

9-30-2013

A framework of image use among archaeologists, architects, art historians and artists

Joan E. Beaudoin

Wayne State University, joan.beaudoin@wayne.edu

Recommended Citation

Beaudoin, J.E. (2014). A framework of image use among archaeologists, architects, art historians and artists. *The Journal of Documentation*. 70(1), 119-147. doi:[10.1108/JD-12-2012-0157](https://doi.org/10.1108/JD-12-2012-0157)
Available at: <http://digitalcommons.wayne.edu/slisfrp/110>

This Article is brought to you for free and open access by the School of Library and Information Science at DigitalCommons@WayneState. It has been accepted for inclusion in School of Library and Information Science Faculty Research Publications by an authorized administrator of DigitalCommons@WayneState.

This is a formatted pre-print of an article currently in press in *The Journal of Documentation*, to appear in 2014.

A framework of image use among archaeologists, architects, art historians and artists

Joan E. Beaudoin

Assistant Professor, School of Library and Information Science,
Wayne State University, 106 Kresge Library, Detroit, MI 48202
joan.beaudoin@wayne.edu

Introduction

How and why images are used have important implications for the information systems, services and professionals involved in supporting image users. Images, like text, can be used for a number of reasons and these differences will influence fundamental aspects of the information transaction, such as what content is needed, where and how the information is sought, and the specific characteristics of the information that may be required. While research has begun to clarify image retrieval processes, basic issues surrounding how and why visual information is used have gone largely unstudied. This gap in the research led to the current study, which identifies, describes and explains the use of visual material among several professional image user groups. The findings of this study are presented as a theoretical framework within which future research into image use can be conducted.¹ Several questions were developed to focus the investigation on specific aspects of image use. The following questions guided the research:

- How are images used to support users' work tasks?
- How are images incorporated into their work?
- What functional roles do images fulfill for users?

The first two research questions examine how images were used by professional image users. These questions investigated users' processes and work products within their use of images. The final question examined why images were used by these professional image users. This

question sought to clarify the reasons behind the use of images in their work. The research questions were used to collect data from several user communities, archaeologists, architects, art historians and artists, whose work requires the use of images. This data was used to clarify how users incorporate images into their work routines, what products they produce through their interactions with images, and why they use visual information to complete their work tasks. This tripartite analysis was used as an exploratory framework for examining and explaining image use among these professional groups of users. Multiple user groups were examined to clarify characteristics of image use found across professions, or only among specific groups. These basic characteristics about image use are required by designers of systems and services to adequately meet users' needs.

Related Studies

Aspects concerning the specifics of how and why images are used by individuals have not been well addressed in the literature. When image use is mentioned there is general a lack of distinction made between image users' needs and what they do with images. For this study use is defined as how images are utilized after they have been retrieved and selected. This is a somewhat artificial distinction since the process of judging the relevance of images has been shown to contribute to a change in understanding for users (Choi & Rasmussen, 2003). The development of knowledge through the selection process is obviously a specific kind of information use, but one that is less explicit or measurable when compared to illustrating a text or citing a particular passage.

This situation, where image use is not explicit, seems to have had a negative impact on the perception and use of images among particular professions. For example, Burke (2001) discusses the lack of image use among historians in his *Eyewitnessing: The Uses of Images as Historical Evidence*. The title of the text implies that images are frequently used for historical research. However, as Burke (2001) states at the start of the first chapter, "[r]elatively few historians work in photographic archives," and when they do include images in their publications, they typically use them as uncommented upon illustrations (p. 10). This weak interest in images among historians is borne out in a review of image use in history journals by Harris and Hepburn (2012). These authors set out to examine if digital

Image Use Among Artists (pre-print)

technologies had impacted the number of images used in publications by historians. In the ten year period of journal publications that Harris and Hepburn reviewed (2000-2009), the “use of images has remained at a relatively consistent level year to year,” (p. 10). The lack of increased interest in the use of images by historians, while they have become more prevalent in the world around them, suggests that visual documents are not as highly regarded as texts. Regardless of the reason behind the limited use of images by historians, the fact that the image-text divide continues in certain disciplines is noteworthy.

