

# **DIGITALLY INVESTED: TEACHING AND LEARNING WITH ONLINE IMAGES**

*by Sharon P. Pitt and Miriam E. Guthrie*

*James Madison University*

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Started in 1998, the General Education Program is the core academic program of James Madison University, required of all students regardless of their major or professional program. This program is intended to provide students with a solid foundation of knowledge, skills, and experiences and to prepare JMU students to be flexible thinkers and life-long learners. Implementing this academic program has greatly impacted all members of the JMU campus community. Faculty express philosophic differences as to the benefits of the program and the reassignment of faculty positions to teach General Education courses. Budget funds have been reallocated to support the new core curriculum and students are now seeking new paths through which to navigate the completion of core educational requirements. In addition, service units are struggling to support the demands of newly created course sections and faculty positions.

The Digital Image Database (DID) instructional system was developed in direct response to increased enrollment and instructor need generated by the new General Education program in general and, as a result, two Survey of World Art courses in particular. In the first year of the General Education program, the Survey of World Art courses provided one of the few means of completing the Arts and Humanities requirements. As a result, the Art and Art History Department was required to shift from teaching two or three sections of the Survey of World Art courses per year (prior to 1998) to instructing a total of 24 course sections in the 1998-1999 academic year alone. These two courses, GARH205B, Survey of World Art I: Prehistoric to Renaissance and GARH206B and Survey of World Art II: Renaissance to Modern, now provide many students with a path through the Arts and Humanities requirements.

In 1997, already utilizing its resources to the fullest, the Visual Resources Center in the Art and Art History Department projected its inability to meet the sudden demands of added course sections and instructors created by the General Education program. Not only

would there not be enough slides in the collection to provide faculty with necessary teaching resources, but some slides were degrading in quality. Unable to acquire resources from other sources, faculty and staff in the Art and Art History Department turned to the mGrants program, an in-university technology grants program, hoping to preempt the anticipated strain. In 1998, an Art and Art History faculty member and the director of the Visual Resources Center were awarded a grant to develop a digital image database and multimedia teaching tool. Currently, faculty and students from the humanities, music and mathematics use the system in and out of the classroom.

## **THE DIGITAL IMAGE DATABASE INSTRUCTIONAL SYSTEM**

The Digital Image Database instructional system is composed of two individual components: the Digital Image Database and the Image Viewer. The DID is a secure web site that permits faculty members to generate and package slide shows at their convenience. Instructors search through thousands of digital images, selecting and sorting the images based on a range of instructional criteria. After organizing selected images for classroom presentation, instructors are able to store slide shows for immediate use in class, annotate and edit slide shows, provide online shows for students review, or archive slide shows for future discussions. Once a slide show has been created, the show may be viewed in class using the second application, the Image Viewer. A Macromedia Director application, the Image Viewer permits faculty to download thumbnail, full-sized and double sized versions of each image in the slide show they created and project these images in a classroom containing appropriate equipment. Instructional manuals for the applications are available to faculty online.

## **THE CIT mGRANT PROGRAM**

The Digital Image Database (DID) instructional system was developed through a CIT Fellowship grant from the mGrants program, supported and awarded by the Center for Instructional Technology at James Madison University. mGrants are divided into three categories: Small Grants, Learning Enhanced Grants, and the CIT Fellowship. While small Grants may be proposed at any time during the year, proposals for Learning Enhancement Grants and the CIT Fellowship are generally submitted every October. A more detailed description of each type of grant follows:

- Small Grants - Small Grants provide timely assistance for projects or activities to support year round faculty needs in instruction. Generally, small grants are for particular software applications, the transfer of computing or peripheral equipment from the CIT to faculty, or the award of staff time to assist in the development of a specific project.
- Learning Enhancement Grants - These grants provides up to \$6,000, which may be used during any semester to develop a project related to the enhancement of teaching and learning. Extra consideration are given to proposals which demonstrate support from the faculty's department or college. Receipt of a Learning Enhancement Grant requires the submission of a final report within one semester after completion of the project. Receipt of a Learning Enhancement Grant also may require assessment of the impact of the technology on the course.
- CIT Fellowship - The CIT Fellowship provides up to \$15,000 for course development. Receipt of the CIT Fellowship requires the submission of a final report within one semester after completion of the project, full assessment of the impact of the project, and involvement of a CIT Project Director. Extra consideration is given to proposals which demonstrate support from the faculty's department or college. Salary:

During the summer, Fellowship recipients receive a stipend equal to one 3-hour class for one term, with a cap of approximately \$5,000. During the academic year, the department of the fellowship recipient receives the stipend, in order to pay for a substitute instructor.

