: Treasures from the Museo Franz Mayer* (http://www.fm.coe.uh.edu), a private art museum in Mexico City (March 2002 launch); an online catalogue and order form for materials from the MFAH Teacher Resource Center (online spring 2002); and a prototype Web site for kids. The Bayou Bend and *Grandeur of Viceregal Mexico* sites were each developed over several semesters by graduate students enrolled in Web design and multimedia classes. Each semester, a different group of students enrolled in the course. For the online catalogue, a staff member in Instructional Technology and a graduate student, took a printed catalogue and, using Cold Fusion, created an online catalogue from which teachers in Texas can order free loan materials from the museum. In another project, middle school students participated in a four-session enrichment experience called "Multimedia Masters." Each session lasted a full day, with part of the activities taking place at the MFAH and others taking place at the university. The Spring Independent School District had collaborated with UH on this activity in the past, and in the fall of 2001, focused the class on a kids' Web component for the MFAH. Through these various partnerships with UH graduate students, faculty, and staff, the MFAH education team has learned valuable lessons about collaborating on Web site development with universities.

For all of these projects, the people developing the Web sites had to learn about the technology and also about art, a new topic for almost all concerned. Graduate students, most of whom worked full time while attending school, had to acquire new technological skills and learn content from a very unfamiliar field of study: art and art history. The enthusiasm of the museum staff and UH faculty for these projects, meant that each project was overly ambitious – although all were completed as planned. The deadlines inherent in an exhibition Web site are much more demanding that those for content focusing on art in the museum's own collections. Finally, the MFAH had a rather small and inadequate Web site that, until late in 2001, did not have the same sophisticated level of design and content as did the MFAH's traditional publications. The museum does not at this time have a full-time Webmaster.

For other museum's planning collaborations with local universities in the development of Web site components, some of the lessons learned from the MFAH/University of Houston partnership are described below:

- **Focus on your permanent collection and on those works of art which have been published, have been the focus of research, for which you have images and curatorial expertise.** The great challenge of working with temporary exhibitions is that text and images are often not available far enough in advance for students to have enough time to develop the site.

- **Begin with projects that do not have definite time restrictions.** An exhibition Web site has to be ready to launch a month or so before an exhibition opens. A component of the museum Web site focusing on an aspect of the permanent collection often has greater flexibility and the museum can respond to the needs of students developing the site.

- **Be realistic in the scope of your initial projects.** The Bayou Bend Web site was developed from three existing brochures focusing on Bayou Bend's collection, founder, and gardens and architecture. Students had access to abundant research and images. *The Grandeur of Viceregal Mexico* project had little advance scholarship accessible in English; few texts on the specific objects; few images until well into the project.

- **Be prepared to spend a significant amount of time working with faculty and students.** MFAH project director and education director, Beth Schneider, attended the weekly 3-hour meeting of the Web design class; facilitated the student group working on the exhibition introduction; and was the conduit for all content information, images, and text approvals. The project also required frequent meetings with faculty and curators.

- **Be aware that not all projects are appropriate for students**. The online catalogue was first assigned to a graduate student who was just learning Cold Fusion and this provided less than hoped for results. The most efficient solution to this problem was for the museum to pay a UH staff member expert in Cold Fusion and a graduate student who was learning the program. Together, they were able to complete the project on time and with significantly greater expertise.

- **Student learning is the focus of the classes**. In a classroom setting, the museum is not a traditional client and university faculty and students are not traditional contractors. Learning to work with actual clients is a part of that process, but not the only important part. The museum staff members involved in the project need to balance the educational needs and goals of the students and faculty and the needs of the museum in creating a final project. This can be a very delicate and sensitive process.

Overall, the MFAH-UH collaboration has been a great success. Everyone involved in the project has learned a great deal. MFAH staff members look forward to future collaborations with the Program in Instructional Technology at the University of Houston and discussions have already begun to determine what projects will come next.