The topic of expanding individuals’ knowledge through image viewing is discussed by individuals working in various domains. Eklund et al. (2006), in their investigation of a digital image database developed to support online learning, state that working with images directly (comparing, organizing, analyzing, etc.) promotes understanding through reflection. These researchers note that in the educational setting, images are used because of they provide unique content, stimulate the communication of ideas and invite discussion, analysis and group activities.

Another examination of the use of images to develop knowledge, discussed by the art historian Promey (1998), describes the various ways images have been used within the art history lecture hall. She relates how images have traditionally been employed to teach students how to think visually through verbal analyses of compositions. According to Promey, viewing, reflecting, and writing about images develop students’ understanding of the visual characteristics of works and the processes used in their creation. She also recounts how graphics software introduced alongside digital images can be used to create compositional “transparencies” to identify major visual elements in a work. This process, too, was noted as developing students’ visual acuity.

Pedagogical image use is also discussed by Freitas and Castanheira (2007) in their examination of how visual representations were used for meaning production in a high school biology class in Brazil. They discovered that visual means of conveying information were used in greater than 77% of the classes. These authors note that the extensive image use they found indicates that visual content serves a unique role in the construction of knowledge which cannot be achieved through verbal language. While this study did not examine how the students learn

through imagery, the prevalence of visual materials in the classroom reveals that images are a standard teaching tool.

Mowat (2002), in her examination of a digital library supporting teaching and learning, found that images were incorporated into the pedagogical process to increase students' comprehension of course topics. Discovered in the study were details concerning how students benefited from their interactions with visual information. These included using images to attract students' attention by piquing their curiosity, communicating ideas, increasing memorization, providing real-world implications and experiences, stimulating discussion, aiding in recall, stimulating analysis, promoting reflection, and making the learning experience more enjoyable. This list suggests there may be additional ways that images are used beyond those that serve as pedagogical tools.

Pisciotta and Copeland's (2003) publication concerning image user analyses for a campus-wide system at Penn State hints at ways the list could be expanded. These researchers classify image usage within their academic setting into three groups: teaching, independent learning, and collection management. While they report on the retrieval methods employed by the three groups, the authors do not address how image use may vary among them. This lack of interest in end-user behavior is notable given that the need for, and use of, images by a lecturer is likely be vastly different from that of a curious citizen and a collection manager. McCay-Peet and Toms (2009) acknowledge the limited state of knowledge about image use in their study of journalists, stating that "we know little about what people use images for. Image use is tightly integrated with the work task that triggered it," (p. 2417). Some investigations into specific image user groups' tasks have appeared however, and this has added to our understanding of how images are used.

Of the user groups included in the current study, archaeologists' information behaviors have seen little research interest. A single study by Huvila (2009) discusses the use of images by this user group. In examining the information resources of archaeologists with varying work roles (academic teaching, field archaeology, antiquarian, cultural heritage administration, public dissemination, academic research and infrastructural development) Huvila found that the archaeologists sought texts and various forms of imagery. The most extensive use of visual information, consisting of diagrams, videos, photographs and objects

Image Use Among Artists (pre-print)

themselves, was found among the academic archaeologists involved in teaching. How images were incorporated into their teaching, and the reasons behind why the images were used by the archaeologists, were not addressed however.

In contrast to the limited research surrounding archaeologists, architects' image use has been addressed by several authors. Chidlow (1991) discusses the typical types of information needed by architects to perform their work. Suggesting that the information needs of architects are similar when taken as a whole, she identifies stages in the design process and ties these back to when images are most likely to be used and for what purposes. According to Chidlow, images are used at the start of architectural projects for inspiration and also for reference purposes for particular styles, and in the design stage to look for peripheral art to complement the building and create an overall environment. A study completed by Sklar (1995), which examined design students' need for and use of images, adds a layer of information regarding the processes surrounding images. Although Sklar examined students rather than practicing architects, the study provides a glimpse into the working methods of architects and individuals in related fields. Sklar notes that the students sought images to find design solutions. The types of information they examined varied widely and included "site plans, soil surveys, census data, zoning codes and other regulatory statues, maps, drawings, and sketches," (Sklar, 1995, p. 13). The students would copy, disassemble, reassemble and reconstruct images to work through design problems and stimulate their thinking.

