Visual Resource Center Five-Year Work Plan
Draft 1 - (mt)
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Vision Statement

Visual resource materials are fundamental to classroom instruction and the learning experience. Research suggests image-based materials bring a contextual dimension to education by illustrating concepts, providing visual memory cues, and broadening instruction beyond its traditional boundaries. Art historians depend on images to convey art and culture within the broader context of human history. Studio faculty uses imagery to illustrate genre, style, and technique to their students. Other departments of the university, such as history, music, sciences and literature, use images to provide context to their instruction and to demonstrate specific content. Further, for many students, imagery may be the only opportunity to view a particular work of art, or specific content.

The Visual Resource Collection (VRC) plays a central role in supporting these pedagogic objectives by insuring that visual and multimedia resources are of the highest quality, and accessible for instruction and study. It has fulfilled this role by building a collection of nearly 75,000 slides and sharing these resources with the greater university community. To many faculty and students the slide collection remains a vital resource. However, the future of this media is tenuous at best. Frequently cited as reasons for slide obsolescence are Kodak's phasing out the production of slide projectors and eventually slide media. Even more important in our opinion is the flexibility offered by digital media: the ability to circulate images widely, to access them on-line, to use them in multiple presentation formats simultaneously, etc.

The VRC has embraced the digital age by expanding its mission and services to digital production and acquisition of digital image and multimedia resources for campus wide instruction. In the next few years, VRC will increase its services by establishing a Visual Resource Digital Center (VRC). Its purpose is to foster and support the use of digital imagery, multimedia and audio content within the classroom and extend these resources to faculty and student population via a digital image database. VRC intent is to ensure interoperability of digital image content and to facilitate sharing of these resources throughout the university.

To achieve this goal, VRC will develop a web presence within the CVPA website. The website will include links to content and resources related specifically to the arts and music, including image databases, professional and educational institutions and instructional aids for both students and faculty. VRC will develop an image database using a software application created by James Madison University known as M-DID.

This database is designed to facilitate remote access to digital images; allowing faculty and students to search, retrieve and deliver images via the VRC's webpage.

VRC Implementation
To ensure the success and longevity of a digital initiative, VRC will need to examine technology requirements and limitations, determine the use of these resources, establish standardization and metadata procedures, and create an execution and delivery plan.

Usability studies
The old saying is to "Measure twice, cut once." This philosophy is essential when initiating a digital project. Jakob Nielsen, a leading usability expert of a usability of electronic resources states it best, "Why should [users] waste their time on a website that is confusing, slow, or that doesn't satisfy their needs?"

With this in mind, VRC is conducting a series of usability studies which should reach their conclusion by December 2005. The purpose of these studies is test the usability of the images within the classroom and the effectiveness of the VRC website and database. Faculty and students will be encouraged to participate in these studies so VRC may better address their visual resource needs and objectives.

The first usability study was conducted this past summer with Michael Taylor and Allison Cywin. We developed a series of beta tests to determine the operability of digital images within the classroom and lecture halls. We scanned a wide range of original materials (books, slides, original photographs, etc.) at various resolutions, bit color, and pixel dimensions. We then projected these scans to evaluated projection quality. The criterion was clarity of detail, screen dimensions and upload time. These tests resulted in technical metadata standards for image projection within a classroom setting (see technical metadata), which required a much higher image quality than web-based images.

The second study is to meet with each CVPA department to determine the use of, or lack of, digital imagery. We have asked to attend departmental staff meetings so we may discuss general needs and concerns regarding digital imagery. The response has been lukewarm so far, but we hope to schedule more meetings this spring. However, we have met with the Fine Arts Department and some individual faculty members the following concerns where brought to light:

- lack of training in PowerPoint and database search and retrieval systems
- lack of portable digital equipment including LCD projectors and computers for classroom presentations.
- lack of adequate space to project digital imagery.
- lack of LCD projectors and computers for outside presentation.