To assist faculty in the creation of their mGrant proposals, a workshop is offered by the CIT and examples of awarded proposals are placed online after receiving the author's permission. CIT staff members are available to assist faculty in the preparation of proposals - particularly in the creation of a budget and an assessment plan - as well as in the production process. CIT staff can provide or contribute to instructional planning, design of instructional materials, production of instructional materials, and obtaining resources for project implementation. The number and size of grants vary from year to year depending on available funding. Operating funds are available for producing materials related to project implementation; however, these funds must be requested in the proposal budget.

### **mGrant Proposal Guidelines**

All Small Grant submissions must include a cover page and a brief description of the project. The cover page should contain a project title; a project abstract not to exceed 250 words, the names, the department, and the titles of all participants. If a department or college offers to support the project, this should be mentioned in the description as well. Learning Enhancement Grant and CIT Fellowship submissions must contain a cover page, narrative, budget and departmental or college endorsements. Narratives are limited to five pages and should contain a statement of purpose, a course description, educational objectives, a proposed timeline, a project plan, a plan for evaluation outcomes, and a statement of anticipated impact and benefits of the project. Critical elements of the proposal must be addressed in the narrative body; however, appendices may be attached.

### **mGrant Awards: Review Process and Selection Criteria**

The CIT mGrants Committee consists of seven teaching faculty members appointed by an appropriate academic dean or program director. The CIT Grant committee has representation from the College of Arts and Letters, the College of Business, the College of Education and Psychology, the College of Integrated Science and Technology, the College of Math and Science and the General Education program and the Office of Assessment and Research Studies. Committee appointments often vary from year to year.

In late October, each committee member receives a criteria sheet for rating and reviewing the grant applications and a portion of received proposals. (The CIT receives approximately 20 proposals each year.) In addition to the mGrants Committee review, CIT staff performs an internal review of all proposals, to determine the feasibility of the proposal, the suggested technology and the project budgets. This review is used by the Director to inform the grant committee discussion in the formal review. The Director of the CIT, mGrants Program Director and mGrants Committee determine an appropriate cut-off score based on committee and staff review. The selection process continues by discussing the merits of each proposal falling above the cut-off score. The CIT Secretary Senior documents the discussion. The mGrants Committee recommends the award of proposals that rated highest in the areas of need, purpose, impact, project plan, evaluation, budget and continued use.

## **DIGITAL IMAGE DATABASE: PROJECT BACKGROUND**

In the case of the Digital Image Database, the need for the project was immense. Without the creation of a technological system for faculty to teach with, resources were unavailable to meet the demand of additional course sections. There would be no alternative and no other method for meeting the need for these students and faculty. In hopes of easing the strain of resources for the additional instructor and course load, Art and Art History faculty hoped to create a digital image library for the Survey of World Art courses. Particularly, they hoped that the development of this system would provide a better learning environment for students by allowing those students to study the actual images used in class regardless of time and location. In addition they hoped to provide a valid teaching tool for faculty.

Upon initial committee review, it was clear that the project plan was unrealistic. Work would need to begin on the project only a few

months before a minimum of one thousand images were needed for classroom use. The environment was high pressure, with a microscope on both the CIT and the faculty who developed the proposal. In addition to a challenging timeframe, the budget was unrealistic and the learning curve was tremendous regarding cost and resources. Art and Art History faculty and university administrators had no conception of the cost or resources required to complete such a project. However, the project had a bright future and would solve an obvious and critical need. Once the underlying system was developed, additional images from the Visual Resources Center and other disciplines had the potential ability to be added to the system and used in almost any classroom setting.

