NITLE

Transformations

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The Visual Resources Environment at Liberal Arts Colleges

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Executive Summary

The increasing availability of digital images at colleges and universities has offered new opportunities for teaching and learning. In some disciplines and on some campuses, the opportunities are nothing short of transformative. Digital images are at the leading edge of the shift towards using many kinds of digital materials for teaching and learning on our campuses. When findings from this study were presented at NITLE's Digital Asset Management symposium in Atlanta in December 2005, discussion ensued about the need for stronger campus leadership in order to maximize the potential of digital technologies for teaching and learning. This report focuses on the issues of organizational structure and organizational culture that are most deserving of the attention of campus and information-services leaders.

The findings are based on visits to seven liberal arts colleges in late 2004 and early 2005, which were designed to examine the role images play in teaching and learning. Although a number of campuses had developed viable strategies for the provision of digital images and the organizational plan and campus culture to support those strategies, several of the institutions we visited suffered from an organizational structure or campus culture that was ill-suited to take the strategic choices needed to encourage a transition to digital images. As the section on Campus Roles and Responsibilities explains at greater length, we saw two fundamentally different organizational models for the information services units that support image provision, one of which was much more successful than the other.[1] The role of the slide library or visual resources collection was the ultimate variable, and those campuses on which the slide library takes a campus-wide perspective (rather than serving the art history department alone) seem to see much easier and more successful transitions to digital images.

Although we did not examine other classes of digital assets beyond images, we believe that our findings have important broader implications. The importance of the slide library suggests that the content specialist and/or "owner" is a key participant in the shift to digital materials—and that the empowerment of this individual to take a campus-wide perspective is a key consideration. If this observation seems to hold true for digital materials beyond images, it will suggest some important implications for campus leaders as they continue to ponder optimal arrangements for digital asset management in the broadest sense.

Introduction

The increasing availability of digital images at colleges and universities has offered new opportunities for teaching and learning. In some disciplines and on some campuses, the opportunities are nothing short of transformative. In other cases, however, digital images have had only a modest impact. What are some of the factors associated with the more successful and transformative opportunities that digital images afford?

To begin offering some evidence to help answer this question, we visited seven liberal arts colleges in late 2004 and early 2005, meeting with numerous faculty, librarians, IT professionals, and campus administrators. We sought to learn about image use and provision at each campus, along with the structures and strategy that support the use and availability of images.

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We found great enthusiasm for digital images among many faculty members, and we found great willingness to support digital images by many library and instructional technology staff. Yet we also found significant concerns about existing image users (such as art historians) being pushed to adopt digital images, and we observed a number of slide libraries that were not positioned to be supportive of a transition to digital images. Digital images offer the opportunity to expand image use well beyond the faculty members who have been traditional users of images, but achieving this expansion requires a viable strategy and the organizational plan and campus culture to support that strategy. Although a number of campuses had developed effective strategies for transitioning to digital images, several of the institutions we visited suffered from an organizational structure or campus culture that was ill-suited to take the strategic choices needed to encourage a transition to digital images. Organizational structure and campus culture are perhaps the most important success factors in seizing the opportunities associated with digital images for teaching.

Since our visits, higher education's concern about digital asset management, as it has come to be called, has increased significantly.[2] Numerous information-service leaders are clearly seized of the issue, although at times they are constrained by these same organizational structure and campus culture issues. In other cases, they may attempt to develop such a broad and all-encompassing solution for digital assets across formats, resource providers, and campus units, that it is difficult to achieve tangible progress. While we focused our conversations, and therefore focus this report, on images alone, many of our findings are relevant for other types of digital assets and broader efforts at digital asset management as well.

At the same time, our sample of campuses was not random at all. It focuses exclusively on liberal arts colleges, and many of the findings, especially those related to organizational structure, will probably have limited applicability to larger institutions such as research universities. Even within the liberal arts college community, our sample was not at all random but rather focused on some of the earlier adopters of digital images. Although we believe that many of our findings may help other colleges, and perhaps even some universities, in a transition to digital images, the bias in our sample is real. Notwithstanding these limitations, we hope that other higher education institutions will be able to take lessons from the experiences of these seven colleges.

Background and Methodology

This study was initially conceived of by NITLE and ARTstor, and it was supported by a grant from The Andrew W. Mellon Foundation to NITLE.[3] When ARTstor's hosting service was piloted at a group of colleges and universities, it was expected that this service for digital image management would present new opportunities and challenges at a campus level. NITLE and ARTstor cooperated in a program to make this hosting pilot available at seven liberal arts colleges, and they identified an opportunity to study these campuses for lessons that might have broader impact on NITLE's and ARTstor's programs. This report documents the campus visual resources environment and assesses how this environment might impact a college's ability to adopt cooperative solutions.

During the course of this study, we visited all seven liberal arts colleges participating in the pilot, spending generally two days at each. At each campus, we interviewed numerous individuals, speaking with faculty and staff members who are involved with the provision or use of images, in either digital or traditional formats. We interviewed faculty members, librarians, and instructional technologists at every institution and, when these positions existed, we interviewed slide librarians, visual resources curators, museum/collection curators, and chief information officers. Table 1 provides information about the visits that we conducted.

Table 1: Institutions Visited

Institution Name	Dates of Visit
Bryn Mawr College	December 14th, 2004
Denison University	February 16th and 17th, 2005
DePauw University	December 9th and 10th, 2005
Grinnell College	January 19th to 21st, 2005
Sewanee: The University of the South	March 3rd and 4th, 2005
Washington and Lee University	February 10th and 11th, 2005
Williams College	March 21st and 22nd, 2005

In these interviews, we sought to develop a comprehensive understanding of institutional practices related to images. From faculty members, we learned about the use of images in the classroom, systems that enabled or inhibited the use of images, and unmet needs in these areas as well. We learned in detail about how the slide library or other local image repository worked with faculty and students to acquire, store, and provide images, as well as learning about any other digital image solutions that have been

considered, planned, or implemented. Although the anecdotal or case study nature of this approach limits the applicability of our findings, we have developed some recommendations that may be useful for consideration by other institutions as well.

The Use of Images Today

Perhaps the most strongly consistent impression across our campus visits was that images are being used far more than ever before. Digital images are becoming more widely available through campus collections and over the web, and their use for pedagogical purposes is growing dramatically across disciplines. In many cases, this growth is due to instructors who believe that supplementing existing teaching practices with visual materials can help them to engage students in ways that would otherwise be impossible. In other cases, instructors have developed truly transformative teaching methodologies that are built around increasing access to a wide variety of images.

