Teaching Art History with New Technologies

Teaching Art History with New Technologies: Reflections and Case Studies

Edited by

Kelly Donahue-Wallace, Laetitia La Follette and Andrea Pappas

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INTRODUCTION

KELLY DONAHUE-WALLACE,
LAETITIA LA FOLLETTE, AND ANDREA PAPPAS

This book documents some of the changes that have occurred in the teaching of art history in the last decade. It provides both a history and an analysis of the increasing number of computer-based tools now at the disposal of art historians. It was prompted by the dearth not only of readily accessible information about teaching art history with new technologies,[1] but of pedagogical literature for art history in general.[2] Currently, there are few places where art historians can go for help in navigating the journey between traditional and computer-mediated practices in teaching. Thus a fair amount of trial-and-error experimentation is being replicated over and over again at colleges and universities. For faculty to succeed with the new applications and approaches, they must be able to draw on the experience of others who have developed expertise with these new tools. This book presents a series of reflections and case-studies by such early adopters who have not just replaced older materials with new, but who have advanced the discipline's pedagogy in doing so. It illustrates how new technologies are changing the way art history is taught, summarizes lessons learned, and identifies challenges that remain. Given the transitional state of the field, with faculty ranging from the computer-phobic to the computer-savvy, these case studies represent a broad spectrum, from those that focus on the thoughtful integration of new technologies into traditional teaching

[1] Art History has always been taught with technology: see the essay by C. Witcombe, where he defines new technologies (p. 16) "as referring to any mechanical or electronic device that is made for and used as a means of reproducing and communicating images and information." Simply put, this means the use of computers and the internet. Although some of us prefer the term new media to new technologies to emphasize the vehicles we use for content and communication rather than the static physical infrastructure of the computer per se, the latter is more common and is used by the authors in this volume.

[2] See our survey of the scholarly literature in the section on Scholarship of Teaching, below.

to others that look beyond the familiar art history lecture or seminar format. They aim to provide both practical suggestions and theoretical models for historians of art and visual culture interested in what computer-mediated applications have been successful in art history teaching and where such new approaches may be leading us.

It is worth noting that most of these case studies are for introductory-level courses, where almost all of the conversation has occurred so far. This is due, in part, to the well-known problems associated with lower-level classes, which include large lectures covering too much material often attended by apathetic and passive learners, who frequently have no experience with art and yet are expected to be inspired and prepared for advanced study at the end of the term. Not only do these and other problems—challenges that are less acute in upper-division courses—lead us to look for new pedagogical methods, but they also represent common ground, because so many of us in the field have to teach them. We see several other reasons for this concentration of pedagogical research at the introductory level. First, they are taught nearly every term and hence provide frequent opportunities to experiment with, assess, and refine the use of technology in a given course. Second, these classes frequently function as general education courses, teaching basic skills and broad concepts to a large student population that typically has a low level of engagement compared to art history majors. Technological vehicles for course content and skill-acquisition tasks can provide opportunities to increase the engagement of these "gen-ed" students. Third, investments of time, infrastructure, and intellectual capital in an introductory course will affect a much larger population than will such investments at the upper division level. Colleges and universities are consequently more willing to provide funding for course development of freshman and sophomore courses. Fourth, in some ways, technology is already so well integrated into upper division instruction in the form of research tools that students use to teach themselves (e.g., ArtIndex), that it has disappeared into the background. At the same time, however, faculty are less willing to experiment with new technologies for the advanced courses, not trusting learning objects and other computer-mediated pedagogical tools for these courses in which the faculty members are more intellectually and professionally invested. Additionally, developing new tools and pedagogies takes time away from research and publication. In the current tenure climate in the United States, professors who devote substantial time to this endeavor may risk their own status at the university.

There are doubtless further developments to be made at the upper division level, perhaps most effectively if deployed in cross-disciplinary

contexts. But, the limited availability of institutional funding, small student populations, pre-existing high (or at least higher) level of student engagement, and relative infrequency with which these courses are taught constitute significant barriers to the investment of time, money, and expertise that such experimentation would require. Furthermore, faculty have developed a broad array of pedagogical approaches for advanced courses that have proven their effectiveness. Lacking a reliable corpus of scholarship demonstrating the value of computer-mediated pedagogy at the upper level, faculty are reticent to change tried and true methods in face-to-face undergraduate and graduate courses. As we reflect more regularly on program goals and learning outcomes, the benefits of interdisciplinarity and collaboration, and skill-building (rather than merely knowledge-giving), the integration of technological tools into our pedagogy holds great promise at every level.

Why Integrate New Technology Into Art History Teaching?

Art history involves more than looking. It asks students to think about what they observe. This is where technology-based activities become useful, especially those that go beyond the presentation of images to explore why images are structured the way they are, and what meaning that structure holds. Today, teaching in the history of art is being shaped by new technologies, technologies that—as has always been the case—were not developed for art historians, but which must be adapted for their needs.