Although CITS offers the laptop program, and LCD projectors are available through the Library, the logistics and availability can be problematic at times. The VRC will offer the following services. (Refer to Appendix A for equipment needs)

- One on one instruction for CVPA faculty members in basic Power Point. (Sessions are scheduled for March 28-31, 2005 to be followed up with further instruction conducted by CITS.)
- Mobile digital workstation equipped with both computer and LCD projector for classroom instruction (CVPA faculty only)
- Acquire a 40" LCD or plasma monitor enabling digital presentation in all classrooms (CVPA main campus only)
- Establish a digital equipment rental program (off-campus presentations)

The third and fourth usability studies will include both student and faculty participation. The first will be a card sorting usability study. The goal of the study is to determine how users organized the features on the new Visual Resource webpage and database. Based on the University of Washington Library usability model, participants in the study are asked to perform two sets of tasks with note cards representing current and potential features on the VRC resource pages. First, participants will grouped note cards according to their perceived importance: critical; very important; important; slightly important; not important. Second, participants will arrange note cards according to their own navigational structure and cluster features they considered similar and would expect to find together. These arrangements will be recorded and analyze for implementation.

The fourth study is based on unobtrusive observation. As Jacob Neilsen states, "If you want to learn whether users can use your design, you have to observe how they use it, not ask them what they think of it." This technique can help to determine the ease of use of the VRC webpage and database interface.

Metadata Standardization—Best Practices

Why is metadata important?
At first glance, the term "metadata" calls to mind another computer buzz word and induces a visit to the dictionary. Simply defined, metadata is "information about information." Metadata is information, which describes the content and characteristics of an object, digital or otherwise, for purpose of search, and discovery.

Imagine trying to find a book in the library without a card catalogue, or computerized search interface. The information contained in these types of systems is essentially "metadata" about the books housed at that library. Metadata describes the "who, what, when, where, and how "of a particular resource. Without this basic documentation, a book would be impossible to locate. This basic principle holds true for digital image, perhaps even more so. Without metadata, a digital file would be nearly impossible to locate among the thousands of files on a typical computer.

What is metadata?
There are three basic types of metadata: *administrative, technical* and *descriptive.* Various national and international standards committees have developed these metadata standards, which in recent years have been deployed by libraries, museums, archives and

the scientific and business communities. Groups that have established best practices related specifically to image metadata are:

- VRA – Visual Resource Association
- LOC – Library of Congress
- NISO- National Information Standards Organization
- DCMI – Dublin Core Metadata Initiative
- W3C – World Wide Web Consortium
- DLF – Digital Library Federation
- ANSI – American National Standards Institution
- ISO – International Organization for Standardizations
- OAIS – Open Archival Information System

Administrative metadata

Administrative metadata are systems that manage and preserve digital resources. These metadata strategies ensure the longevity of the digital file and ability to interpret in the future. When developing an administrative metadata schema, one must have a good understanding of the whole project. What kinds of derivatives (i.e., "duplicate" images at lesser size and resolution) are needed? How many images will be scanned? Will they be stored in different places within the operating system? How will the files be backed up? Will the files be integrated in an existing system (e.g., a library catalog), or in a stand-alone system?

One of the first steps is a file management or URL structure that enables the librarian to identify both the digital master and derivatives. As illustrated by Michael Ester, this can be complex process and takes a great deal of consideration.

> To take a simple example, consider giving an image file a name. This can begin as a straightforward task of giving each image file the same name or identifier as the image from which it was scanned. This assumes, of course, that the name will fit in a filename. Next, there are perhaps three or four smaller images created from the master image, or alternatively, versions of the image in different formats. More names needed. The image variations will probably not be stored in the same place, so now we need to come up with names for the places we put them and what goes into these different areas so we don't mix them up. Finally, we need to record all of the names somewhere so that other people and computer programs can find the images and versions of images they need. What starts out as giving one file name to an image grows to a many-sided production step, and names are only one characteristic of the image we need to track.

There are two approaches to URL structure, specifically file naming. One is to use a numbering schema that reflects numbers already used in an existing cataloging system; the other is to use meaningful file names. It is important to remember that files should be

assigned a unique identifier. This is extremely critical if there is a potential for future sharing or the descriptive metadata is held separate from the digital resource. With this in mind, VRC decided to discontinue the "Cutter" classification system, which has been used for slide identification and indexing. This decision was based on limitation of VRC work force i.e. undergraduate students. These students assist with the scanning and naming of digital image files. Training this transitory staff in "Cutter classification" would be a difficult task and we believe would incur a high probability of error.