Artists' information behaviors have been examined through several studies. These studies identify visual information as critical to artists for several reasons. These reasons include the development of technical processes (Hemmig, 2009; Frank, 1999; Toyne, 1977), knowledge construction (Mason & Robinson, 2011; Frank, 1999) and inspiration (Mason & Robinson, 2011; Hemmig, 2009; Frank, 1999; Cobbledick, 1996; Pacey, 1982; Toyne, 1977). Information accompanying images was also discussed with periodicals, which were enthusiastically read by artists. Several authors discussed the heavy use of periodicals by artists to maintain current awareness of the art world (Hemmig, 2009; Frank, 1999; Cobbledick, 1996; Nilsen, 1986; Pacey, 1982).

Hemmig's (2009) study of artists' information-seeking found that

inspiration was sought through images and other means. These additional means included direct observations, life experiences, artworks, non-art man-made objects, analog and digital images, film, music, texts, and radio content, among others. Hemmig examined artists' behavior through a model of four information uses ("inspiration; specific visual elements; knowledge of materials and techniques; and marketing and career guidance," p. 694) developed from his earlier literature review (Hemmig, 2008). The results of his study indicate that artists seek information to support these four needs, but that their information needs and use are highly idiosyncratic. He found the usefulness of particular resources by participants was variable. However, visual information was critical to these users. This was particularly evident in the findings for the information needed for inspiration, for specific visual elements, and for marketing and career guidance. One information use in Hemmig's model not found to have a strong visual focus was developing knowledge of materials and techniques. For this need Hemmig found social information gathering among the artists' community of practice was most important.²

Many publications have acknowledged art historians' heavy reliance on images, however few have addressed how or why images are used. This is problematic since, as Ester and Shipp state in Bakewell et al. (1988), there is a lack of understanding regarding the working processes and systems use by art historians. These lacunae limit developments useful to the discipline. Bradfield (1976), among the earliest researchers to report on the image use of art historians, reports art historians typically seek images for teaching pre-planned lectures. Promey's (1998) more recent study of art historians in the classroom, also notes the usefulness of images to the learning process. While the use of images for pedagogical purposes is commonly associated with art historians, this is not as acute among professionals working outside of academe. Stam's study (1993) reveals that art historians working within the museum setting use images less frequently than their academic counterparts. In addition to their pedagogical function within art history, images have been identified as important resources for research. Challener (1999) discusses the use of images by art historians as a sort of springboard to text-based research. She notes these users tend to begin their research with an image (or a group of images) and then move on to primarily text-based resources. This working process, which holds the image at its center and seeks visual connections to other materials, is described by the practicing art historian

Image Use Among Artists (pre-print)

Brilliant (1988). Images are analyzed and the information gleaned is used to answer some question in the mind of the art historian-viewer.

The literature surrounding image use among the user groups examined in the study is limited, however, studies of additional user groups add to our understanding of this phenomenon. The study of health care professionals completed by Müller et al. (2006) examines image use in the completion of work tasks. In their analysis of different classes of users within the domain of medicine (students, researchers, lecturers, and clinicians) these authors support the ideas of McCay-Peet and Toms (2009) when they state that “[t]he tasks performed with images . . . vary strongly depending on the department of the person and on the role,” (Müller et al., 2006, p. 31). According to their findings students use images for illustrating study materials and presentations, and for preparing for exams. Researchers use images for illustrating presentations and publications. Lecturers mainly use images for presentations, while clinicians use images for patient diagnosis and colloquia presentations. Although the description of image use in this study is at a fairly coarse level, it does support the idea that images are used for various task-dependent purposes, and that their main use across the study’s users was illustration.

Another study of image users within the health sciences is the examination of dental faculty conducted by Pailing et al. (2008). This investigation of dental faculty and deans of dental schools reveals that images were used for teaching (their students and patients), patient diagnosis and monitoring, and for illustrating publications. The researchers also report the results of a national survey which indicates these users overwhelmingly identified teaching (96.2%) as the reason behind their image use. Additional reasons for image use identified by this group included clinical consultations with patients (32.5%), research (13.5%), and diagnosis (25%).³ Why the use for images for publications went unrecognized by the survey’s respondents is unclear.