The reasons for integrating new technologies are threefold. First and foremost, new technologies allow teachers and students to engage in new activities, and thus create new opportunities for teaching and learning. Second, research on cognition stresses the need for students to take control of their learning, something the interactive technologies can facilitate. Third, the integration of new technological tools and active learning techniques recognizes and responds to a cultural shift that has already occurred with our students and much of the society at large. As the shift from a print-based culture to an image-based one intensifies, the lessons art history teaches—that images are complex and one must learn how to read them—become increasingly important and necessary.

Essential Principles

New technologies for art historical instruction are here to stay. But many important corollaries to their use have yet to be discussed, such as understanding the social impact of the shift from analog to digital image,[3] parsing the level of investment required (financial and otherwise),[4] deciding who should control rights to computer-mediated teaching products (such as online courses and learning objects), recognizing the importance of scholarship of teaching, and enunciating guidelines for effective applications. The editors of this volume firmly believe these last should include the following.

- New technologies must be used intelligently and judiciously, not simply because they are available. Faculty should reflect critically on the pedagogical value of computer-mediated tools, embracing (and investing in) those that offer something that more traditional approaches do not. New technologies are extremely expensive and should only be deployed if they can accomplish something that paper and pen cannot. Resources are too scarce to jump at every new toy.

- Instructors should consider their pedagogical needs and goals before adopting a specific technology to their teaching. While the potential field of action presented by a technology can spark useful reflection, in the end, technology should serve the pedagogy, not the other way around.

- New technologies, either in support of face-to-face classes or used in online teaching, must be intrinsically and transparently linked to course and program learning outcomes, and their effectiveness should be rigorously assessed using empirical methods. Formative and summative assessments document the benefits of the learning technologies and their usefulness in art history instruction. Failure to integrate the new

[3] See the essay by Harris and Zucker in this volume on the culling of digital images as a solitary activity and the need to reclaim the social forum of the slide library.

[4] These vary widely as demonstrated in the essays here: from the largest public provider of online education in the U.S., the University of Maryland University College, which invests $25,000 on average in every online course (Allen p. 102) to the University of North Texas which offers grants of $10-20,000 for online course development (Donahue-Wallace p. 112). At the University of Massachusetts, La Follette and her colleagues developed eight learning objects with outside funding: these would cost between $12-15,000 apiece today. The latter could be disseminated nationally, while the online courses are proprietary to the institutions for which they were developed (though as Donahue-Wallace notes, UNT unusually allowed her to share the rights, p.112).

technologies with learning outcomes and assessment plans makes them little more than "add-ons" or "bells and whistles" rather than serious tools for learning.

- Instructors should not promote the technological system to the level of course content—if so, it becomes a distraction at best, another barrier to learning in art history at worst.

- Any experiments in pedagogy will yield some unexpected processes, side-effects, and results. Instructors (and those who evaluate them) should be open to these surprises, examining them for their usefulness instead of concluding prematurely that such unforeseen events represent failures.

- Instructors must establish a community of practice for sharing information about pedagogy and technology. Groups such as Art Historians Interested in Pedagogy and Technology in the United States and the Computers and the History of Art in the United Kingdom provide the opportunity to discuss innovations and their merits for art history teaching. Involvement in these or like groups helps faculty to avoid needless re-invention of technologies and methods. At the same time, larger organizations, such as the College Art Association and the Association of Art Historians, must embrace these and other societies as central to their missions to promote the study and teaching of art history.

By showcasing a variety of models, we hope this book will serve to advance discussion in these areas as well.

Computers in Art History Teaching

The use of computers in art historical instruction may be considered under three rubrics: first, the digitization of images; second, the development of computer-mediated interactive exercises using digital images; and third, the emergence of courses taught exclusively online.

The first, teaching with digital images instead of 35 mm slides is not a central focus of this volume, but it is nevertheless fundamental to the other two.[5] The teaching of art history has always relied on reproductions, and its nature has changed with each new method of reproduction. Replacing analog slides with digital images has several far-reaching repercussions, most notably increasing access to the reproduction outside of the

[5] Harris and Zucker consider the issue of slides versus digital images in their essay about the slide library, as does Witcombe, who traces the use of various technologies used in the teaching of art history over time.

classroom by students for review and study purposes. Professor Dana Leibsohn of Smith College (Read 2003) noted that her students became more adept at reading images closely and using visual evidence to support their arguments after they were given access to digital image banks. Before digital images, students typically saw the projected slide only in the lecture hall; to review images required going to their textbooks (where the reproduction was not always large or in color), or to a specific physical location on campus where hard copy reproductions were mounted temporarily for review. Digital images on a website now allow students to review images more easily, conveniently and often, thus encouraging greater familiarity with the works and more careful study.

In class, faculty employ PowerPoint or other presentation programs filled with digital images in the same manner as they did analog slides, projecting them singly or in static pairs. The ease with which textual information may be added alongside the projected image has offered instructors a slight advantage over the "write-on" slides of yesteryear.[6] The development of presentation software adds new functions including panning, zooming, selecting, and rotating. These tools surpass the static visual reproduction of the object to simulate in part the usual physical engagement the viewer has with a work of art: moving around it, approaching, and receding. With high quality images, some of the tools allow the viewer to see more than would be possible for the visitor standing in front of the object, as magnified images may reveal more than what is visible to the unassisted eye (Rhyne 1997).