Therefore, VRC opted for simpler and more direct approach to file naming, insuring uniqueness and easy implementation. Each new master TIFF identifier begin the year it was created, 04, 05 etc. (date will assist with technical metadata linking image creation with capture device), followed by a collection/order character code, and followed by a consecutive four digit item number. File names are entered in lower case since some software and web applications are case sensitive. Each surrogate image will have the same file name with a qualifying suffix related to type of surrogate (_f = full; _p=postcard; _t=thumbnail). This will ensure that the master and the surrogates will appear together within a file directory, thus making the management of files easier.

"Preservation metadata" relates to the management of digital resources in the future. There are three preservation strategies: technology preservation, emulation and migration. Technology preservation requires maintaining the original software and operating system used to generate the digital file. Emulation is attaching annotation metadata to the file explaining how to decode a possibly obsolete digital object. Migration, the third approach adapted by many digital archives, is the periodic transfer of digital image files from one platform to another and before the digital data is no longer readable. VRC has elected the third approach and has adopted a five to seven year migration schedule, depending on the evolution of technology.

"Data storage" is another preservation measure with both short-term and long-term implications. Preserving digital data is fundamentally different from analog data. Traditional analog preservation relies on slowing the physical decay of the object. On the other hand, digital image files over time become obsolete and no longer retrievable and disappear permanently. An active approach with continue monitoring of data viability, data storage and backup systems are imperative.

Choosing storage media can be complicated. There are a several options including burning data to optical disc, mirroring data, RAID systems etc. or a combination. Before determining the best option, we need to understand each storage solution.

Optical discs (CDs, DVDs) are manufactured in a variety of sizes and materials. Most commonly, they are made from polycarbonate and glass. The image recording layers feature organic and inorganic coatings. Franziska Frey, leading photographic conservator, explains the properties of optical media.

> Read-only discs have the surface modulated by molding of the polycarbonate substrate. Erasable discs are based on magneto-optical or

> phase-change properties. Despite this vast dissimilarity in composition, optical discs have an important advantage over magnetic materials, namely, that their life expectancy is more certain. Optical discs are recorded and read by light and do not come into contact with moving or stationary parts of equipment. Therefore, their useful life is mainly determined by the properties of the material itself; physical wear and tear is less of an issue than it is with magnetic tape.
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> Optical discs can fail by a number of different mechanisms, such as relaxation of the substrate, which cause warping; corrosive changes in the reflecting layer; cracking or pinholes; changes in the reflection of any dye layers by light, pressure, or crystallization; or breakdown of the disc laminate by adhesion failure and layer separation. Of particular interest to the consumer is how long optical discs will last. Various tests reported that their life expectancy ranges from 5 to more than 100 years, depending on the product.
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> Appropriate storage conditions can prolong the life of optical discs, regardless of the inherent stability of the material. The recommended environmental conditions are 23 °C and a relative humidity between 20 and 50 percent. Lower levels of temperature and RH provide increased stability, with the lowest specified conditions being -10 °C and 5 percent RH.. Particular care should be given to maintaining a low-dust and low-dirt environment. Another important consideration is to avoid large temperature and humidity variations. Protection from light is vital for many writable CDs.

Backing up data to a server and/or a RAID system is another safe option. This approach insures that the data is stored on a redundant system and is updated on regular basis. It allows for easy access, distribution and migration of files to future systems. It is advisable to have at least two back-up copies of the master files.

With increased production of digital content come issues of type and amount of storage and the rate in which data may be transferred from one workstation to another. These issues came to a head this past January, when the VRC server and workstations came to abrupt halt due to lack of hard disc space on the server and connectivity problems in the center. To give an example, since fall semester 2004, the Art History Department (7 professors) has almost completely transitioned to digital content and only very rarely uses slides. During that time approximately, 4,760 master images (TIFF files not exceeding 40MB) were generated. Along with their 10,000 surrogates, hey occupy 65.5 GB of hard disc space. VRC's server has only a 68GB internal hard drive; 65.5GB of that space was used in six months.