Image use among journalists has also been examined in several studies. McCay-Peet and Toms (2009) categorized how journalist-participants used images based on Fidel’s (1997) image continuum. Fidel (1997) suggests that image needs among users range from two extremes, the Data Pole (images as information, i.e., x-rays, maps) and the Object Pole (images as illustration, i.e., aesthetic objects), with the majority of

cases falling at some point in between the two poles. In McCay-Peet and Toms' (2009) study the majority of the journalists' general image use (60%) was reported as being for illustration purposes, with images used for information found far less often (16.7%). Image use which met both illustrative and informative purposes was noted by 20% of the participants. When the participants were asked about two specific image use instances, nearly all participants recalled using images as illustrations. For images used as information, the number of journalists noting specific instances dropped to two-thirds. While this study helps support Fidel's image continuum theory to some degree, a deeper level of analysis would help explain the rationale for image use. For example, an image used as an illustration could provide proof, or develop knowledge in the viewer. However, an image used as information serves these uses as well. This difficulty in making a distinction between how an image was used (e.g., as an illustration) and the reason behind why it was used (e.g., to be able to recognize cell structures) is a common one among studies examining image use.

Several studies provide deeper analyses of image use. Among these is the study of journalists completed by Westman and Oittinen (2006). They report upon several common image functions: proof of a news event, catching readers' attention, filling pages, conveying information or adding value by bringing a new dimension (aesthetic or informational) to the associated text. Images were also used for developing knowledge about a topic, with the authors providing as an example seeking images to "find out when the ice cap of a certain lake had melted," (Westman and Oittinen, 2006, p. 105).

Chew et al. (2010) also provide a detailed list of reasons for image use in their study of users of everyday images found via the web. From their findings they develop a four-pronged framework which includes: Learning and Research, Image Access as Secondary Goals, Recreating or Connecting to Remote Experiences, and Images as the Objects of Communication. The researchers identify the most common motivation for image use as Learning and Research. This category consists of gaining information to expand understanding. Image use within this category also included inspiration and satisfying curiosity. Among the category Images Access as Secondary Goals, images are "sometimes used to facilitate other activities," and act in a supportive role (p. 107). Images used in this way

Image Use Among Artists (pre-print)

provide alternative, orienting or navigational information, or visual indexing. In the category Recreating or Connecting to Remote Experiences images link users to places, people and experiences “that were otherwise remote, either spatially or temporally” (p. 108). The final category, Images as the Objects of Communication, uses visual information for facilitating communication and social interactions. These researchers note that specific image uses influence the image systems selected, since particular systems provide features relevant to unique tasks.

Among the studies to more thoroughly explicate the reasons behind image use is Connis et al.’s (2000) examination of image seeking among a number of professions in various settings. In their VISOR I study they found seven classes of image use (Illustration, Information processing, Information dissemination, Learning, Generation of ideas, Aesthetic value, and Emotive/persuasive). The class Illustration is defined as using an image as “a means of representing/encapsulating what is being referred to,” (p. 46). Noteworthy is that Illustration, unlike the other classes, does not directly address the motivation for image use. The remaining classes identify why individuals seek out and use images. They found that images were used for decorative or aesthetic purposes (Aesthetic value); to convey or stimulate an emotion, to “convey a particular meaning or message” (Emotive/persuasive), to “provide inspiration or provoke thought patterns” (Generation of ideas); to develop knowledge through the image (Learning), to communicate information (Information dissemination), and for the identification or absence of particular kinds of information in images such as x-rays or mug shots (Information processing) (Connis, Ashford and Graham, 2000, p. 46).

Chung and Yoon (2011) examined how the image need context impacted the kinds of attributes used in image seeking. The researchers mapped image-seeking questions from a data set collected from Yahoo! Answers.com to Connis et al.’s seven classes of image use. They report that Illustration, that use category that identifies how rather than why images are used, was the predominant class (40.1%). This was followed by the classes Generation of Ideas (21.4%), Aesthetic Value (10.9%), Learning (10.4%), Information Dissemination (7.3%), Information Processing (7.3%), and Emotive / Persuasive Purposes (2.6%). Applying these categories to Fidel’s (1997) data-object image continuum, they report that 53.6% of image use in their study was object (illustration) oriented, 24% was data

(information) related, and 21.4% was both. These figures, reflecting Fidel's image use continuum, support the findings of the study by McCay-Peet and Toms (2009).