Our second rubric, the development of interactive exercises known in computer-mediated instruction as learning objects has had as its goal the user's engagement with the object, concept, or question. The key repercussion here has been the adoption of active learning, a more student-centered and skills-based approach.[7] Art historical learning objects first

[6] Carlucci, Haubold and Stynes address the building of campus-wide digital image collections as successors to the departmentally-funded and based slide library.

[7] Two widely cited definitions of such active learning are John D. Bransford, Ann L. Brown and Rodney Cocking , eds. *How People Learn: Brain, Mind, Experience and School*, National Research Council. Washington, DC: National Academy Press, 1999: "New developments in the science of learning emphasize the importance of helping people take control of their own learning." and Chickering and Gamson, "Seven principles for good practice in undergraduate education", *AAHE Bulletin* (March 1987): "Learning is not a spectator sport. Students do not learn much just sitting in classes listening to teachers, memorizing pre-packaged assignments and spitting out answers…" For more on this concept, see the glossary on the American Historians' Visual Knowledge Project site (http://crossroads.georgetown.edu/vkp/resources/)

appeared in museum kiosks and websites, before spreading to schools. CD-Roms provided by textbook publishers and commercial vendors likewise promoted interaction. Using Macromedia's Flash or another interactive program, museum educators, publishers, and instructors have created animated activities, requiring users to drag and drop architectural elements, to click selected hotspots on a digital image for more information, or even to choose their own adventure in game-like situations. Used in art historical instruction, these tools have placed students in direct engagement with the reproduced work of art, allowing them to work more closely with images, empowering them as participants, and encouraging them to take an more active role in their learning in a way that is uncommon in the traditional lecture model.

The third rubric, the online course, is the most recent manifestation of computers in art history instruction. In the past five years, the number of colleges and universities offering online art history instruction has exploded, particularly at the first- or second-year level and most commonly at junior colleges and public, commuter universities. Many of these courses replace the face-to-face lecture with online materials. Some instructors rely on the textbook for course content, asking students to read the relevant chapter, and answer questions submitted electronically; many also require virtual visits to outside websites, including museum sites, to supplement the textbook. Other faculty substitute commercial videotapes for face-to-face lectures or move beyond the textbook content with additional instructor-authored html text. Many online courses use message boards, forums, chat rooms, and video conferencing for asynchronous and synchronous, seminar-style discussions. Blended or hybrid courses combine in-class experiences with small group, online, or other activities. Most instructors who author these courses do so based on their own intuition and experiences, or their colleagues', rather than on studied and proven methods from art history or other disciplines. In fact, the literature on online or hybrid art history courses and learning objects is woefully thin. The best practices emerging for online instruction differ from the traditional, lecture-driven instruction model, drawing upon the active learning and student-driven inquiry models described in our second rubric.

Looking Back: Strengths of the Traditional Slide Lecture

No statistics have been collected about the number of faculty who still use slides versus those who have gone digital, but clearly the traditional art history slide lecture is becoming less frequent across the country. It is important, however, to recognize its strengths, and to consider how to

maintain them as we move to technologically-driven ways of delivering curriculum. Generations of art historians have found their calling in darkened classrooms illuminated by the glow of projected slides. They have been enthralled by the professor at the lectern whose vast knowledge of the artists, objects, and monuments discussed in lecture seemed much more than could possibly be acquired in a single lifetime. Striding about the stage, the professor pointed to areas of the projected slide, revealing to the captivated audience hitherto unseen mysteries. Standing before pairs of projected images, the professor explained the visible differences or similarities, leading the students through a complex and edifying survey of artistic, historical, philosophical, religious, and social factors. These explanations frequently involved the professor's own research and personal tales of experiences in the archive, the museum, or the distant archeological site. Posing open-ended questions to the audience, the professor challenged the students to see the complexity inherent in studying works of art and architecture. Such performances inspired many undergraduates to pursue a career in art history, in part from a desire to emulate the professor and possess his/her knowledge, but also from the aspiration to add to collective art historical knowledge, and to make the discoveries that future art history students would learn about in their own darkened classrooms.

Looking Ahead: Problems and Challenges

This romantic tale of intellectual inspiration still plays out in some college classes, but the academic landscape is also changing for art historians. Although some faculty had begun experimenting with computer and digital technologies for teaching well before 2004, when Eastman Kodak decided to end production of slide projectors, that decision forced the majority of art historians into a largely unfamiliar digital realm. Those more comfortable with these new technologies see their potential to offer a more dynamic way of learning than static slide projection, but often lack the technical knowledge and financial resources to pursue such new approaches. At the same time, institutions seeking cost-effective and revenue-generating classes view online and blended or hybrid learning as the answer. They likewise strive to improve learning outcomes and turn to technology-mediated instruction as a promising solution. The instructors at these schools, however, have little experience with the technologies or the literatures that would help them to transform their teaching. Students, on the other hand, are increasingly technologically-savvy: they judge electronic tools used in class as they would commercially marketed

products and they expect courses to engage them in ways that art history's traditional "art in the dark" lecture format cannot. With their laptop computers open to take notes, many of these multi-tasking students now simultaneously use the university's wireless connection to surf the Internet, chat with their friends, and otherwise disengage from the learning environment, in traditional-style lecture classes.