Perhaps the most transformative development has been the ready availability of presentation software like PowerPoint, which has been widely adopted by faculty outside the arts and art history. Using Power-Point, instructors have not only altered their classroom style but have also incorporated images more readily (as compared with adding a single image or movie clip into a traditional lecture using a projector). In some cases, we were told, this development has resulted in dramatically altered and improved in-struction. The evidence that we were able to gather suggests important disciplinary variations, with faculty members outside art history and allied disciplines more likely to find their teaching transformed, and art historians more likely to adapt, as best as possible, existing methodologies to the digital tools.

Disciplinary Overview

Art historians frequently require very high quality images for detailed analysis of technique and style. Traditional slide libraries were designed around the needs of art historians and, where adequate resources were available, have generally served them well. Because art historians require very high image quality, the poor image quality in early digital images was of great concern. For art historians and other arts faculty, images are at the very core of their work, and they have often been well-supported with them. As a result, art historians tend to be risk-averse in considering changes to this critical infrastructure.

In the past few years, colleges have moved from environments in which almost all users of images for teaching were art historians, to environments in which many other faculty members incorporate images extensively into classroom teaching as well. This evolution has occurred mainly with digital images: there are still very few faculty members outside of the arts who use actual slides. The newer users of images in other disciplines have directly benefited from the wide availability of digital images, which has made it much easier for them to incorporate images into their teaching.

The fields outside of art and art history most closely related to those disciplines (such as archaeology and classical civilization) still make the most extensive use of slide libraries, since they often use images in much the same way, and are interested in detailed analysis of style and technique. They also tend to contextualize images—using images of objects, or locations, maps, charts, or graphs to illustrate archaeological sites. These types of faculty frequently create annotated slides that combine text and image (often in PowerPoint when working digitally).

Faculty in other humanities and social sciences, such as cultural history, political science, and sociology, make use of images to illustrate concepts and themes. This approach allows them to illustrate concepts

in a way that is far more effective for many learners than simple description. Many faculty members in these disciplines have also viewed this use of images as an opportunity to bring primary sources into the classroom, allowing students to interrogate primary sources during a classroom lecture.

Language and cultural studies faculty make extensive use of images for teaching vocabulary and national culture. Images often include photographs of signs, product wrappers or interactions that illustrate vocabulary or concepts. These images are typically used as examples to put concepts in context, rather than for close study. In the sciences, we met with biologists, in particular, who were avid users of images for teaching. Images are used to illustrate concepts or themes for students, and animations can be used to show how processes work. Many science images we were told about came from photographs that were taken by the faculty members themselves, making those faculty members the copyright holders. As is the case in the slide libraries, the physical slides used in science often decay and require replacement, making digital versions of these slides an attractive option for collection maintenance over time.

We saw marked differences between the acceptance of current learning-side digital technologies in comparison to teaching-side technologies. We define the former as systems set up to enable studying, class work, and research, the latter as the tools to teach in the classroom.

Independent Study and Learning

Independent study and learning with images tends to be particularly important for art history, where students must learn image identifications and related information. For learning or study purposes, students in art history traditionally use slides for "slide IDs"—to help them memorize images and retain the information associated with each image (e.g., title, artist name, medium, location, date, etc.). Traditionally, slides that were included in classroom lectures could be set up on light tables for students to review and study. (Some schools mounted print images on the wall in a study area as an alternative or addition to light tables.) During peak study periods, students often crowded in groups around the slides or prints, making it hard for students to spend large amounts of time doing close examination of any one image. It was rare that slides could be removed for study purposes, so access to light tables and slide study has long been a constraining issue for art history students.

At the colleges we visited, online study solutions have almost entirely replaced traditional study and learning facilities such as light tables.

At the colleges we visited, online study solutions have almost entirely replaced traditional study and learning facilities such as light tables. Even those art history faculty members that have been unwilling to adopt digital images for classroom teaching believe that there are student benefits to having online study opportunities. So, especially for larger and introductory classes, digital images for study and learning are now the norm.

The Systems

A number of different approaches exist to making digital images available for student use. Some of the systems are homegrown, driven by FileMakerPro or Access databases. Our interviews suggested that learning-side services have often been developed as homegrown systems set up by a single instructional technologist at the request (or in the service of) a single faculty member. The initial success of these custom systems often led to failure from lack of scalability—as new features were required and/or student use increased, they became overburdened or crashed entirely. (Some crashes happened at inopportune times, when student use was heavy and critical needs were not met.) As a rule, these custom systems

were not created as campus-wide digital solutions, as they were typically created before any campus-wide digital image initiatives were envisioned or in place.

Many systems today are based on MDID. Some faculty members mount individual images on their own web pages or in course management systems (CMSs). Finally, a number of faculty members simply post their PowerPoint files to a course management system such as BlackBoard, allowing students to access digital images and text as they were presented in class. CMSs can be difficult to use for these purposes, however, because of limited storage allocations for courses at some colleges. CMS options seem to be more widespread outside of art history, where there are fewer images and less need for students to quiz themselves on the images. Some faculty members also used ARTstor's course folder functionality to allowing students to use it for learning and study purposes.

A few of the art historians we met were convinced that these new study opportunities have transformed learning. At Washington and Lee, one art historian reported that student grade point averages have increased by approximately ten percent since online study mechanisms were made available—he believes as a direct result. He also noted that his students "loved" using digital images for presentations in seminars and that the very fact that the images were digital allowed them to choose from a variety of software options when creating their presentations.

Classroom Teaching

Art history has seen relatively few transformative effects from digital images in the classroom. The scale of the need for images is great, especially in art history; a typical art historian might want to have about 1000-1500 images per course per semester. At least 40 images may be shown during a given class meeting, with 24 to 26 class meetings per term. Most faculty members teach between one and three courses per term. The amount of time required to gather the images required for those lectures—either digitally or with slides—is not insignificant.

In art history classes, methodologies for using slides are fairly consistent across institutions. Generally, the side-by-side, two-projector set-up has been used to allow two images to be examined at one time during a lecture. The interviews we conducted made it clear how this ingrained teaching methodology not only deeply influences the ways lectures are given, but also how they are created; several professors we talked with discussed how the "rhythms" of their teaching style were based on their use of two side-by-side projectors to show slides. The only college we visited where a two-projector arrangement was not typical was Williams, which has a tradition of four projectors set up two-by-two.