Discussions of image use are complicated by the fact that a single user may have multiple reasons for using images. For example, Garber and Grunes (1992) discovered that images were used at three critical points (creation of initial artistic concept, preparation of initial compositions, and initiation of the final photograph search) during the creation of advertisements. Images were used for different purposes (inspiration, idea and compositional development, and the realization of concept) depending on the process phase. Additionally, multiple simultaneous reasons for using an image (e.g., to communicate information and to convey emotion) were suggested by Connis, Ashford and Graham (2000). A way to think about image use might be borrowed from discussions of humanities scholars' utilization of resources. Brockman et al. (2001) categorized the resources used by these users into functional groups consisting of data, evidence, negative evidence, exemplars, factual, referent, theory, and absences. These categories are reminiscent of Fidel's (1997) discussion of image continuum. As categorization of the various means and motivations of image use would provide a useful theoretical framework within which to conduct future research, the current study worked toward this goal.

Methods

The research presented here is part of a larger study which sought to identify, describe and understand the human behaviors, thoughts and beliefs surrounding image needs, retrieval and use among archaeologists, architects, art historians and artists (Beaudoin, 2009). The limited research in the area of image users' behaviors meant this study was exploratory in nature. Qualitative research methods were chosen since they are most appropriate for understanding under-researched areas (Miles & Huberman, 1994). The data collection methods employed in the study were surveys and semi-structured interviews. An account of the steps, instruments and techniques that were used to gather and analyze the data follows.

Assumptions and Biases

Image Use Among Artists (pre-print)

This study would not have taken place without the knowledge and practical experience of the researcher whose employment history includes work in image collections and teaching art history. It is likely that these experiences shaped the researcher's perspective, since as Etzi (2004) states, "[i]t is presumed that every researcher has presuppositions or biases from which he/she begins. There is no such thing as knowledge without bias or presuppositions, since any knowing or questioning for that matter is from a particular perspective," (p. 1). It is hoped this knowledge and understanding led to an increase in the extraction of meaningful and important information provided by the study's participants.

Participants

This study set out to examine the behaviors of individuals whose work depends on images. While many professions work with images, it was believed that studying these four user groups (archaeologists, architects, art historians and artists) offered several advantages. The groups' shared interest in, and need for, images of cultural objects could provide interesting insights since variations might clarify the impact profession has on image users' behaviors.

Beyond profession, the inclusion criteria for participation in the study were further defined by the career paths chosen within their respective occupations. The participants included in the Archaeologist and Art Historian user groups were expected to be academics actively involved in teaching and research at the college or university level. The participants in the Architect and Artist user groups were expected to be currently producing creative works (architectural or artistic). The architects were included in the study if they were paid to create architectural designs and the artists were included, if they self-identified as an artist and were actively exhibiting their work.

Recruitment Procedure

After receiving approval to conduct the study by Drexel University's Institutional Review Board, participants were recruited using purposeful sampling. According to Patton (2002) "[p]urposeful sampling focuses on selecting information-rich cases whose study will illuminate the questions under study," (p. 230). Since the answers to the study's research questions were dependent on examining the specific work tasks and image

behaviors of these user groups, participants were selected on the basis of their professional role. The demographics of the study's participants are provided in Table 1.

Recruitment of participants was completed using the so-called snowball or chain method (Vogt, 2005; Patton, 2002). Through this method colleagues known to the researcher acted as contacts for additional professionals. Potential participants were contacted by the researcher via email or phone to discuss the study. Individuals who met the inclusion criteria and added variation to the group were asked to participate in the study.