Extrapolating growth projections from this experience, we find that one professor has the potential of requiring 9GB of imagery per semester. If we take this estimate and multiply it by the number of CVPA faculty (52) it equals 468GB per semester. Realistically, use of

the same core images is highly probable, so let us cut this number by half. Additionally, of course, studio faculty tends to require fewer images than art historians. Nevertheless, in five years we estimate that VRC will generate 2TB of digital image content. This figure seems staggering, but by the standards today's image collections it is more than reasonable. Years ago, a two-terabyte server would have cost ten-of-thousands of dollars. Today a terabyte of disc space can be had for less than $800 dollars. Based on these growth projections, Craig Oliveira, System Administration and Operations Team Leader, has offered the following a short-term and long-term solutions for storage and connectivity needs.

Storage and Connectivity Needs – Short-Term (in process of implementation)

- Increased RAM to 1GB on all scanning workstations.
- Upgrade Apple operating system from 9.2 to 10.3
- Upgrade Photoshop to current CS version allowing for future technical metadata to be embedded utilizing XMP.
- Replace Ethernet cabling with CAT 5 and a localize switch to improve data transfer and connectivity.
- Acquire an additional 1TB hard disc.
- Image data is being backed-up to university's enterprise backup system (Tivoli) every night and optical disc.

In February, Michael Taylor, Allison Cywin and Craig Oliveira (System Administration and Operations Team Leader) met to discuss long-term strategies for data storage and preservation. Mr. Oliveira indicated that CITS is will be upgrading its present backup and delivery this coming summer. As part of their upgrade, CITS has agreed to allocate 3TB to VRC for storage and image distribution space.

Storage and Connectivity Needs – Long-Term

- Upgrade VRC connectivity to support the use of image and multimedia digital content
- CITS agreed to support VRC with 3TB of storage and distribution space using the new SAN system (ATA and FC RAID 3 and RAID 5 system)
- Examine the issue of Star Store connectivity limitations (i.e., T1 cabling) and seek solutions for direct image and multimedia delivery system.

Discovery and Delivery

A university-wide image content and delivery system will require great deal coordination with CITS. We have begun some primarily discussions with Mr. Oliveira regarding distribution of VRC image database. These discussions will continue, as VRC's database is assembled and ready for campus-wide consumption.

In the meantime, VRC has established a local image delivery system for the Art History department. Faculty is are now able retrieve their image requests via their office desktop

or laptop computer. This new delivery system has saved VRC money, since we no longer need to burn images to CDs, and time for both the faculty and VRC's staff. VRC would like to extend these same services to the Star Store campus, but a number of issues need to be addressed. Star Store depends on Window FileSharing which is prone to viruses. Thankfully, CITS has remedied this situation by establishing security barriers. Unfortunately however, these security precautions may prevent the ability to set up a similar delivery system at Star Store. In addition, the Star Store network connection to the main campus is T1, restricting data transfer to 1.5MB and making it impossible to deliver multiple high quality image files in a timely way and without clogging the connection. Wireless networking has been discussed, but it too has limits and cannot accommodate large data transfers.

To expand digital content and services, VRC has acquired four computer terminals for internet and intranet access for students and faculty to conduct research and study. VRC has extended its services by include a place for students to congregate to review lecture notes and study guides, and view supplementary materials to extend classroom instruction. Study groups and review sessions are held on regular basis. As an interim step to VRC digital archives, we will post all digital images on local computer workstations within the VRC facility. These digital images will be categorized under broad headings for easy access: e.g., genre (photography, ceramics, textiles), geographic (Japan, American, French) and periods (18^{th} century, medieval, 19^{th} century). Faculty may copy these images to external storage device.

To extend VRC service further, we are creating a new "Resource" section within the CVPA website. The purpose of the VRC's website is to provide a central location where both faculty and students may obtain information and resources related specifically to the visual and performing arts. There will be six areas of content: collections, services, image database; arts and music resources; faculty resources, student/artists resources and UMass Library Visual Art resources.