So how can art history's slide-based courses and their emphasis on visual literacy, analysis, and research be translated into technology-mediated formats in a manner that preserves the discipline's best pedagogical practices while simultaneously adding fruitful new approaches to teaching? What should instructors adopt from other fields and what can they additionally develop for art history's specific needs? And finally, how can instructors today inspire the next generation to pursue the discipline as they had been led to do by their own teachers?

Scholarship of Teaching[8]

Part of the challenge for developing pedagogically sound and constructive learning objects and technology-mediated courses, and in publishing the practices and analyses of these tools, is the dearth of published information about pedagogy and assessment in the discipline of art history. Art history is an academic discipline largely lacking a body of pedagogical literature or a venue for publishing new scholarship in this area. The discipline's emphasis on object-oriented research and theoretical reflection has ignored pedagogy. Rich in historiographies of its research and writing practices and keenly aware of its modes of scholarly inquiry, art history has yet to examine its teaching seriously. The College Art Association's *CAANews* September 2005 issue admitted the lacuna in the article "Building the Literature of Art Pedagogy" in which author Robert Bersson lamented the lack of literature on teaching in our discipline.

With a handful of exceptions, such as Robert Nelson's (2000) thoughtful consideration of the slide lecture, the most developed area of art historical pedagogical literature addresses how art history has selected the works taught in its classes, particularly the large survey courses. Articles published in the College Art Association's *Art Journal* in 1995

[8] The editors of this book follow Lee S. Shulman's definition of this term: "A scholarship of teaching will entail a public account of some or all of the full act of teaching—vision, design, enactment, outcomes and analysis—in a manner susceptible to critical review by the teacher's professional peers and amenable to productive employment in future work by members of that same community" (Hutchings 1998, 6).

considered how the art historical canon presented in survey courses was developed and how a handful of higher education institutions were abandoning the notion of a single, Western canon dominated by dead, white, male artists.[9] Other articles addressed teaching and assessment strategies such as incorporating writing and abandoning the hallowed "darkness at noon" lecture format. In 2005, the *Art Journal* again looked at art history teaching, addressing how the art history survey is and might be taught. Non-traditional pedagogies, assessment issues, and learning styles also received some attention in this published roundtable discussion. The College Art Association's *CAANews* briefly considered the potential of problem-based learning in art history (Lindner 2005).

Scholarship on computers in art history instruction is similarly limited. While digitization and digital projects have received some attention, the scholarship on teaching with digital images is minuscule.[10] In 1997 the College Art Association's *Art Bulletin* dedicated part of one issue to digital images in art and art history; several of these short essays addressed teaching. Marilyn Aronberg Lavin offered the most radical reinvention of art history teaching, whereby the slide-based lecture is replaced by student-generated searches of digital images and texts. The abstracts and proceedings of the annual conference of the British society Computers and the History of Art (CHArt) do regularly consider teaching with digital images (Costache 1998, Bailey and Graham 1999, Greenhalgh 2001), but when compared to the scholarship on art historical research, these pedagogical publications are few and far between. The scholarship on learning objects in art history is equally small, with only a handful of articles (Cason 1998, Hamilton 1999, Donahue-Wallace and Chanda 2005) considering their role and effect in art historical instruction. The most sustained considerations of learning objects appear in the CHArt publications (Cock 1997, Levy 1997, Hamilton 1999, Clancy 2001, Gordenker 2002, Pollini 2005). Finally, of the three areas of computer-mediated art history we consider here, online pedagogy has received the least attention in scholarly publications (Briggs 1997, Maddox 1997, Schmidt et al.1999, Lahav 2001, Kwastek 2003). What is particularly lacking are qualitative or quantitative studies of the effect of the online

[9] See for example Bradford R. Collins, "Rethinking the introductory art history survey," *Art Journal* 54 (1995): 23-89.

[10] One might compare in the field of American studies, for example, the review by David Jaffee of electronic materials for the teaching of American history: "Scholars will soon be instructed through the eye: e-supplements and the teaching of U.S. history," *Journal of American History* (90.1) 2003, 1463-82, available online at http://www.indiana.edu/~jah/textbooks/2003/jaffee.shtml

environment on art history learning or pedagogical strategies for teaching in this new arena.

Art History cannot progress in developing a body of scholarship treating the pedagogical issues specific to the discipline until we also recognize that pedagogy is an academic field of its own, and that the scholarship of teaching in art history is just as interdisciplinary and rigorous as traditional intersections with other areas such as literature. This particularly impacts younger practitioners in art history who are finally beginning to receive some formal training in pedagogy in graduate school, and who will thus be well-equipped to advance the field in this way. As their senior colleagues, we should be prepared to consider valuing such publications towards tenure the same way we weigh traditional object-oriented or theoretical research.