Table 1. Demographic characteristics of participants by user group

No. in Group	Gender	Education	Years in Profession	Position	Area	Setting
Archaeologist User Group						
4	4F	Ph.D.	15-40	Instructor, Asst. Professor & Professor	Etruscan, Greek, Roman, Hellenistic	Small college & large university
Architect User Group						
6	3F 2M	BArch & MArch	4-40	Head of Graphic Design, Designer, Architect	Civic, Educational, Residential, Medical & Urban Renewal	Consultant, small to large firm
Art Historian User Group						
4	4F	MA & Ph.D.	15-41	Instructor & Professor	Ancient, Medieval, Renaissance, Contemporary	Small college & large university
Artist User Group						
6	4F 2M	BFA-MFA	7-40	Multimedia, Painter, Printmaker, Sculptor, Mixed media	Figurative & Abstract	Own studio – studio with collaborative

Saturation

Recruitment stopped at four participants in each of the academic user

Image Use Among Artists (pre-print)

groups, those representing the archaeologists and the art historians, when the data became repetitive and was corroborating previously collected phenomena and themes. This situation indicated data saturation had been achieved. Data collection for the creative users, those in the architect and the artist groups, ceased with six participants in each. Data collection continued in the case of the creative user groups since their responses showed more variation. Data collection ceased when significant new findings concerning the creative users were no longer being revealed.

Data Collection

Multiple data collection techniques were employed in order to increase the credibility and dependability of the study (Guba, 1981). The first data collection event consisted of a survey designed to gather information about participants' demographics and basic image behaviors (Appendix A). This was followed by a semi-structured interview containing a series of questions and probes (Appendix B). The semi-structured interview method encourages discussion concerning topics running parallel or tangential to those provided through the interview guide (Patton, 2002; Spradley, 1979). It also allowed the researcher to ask additional questions for more detailed coverage of a topic. Verbal content of the interviews were recorded using digital voice recorders and hand-written field notes were kept to document any notable characteristics relating to the interviews that were not perceptible via the audio recording (e.g., body language or facial expressions).

Data Preparation

Data collected through these methods were prepared prior to analysis. Hand-written responses to the paper-based survey and the audio recordings from the semi-structured interviews were transcribed verbatim. Noteworthy non-verbal aspects recorded in the field notes, and audio clues to participants' point of view or state of mind, were included in the interview transcripts as bracketed information within the participant's responses (e.g., [laughing]). Each survey and transcript was identified by the user group the individual belonged to and their participant number within their group (e.g., Artist 2). Line numbers were added to the interview transcripts so that individual responses could be identified in reporting the study's findings (e.g., [Artist 2, 1485-1490] specifies that the

quoted statement is recorded in lines 1485-1490 of Artist 2's interview transcript).

Data Analysis

Two broad kinds of data were examined in this study. The first, factual data, consisted of extracting direct responses made by the participants. An example would be the participants' responses to the survey question which asked about what tools and technologies they used to work with images (e.g., PowerPoint, scanners, etc.). This analysis was useful for discovering patterns and dimensions in participants' responses. The second kind of data consisted of units of theme-based content found at various points across the entire corpus of transcribed interviews. An example of this data is the response concerning the theme of financial costs, such as "[i]t's going to cost a lot of money to try to develop all this," [Artist 3, 1879]. These thematic passages were used in the constant comparative method of data analysis adopted in this study.

The constant comparative method is an iterative process of assigning thematic labels to words, sentences, passages or documents with the aim of developing higher conceptual categories which can be used in the development of theoretical constructs (Glaser & Strauss, 1967). Data analysis in the study began with the initial review of the first interview and its accompanying field notes. Next, the printed interview transcript was read several times and coded for topics. Assigned codes were listed in the margins and after several passes through the transcript these were gathered and a list of codes and their meanings was developed. This process was repeated with additional transcripts. As new topics emerged, the coding scheme was modified (i.e., codes were added and, or adjusted) and earlier transcripts were revisited. This coding process continued through several passes through the data.

Inter-Coder Check

An inter-coder assessment was completed to evaluate the reliability of the coding scheme developed by the researcher. Eight coders were given a spreadsheet containing twenty-five passages, and a document containing instructions and definitions of the codes. The instructions asked coders to choose two codes for each passage, one at a coarse level and the other at a finer degree of meaning. The granular codes applied to the passages saw a

Image Use Among Artists (pre-print)

96% agreement rate across all of coders and the researcher. The six more focused themes achieved an agreement rate of 81%. The agreement rates indicate the coding scheme was understandable and reflective of the themes found in the data.