### **Project Tasks and Process**

To date, the total resource committed to the development of the digital image database by both the principle investigators and CIT personnel total 1700 hours and over \$60,000. Project tasks included project overview and management, cataloging, production of image database and multimedia viewing system, scanning and editing images, remounting and labeling slides, assessment, and administration of the system server. Project development and implementation spanned the three year process outlined below:

#### *Spring 98:*

- Began project management and meetings with the principle investigators to outline responsibilities and duties of content experts and CIT, the order images would be scanned and scanning schedules
- Programmers independently researched off-the-shelf products and determined to develop the application(s) in-house

- Support hardware and software was purchased (e.g. Slide Scanner, Flatbed Scanner, Power supply (uninterrupted), storage media, NT server)
- Primary focus was selecting, digitizing slides and assessment rate and quality of product
- Visual Resources Center was charged with the responsibility for seeking any necessary copyright permissions, with some administrative and resource support by CIT

*Summer 98:*

- Continued digital slide translation and project assessment
- Issues regarding application development were reviewed (e.g., cross platform functionality, designations of primary and secondary web browsers, ease of development, availability of robust Internet connectivity, flexibility and control over visual workspace and caching, development start and finish dates, development of process to speed creation of three sizes per image)
- Development of DID applications were started and completed - programmers created a hybrid technical solution to include a Macromedia Director application and the World Wide Web

*Fall 98:*

- Interface redesign based on feedback from faculty, staff, student use
- Trained Art and Art History faculty and Graduate Assistants on system
- Scanning continued and included outsourcing to a photographic services company to meet time and need demands of faculty
- Monitoring and adjustment of system
- Formal faculty and student assessment by CIT

*Spring 99:*

- Continued slide translation and project assessment (minimal image additions to database)
- Extended faculty participation in use of database
- Monitoring and adjustment of system
- Formal student assessment by CIT

*Summer 99:*

- Continued slide translation (minimal image additions to database)
- Extensive revision of system based on assessment data, technical and graphical user interface needs
- Formal student assessment by CIT

*Fall 99:*

- Continued slide translation (minimal additions to database)
- Extended faculty participation in use of database (particularly across disciplines)
- Faculty and GA training on use of system
- Monitoring and adjustment of system
- Conclusion of formal faculty and student assessment by CIT
- Final report on Digital Image Database submitted

## **DESIGN AND DEVELOPMENT ISSUES**

**Selecting Images** - The grant recipients anticipated that the increase in enrollment and addition of course sections and instructors would strain the availability and preservation of the 35mm slide in image collection of visual resources center. Some main sources included the Visual Resources Center, personal and museum collections, student pictures from trips abroad and scanned images from books.

**Acquiring Permissions To Use Images** - The Visual Resources Curator at JMU is responsible for providing image source information for the works in the database and ultimately, for acquiring any necessary copyright permissions. Each image currently in use has been reviewed and placed into categories. The permission acquiring process for the categories of images involved in the project was conducted simultaneously and is still ongoing. As much as possible, the Visual Resources Center has obtained permission from and incorporated the slide collections of JMU faculty into the database. Images in the public domain are cited by source credits. Images from sources that might require permission or are not in the public domain, are being researched for copyright holders. The Educational Multimedia Fair Use Guidelines allow use of copyrighted material for two years as permissions are being sought. The DID project was completed in February 1999. Both applications of the DID instructional system run from a secure server in a unique password environment. Only faculty members are able to access large, high-resolution images used in a face-to-

face classroom setting. Students must use their JMU user identification and class password to access slightly lower resolution images used in faculty lectures.

Developing A Cataloging System - The Visual Resources Curator at JMU is also responsible for developing the cataloging system of the image database to meet specifications and needs of faculty search criteria. Database Records use a trimmed down version of a full fine arts catalog used in the Visual Resources Center. The fields used by the Center for describing works of art correspond directly to the VRA (Visual Resources Association) Core Categories Version. 2.0. The Visual Resources Curator and faculty discussed common search practices and the minimal number of fields necessary to search and find the desired works of art. Together, the curator and faculty participants decided on six common criteria: artists name, title, period, medium, style, and keywords.