Recommendations from the University of Houston Instructional Technology Program

Bernard Robin, Associate Professor of Instructional Technology, University of Houston

Two graduate Instructional Technology courses at the University of Houston (UH) use content from the Museum of Fine Arts, Houston (MFAH) as the raw material for technology-based projects that student teams design and develop. The first course to be discussed is CUIN 7330: Project-Based Web Design and Development. This course focuses on the planning and creation of web-based educational resources that enhance works of art and decorative arts that are on display at the museum. Each student in the course is part of a team that includes other students, a university facilitator, and a staff member from the MFAH's education department. The teams are each assigned different project components that together make up a large-scale project that may last for several semesters or even several years. A more detailed discussion of the course and its workings may be found in *A Model for Creating an Art Museum-University Partnership to Develop Technology-Based Educational Resources* (Robin, McKay, Schneider, McNeil, & Smith, 2002.)

The course is now in its fifth year and the relationship with the MFAH, as the content provider, continues to evolve. Based on our experiences, the following recommendations are suggested for other educators who would like to create similar partnerships with art museum partners.

- **Make sure the students understand the expectations for their work.** Working with real clients with real deadlines gives students an understanding of what they will face when they finish school. In this course, we do not operate under the philosophy that "this is only a school project." If the work is good it will be considered for going on the web; if it's not good, it will not. Clear expectations about the quality and specifics of student work should be articulated by the client and the faculty members. In this collaborative setting, students learn to critique their own and other students' work in a non-personal, non-threatening manner. Through a series of such critiques, not only will the quality of the work improve, but the students' understanding of the design process will increase.

- **Make sure the museum staff understands that student learning is the most important component of the course.** This concept is often stated but is worth repeating. It is the job of the university educator(s) to make sure that student learning remains the most important component of the course. The opportunities afforded by working with an art museum are many, but the opportunities for learning are the reason students enroll in a course. A willingness on the part of the client and the faculty to be open to student ideas will increase the potential success of the partnership.

- **Make sure that university educators understand basic museum policies and procedures.** Even though student learning is the focus of the course, educators must not forget that the client's needs are almost as important. If the student work does not meet the client needs, or if the faculty do not work within the policies of the museum, the partnership will suffer and ultimately, may dissolve.

- **Use additional university and museum experts as project component facilitators.** We have learned that in large-scale projects, student teams benefit from a university or museum expert who is willing to work with the students. These individuals provide valuable guidance and expertise and help the teams determine which parts of their design and development meet the needs of the client.

- **Try to recruit students from other disciplines outside of the Instructional Technology Program.** We have also found that the course can be strengthened by having students from other programs besides IT enroll in the course. Student with backgrounds in other areas such as art, art history, and social studies can add depth and meaning to the projects that are created. Since there will almost certainly be other team members who possess technology skills, not every student in this technology course needs to be a technology expert.

- **Provide opportunities for in-depth research.** Students interested in using these projects as the basis for thesis or dissertation work find a great opportunity for research. The museum benefits from scholarly research that focuses on their exhibitions and students benefit from a wide array of possible research topics and a large population of potential participants.

- **Prepare for changing expectations of the clients.** Finally, be aware that as design and development of technology-based resources progresses, the client's expectations may change. Rather than treat this as a negative occurrence, we view this as a predictable and necessary consequence of such a partnership. Students learn first-hand that no matter how meticulously they plan their projects, modification of their work will be needed as their clients see their work and begin to adjust their expectations of what is possible.

For the Project-Based Web Design and Development course, a critical factor for success has been the ability of the university educators and the museum education staff to adapt to change. Over the last several years, we have continuously made changes to the course and to the projects that students create. In addition to the recommendations already mentioned, being flexible will almost certainly enhance a successful, long-term outcome in a museum-university educational partnership.

Other Critical Factors for Success

Sara McNeil, Associate Professor of Instructional Technology, University of Houston
Donna Odle Smith, University of Houston, Instructional Technology Program

The second course, Collaborative Design & Development of Multimedia, is a two-semester course sequence of planning and creating interactive multimedia resources. These students also work in teams with content facilitators, but the products from this class are destined to either function in stand-alone multimedia kiosks, or to deliver web-enabled multimedia content. The deliberately interactive nature of this type of product requires a unique approach to content design, organization and delivery.

Several themes that emerged from data gathered from both the students and the client that are representative of the current literature in the field of educational technology development are shown below.

- **Preparation and Shaping Expectations**
  Students need to completely comprehend the steps of the process before they begin the actual design phase. The process of designing and developing multimedia courseware is complex and often difficult to understand when it is built only on a theoretical and technical framework. If both the students and client understand that there are often periods of indecision and questioning and possibly redesign, then perhaps the process would proceed more smoothly. Students should also realize that every team is different and that flexibility is a critical factor for success.