Member Check

After completing the data analysis, participants in each group were sent a summary of the findings via email and were asked to read and comment on these. The aim was to speak with one individual from each group to ensure that what was being reported was a reflection of their experiences. Telephone re-interviews were carried out and a series of questions were asked to elicit information about the contents of the summary (Appendix C). Participants who commented on the summary (Archaeologist 3, Architect 6, Art Historian 4 and Artist 6) confirmed the findings. As the researcher set out to provide an accurate description of the image users' thoughts, beliefs and experiences, this step was a critical component in guaranteeing the credibility of the study.

Limitations

Several limitations of the study must be acknowledged. While this study attempted to broaden the discussion of how professionals use images in their work, each shared an interest in images of cultural materials, had similarly high levels of education and well-honed visual analysis skills. The goal of providing a high-level, holistic view of image users' behaviors meant detailed statistically significant, quantitative analyses were beyond the study's scope. All potential variations in each user group were not accommodated in the study. Participants' technological skills were not used as criteria for selection and this may have impacted the data collected. No male participants were recruited for the academic groups. Finally, as the data collection methods employed did not include direct observations of the participants' behaviors⁴, the study had to rely on the participants' abilities to recall past processes and events and to express their thoughts completely and coherently.

Findings

Two kinds of information were sought from participants concerning

their image use. The first involved how images were used, and so the work tasks and work products supported by images were examined. The second kind of information concerned why images were used. While the participants' work tasks and work products were examined to answer this question, the focus for this question was the participants' rationale for using images.

Table 2. Processes and products of image use by user group

	Archaeologist	Architect	Art Historian	Artist
Q1: Processes				
Catalog	X			
Cut & paste		X	X	
Download / collect	X	X	X	X
Import into software		X		
Inspiration		X		X
Manipulate		X		X
Model for artwork				X
Print		X		X
Reference	X	X	X	X
Scan (digitize)	X		X	
Q2: Products				
Architectural design / Artworks		X		X
Boards (concept, presentation)		X		
Contractor booklets		X		
Lectures / presentations	X	X	X	
Marketing materials		X		
Renderings		X		
Research / Publications	X		X	

Work Tasks and Work Products

In the larger study, the findings related to image need show that individuals sought out images for particular kinds of work tasks associated with their profession.⁵ The work tasks most closely aligned with the archaeologists and the art historians were teaching, research and publication. For these users images were generally needed to illustrate lectures and scholarly publications. Images were also needed for research,

Image Use Among Artists (pre-print)

the results of which would support their teaching and publication efforts. The architects and artists shared a need for images to develop creative works. These two groups needed images to assist their creative processes, for problem-solving and also for stimulation. The architects were also found to need images to support the presentation and marketing of their architectural projects and for communications concerning their designs.

To investigate the various ways images were used in their work, the participants were asked to provide responses to several survey questions (Q1: Once you have found the images that interest you, what do you typically do with them? and Q2: How do you incorporate images into your work?).⁶ The first question examined the processes involved in using images. The second sought to discover the work products resulting from their image use.

Archaeologists Images used to support teaching figured prominently in the archaeologists' responses, with each participant focusing on digital image processes (downloading, saving and scanning) to prepare lecture presentations. Lectures were typically presented through software (PowerPoint and ARTstor's Offline Image Viewer). However, one individual discussed naming image files with sequential numbers corresponding to her lecture notes and opening each manually as her lecture progressed. One archaeologist-participant noted that in addition to teaching she would use images in her research and publications.

Architects The architect-participants provided more varied responses to the survey questions than the previous group. Their responses to survey question 1 went beyond downloading and saving images and included processes which would prepare digital images for later use (modifying, collecting, printing, and importing into software). Responses to survey question 2 discussed the ways images were used in work products, conceptual design developments, background research, and digital manipulations. The majority of the participants, however, discussed their work products: concept boards, marketing materials, websites, renderings, presentations, and booklets of images used for estimating projects' costs. The variation seen in the architect-participants' responses to the survey questions suggests that this profession's image needs are more complex than those of the other groups in the study.

Art Historians The art historian-participants provided responses to the survey questions similar to those given by the archaeologists. They too focused on downloading, saving and copying processes associated with digital images. While all of the participants in this group mentioned using images in presentations, only half specifically identified classroom use. The majority of the art-historian participants identified PowerPoint as the software used for their presentations, while one participant noted the use of the freeware MDID (Madison Digital Image Database) to project images during her lectures. While images were also used for research and publication among the art historians, only one participant mentioned using images in this context.