Scanning Images - Slide scanning was done both in the Center for Instructional Technology as well as subcontracted out to various photographic companies. In the Center for Instructional Technology, both CIT personnel and student associates were utilized extensively to complete most all digitizing and correcting prior to the start of the 1998 fall semester. While there are many slides of museum quality, numerous personal photographs were faded and a number of slides were damaged from extensive use, overexposure, or dust inside slide mounts or embedded into the film emulsion. All slides/images were scanned at 200 dots per inch (dpi) and edited or corrected based on color, damage and comparability to the original work of art. Completed scans were resized to 144 dpi and made accessible to the database in three sizes.

The Mounting And Labeling Slides From Visual Resources Center - In order to scan a series of images, slides from the Visual Resources Center were demounted (removed from their glass casings) and placed into specifically sized plastic casings for scanning. Once those slides were scanned and returned to the Visual Resources Center, the slides were remounted into glass casings and relabeled so that they could be returned to the Visual Resources Library, for more traditional teaching and learning uses.

Training Faculty - Each start of the academic school year, CIT provided a training session for Art and Art History faculty and Graduate Assistants on use of the Slide Show Builder and Viewer. This training walked DID users through the process of creating a new slide show, archiving slide shows, editing and annotating

slides, and permitting students to view online lectures created with the Slide Show Builder. This training session also highlights the use and features of the in-class slide Image Viewer application. Personalized one-on-one sessions were held on a needs basis and training documentation is available via the World Wide Web.

Administering The Digital Image Database Server - The DID runs on a Dell 4300 PowerEdge NT server, located in the Library building. The NT server is periodically checked for Y2K compliance and updated with NT service patches. Should the original disk drive fail, a hot-swappable copy of the images is available to plug-in to the NT server. The server is administered within the CIT. The CIT staff works in close association with the Network Services division of the university to track potential server failure, track slowness in network speed, and collaborate in the design of an authentication scheme for the system. Two staff members have access to the actual server, server passwords, and the digital images. Five staff members have the ability to assign accounts to faculty that wish to use the system.

Intellectual Property Rights - The intellectual property policies of JMU are currently under revision. Faculty members are encouraged to review the current intellectual property policies of the university or contact the university Intellectual Property Committee before submitting mGrant proposals. The current policies at JMU indicate that intellectual property rights remain with the faculty member, unless a substantial amount of university resources are used. In the course of two years of the mGrants program, only a small number of grants have used substantial resources. It is the intent of the CIT that the mGrants program promotes faculty entrepreneurial work in the development of instructional technologies and instructional methods.

## **COPYRIGHT**

Pursing permission to use images that are under copyright can be time-consuming and difficult. Often the source of an image is not the same party that owns copyright and can grant permission. Sometimes in the case of images that are not unique works, but instead records of art or architecture in another medium, whether the image is a "derivative" work entitled to equal protection may be complicated by the conditions of sale under which it was originally acquired, or even current uncertainties in the copyright law when dealing graphic works. Despite these factors, taking a conservative approach and seeking permission as a matter of course is helped

by applying the Educational Multimedia Fair Use Guidelines, which were developed and approved during the

Conference on Fair Use (CONFU). Although not a part of copyright law, these guideline represent a reasonable consensus interpretation of "fair use" of copyrighted materials that benefits the development of this project, since they permit a two-year use period while permission clearances are being acquired.

JMU will reach the end of the fair use term for certain images as defined by the Educational Multimedia Fair Use guidelines in February 2001. Without appropriate copyright permission, some of the current images would need to be pulled or replaced in the database. However, JMU is in the process of purchasing a site license from AMICO, the Art Museum Image Consortium, which may contain many of the copyrighted images contained in the DID. JMU is initiating talks that should allow the easy incorporation of the AMICO images into the database, allowing access to faculty and students tens of thousands of digital images.