Overview of the Contents

The essays in this volume amplify dramatically the available literature on computer-assisted art history teaching. The first section of the book examines broad questions on the state of technology-mediated instruction and assessment in art history. The first essay, written by Christopher L. C. E. Witcombe, a pioneer in digital resources for art historians, addresses technology-mediated instruction broadly. It combines practical issues, philosophical reflection, and guidance for those entering this arena. The second, by Stephen Carroll, sketches the dangers, for both teachers and students, of thoughtless and uncritical implementation of new technologies and recommends a careful application of computer technology where this supports teaching and learning. The third, by Beth Harris and Steve Zucker, reflects on the slide itself, and asks how the community of the old slide library can be extended into the digital realm.

The second section presents an array of computer-assisted learning objects and other activities that augment the face-to-face class. In order to help readers replicate the models presented, these essays and those in the following section, address the identification of a need, funding, design and development, pedagogy, assessment, implementation, and results. Laetitia La Follette looks at the benefits of adaptation rather than radical change and the impact of interactive learning objects developed as homework to help students acquire skills needed for the art history survey course. Robert Carlucci, Alexander Haubold, and Jeremy Stynes consider the creation of interactive learning objects in support of art history courses at Columbia University, tracking the changes in the use of technology over several years, and reflecting on the changing role of the visual resources

curator. Stephen Carroll, Dolores laGuardia, and Andrea Pappas examine a team-taught approach to teaching art history and composition with the assistance of a course-management system. Eva R. Hoffman and Christine Cavalier end this section with a close examination of computer-assisted concept maps that allow students to make cross-cultural connections in art history survey courses.

The final essays in the book address online courses. Eva J. Allen narrates the development and implementation of an online art history survey course, explaining how she reconciles art history's traditional pedagogy with the potential of the computer-based course management system. Kelly Donahue-Wallace compares two models of online courses, comparing the relative merits of redesigning the art history survey course using problem-based learning to the advantages of a more instructor-directed approach. Geoffrey Simmins examines strategies for engaging online students, offering instructive narratives from his own experiences encouraging distributed learning students to participate in course discussions. Allen and Donahue-Wallace bring this section to a close with a co-authored chapter reflecting upon the state and future of online courses.

Teaching Art History with New Technologies. Reflections and Case Studies holds up a mirror to the discipline's diverse applications of computer-mediated pedagogies and offers art historians and others the opportunity to learn from the successes and failures of early pioneers and to benefit from their experience. The authors' practices and specific technologies differ; their institutional support and individual paths into the technology arena vary as well. Uniting all of the essays, however, is a recognition that the discipline's use of computer applications, Internet resources, and other technological tools must be driven by thoughtful reflection on art history's needs and be implemented in concert with strong pedagogy.

PART I

REFLECTIONS

CHAPTER ONE

BYE BYE, SLIDES
BYE BYE, CAROUSELS
HELLO, INTERNET
I THINK I'M A GONNA CRY-Y

CHRISTOPHER L. C. E. WITCOMBE

There are a couple of interlocked issues that I think are useful to lay out on the table at the outset and to keep in mind when reading this essay and those following in this book. Perhaps we can use some familiar terminology to describe the situation. The first issue concerns form and content. On the one hand we presume the existence of a discipline of art history, which gives form and structure and defines our approaches to its content, which is the art. Or, to put it another way, the *history* part of art history encompasses our methodologies, while the *art* part of art history indicates that to which we apply those methodologies. Which one is or should be paramount – the art or the history – is debated every so often in association with the question of whether the discipline should be called art history or the history of art. Distinctions between the two are sometimes made around the question of whether we are constructing a history *of* art, with an emphasis on identifying and refining our understanding of matters of style and iconography which serve as the means for devising historical continuities among art objects, or whether we are examining art *in* history, with the emphasis placed on art and its role, place, function, meaning, and so forth, within the context of the historical moment in which it was made or later appears. Although these distinctions – form and content, art and history – quickly lead to the old chicken-or-egg problem, they are valuable in the way they force us to think about what we are doing as art historians.

With respect to the form and content of art history (or the history of art, if you prefer), it has generally been the case that what we teach mostly in the classroom is *content*. Matters of *form*, in which the aims, goals, and

purpose of art history and the methods, approaches, philosophies, and theories we utilize as art historians to reach those ends, are usually relegated to methodology courses, theory courses, and senior seminars. But of course when challenged on the matter of form (and the challenges brought to the discipline over the past 30 years have greatly contributed to our awareness of this issue), we readily acknowledge that form informs every aspect of how we treat content. Simultaneously, we would also acknowledge that content has in turn guided and shaped the selection and application of form in both general situations and specific instances. Today we recognize that the inclusion of new types of content, such as film, and challenges to the conventional canon of content, have given rise to new approaches and methods of analysis. With a certain arrogance that assumes our forebears (i.e. art historians working before 1970) were generally ignorant of such issues, today we pride ourselves on our special sensitivity to the interrelationship of form and content in art history and our clever and insightful understanding of how it shapes the discipline. Indeed, many instructors today, including some of those contributing to this volume, are seeking ways to incorporate a greater awareness of form into their courses.