Technical Metadata

Technical metadata documents the creation and function of the digital content to ensure image integrity and usability in the future. By recording the technical metadata, either by embedding the data within the digital image and placing it in a separate database, we will enable future users to restore the digital content long after its creation. The metadata also provide a metric to measure technical content for accurate rendering of the digital image.

The National Information Standards Organization, (NISO), a non-profit association accredited by the American National Standards Institute (ANSI), identifies, develops, maintains, and publishes technical standards related to the management of digital information, in the realm of retrieval, re-purposing, storage, metadata, and preservation. In 2000, the National Information Standards Organization released a *Data Dictionary - Technical Metadata for Digital Still Images.* This draft outlines a series of technical metadata elements necessary to manage and preserve the longevity of digital image collections. VRC has used these NISO guidelines to articulate its own technical metadata standards outline below.

With each analog image, VRC is producing four digital image files. The first is a master uncompressed TIFF file, which will archived and migrated over time. The master file dimensions are based on a size ratio of 40MB or less. This decision derives from a number of factors. First, the size differential between the master and derivatives has a direct impact on image quality. Second, we do not intend to produce a hardcopy of the original, so 1:1 ratio in unnecessary. Third, by limiting the size of the master file we can conserve valuable server space and reduce bandwidth requirements. From the TIFF file, three surrogates will be generated through a batch process within Photoshop CS. This first is a high-resolution jpg designed for projection purposes. The remaining two, will be low-resolution jpg's for web access. Each derivative will be placed in a separate URL location in compliance with the MDID delivery application.

Technical Metadata Guidelines for Image Capture

Digital Masters (uncompressed TIFF)

General settings for reflective and transparent objects

- File Size: not to exceed 40MB

Original color photograph or half-toned

- Bit color: 48
- Resolution: 600dpi
- Unsharp Mask Filter: High
- Descreening Filter: Fine 175 lpi
- Saved as read only

Original color transparency

- Bit color: 48
- Resolution: 600dpi
- Unsharp Mask Filter: High
- Dust Removal: Low
- Saved as read only

Original black and white photograph or half-tone

- Bit color: 16
- Resolution: 800dpi
- Unsharp Mask Filter: High
- Descreening Filter: Fine 175 lpi
- Saved as read only

Original black and white transparency

- Bit color: 16
- Resolution: 800dpi
- Unsharp Mask Filter: High
- Dust Removal: low
- Saved as read only files

User Surrogates (High and low resolution compressed jpg's)

Full (classroom projection)

- Bit color: 8
- Resolution: 150 dpi
- File Size: not to exceed 1.5MB
- Pixel dimension ratio: width 1800 x height 1400

Postcard (web)

- Bit color: 8
- Resolution: 72dpi
- File Size: not to exceed 500KB
- Pixel dimension ratio 320x240

Thumbnail (web)

- Bit color: 8
- Resolution: 72 dpi
- File Size: not to exceed 200KB
- Pixel dimension ratio: 96x72

Fortunately, Adobe Photoshop, using the XMP schema, embeds some of the technical metadata (file size, resolution, pixel dimension, etc.) automatically. Metadata related to image creation device will be recorded in a separate log and will include the following elements.

Image Creation and Devices

- Creation Date
- Image Producer
- Host computer
- Operating System
- Version
- Device Source
- Scanner Manufacturer
- Scanner Model Name
- Scanner Model Number
- Scanner Software and Version
- Image Identifier (file name)
- Image Identifier Location (URL for file)

Descriptive Metadata

Descriptive metadata is a content tools used for the indexing, discovering, and identifying digital resources. Librarians, archivists, and visual specialists use many descriptive metadata schemas including, MARC21, EAD, VRA Core 3.0 and Dublin Core. These

schemas allow for consist vocabularies, field designations, and terminology which is imperative for precise content discovery.

VRC has selected Dublin Core for its core descriptive metadata schema. This decision n is based on Dublin Core's simplicity of creation and maintenance, commonly understood terminology, international adaptation, and extensibility.