During our visits, art history faculty members were still using traditional slide collections for teaching purposes, although some had made the transition to digital images. For varying reasons, digital images were not always seen as adequate substitutions for the typical slide/slide library set up. Because art historians have been teaching with slides their entire careers, there is often significant resistance to changing their teaching habits. Often, traditional users planning to switch to digital images would like to be able to do exactly the same thing pedagogically in the digital format as they do with slides. Art historians are recognizing that their discipline will come to rely on digital images in the future, especially since Kodak announced that it would no longer sell projectors. Consequently, even though very few of the art historians we talked to felt that there were any real shortcomings to the existing slide-dependent system, many of them were experimenting with digital images or had already transitioned to digital images for teaching. The remainder recognized that they would have to do so in the next few years or, in one or two cases, expressed optimism that they would be able to retire before the last slide projectors failed or were no longer supported. For art historians, teaching with digital images has (until recently)

required local digitization of the requisite slide images, which is discussed below, or has involved tip-toeing around the copyright issues of images found on the web. For those reasons and more, it has not always been in their best interest to spearhead a transition to digital images.

Beyond concerns about losing "rights" to services and quality in the slide library, a number of barriers have slowed art historians' adoption of digital tools for teaching. For instance, not all digital image teaching tools have made it easy to bring together two images side by side, which has made it difficult for some instructors to mimic traditional art history teaching methods using digital solutions. This barrier has meant that a transition to digital images required adjustments to teaching methodologies, even though the existing methodologies were widely used and considered effective. In addition, early model digital projectors often offered insufficient quality that impacted the projected image no matter the quality of the actual image itself. The digitization process itself, if not sufficiently managed, could also result in image and color problems that would prove problematic for faculty and students. (This problem is discussed further below.) The depth of the complexity of a local digitization process—including scanning, cropping, color correction, metadata entry, and storage—should not be overlooked, given the number of images often in question.

The reasons listed above are some of the concerns art historians shared with us in discussing their resistance to fully adopting digital images for teaching. Equally important at this moment of the transition process, however, is that it has been simply ineffective to teach using a *combination* of digital and slide images. Unless all the images required for a class session are available through the same interface, it is difficult to switch between multiple interfaces or multiple formats. This barrier has been a major impediment for some faculty members who might otherwise be willing to try digital images in their classes. In some cases, it has led faculty members to teach some of their courses (such as introductory surveys with broad subject matter) with digital images while continuing to teach upper-level courses (with more specialized subject matter) with slides.

In one case, we were extremely impressed with the thoughtfulness with which an historian had incorporated art images and text into a slide presentation to enable students to consider the ways that cultural imagery is understood and incorporated both across generational and national boundaries.

While faculty in art history struggle to find digital solutions that allow them to continue their traditional image-based teaching methodologies while incorporating the improvements available through technology, faculty in other disciplines expressed the excitement of pedagogical transformation using digital images. In particular, faculty in the humanities and social sciences indicated that the increased access to large numbers of images has made digital image databases such as ARTstor very appealing. Several times, we heard that the early adopters of ARTstor on a campus often came from outside of the art history department, since those faculty members not accustomed to having easy access to images were increasingly using images in their teaching. Professors seem convinced that students prefer the use of multimedia presentations in class, even outside of the arts.

While we did not observe any lectures, several faculty members generously shared with us slide presentations for their lectures. In one case, we were extremely impressed with the thoughtfulness with which an historian had incorporated art images and text into a slide presentation to enable students to consider the ways that cultural imagery is understood and incorporated both across generational and

national boundaries. It was difficult to imagine how such a lecture could effectively have been taught without images at all, or when relying solely on traditional slide carousel approaches. More broadly, the excitement was palpable about being able to illustrate concepts to students and to bring primary sources into a classroom lecture.

The Systems

The types of software being used for teaching with digital image varies by institution and by individual. Many have been bringing digital images into PowerPoint or a similar tool called KeyNote. (Adoption of these programs have undoubtedly been helped along by their easy accessibility through standard software packages.) Since this type of presentation software was developed for business use, it is not surprising that it has some drawbacks when applied as an in-class teaching tool. Many faculty members have expressed concern that PowerPoint makes it difficult to place two reasonably sized images side-by-side and that it makes it impossible to advance each image independently of the other. Some also noted that it creates a tendency to add text alongside the images, which, although helpful in certain cases for organizational or handout purposes, has had the side effect of making lectures more linear, ruining the serendipity of somewhat more spontaneous lecturing. On the other hand, a large percentage of the art historians we met had few complaints about PowerPoint, as it offered a straightforward interface that was easy for them to use (and cost their departments nothing to implement). In several cases, they liked the ability to add text and other graphics to the images, which they felt added important visual cues for students and for themselves while lecturing.

Those art historians who expressed discomfort with PowerPoint during our visits did not have many alternatives. Some used MDID for teaching, where the college instructional technology department supported it. MDID was viewed as a relatively intuitive product into which local digital images could be loaded, creating a high degree of control over the database. Often MDID was used by students, who studied from pre-loaded image groups. Content DM was also used to “host” local image collections and a feature that allowed an institution to create varying levels of access to the images was considered particularly useful in that it helped alleviate some concerns about fair use of copystand images.

There were also a number of art historians who used ARTstor for teaching purposes. The wide variety of images available in ARTstor was helpful and relieved them of the burdens of digitization and meta-data entry, as noted earlier. Concerns about ARTstor’s implementation included sparse content in certain fields (such as modern courses and Asian courses); differing image quality across collections (digitized copystand images being the primary concern); and duplicate images. Although ARTstor hosting offered a solution to these concerns since it allowed the addition of local images, many were concerned that the spontaneous additions of images just before class was not yet possible in ARTstor.

Several faculty members told us that Google’s Image Search (and, in other cases, Bridgeman or AMICO) had become an important part of their classroom teaching, especially in smaller classes, where student questions and suggestions allowed them to access images that they had not planned to include in the course but that offered interesting comparisons or responded to student interests. The slide librarians to whom we spoke often voiced their own concerns that images gathered from the web presented copyright concerns.

In the disciplines outside of art history, we found near-unanimous satisfaction with PowerPoint. Its stability was noted by faculty members on several occasions, mostly in that it allowed them to use digital technology without requiring a live internet connection. Its portability—it can be used on almost any computer anywhere without the need for installation of new programs—was also appealing. For

faculty more interested in creating “hybrid” slides using text and image, the ability to circle a site on a map, for example, proved very appealing.