Having placed these familiar issues on the table, I want to add another: technology. To the same extent that methodologies have determined how art historians deal with content, it is important to recognize the extent to which technologies have also shaped the discipline. This may sound like a rather tendentious claim, especially in a book like this one, but it is not difficult to show that the trajectory of the discipline of art history – both in its selection of content and the methodologies through which that content has been addressed – parallels innovations in communication technologies. It is important to recognize the impact of technology on the development of the discipline of art history because we are currently in the midst of a major technological revolution. Digital technology is transforming the world around us. In the same way that previous technological innovations shaped the form and content of the discipline, there is every reason to believe that art history will be transformed by digital technology. Indeed, this transformation is already underway. It is no mere coincidence that the new field of Visual Culture has emerged alongside the World Wide Web. The eleven essays contained in this anthology describe various exciting new ways in which computer-based technology can be used to teach art history. In addition, these essays also begin to articulate shifts in the discipline and I urge the reader to be alert to how the technology itself is beginning to alter how we think about the form of art history.

The following offers a brief review of the relationship between art history and technology drawn in large part from my online essay *Art History and Technology*.[1] I use the term technology in a broad contemporary sense as referring to any mechanical or electronic device that is made for and used as a means of artificially reproducing and disseminating (communicating) images and information. None of the technologies mentioned below was devised or invented specifically for the use of art historians, but in each instance they provided a means by which the discipline could pursue its special interests, even as those interests themselves were necessarily adjusted to suit the parameters or opportunities that the new technologies made available. The point I wish to stress is that in the process of adjustment and adaptation, the discipline itself underwent changes. Technology has not only shaped and guided the discipline in the past, it continues to do so. Much of what art historians do today in the study and teaching of art history is due to (and is done at the mercy of) technology.

The discipline we practice today emerged during the Renaissance hand-in-hand with the new technology of the printing press. The ability of the printing press to provide multiple copies of books and prints contributed significantly to art history's development. Giorgio Vasari in the sixteenth century was able to take advantage of the printing press to produce multiple copies of his book of artists' biographies, which immediately provided both a framework and a methodology for the study of art history.

At the same time, the presses were also churning out multiple copies of woodcuts and engravings. By the time the first edition of Vasari's *Lives* was published in 1550, Europe was awash in prints. A large number of the prints produced at this time were "reproductive" in that they reproduced other works of art, including paintings, sculptures, and architecture. For the first time, someone in Antwerp or Paris could see an image of an altarpiece or a fresco in Rome. Prints were actively collected and through them a person could supplement a study of art with reference to examples in distant places. Prints were portable and relatively inexpensive and were used also as illustrations in books.

During these same years (we are still in the sixteenth century), there also emerged the institution of the art academy, first in Florence then in Rome, where instruction included studying examples of ancient art, mostly statues and reliefs. When original examples of antique sculpture were not available firsthand, students could study prints, but a preferred solution

[1] This essay is available at http://witcombe.sbc.edu/arth-technology/.

was reproductions of ancient sculpture in the form of plaster casts. The making of casts of sculpture from plaster of Paris was not a new technology, but it was a technology nonetheless that was utilized by art academies who acquired casts in order to increase the range of examples available to those studying art. By the eighteenth century, practically every art academy in Europe was in possession of a collection of plaster casts of ancient sculptures. The availability of casts and prints greatly expanded the scope of the study of art history. It was now possible to compare and contrast a statue or a painting in Rome with a statue or a painting in Paris. This ability quickly came to define a central activity for the art historian. However, as the study of art history took shape around "study aids" – reproductive prints and plaster casts – the art history lecture simultaneously became more difficult.

The roots of art history teaching can be traced to lectures given at the new art academies. The first program of lectures was that organized in 1594 by Federico Zuccaro, the *Principe* of the Accademia di San Luca in Rome. At first lectures were given by artist-members of the academy, but beginning in the seventeenth century lectures by members who were not artists were also included. When Giovanni Pietro Bellori set forth his artistic theories in an essay read to the members of the Accademia di San Luca in Rome in 1664 (later published as the preface to his *Lives*), he included references to various paintings, such as Raphael's *Galatea* and Guido Reni's *St. Michael,* as well as to ancient sculptures which could not be seen by the audience there in the lecture room. As far as we know, Bellori did not use any "visual aids." In other words, his lecture was not illustrated and so he had to rely on the assumption that his audience would be familiar with the works he mentioned.