In March 1995, Online Computer Library Center and the Nation Center for Supercomputing Application sponsored the first Dublin Core metadata workshop held, yes, in Dublin, Ohio. Its mission was to concentrate on the enormous problem of discovery, and delivery on electronic content. To address these concerns, the workshop developed a core "data element set" designed to describe a wide array of electronic resources. To this end, Dublin Core Work Group agreed upon thirteen core data elements: *title, creator, subject, description, publisher, contributor, date, type, format, identifier, sources, language, relation, coverage, and rights.* Since it original conception, Dublin Core has added three new elements: *audience, provenance, and rights holder*. Dublin Core offers the flexibility to expand the core elements by introducing localized elements specific to one's institution. Over the past five years, Dublin Core has become the standard for digital resources and adopted internationally by cross-disciplinary professionals including libraries, museums, archives, computer science, and text encoding communities. The Dublin Core Metadata Element Set was approved by ANSI and assigned the number Z39.85.

As a librarian, we may think of Dublin Core as a minimum set of catalog fields within a catalog schema; answering basic questions who, what, when and where. Dublin Core specifies the type of content within the element, i.e., descriptive catalogue field. However, the actual content may be free flowing as in simple Dublin Core or controlled to enhance discovery as in qualified Dublin Core. These qualifiers are based on vocabularies, terms and lexicons maintained by established institutions such as the Library of Congress and Getty. (Dublin Core has a registration list of acceptable qualified schemas on its website.)

There are three ways the Library community has deployed Dublin Core. The first is to embed metadata within electronic resources, usually located in the header. The second is using the DC element set as field designation within a database thus separate from the electronic resource. The third is to use Dublin Core as a crosswalk linking different types of metadata schema, resulting in a single discovery unit.

VRC will use qualified Dublin Core elements along with several localized elements specific to the institution. These elements will be deployed as field designations within a mySQL database structure (MDID). Each descriptive data record will point to multiple electronic image files resulting in a seamless presentation to the end-user. This implementation gives a greatest flexibility regarding future updates and global changes in content or images. Dublin Core data elements can serve to develop crosswalks to the UMass library databases and other Visual Resource collection within the UMass system in the future.

Several tasks need to be accomplished before building descriptive metadata. A field dictionary must be prepared outlining the semantics and syntax of the actual data. Anticipating data sharing in the future, a Digital Image Task Force has been established. Their mission is to articulate metadata standards that may be deployed through the UMass system. In addition, this summer UMass Boston's Visual Resource department and VRC will begin to develop basic lexicons for subject, genre, medium etc. to be shared across campuses. VRC must also upgrade the current application of MDID to MDID2, scheduled for this July. With a help from a consultant, VRC will modify the MDID2 application to include controlled data input screens enabling work-study students to enter basic descriptive metadata during the scanning process.

Broader implications and issues

Metadata standards go beyond a simple image capture and delivery systems. Across the campus, professors and students are generating digital resources in a variety of formats, and digital environments for all sorts of purposes: papers, thesis, student and faculty portfolios, research and classroom instructions. Yet, there is lack of coordination to ensure longevity or integration of digital content. Unlike paper, which deteriorates slowly over long periods of time, digital content has no such luxury. Content can be lost in a matter of years, and not decades.

Content sharing is a complex problem with many technical layers and copyright concerns. Let us begin with content sharing on a basic level. One of the simplest methods to control content stability is platform conformity. Consistent operating and application systems, and documentation of this metadata, ensure stable and interoperable content. In the case VRC, we are working in a multi-platform environment of PCs and Apples. Although the interoperability between these two systems has grown closer over the years, basic conversion problems remain. Incapable files and corrupted storage devices within a cross-platform environment disrupt content sharing; leaving VRC to produce duplicate files formats to accommodate both Apple and PC users.