In order fully to appreciate the distinction between those circumstances in which commercial software is valuable and those in which it is unacceptable, we would have had to undertake a far more subtle study of the use of PowerPoint and similar software on campuses, which we did not set out to do. However, we observed that, as in the commercial world, faculty talks are increasingly reliant on PowerPoint as an outline, for contextual images and documents, and sometimes as a crutch. Numerous instructors praised PowerPoint for enabling them to bring images, documents, multimedia, and other contextual background to students’ attention during a lecture. Several instructors told us that they appreciated the fact that by creating lecture slides in advance, they were forced to organize their lectures formally in ways that had never before been necessary—or that they had been forced to take the opportunity to update lectures that they had been delivering virtually unchanged for many years. It is certainly possible to imagine, however, that once a digital presentation is finalized, it could stay the same over time, while a physical carousel would need to be redone over time, even if the order of the picked slides remained the same from year to year.

Organizing Digital Collections of Images

We found a variety of different types of digital collections at the campuses we visited, including some that were institutionally or departmentally managed and others that were developed by individual faculty members. In this chapter, we review both types of image collections and discuss some of the opportunities and challenges presented by remote hosting of local collections of images.

Institutional Collections of Images

The slide collections at the institutions we visited were organized and managed in a variety of different ways. Sometimes these collections have grown to serve the campus community in a broad sense; in other cases, they remain targeted to the art history/art-related disciplines. In either case, colleges almost inevitably have other institutional collections of images outside of the slide library. In this section, we first examine the visual resources collections that we worked with and/or identified at the seven colleges we visited; we are sure there are likely to have been additional image collections at each institution that we did not address.

The majority of the collections that we discussed emphasized the support of teaching, as opposed to research. Of the seven colleges we surveyed, probably only two can be said to be building deep and comprehensive image collections sufficient to support research. The general teaching focus of the collections we visited is an important factor that probably distinguishes many of these slide libraries from those that would be found at some major research universities.

As would be expected, the visual resources collections and slide libraries all began their existence in the service of art history, although a number of them have broadened their clientele since then. Table 2 shows some indications of how these collections are organized at each of the seven schools. In six of the seven cases, the visual resources collection is staffed. The scale of these collections, in terms of holdings, varies significantly.

Table 2: Slide Libraries and Visual Resources Collections—Non-Digital

Institution	Collection reports to:	Collection serves:	Staffed?
Bryn Mawr College	CIO	Art history and allied fields	Yes
Denison University	Art history dept	Art history dept	Yes
DePauw University	Library/CIO structure	Entire campus	Yes
Grinnell College	Art history dept	Art history dept, some limited willingness to help others	Yes
Sewanee: The University of the South	Art history department	Art history and studio art	Yes
Washington and Lee University	Art history dept	Mainly art history	No
Williams College	Art history dept	Art history dept, though increasingly interested in serving campus-wide	Yes

At several schools, the visual resources collection has been asked to provide services to faculty outside of the arts. Serving the broader campus is a move that is often (but not always) associated with the administrative reorganization of the slide library into the campus library or into the information services organization. In many cases, this administrative reorganization did not have a dramatic impact on the actual clientele of the traditional (i.e., slide-based) collections, although it has in some cases made a significant difference in the role of the visual resources staff in managing digital images.

The Traditional Slide Library

Until recently, traditional slide collections were principally designed to meet the teaching and learning needs of art historians and their students and were overseen by the department chairperson. Slide libraries are traditionally staffed with a slide librarian whose responsibility is to manage and grow the collection, support the faculty, and oversee new slide creation and acquisition.

Slides have often been locally produced for institutional use via copystand photography, a technique in which a slide librarian or work-study student photographs images from books to convert the images into usable slides. At some institutions, art history books purchased by the library are routinely routed to the slide library so that relevant images can be photographed (an outside firm is generally engaged to make the actual slides). Images produced from copystand photography are not often of the highest quality since their clarity is constrained by the quality of the source image and the materials on which that image is printed. Nevertheless, copystand has generally proven adequate to meet faculty needs. Cataloging information is then added to each slide based on the requirements and rigor of the slide library. Subject cataloging of copystand slides is rare unless the slide library's collection requires it or supports it.

Slide collections also grow from acquisition—mainly in the form of purchasing slides from museums or through vendors. These "vendor slides" generally possess far higher image quality than the slides produced via copystand photography. Their cost is often viewed as prohibitive and many times specific

image needs cannot be met through available vendor catalogs. Because of these factors, purchased slides do not make up the majority of the collections, generally speaking.

Finally, many collections contain significant numbers of slides contributed by faculty members. In some cases, these are based on the faculty member's own photography while traveling or during the course of research, while in other cases they are slides that faculty members have purchased or have had created via copystand. In either case, these images have usually been acquired over time and often across institutions.

We did not encounter any slide libraries that had incorporated slide collections built or used by science faculty members for their own use.

The setup of and service provided by slide libraries has generally been optimized for art history faculty or affiliated faculty granted access to the slide collections. Slides are usually maintained in drawers, generally organized by broad categories and often organized by artist name—generally the logical organization for art historians. At well-staffed collections, some faculty have the option to submit lists of images needed for a given course and receive slide carousels prepared by slide librarians for their use.

The ability for a slide collection to serve the needs of faculty outside of art history is somewhat more variable. Even when there has been significant outreach to faculty beyond art history, it is unusual for the slide library itself to support the slide-based image acquisition needs of faculty outside of the humanities departments. Similarly, we did not encounter any slide libraries that had incorporated slide collections built or used by science faculty members for their own use. Indeed, even when the intention existed to offer the slides in the slide library as a campus-wide resource, a number of factors often prevented them from being widely used outside of the humanities. For example, slide libraries are often housed in the art or art history building, making them less accessible for faculty outside of the art departments; they are generally organized to serve art history (without the type of subject cataloging that would be required for it to be intuitive for other users); they are generally staffed by slide librarians with subject expertise specific to the arts; and not all non-arts related classrooms are equipped to handle projector use.

Organizational Responsibility for Digitization

Each of the seven colleges included in this report have begun to develop local collections of digital images for teaching and research purposes. It is in the development and management of these digital collections that we noted tremendous variation based on how the slide library and other information services apparatus are organized administratively.

At schools in which a staffed slide library reports into the art history department, we often saw a much-reduced role of the slide library in the development of digital collections. At these colleges, it was generally the case that the instructional technology staff and/or the library itself, rather than the slide library, took responsibility for digitization itself and the management of digital collections. We believe that can take place because the art history department is generally so well served by existing slide library service that it is hesitant to try very actively to improve on matters.