But because the discipline is fundamentally a visual one, there is a strong desire to show the audience what is being described. But, how was this to be accomplished in a lecture? The useful "study aids" (prints and plaster casts) are practically useless as "visual aids" in the lecture hall. It is difficult to move full-scale plaster casts into the lecture hall as needed, while copper-plate prints, which are generally rather small in size, would be difficult to see from the back. The desire to find some way to illustrate art history lectures resulted in some cases in the laborious production of enlarged drawings and diagrams. In the eighteenth-century, John Soane, who lectured at the Royal Academy in London for nearly thirty years, amassed some 2,000 display drawings of architecture, most of them measuring four feet by two feet and coloured for effect (the collection is still housed in Sir John Soane's Museum in London). Photographs, after they became available in the 1840s, alleviated the problem of reproduction

but were otherwise of little help in the lecture hall because, like reproductive prints, they were usually small in size. What was needed was some form of enlarged photograph. Technology came to the rescue in 1850 when two brothers in Philadelphia, William and Frederick Langenheim, invented a transparent positive image of a photograph in the form of a glass slide that could be projected onto a wall or screen using a Magic Lantern.

The practice of using a Magic Lantern to project images on glass plates was by no means new. An illustration in the 1671 edition of Athanasius Kircher's *Ars Magna Lucis et Umbrae* shows a type of Magic Lantern with images projected onto a wall. In an earlier edition of the same book published in 1646, Kircher had included a description of a way to project images using sunlight or candlelight and employing a convex lens as the means to focus the images. Kircher's images, though, were drawn directly onto the glass. The innovative feature of the Langenheim's invention was that the glass slides (called a "Hyalotypes" after the Greek term *hyalo* meaning glass) were made of actual photographs.

The technology developed quickly. By the 1870s, Magic Lantern projectors were using limelight as the source of illumination. (Limelight is a dazzling white light that was produced by directing a very hot flame onto the surface of a pellet of lime.) In 1873, Bruno Meyer, a German art historian at the Polytechnic Institute in Karlsruhe, was using projected lantern slides in his lectures. In 1892, electric Magic Lantern projectors were introduced. This new technology was enthusiastically adopted by Hermann Grimm, a professor of art history at the University of Berlin. In an article published in 1897, he reports how lantern slides permitted the projection of works full-size, or allowed small works or fragments to be enlarged to colossal scale. Grimm's successor at Berlin, Heinrich Wölfflin, also embraced the new technology. Wölfflin used slides extensively and was the first to utilize two slide projectors together so that he could show details alongside the principal image, or show different images side-by-side. Through his utilization of a new technology, Wölfflin introduced a new way of teaching art history. His method of compare-and-contrast was quickly recognized as an effective teaching strategy and continues to serve as a valuable pedagogical tool for art history instructors today.

At this time, lantern slides were black-and-white (although they were frequently hand-tinted with transparent colours). Prints and illustrations in books were also black-and-white (although they too might be hand-tinted). (The Alinari Brothers had established a photographic workshop in Florence in 1852 and, beginning in the 1860s, photographs of artworks could also be purchased from Adolphe Braun. By the 1890s photographs

were of sufficiently high quality to be employed by art connoisseurs, such as Bernard Berenson.) It could be argued that when using black-and-white printed images and black-and-white lantern slides, art historians tended to focus on those elements in an artwork that did not rely on colour. It may have been the absence of colour in the "visual aids" at hand that contributed to a growing emphasis in art historical discourse on matters of *style* and on those formal aspects of a work of art, such as line and shape, as well as matters of composition and proportion, which could be analyzed and discussed without having to pay too much attention to colour. The neglect of colour (with discussion of pigment, colour relations and composition, and tone) as the analytical focus of a painting perhaps stems from this black-and-white era in the history of the discipline.

The absence of colour in reproductions may have contributed also to a shift in interest among art historians such as Erwin Panofsky to the more visibly accessible questions of iconography.

In 1916 the German company Agfa invented a process for producing colour lantern slides, but because of the First World War the invention did not become available outside Germany until the 1920s. A major technological advance occurred in 1936 with the discovery of the Kodachrome three-colour process that allowed for the production of colour 35mm slides. Art historians, however, remained skeptical of the accuracy and authenticity of the colour reproduced in 35mm slides and persisted in an approach that embraced either stylistic and/or iconographical analysis to the general neglect of colour and related compositional features.

There are, of course, problems with all these forms of reproduction (prints, photographs, slides). Roger de Piles was perhaps the first to express misgivings about the uses of engraved reproductions. A little later, in the Preface of his *History of Ancient Art*, we find Johann Winckelmann (1880) railing against the inaccuracies and errors found in reproductive engravings. As Susan Lambert points out in *The Image Multiplied* (1987), it was sometimes the case that the reproductive engraver was not even working from the original, and thus the potential for error was increased. More recently, William Ivins, in *Prints and Visual Communication* (1953), has discussed how reproductive engravings have the effect of removing works from their original contexts. They also arbitrarily reduce or enlarge their scale.