Perhaps the biggest challenge to content sharing is copyright. The U.S. Copyright Fair Use and Technology, Education and Copyright Harmonization (TEACH Act of 2002) provisions restrict academic content sharing. Thanks to American Library Association, guidelines for placing texts on e-reserves have been made fairly clear. We need similar guidance when it comes to images. One model we can look at is University of California Libraries and Visual Resource Collection, which in 2003 issued a report entitled *Digital Visual Resources Planning Report.* This report suggests that we apply the same fair-use principles outlined for traditional copy stand work to digital images.

> Most visual resource collections have policies and procedures for acquiring and producing slides. Local policies generally reflect a balance between the needs of instructors for images with the rights of the image provider, which may include the publisher, photographer, artist, museum, trust, or some combination of those

> entities. Many visual resources collections interpret the "fair use" provision of the U. S. Copyright Law to mean that slides can be made from print sources to support specific classroom teaching and presentation needs. Collections often limit the percentage of images from a single source. It is widely accepted that the use of slides is limited to institutional-specific teaching needs, and slides are not loaned to other institutions.

In the twenty-first century as digitization technologies replace obsolete technology like of 35mm slides, these issues become even more complex. This situation has generated two bodies of opinion regarding copyright and digital reproductions for educational instruction.

Visual resource collections began experimenting with e-reserves by placing digitized versions of images on intranet and/or burning images to CD-Rom to support specific courses. To accommodate student and faculty demands while maintaining copyright provisions, universities have restricted image access to a localized intranet requiring a user password and limiting access to a specified time or course, at which time the images a dumped from future use.

The second approach that the visual resources community has taken is to construct image databases with low resolution images for discovery and display using low resolution images, with the future potential for supporting the projection of digital images in the classroom. The University of California among other academic institutions has begun to build a digital image database and to explore issues of fair use. But these content delivery systems still limits access to students, faculty and staff, user constraints and legal disclaimer stating copyright provisions.

Visual Resource Association offers additional guidelines to copyright visual and multimedia resources.

> TIME LIMITATIONS:
> Educators may use their own multimedia programs, containing portions of copyrighted works incorporated under fair use and developed for educational purposes, in teaching courses for a period of up to two years after completion of the finished multimedia product but use beyond that time period requires permission for each copyrighted portion incorporated in the production.
>
> ILLUSTRATIONS AND PHOTOGRAPHS
> The reproduction or incorporation of photographs and illustrations is more difficult to define with regard to fair use because fair use usually precludes the use of entire works. Under these guidelines a photograph or illustration may be used in its entirety but no more than 5 images of an artist or photographer may be incorporated into any one multimedia program. When using photographs and illustrations from a published collective work, not more than 10% or 15 images, which ever is less, may be used in the multimedia program produced by an educator or student for educational purposes.

MOTION MEDIA
Up to 10% or 3 minutes, which ever is less, in the aggregate of a copyrighted motion media work may be reproduced or otherwise incorporated as part of a multimedia program produced by an educator or student for educational purposes.

MUSIC
Up to 10% of an individual copyrighted musical composition, or up to 10% of a copyrighted musical composition embodied on a sound recording may be reproduced or otherwise incorporated as part of a multimedia program produced by an educator or student for educational purposes.

Notwithstanding the above, using more than 30 seconds of an individual copyrighted musical composition, or of an individual musical composition as embodied on a sound recording shall require permissions from the copyright owner or licensing collective.

Library e-reserve policies and guidelines are another possible solution to the copyright concerns. UMass Dartmouth's library has a comprehensive copyright policy, http://www.lib.umassd.edu/policies/copyright_reserve.html. For better or worse, these provisions are unsatisfactory to both students and faculty who rely solely on digital images to present content within the classroom. The American Library Association offers the following guidelines when developing an e-reserve policy.

First factor: The character of the use.

- Libraries implement e-reserves systems in support of nonprofit education.

Second factor: The nature of the work to be used.

- E-reserve systems include text materials, both factual and creative.
- They also serve the interests of faculty and students who study music, film, art, and images.
- Librarians take the character of the materials into consideration in the overall balancing of interests.

Third factor: The amount used.

- Librarians consider the relationship of the amount used to the whole of the copyright owner's work.
- Because the amount that a faculty member assigns depends on many factors, such as relevance to the teaching objective and the overall amount of material assigned, librarians may also consider whether the amount, even the entire work, is appropriate to support the lesson or make the point.