At one school, where the slide library reports into the art history department, the slide librarian position is funded for nine months, and the department has been unwilling to fund training in digital technology

and methods. We had the impression that the dependence on the academic department for funding was a complicating factor, since the department had to decide whether its scarce resources were best applied in improving the visual resources collection in a way that would primarily benefit other departments rather than its own members, who were adequately served by the existing arrangements. Although an organizational explanation exists in this case, we believe it is only part of the story; there were cultural factors at work at this school that probably decreased the likelihood that an academic department would be willing to contribute to the greater good. Instead, the library has taken the lead in digitization and in supporting digital solutions, working in partnership with the instructional technology staff.

In other cases, even when the slide library reports to the art history department, a different outlook prevails. At one school, for example, an initial spurt of digitization by the instructional technology department digitized about 8,000 slides, but since then the slide library has been managing the digitization process and, at the time of our visit, had converted 24,000 slides out of the total collection of roughly 95,000. The faculty members appreciated the value-added contributions of the slide librarian to the digitization process—her background in the arts made her adept at accurate color correction and at troubleshooting metadata. (The assumption being that someone without her arts background could not provide these skills.) While the slide librarian still primarily served the art historians, she readily helped faculty outside of her department, which was essentially another model by which the slide library could operate—run and operated by the art history department, but accessible to others, making the collection essentially an institution-wide one.

We also saw a number of cases in which the instructional technology staff took the lead in the digitization work. In all cases, the database that manages local collections is run on an instructional technology server and generally managed by the instructional technology staff. But the digitization of content, such as slides, is handled in a variety of ways. In some cases the slide library plays a role in the digitization of slides. In other cases, the instructional technology department takes a more direct role. At Washington and Lee, where the slide library is not staffed, an instructional technologist was responsible for the initial digitization work and the art historians themselves took on increasing roles and were principally responsible for the creation of basic metadata.

Processes and Systems

In terms of the logistics of the digitization process, we observed a number of different approaches. In many cases, there was an effort to anticipate the needs of individual courses—to work with a faculty member to identify the images to be digitized for an upcoming semester. This hand-holding course-support process was undoubtedly the most efficient way to make available digitized resources for a course, but, because of last-minute additions and changes, a carefully thought-out logistical stream sometimes had hiccups in implementation. In several cases, we saw a use-based approach in which, before slides were filed back into the collection after use, they would be digitized. A usage-based workflow, combined with targeted digitization in response to immediate needs, can also offer a viable solution. In either case, it becomes clear that a substantial portion of the slides in a visual resources collection are not in frequent use. This point can raise dilemmas about whether to migrate unused slides to digital format; many colleges appear to have elected to undertake this migration completely, but it is not clear that there is unanimity on this point.

In most cases, the initial local solution was some sort of homegrown database that was locally developed and configured, often to meet the needs of one professor. Although most of our interviewees indicated they had been happy with this set-up when first developed, scalability proved to be a major issue for many campuses. In some cases, the need to upgrade to other software in response to growing demand

was handled strategically, with effective due diligence and good communications with users. In several cases, however, the transition was not managed well and a last-minute scramble in response to a failing system or a top-down approach to choosing a new resource did not adequately involve faculty members in the selection process. In the failure to involve faculty members, especially, a poorly managed transition can create unnecessary misunderstandings and territory disputes that, at least in one case, outlasted any substantive concerns with the software or the process.

Table 3: Digital Image Management Solutions

Institution	Solution (s) in Place	Responsibility for digitization/management
Bryn Mawr College	MDID, Content DM	Slide library, library
Denison University	ContentDM	IT
DePauw University	Access DB, Luna	Slide library
Grinnell College	FileMaker Pro, MDID	Slide library, IT
Sewanee: The University of the South	Embark, MDID	IT, slide librarian
Washington and Lee University	MDID	IT, faculty
Williams College	Content DM, Argus	IT, slide library

Some colleges, but not very many, purchase/license individual digital images from vendors such as Saskia. These have been loaded into local campus systems and integrated with locally digitized images. However, given the costs involved, and the lack of comprehensiveness in vendor-based options, all visual resources collections seem to feel forced to consider local digitization. Besides the need for immediate access to digital images (a last-minute request for a lecture, for example), two concerns surfaced that reflected the uncertainty around external digital image sources as a replacement for local sources. One concern was about access—issues of intermittent internet stability still impact professors' willingness to use online resources in the classroom. The other issue was control. While it is clear that institutions would prefer to eliminate redundant digitization costs, there is also an uncertainty about the long-term viability of different remote image sources (the demise of AMICO may be one reason for this concern). As an alternative to relinquishing control of their digital images, many campuses expressed a desire to have a local database on hand, even as they had alternative, subscription-based access to a variety of digital images.

Other Collections

Occasionally, there are other, less formal institutional collections that support departmental use. For example, in cases where the slide library has principally supported the art history department, other departments may have chosen to set up smaller, un-staffed collections for their own teaching needs. At Grinnell, for example, the classics department created a slide collection of 2,000-3,000 slides, principally designed to support the teaching needs of its faculty. In the case of this Grinnell collection, cataloging is informal and preservation has not been a priority, two issues that may be mitigated in the course of a migration to digital format that was underway during our campus visit. It is often the case that slide collections like this one are often spearheaded by the collecting activities or direction of a single faculty member.

Personal Faculty Collections of Images

When art historians and other faculty members travel to site-specific locations, they often return to campus with personal images viable for—or designed for—classroom use. These images are often deposited with the campus visual resources collection, and faculty might in such cases find it unnecessary to maintain personal collections beyond this. Since it is clear that personal collections do still exist, we spent time talking to faculty members about why they might choose to maintain a personal collection of images. Outside of the discipline of art history, depositing unique images with a campus collection is often not seen as an option. There was often no other way for faculty to store their images other than in their own computer (or slide tray, for non-digital images). Another explanation occasionally given was the desire to maintain control of images should an individual move to another institution. And in some cases, faculty members had been building digital collections before their institution had digital solutions available, and they had simply not bothered to transition to an institutional solution. Whatever the cause, the campuses we visited had numerous personal faculty collections of images, on which faculty members were in many cases highly dependent.[4]

Personal image collections can accumulate quickly. An art historian/archaeologist who has been working for four years has amassed a collection of approximately 12,000 slides. As a guest professor, it was important for her to have her own images (in part, perhaps, because the slide collection at her institution, Washington and Lee, has no staff and has been built up to suit the particular needs of the art historians on that campus, who have a different focus than she does).

The distinction between personal and institutional collections can be vague. In the sciences, it is sometimes complicated to build effective image collections for teaching. We met one biology professor who has several thousand slides, used exclusively for teaching purposes. Many of these slides come from his own photography, but a substantial portion is copied from friends or colleagues. Although it is a personal collection, it is housed on the campus-based Content DM system and has the potential to be a shared resource, either at his home institution or beyond. He and other biologists routinely copy images for one another and, although the specific images in each collection may vary somewhat, the concepts they are trying to elucidate are similar.