## ASSESSMENT AND INSTRUCTIONAL IMPACT

The assessment was designed to take place over the course of four semesters and to provide both qualitative and quantitative data, informing redesign activities and providing information on demographics, baseline statistics, usage statistics and instructional impact. Provided below is an overview of the assessment plan:

SEMESTER	AUDIENCE	PURPOSE	METHODS	DATA
Redesign Fall 1998	Faculty Students Staff	Baseline Demographics Usage	Surveys Interviews (PI's only)	Quantitative Qualitative
Spring 1999	Students	Demographics Redesign Impact	Surveys	Quantitative
Redesign Summer 1999	Students	Demographic Redesign Impact	Surveys	Quantitative
Fall 1999	Faculty Students Staff	Baseline Comp. Impact Process	Surveys Focus Groups Interviews	Quantitative Qualitative

### Assessment Results (Highlights)

This instructional system is an example of how technology can positively impact faculty and student success when appropriately integrated into the teaching and learning process. Current assessment data offers a significant correlation between the frequency of student use of the system and their self-perceived interest in Art History, preparation for exams, and learning of course content. Below are a few highlights from gathered data:

*Baseline Comparison - Faculty (Fall 1998)*

- Minimal use of technology
- Keen interest in integration of World Wide Web into instruction
- Faculty access to and use of slides was rated as reasonably effective, efficient and organized
- Student access to slides for review and preparation was rated as inefficient, unreliable, inconvenient
- Hours spent by faculty per task per semester: 39 hours selecting slides/images, 19 hours obtaining slides/images, 21 hours organizing for class use, 21 hours organizing for student review
- Main slide/image sources for faculty: Visual Resources Center (32%), personal collections (29%), World Wide Web (16%), CD-ROMS (13%)

*Student Demographics (Spring 1999)*

- 78% owned personal computer - remaining students access via Campus Lab (37%) or a roommates computer (37%)

- 90% used Windows Operating System
- 89% had network connection

#### *General Usage (Spring 1999)*

- 59% access lectures 1-4 times per month
- 19% access lectures online more than 5 times per month
- Biggest reasons for accessing the online slides was exam preparation (53%), study (47%), missing class (4%)
- Biggest reasons for not accessing online slides were: want more slide info (31%), slow connection to internet (26%), no access to computer (17%), instructor didn't mention it (15%)

#### *Requests for Redesign (Spring 1999)*

- Accuracy of information
- Images: less download time vs. higher resolution
- Opportunity for instructor analysis, annotation to be added to information
- Better students navigation and display interface
- Faculty option of editing and archived slide show and committing to archived status immediately
- Ability to print online shows and lecture materials

#### *Instructional Impact (Summer 1999)*

- Affect on course Research or Project Work: Helped Tremendously (50%), Helped Somewhat (38%)
- Affect on Exam Preparation: Helped Tremendously (68%), Helped Somewhat (27%)
- Affect on Learning Course Content: Helped Tremendously (80%), Helped Somewhat (10%)
- Affect on Interest in Art/Art History: Helped Tremendously (32%), Helped Somewhat (32%)
- Affect on Success in Course Helped Tremendously (54%), Helped Somewhat (27%)
- Affect on Grade in Course: Helped Tremendously (56%), Helped Somewhat (29%)

*Baseline Comparison - Faculty (Fall 1999)*

- Decrease in task and preparation time?
- Positive and extensive instructional impact?
- Alleviation of time/resource demands on VRC?
- Higher integration of technology into instruction?
- Relief of student and faculty problems with access and review?

## **INSTRUCTIONAL IMPACT**

Although incredibly time-consuming, the Digital Image Database instructional system has had numerous benefits. In addition to unlimited acceptability, faculty and students using the database

system are already reaping the advantages of viewing works of art in dynamically new ways. Some of the instructional advantages that are changing the teaching and learning experience of art in Art History are provided below:

- Digitizing and editing images ensures the preservation of slides, permanently establishing and maintaining the integrity of the image and accurate representations of the original works of art.
- Passing a single 35mm slide around to ten faculty members (from a personal collection) is impossible; however, now all faculty are able to access the best slides without burdening the collection of any individual(s).
- No additional damages are incurred to personal and university slide collections even though faculty and students access online images twenty-four hours a day, seven days a week, and from any desired location.
- Students have online access, anytime, to instructor-supplied lectures and slide images. This provides the security, safety and convenience of a campus lab, apartment or home as compared to an often-empty campus hallway or classroom during prescribed hours.
- Faculty can electronically search hundreds of digital slides and organize selected slides into classroom lectures twenty-four hours a day, seven days a week, independent of the schedule of the Visual Resources Center.