Fourth factor: The effect of the use on the market for or value of the work.

- Many libraries limit e-reserves access to students within the institution or within a particular class or classes. Many use technology to restrict and/or block access to help ensure that only registered students access the content.
- Libraries generally terminate student access at the end of a relevant term (semester, quarter, or year) or after the student have completed the course.
- Many e-reserves systems include core and supplemental materials. Limiting e-reserves solely to supplemental readings is not necessary since potential harm to the market is considered regardless of the status of the material.
- Libraries may determine that if the first three factors show that a use is clearly fair, the fourth factor does not weigh as heavily.

A member of the UMass Digital Task Force, Kate Harrington, Senior Associate for Academic Affairs, is asking council to review the copyright provisions regarding digital image sharing. While the larger copyright questions will continue to be debated, it is necessary to continue to develop practical approaches to dealing with copyright and fair use.

- If in creating a slide collection "fair use" principles have been followed, does this imply that providing digital versions of those images is allowed?
- Can digital images be shared legally between multiple institutions?
- Are there different legal considerations when providing digital image reserves versus providing permanent digital image collections?

Bibliography

1. Technical Advisory Service for Image. ***Designing the collection for Learning, Teaching & Research.*** 2004 http://www.tasi.ac.uk/advice/using/image-use.html
2. CONFU. ***The Conference on Fair Use***. 1997 http://www.utsystem.edu/ogc/intellectualproperty/confu.htm
3. CCUMC. ***Fair use Guidelines for Educational Multimedia***. 1995 http://www.vraweb.org/copyright/multimedia.html
4. Educational Multimedia Fair Use Guidelines Development Committee. ***Fair Use Guidelines For Educational Multimedia.*** July 17, 1996 http://www.utsystem.edu/ogc/intellectualproperty/ccmcguid.htm
5. Marion Walton. ***What is usability? Why is usability important?*** 2004 http://www.writing.uct.ac.za/user/usability1.htm
6. Brenda Gerth. ***Web Site Usability and Accessibility Education Services Group, Computing User Services.*** 2003 http://web.uvic.ca/comped/online/accessible/acadaccessusesites_files/TextMostly/Slide1.html
7. Ward, Jennifer and Holstrom, Christopher. ***IT Services Usability - Card Sorting Usability Study.*** University of Washington Libraries. 2001 http://www.lib.washington.edu/Usability/cardsort/cardsummary.html.
8. Sim D'Hertefelt***, Observation methods and tips for usability testing,*** 12 December 1999 http://www.interactionarchitect.com/knowledge/article19991212shd.htm
9. Franziska Frey, ***File Formats for Digital Masters. Council on Library and Information Resources***, 2000 http://www.rlg.org/visguides/visguide5.html
10. Linda Serenson Colet. ***Planning an Imaging Project***. 2000 http://www.rlg.org/visguides/visguide1.html
11. Cooper, Brian; Garcia-Molina, Hector. ***Creating trading networks of digital archives***., 1st ACM/IEEE Joint Conference on Digital Libraries, 2001 http://www.adobe.com/products/xmp/pdfs/xmpspec.pdf
12. Robin L. Dale and Oya Y. Rieger ***Data Dictionary - Technical Metadata for Digital Still Images.*** 2003 http://www.niso.org/committees/committee_au.html
13. Colorado Digitization Program. **General Guidelines for Descriptive Metadata Creation & Entry.** 1999 http://www.cdpheritage.org/resource/metadata/std_metadata.html#What

14. Digital Visual Resources Task Force to the System-wide Operations Planning Advisory Group, University of California Libraries**.** ***Digital Visual Resources Planning Report.*** **2003**
http://libraries.universityofcalifornia.edu/sopag/vrtf/VRTF_Report_082603.doc

15. ***Digital Initiatives: MDID Image Database and Teaching Tool****.* 2004
http://oncampus.richmond.edu/academics/library/digital/mdid.htm

16. **Dublin Core Metadata Initiative.** 2004
http://dublincore.org/