Digitization: Personal Solutions

As we have discussed, traditional slide collections are being migrated, both prospectively—and in some cases retrospectively—to digital format. We encountered many faculty members who have transitioned to all-digital, or nearly all-digital, personal collections as well. Sometimes these are markedly successful, even though faculty members sometimes lack the technology, the experience, or the patience to perform high-quality scanning. In general, the success factors were clearly the coordination between a faculty member with specific needs and a technologist who was able to design a solution around those needs. Instructional technologists, who are focused on technology in the service of pedagogy, are often ideally suited to help faculty members set up a digitization protocol for their personal collections. We found some cases in which the instructional technologists took on the digitization tasks themselves or with work-study students, or in which they helped the faculty member or slide librarian to hire a student worker directly.

Digitization is often viewed as a preservation solution for those professors with personal slide-based image collections. Yet for owners of large traditional-format collections, sometimes only the most useful or important images are selected for digitization (effectively abandoning other images). The

absence of an acceptable archiving solution for digital images is a particularly glaring shortcoming for personal collections, compounded by uncertainties in responsibility and control of personal collections.

In some cases, there is less emphasis on digitization of traditional media and more on direct digital capture. One faculty member in classical civilizations, who has roughly 10,000 images, has built up his collection using images from the web, personal photography, and scanned slides. This collection allows him to be totally self-sufficient; he does not use the campus slide library, although it is accessible to him.

The personal solutions for storage of digital images are often very informal, and the range of solutions is wide. Sometimes, hierarchical folder structures in Windows or Mac, organized by period or region, offer an adequate solution, either on a PC or in individually assigned space on an institutional server. Although for an individual this informal approach can be adequate, since an individual can organize items in a way that works for himself or herself, even individual collections can grow so large as to make such a solution impractical. Although these collections are sometimes integrated into a program like FileMakerPro, generally speaking the management is far less formal and meant to serve that faculty member in particular.

Digitization: Institutional Solutions

Although personal solutions are imperfect, they require only a tiny amount of overhead. Institutional solutions, on the other hand, require a much larger up-front time commitment, especially in terms of metadata entry. In addition, unanswered questions exist about the "institutionalization" of personal collections, such as an absence of policies on appropriateness, control, and archiving. At the same time, some institutions are beginning to view digital materials, including images, as collections that, in the traditional sense, could constitute intellectual property of the institution itself.

Although many of the campuses we visited had an interest in enabling a user to search once across a database (or many linked databases) to find a desired image, none of them had implemented a resource with that capability.

Another problem is with the infrastructure required to create cross-searchable institutional solutions. For example, if an institution's digital image database includes collections beyond those of the art history slide library, it can be challenging to establish the appropriate metadata fields and link them correctly to the larger context. Although many of the campuses we visited had an interest in enabling a user to search once across a database (or many linked databases) to find a desired image, none of them had implemented a resource with that capability. In addition, fairly rigorous access-restriction needs must be met if a collection is to be fully accessible (either at an institution or, more broadly, with partner institutions). In at least one case, an image management software was selected because it allowed for tiered access levels, but once past the access issue, its actual capabilities for image use and display presented different complications for faculty members.

The desire to improve access to faculty collections is a primary reason for interest in digitization. The sense that image collections can be made broadly available to colleagues and students at other institutions is in many cases a key faculty need. The institutions we visited were fully aware of the copyright issues and fair use concerns presented by digitized copystand slides and by the integration of less-monitored faculty collections into institutional collections.

Remote Collections

An important factor in the transition to digital images is the availability of remote collections of images. Under this broad heading, we include image search engines such as those provided by Google and Yahoo; RLG's Cultural Materials project; Bridgeman; online museum websites; AMICO; and ARTstor. Remote collections therefore vary from Internet free-for-alls to highly curated, scholarly-driven collections. During our campus visits, many faculty members expressed significant enthusiasm for the opportunities presented by remote collections.

This enthusiasm generally derived from perceptions of the quality and/or comprehensiveness of these resources. At many of the colleges we visited, these remote collections offered far more images than were available through the campus slide library. They also contained search options that made images far more accessible than they have been in a slide library lacking subject cataloging. The images found through search engines often presented the widest variety of quality, but also the greatest breadth of offerings. The images offered through many of the services were targeted at academic users, although tradeoffs were noted between quality and breadth.

Integrating these remote collections locally presented challenges. Faculty members want to be able to combine the image sets they have come to prefer with the opportunities and spontaneity of teaching with the newly available images from these remote collections. This desire posed particular problems with ARTstor, where the security infrastructure prevents the export of high-quality images into standard display software (a concern that ARTstor has attempted to mitigate via the offline image viewer and the hosting pilot), but it is fundamentally of importance for the integration of any remote and local resources. Interoperability across resources is an important concern for campuses.

Campus Roles and Responsibilities

The demands being placed by faculty for image resources suggest that local collections and remote collections of images, the databases in which to store them, and the tools with which to use them will have to be brought together to make any one resource truly useful. User demands for flexibility of access and content suggests ARTstor will probably not be the last provider to combine a curated content and software resource with the ability to include local content. And whether local and remote content are united in a single provider or simply come together as campus information-services organizations attempt to meet user demands, similar issues are likely to arise.

The increasing variety of sources of images is very different than the single-source model around which image provision had previously been organized. Instead of slide libraries having primacy for image provision, roles have become more overlapping and responsibilities more diffuse. How responsibilities are to be distributed between visual resources curators, art reference librarians, instructional technologists and even the faculty themselves is not immediately clear. At present, some of the liberal arts campuses we visited have begun to develop a strategic user-centric, pedagogically focused model, while others see various entities competing for an image-related role but have yet fully to define responsibilities. In this climate of uncertainty, it is particularly important that a resource like ARTstor attempts to understand the ways in which image resources are managed in a local campus context, since these local management issues impact user services and implementation.

The number of individuals and departments interacting because of image management issues at the campuses we visited is remarkable. In some cases, these roles relate to an historic responsibility or

interest related to content management, while in other cases they derive from newer, technology-related missions that are defined broadly to accommodate the dynamic technological environment. Bridging the gaps and organizing coherently across an institution has often led to political and territory disputes in terms of ownership of resources. Overall, the groups impacted include: the slide library or visual resources curator; librarians, including art reference librarians; instructional technologists; campus computing; and, potentially, dean or provost-level administrators who are often responsible for allocating responsibilities and funding. The reported rationale for each group's ownership of or involvement with digital images is discussed below.