Photographic reproductions are also flawed. The art critic John Ruskin was among the first to embrace the new Daguerreotype photograph (invented by Louis Daguerre in 1839). Writing to his father from Venice on 7 October 1845, he tells of buying "some most beautiful, though very

small, Daguerreotypes of the palaces I have been trying draw.... It is very nearly the same thing as carrying off the palace itself; every chip of stone and stain is there..." However, despite his enthusiasm for Daguerreotypes of architecture, when it came to photographs of paintings, Ruskin acknowledged their drawbacks. In Letter 59, dated November 1875, he reminds his readers in reference to a photograph of Fra Filippo Lippi's painting in the Uffizi of the *Virgin and Child and St. John*, "that a photograph necessarily loses the most subtle beauty of all things, because it cannot represent blue or grey colours, and darkens red ones; so that all glowing and warm shadows become too dark."

Some art historians, such as Carl Justi (1832-1912), professor at the University of Bonn and Berlin, rejected photographic reproductions of any sort. He believed that machine-made images corrupted the eye and, despite their apparent fidelity, distorted the original. Slides, too, provide drastic paraphrases of the original and produce a false impact, both aesthetic and psychological. We all know this to be true. At least the nature and form of reproductive prints and photographs prevent us from confusing them with the originals they reproduce. But, we tend to take the visual evidence of projected images in the classroom pretty much at face value. You may have noticed how slides have become more than a substitute for the original artwork. In the classroom, when the next slide appears on the screen, how many of us are guilty of saying "This is Botticelli's *Birth of Venus* painted in...." when, in fact, the projected image shows not Botticelli's painting but a slide or a digitized image derived from a photographic reproduction.

To the extent that photographs and slides have influenced how art history has been studied and taught over the past century or so, it can be safely assumed that the new digital technology will have a similarly profound impact. It is impossible at this point of development to see what form and direction the discipline might take because, by all accounts, the revolution in digital technology and communication has only just begun. A glance back over only the last twenty years quickly reveals that new forms of technology are constantly being developed; twenty years ago it would have been impossible to imagine the types of software and hardware we have now. There is no reason to assume that these developments have reached a plateau; rather, there is every indication that the revolution in technology is going to continue and produce software and hardware that it is currently impossible for us to imagine.

The situation we are in today may be likened to that encountered in a letter John Ruskin wrote to his father from Venice in 1846 in which he marveled at the new Daguerreotype photographs calling them "the most

marvelous invention of the century." Ruskin was certainly right in recognizing the value of photography, but in 1846 he could not possibly have imagined what lay ahead. Four years later, in 1850, the Langenheim brothers invented the Hyalotype, as was noted above. In 1916 colour glass slides became available, followed in 1936 by colour 35mm slides. At the same time, the technology of photography also brought forth moving images, cinematic film, IMAX movies, and even 3-D IMAX movies. So, what can we look forward to?

The new digital technology has already provided us with a greatly enhanced ability to conduct research and to study artworks. We have ready access through the World Wide Web to library catalogues around the world, to databases filled with data, to huge image resources, to information of all kinds on many thousands of Web sites. Questions that emerge during research and writing can be quickly answered. Bibliography can be easily compiled; images easily tracked down and just as easily downloaded for use. And this is just the beginning. Computer capacities, processing and Internet speeds, data storage, and image quality continue to improve. Because digital photography can achieve a degree of exact mathematical specification impossible to duplicate through the analogue chemistry of photosensitive film emulsions, it promises to provide a much more precise and accurate record of visual images.

The new technology already permits us to do things in the classroom we could not do before with slides, such as zooming and allowing three-dimensional objects to be turned. Other changes are likely to occur, such as pixel configurations that will enable the creation of large digital surfaces, such as walls and ceilings. A "classroom" with "digital walls and ceiling" would not need a projector, the information and images would appear on the surrounding surfaces. It is a short step from that to the replication of complete spaces and environments, such as the interior of the Sistine Chapel, or Chartres Cathedral, or Lascaux, with the additional ability to "move" in any direction; to zoom to any part of that space to examine details close up. Other structures now in ruin can be reconstituted and viewed in a similar manner. Soon it may be possible to simulate three-dimensional objects, such as statues and buildings, in the classroom space. Scale could be manipulated and set to "actual size" if desired.

Not only what we do in the classroom, but the classroom itself may become transformed into a computer-based three-dimensional graphical environment, a virtual world of a type inspired by Neal Stephenson's 1992 cyberpunk novel *Snow Crash*, where instructors and students meet and interact in the guise of self-designed humanoid avatars. The virtual world *Second Life* currently hosts twenty or more colleges and universities in

England and the United States (though none of them offer as yet classes in art history). Such simulated environments could further alter how the discipline is conducted.

How computer-based teaching strategies such as those presented in this volume will transform the discipline of art history is difficult to say at this stage of the digital revolution. What I do see occurring is an increased inter-functional closeness in the relationship between computer-based technology and the teaching of art history to the extent that a new sort of symbiotic existence will emerge. Happily, as both a tool and a medium, digital technology is especially responsive to the changing needs of art historians today and this bodes well for the future of the discipline. Art history is currently in a transitional phase and will soon emerge, I believe, to play a greatly enhanced and newly vital role in the twenty-first century.