- **Dedicated Client-faculty Member**
  The client must be willing to work with students in a variety of roles from content matter expert to the user of the materials and must become active participants in the process. The client must be accessible at times other than class periods and flexible in their thinking about the possibilities for design.

- **Time to Build the Large Community with Adequate Time for Reflection and Meetings**
  The teams and the learning community in which they function, needs to be established as quickly as possible. Other opportunities for developing team skills and communication should also be provided throughout the design and development process. Teams should have time during class to meet, but should also expect to communicate either face-to-face or in person between classes.

- **Good Problem and a Variety of Approaches**
  The instructional problem should create a balance between challenge and frustration for the teams. The process should support a variety of solutions and opportunities for creative and original discoveries.

The multimedia projects that resulted were the results of a small team of students working together part-time with limited interaction and limited resources. Even with those limitations, the four modules developed displayed a remarkable level of creativity, imagination, innovation, and mastery of both instructional design principles and application of technology for online learning. It is not hard to visualize the level of quality that might be achieved by those teams working under different circumstances where more time and resources were available.

The Convergence of Teacher Education, Art Museums and Instructional Technology: Goals, Insights, and Recommendations

Sara Wilson McKay, University of Houston, Art Education Program

The following section includes some thoughts about collaborative efforts among teacher education programs, specifically in art education, art museums, and instructional technology:

Collaboration: A Definition

In any collaborative effort, a laying bare of several key aspects must occur. Players in the collaboration must each honestly assess their strengths and be forthright about what benefits they hope to reap from the collaborative process. Also a genuine willingness to co-labor is imperative: true collaborative work (vs.

cooperative work) recognizes that each participating party comes to the table with goals and agendas, but there is an openness and an expectation in collaboration that these goals and agendas will change and be improved through the process. To emphasize co-laboring is to admit that any truly collaborative endeavor is indeed a difficult and delicate task requiring the utmost in trust from all parties.

Correlated Communication

The Art Education program at the University of Houston has collaborated with several area arts organizations of varying size and structure, before now becoming involved with the MFAH. Attempting to add Instructional Technology components to already conceptualized collaborations that students in the Art Education program have developed as their real-world projects has so far most often occurred as an afterthought—e.g. a video project was conceptualized to support the orientation information for teachers for the university's Mobile Art Quest (MAQ); at the time during the class, the realization of this idea was not a possibility, but this project has now been adopted by IT Program's video class as a potential project, yet it could have been a much richer project if it had been conceptualized in a collaborative way from the outset. However, now that frequent and open communication has become more of a stable feature between IT and Art Education, we expect that the very conceptualization of the projects with area arts organizations will change for the better.

Real-World Projects

In addition to open and on-going communication, the next key feature is the opportunity to work on real-world projects in pre-service teachers' classes. Future art educators, when working with their client, begin to see their efforts in a whole new light. They conceptualize education in a much larger way than what occurs in the K-12 classroom—the end-user is not a generic 10-year-old who is imagined during the creation of endless lesson plans. Rather, the end-user of their educational efforts is someone they can imagine who has specifically had certain experiences in a museum or on a web-site. Specifying the beneficiaries of their efforts concretizes the pre-service teacher's transition from student to teacher in that they become cognizant of the importance of their role as teacher. They see, anticipate, and plan for direct results of their educational efforts. Obviously, there is overlapping benefit in students broadening their thinking about education in a non-school environment that impacts their eventual performance in the K-12 classroom.

Linking Pre-service to In-service

In bringing together IT, art museums and teacher preparation programs, one of the goals is to prove the usefulness of both technology and museums (and other learning sites) in students' future teaching endeavors. If teachers experience instructional success with technology and view museums as important educational places in their pre-service work, they will take these beliefs and these skills into the schools where in turn they will have influence not only on their own students but also on their colleagues. It has been said that improving the quality of education happens one teacher at a time pointing to the impact quality teachers have on their students, but this does not acknowledge the large impact innovative teachers also have on their colleagues and on school climates. Forging the link frompre-service education to in-service education is one of the things a convergence of museums, technology and teacher preparation does best.

References

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