The slide library or visual resource collection manages local image collections and provides services to help faculty and students use them. They have almost always reported administratively to an academic department—history of art—and, even when reporting into a different part of the college, a legacy of ownership often still prevails.

Which entity should be responsible for the management of local collections of content? Although libraries have in recent years taken responsibility for licensing remote collections, there is confusion, and in some cases jealousy, on the question of which entity should manage local collections.

The college library purchases or licenses content resources, organizes them, makes them available to users, and provides reference and user instruction. Although not traditionally responsible for image provision through slides, the library often had a very close working relationship with the slide library, routing to it new art books that may be photographed for inclusion in the slide collection. In other words, there was a partnership of sorts related to acquisitions.

Instructional technology groups help faculty use new kinds of resources for teaching and often support those resources. This group is often heavily involved in supporting classroom teaching, in some cases defining its role as such. Classroom teaching with images involves a projector, and it—along with other technology infrastructure—is generally provided by this group. In addition, the instructional technology group sometimes defines its role to include building and supporting databases, and so local databases for image use are often selected—or at least supported—by this group. Sometimes, this group defines its role even more ambitiously: to use technology to help faculty improve teaching, including course design.

In some cases, a CIO or similar senior campus administrator (such as a dean, provost, associate dean, or associate provost) coordinates the work of two or more of these units. Although one might expect to find that the absence of such a figure would complicate division of responsibilities, in fact we found no such correlation. In fact, one school that lacked a CIO but had high morale and a cooperative user-centric spirit was among the most well-organized for the provision of images. Even in that case, however, the issue of ownership was still pointed out.

Which entity should be responsible for the management of local collections of content? Although libraries have in recent years taken responsibility for licensing remote collections, there is confusion, and in some cases jealousy, on the question of which entity should manage local collections. The instructional technology group generally takes a role in the digitization and management of local collections of images. When there is a slide library that reports into the art history department and is focused exclusively on the needs of that department, an alliance is often forged between it and the

instructional technology group. This model, with the creation of an image database mainly for the art history department, was one we commonly saw. In these cases, the library is not part of the process and jealousies sometimes therefore exist. It was impossible to determine whether there was a consistent pattern of shortcomings due to the omission of the library. But in several cases, when the library is asked to support image resources like ARTstor out of its funds, it is confused as to why it should do so when it has been otherwise relieved of responsibility for image provision. We encountered problems in communications between instructional technology and the library in these cases (roughly half the campuses that we visited). The instructional technology groups and libraries in general did not fully understand one another's work, and the cultural distinctions between the two fields further complicated their interactions.

There was a second model as well. Here, the visual resources collection takes a campus-wide, user-based perspective, generally but not exclusively because it reports not into the art history department but rather into a CIO structure or the academic library. In these cases, the library becomes more engaged in the digitization and management of the local collection and all parties are better positioned to evaluate campus-wide solutions from a more strategic perspective. Where we saw this model occurring, it was within the context of a more holistic vision for digital collections—one that saw them as a part of a "digital library" or as the beginning steps toward something along those lines.

The greatest point of friction in these relationships appears to be between the library and the instructional technology group. It is between these two entities that the most potential overlap in roles exists. The distribution of responsibilities differently for management of local collections and licensing of remote collections has created particular challenges.[5] Without close cooperation and smooth handoffs among different groups on campus, including the library and instructional technology, it is not clear that users can be well-served by these types of resources.

One notable problem is the vague definition of the responsibilities of the instructional technology group. Is instructional technology a collection of teaching experts, often with Ph.D.'s, who use technology as one element to help improve pedagogy? (This model is specifically perpetuated by the Mellon Foundation's funding of discipline-specific instructional technologists.) Is instructional technology responsible for helping with the set-up and maintenance of classroom-based hardware and software? Is instructional technology a revamped version of what once was known as academic technology, that is, the collection of all services that aren't administrative technology? Or is it something else? Responsibilities and roles vary by institution and are often unclear to the staff and user base within individual institutions. The dynamic technology environment makes it difficult to provide clear definitions.

Separately, there was much ambiguity about the future of slides. If remote collections prove themselves valuable and reliable, then the redundant components of campus-based image collections will decline in importance or be reconfigured as visual resources centers with a strategic, institutional perspective. By serving the needs of the campus as curators of collections and with excellent reference and instructional service, these centers seem to have found one possible path to the future.

The bad news is that, at many campuses, especially those with tensions between the library and instructional technology, some issues appear to be in danger of falling through the cracks. These issues are discussed in the following section.

Overlooked Considerations

Another issue, perhaps too early to be addressed since the infrastructure is not fully in place, is to determine what steps should be taken to ensure the integrity of digitized collections. In addition to issues of archiving, which were slow to emerge at many campuses, digital collections present complications related to access versus control. Who the main point person should be seems to be in play. In some cases, the slide librarian plays that role as an extension of the previous life of the slide library. In others, the librarians take control of digital images as one element of a broader campus collection-building process. At most campuses, the longer-term answers to these questions are not being addressed—in part because they are slightly ahead of their time and pose difficult choices, and perhaps also because they are not yet clearly the responsibility of any of the parties involved.

What steps should be taken to ensure that collections would remain intact over time? What policies must be put in place, or agreements signed, with depositing units or individuals to ensure that mechanisms of control are adequately understood?

As we were making our campus visits, we tried to listen to local practices and needs. Several considerations that we had expected would be an important part of the dialogue on each campus were raised at few if any of the campuses we visited. These overlooked considerations included:

- The policy implications of the intersection between personal and institutional collections. Under what circumstances can personal collections become institutional collections? Under what circumstances can institutionalized collections revert to individual ownership? Although the distinction between personal and institutional collections was clearly becoming less clear at many of the schools we visited, there had been little if any consideration of policy implications.

- Very much tied into the personal/institutional question is sharing and cooperation in image provision across campuses. Several faculty members we spoke to have these questions very much on their minds, since they would like to be able to share personal or institutional collections with their colleagues. There are a few initiatives in this area, such as REALIA, but there are few policies in place to guide this type of activity as a regular operation. Only one or two campuses were beginning to consider policies to address these issues, including related considerations of intellectual property and fair use.

- Archiving and preservation of digital assets was being considered only in the most tentative of ways at most of the schools we visited. (It should perhaps be noted that stewardship practices for slide collections had varied significantly across the schools we visited.) Digital archiving was raised as an issue of uncertainty on several occasions, usually to explain why digitized and therefore disused slides were being retained. Little consideration had been given to collaborative arrangements for archiving. In general it seemed not so much that these issues were being overlooked as that they were being consciously put off until a later point.