- Descriptive information on all images is available within the Image Viewer. This software feature saves in-class time for faculty and provides appropriate spelling, dates, and pertinent information for students.
- High-resolution images permit faculty to enlarge images and show details in Image Viewer without blurring, pixelation or working with multiple detail slides simultaneously. This permits ease of use and maintains the continuity of viewing. It also provides time for more discussion or the viewing of additional images.
- Flexibility of the software encourages movement within an image, removing the static quality of images and providing what is equivalent to a "walking tour" which incorporates both overview and detail slides. For example, students can progress down a road, frieze, or around a room, by enlarging the image and then dragging the image along a line of view. Discussion can take place at points of interest without breaking a student's attention or an image's fluidity.
- Faculty access the best slides from numerous public and private collections, enhancing the context, environment and accuracy that comes from a variety of perspectives on a single work of art.

- By updating the image database, students can view artwork, sculpture and architecture over time.
- Faculty can show personal or student pictures taken while traveling abroad or on-site.
- Faculty and students have use of a truly anytime, anywhere teaching and learning tool. Shows can be created, classes can be instructed and students can access and learn from a distance.

## THE PILOT - LESSONS LEARNED

There is a technology learning curve for faculty - Education about technology and its integration into the teaching and learning process is critical. Education about technology for content experts and training in the use of the system for all faculty should be integrated into the project life cycle.

There is a content learning curve for technology developers - Technology professionals need to be reminded of the need for patience and the need for service. Design of instructional technology is a collaborative process and technology professionals must be proactive in making that process collaborative. An open and accessible exchange of knowledge is a necessity between technology experts and content experts.

You don't know what you really need until you've done it - Though highly collaborative and extensive redesign has taken place, it is clear that more design changes are needed. As faculty and students use the tool increases, ideas for its improvement and use emerge. As in any design process, it is sometimes the accidents of design that become the most powerful features of the system (i.e. the dynamic viewing of maps and friezes).

The need for infrastructure is larger than you think - It is clear that the development of an innovative instructional system impacts the academic technology infrastructure of the university. Already, faculty are demanding additional technology classrooms, in which they can utilize this teaching tool. In addition to new technology

teaching classrooms, faculty are knowledgeable about the types of technology they want in these classrooms. The best projectors are required to teach the visual arts. More computer memory is required to allow faster access to the server images. More development is needed on the system to make it a better teaching tool for all Art History courses and for disciplines beyond Art History. More images are needed.

## **ACCOMPLISHMENTS AND CONCLUSIONS**

Through the Digital Image Database instructional system, a solid framework has been built for future expansion. Though the system now meets needed yearly requirements for over 20 faculty and 2000 students, it is clear that the current system is a stop-gap measure that meets the instructional needs for only two courses. The systems underlying the instructional system have the capacity to grow across even more disciplines.

A second accomplishment rests in the strength of the project due to an interdisciplinary effort. Professionals from the Center for Instructional Technology, the university library, Art and Art History, History, Mathematics, Music and more are providing input for redesign of the system. At the end of this semester, a faculty focus group will provide final input for design for Art and Art History use of the system. In the meantime, a university committee made up of librarians, the Visual Resources Curator, and faculty across the university will determine the future of the system for the university. Questions to be addressed include: How are images added to the system? How is search criteria expanded? What images are appropriate for the system? And how should the system be expanded to incorporate other instructional needs?

Faculty and student satisfaction is high. With the image database and the associated software applications, faculty search the database online, receive nearly instantaneous results and immediately select and organize these results according to preference. In addition, database use removes the necessity to re-file slides for both the Visual Resources Center and faculty since the images are digital and retained on the CIT NT server. The image database addresses issues of student and faculty access. Faculty no longer need to select, locate and organize prints or images for student review. Students will have online access to all slide shows created by their course instructor. The option for faculty to archive created shows can greatly reduce faculty time spent in the selection, location and organization process. Both faculty and

students are happy with the system, but anxious to incorporate new ideas.