- Beyond preservation and archiving issues, there were issues of integrity and control of digitized collections that were not being considered. What steps should be taken to ensure that collections would remain intact over time? What policies must be put in place, or agreements signed, with depositing units or individuals to ensure that mechanisms of control are adequately understood?

In cases where the unit that "owned" the database or digitization process and the unit or individual that "owned" the underlying analog content were different, these issues were always resolved via an informal means that might, or might not, survive a transition in leadership or responsibility.

- Finally, we heard very little about the interaction between image management solutions and course management systems, such as Blackboard and Sakai. When and how are images optimally brought into course management systems? How are issues of standards compatibility and copyright best resolved? We heard many complaints about the problems of depositing huge PowerPoint presentations, full of images, into space-constrained course management systems, but relatively little about interoperability options and needs.

In many cases, these issues were probably omitted from consideration because responsibility for them fell between several of the campus units involved in image provision. These issues are probably among the next set of considerations for the digital asset management community.

Findings: Key Variables for the Provision of Visual Resources

The case-study nature of this study makes it impossible to compile a stringent analytical grid. Nevertheless, the following variables were among the most important we observed regarding the visual resources environment at each institution.

Disciplinary Variations

- Visual resources are used differently by arts and art history faculty and students than in other disciplines. Arts and art history faculty have generally been well-served in their needs for visual images, whereas other disciplines have traditionally been underserved. Other disciplines in the humanities and social sciences, in particular, are extremely excited about the transformative potential of digital images and teaching techniques, whereas arts and art history faculty seek technology, tools, and content that meet or exceed what has been traditionally available. Successful campus outreach must distinguish between the needs of different groups of faculty.

Campus Culture

- For reasons that were rarely possible to determine, certain colleges had an extremely user-centered culture for information services, while others had information services structures that remained decidedly territorial in their operations. Those that were more user-centered saw intense cooperation across skill-sets to reach excellent user outcomes. There was no direct correlation between a merged information-services structure (under a CIO-type leader) and a user-centered campus culture.

- A user-centered culture, as opposed to one that is collection-centered, resource-centered, or technology-centered, listens to faculty members' (and students') needs. It avoids forcing users to adopt one solution or another but at the same time must take strategic choices on behalf of its users, finding optimal solutions that can scale campus-wide (or even more broadly). Incentives and encouragement for preferred solutions, rather than mandates, would seem to be more effective in this environment.

The Role of the Slide Library / Visual Resources Collection

- Many slide libraries remain defined around specific departments rather than taking on a campus-wide role for visual resources. In these cases, slide digitization tends to take place in cooperation with the instructional technology group for the benefit of the arts and art history departments, with the campus library and broader campus needs excluded from the process.

- In recent years, however, many slide libraries have taken a campus-wide perspective, whether because of their reorganization into a merged information-services structure or because of the commitment of an individual librarian/curator. When a campus-wide perspective exists, visual resources collections are more likely to take the lead in digitization initiatives and to work cooperatively with all the information-services organizations on campus.

The Quality of Slide Collections

- Institutions that have provided excellent visual resources to faculty via deep collections of slides find it more difficult to transition to digital images than do institutions with more typical visual resources availability. The excellent collections have met such a high proportion of local needs that there is less impetus to change, while the size of these excellent collections makes a transition much more costly and complicated. Institutions that have more modest local collections tend to experience more enthusiasm for local digitization and for remote collections such as ARTstor.

The Role of Instructional Technology

- Instructional technology groups are organized in a variety of ways. In some cases they report into an information-technology organization charged with both academic and administrative technology, while in other cases they report to an academic information-services organization led by a CIO. In still other cases, they report into the provost's organization. In addition, IT groups have dramatically different mandates, ranging from the provision of technology in the classroom, to the provision of all academic technology, even to a curricular support role that is only tangentially related to technology. The differences in mandate and in reporting structure have made it difficult for the IT "profession" to establish itself in the context of libraries, slide libraries, and others with more clearly defined roles. In some cases, ambitious campus IT leaders can, with the best of intentions, define their mandate in a way that conflicts with preexisting mandates of other information-service providers, leading to conflict rather than cooperation.

The transition to digital images, as well as to other types of digital assets, is well underway, with advantages to many faculty members and students. Providing users with the resources they need requires new thinking about campus culture and organizational structure. This type of new thinking is necessary in order to take the strategic steps that will yield the best possible outcomes for users. The variables discussed in this section were some of the most important ones we observed that explained the differences across campuses in information services for image provision. While the institutions we studied are a small, and biased, subset of academia, we believe that many of these variables merit consideration more broadly for digital asset management across liberal arts colleges and perhaps other higher educational institutions.

Notes

[1] My thanks to Melissa Dalrymple, who, while working as a consultant for ARTstor, visited all seven schools together with me and contributed significantly to the research and analysis that is presented here.

[2] "Digital asset management" has become the accepted term of art, but it is important to point out that these assets differ significantly from the traditional definition of an asset. An asset is traditionally understood as something that allows its owner to generate revenues, whereas "digital assets" actually present a long-term need to be cared for.

[3] NITLE is the commonly-used acronym for the National Institute for Technology and Liberal Education, a non-profit organization with a mission to catalyze innovative teaching to enrich and advance liberal education in the digital age. See www.nitle.org for more information. NITLE is being incubated by Ithaka, which provided the research staff that completed this report. See www.ithaka.org. ARTstor is a non-profit initiative, founded by The Andrew W. Mellon Foundation, with a mission to use digital technology to enhance scholarship, teaching, and learning in the arts and associated fields. See www.artstor.org.

[4] For a broader view of personal collections going beyond images, see Neil Beagrie, "Plenty of Room at the Bottom? Personal Digital Libraries and Collections," D-Lib Magazine 11, no. 6 (June 2005), <http://www.dlib.org/dlib/june05/beagrie/06beagrie.html>.

[5] Because ARTstor includes not only remote content, but also tools for handling local content, it raised some of these issues most acutely at a number of campuses we visited.

About the Author

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Transformations is an online series of occasional papers exploring the intersection of digital technologies and the liberal arts. We address a variety of topics with an eye on emergent practices, examining projects from the reaches of cyberspace to the liberal arts campus: social software, spatial learning, digital images, gaming, and more. *Transformations* is edited by Bryan Alexander, Research, NITLE. Bryan can be contacted at bryan.alexander@nitle.org.

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