Artists The artist-participants provided varied responses to the question of what they did with images and yet they gave similar responses to one another when asked how they incorporated images into their work. The majority of the artists discussed using images to create their own imagery in response to the first question. However, half of the group's participants also gave responses about the processes associated with using digital images (e.g., saving and modifying). Additionally, using images for the information they contained was found in the responses of half of the participants. Thus some participants stated the parts of the images would be "distorted or somehow changed" [Artist 6] and incorporated into their work, while others noted how they would use images "as models for artworks" [Artist 1]. The reason for the more varied responses of the artist-participants to the first survey question is unknown.⁷ Their responses to the second survey question, which asked how images were incorporated into their work, were uniformly focused on the use of images as reference material.

The Functional Role of Images

This section presents the findings concerning why participants used images. The findings here provide answers to the research questions examining the role of images for the participants. The participants' responses to interview questions A and B (A: Can you walk me through how you typically use images? and B: Does your use of images for your own research differ from the ways you might use them in the classroom/in the studio?) were used to gather data to answer this question.⁸ During the interview, when asked to discuss their image use,

Image Use Among Artists (pre-print)

participants typically gave responses concerning their work tasks and, or work products. After discussing their image use in this concrete way, additional questions about why they used images for the task or product just described were asked. For example, if a participant stated images were used for teaching, additional questions were asked to investigate the reason behind using images in teaching. Questions of this nature were clearly more difficult for the participants to respond to, with several continuing to discuss projects and processes even after several attempts by the researcher to elicit their underlying reason(s) for image use.

The thematic analysis of the participants' responses revealed a variety of reasons for the use of images in their work (Table 3). The most often recounted reason given across all participants was developing knowledge and this was followed by using images used as models for developing creative works. Reasons recounted by a moderate number of participants were that images were used for communication, inspiration, and cognitive recall. Additional reasons were given by a limited number of participants and these included critical thinking development, proof, translating verbal information, engaging students, connecting with people, creating emotion, marketing and developing trust.

Table 3. Functional role of images by user group

	Heavy		Moderate			Limited							
	Knowledge	Conceptual Model	Communication	Inspiration	Cognitive Recall	Critical Thinking	Emotion	Engage Audience	Marketing	Proof	Social Connection	Translation	Trust
Archaeologist	4	-	-	-	2	2	-	1	-	2	-	-	-
Architect	4	6	5	3	-	-	1	-	2	-	1	2	1
Art Historian	4	-	1	-	1	2	-	1	-	-	-	-	-
Artist	3	6	1	4	2	-	1	-	-	-	1	-	-
Total	15	12	7	7	5	4	2	2	2	2	2	2	1

N=20

Overall patterns in the data show that using images to develop knowledge was the only reason identified by participants across all of the study's user groups. Several reasons for using images were noted by most participants in a single user group or by a pair of user groups. For example, two uses for images (Conceptual Model and Inspiration) were discussed by the architect- and artist-participants. The majority of the participants in the Architect user group discussed using images to communicate, while single participants in the Art Historian and Artist groups recognized this use. No other major patterns were found in the data. The participants' discussions of why they used images in their work help to clarify the different roles images play in their work. The reasons underlying image use are presented here from those discussed most to least frequently by the participants.

Knowledge Using images to develop knowledge was the reason expressed most often by the study's participants. Discussed by individuals in all user groups, an increase in knowledge was achieved in the participants by examining an image, or an image was used by them to increase understanding among others (e.g., students, clients, co-workers), as this architect so clearly states,

... all those images inform you. Then those images can be used and manipulated to make a presentation. And then that presentation is shown to the client. ... It [the presentation] is for our benefit, so that we can do it. But then it informs the client to what our process was and kind of brings them onboard.
[Architect 4, 997-1006]

Information transferred through images was clearly recognized and appreciated by the majority of the architects. Knowledge held by the clients was considered critical in the design process and images played an important role in drawing this out. In the next passage the clients were shown renderings illustrating a design being developed for a medical facility.

Image Use Among Artists (pre-print)

They [the clients] will say ... For instance in this last proposal that we did there was a coal plant right near it. 'Oh, there is a window?' ... I mean a huge glass wall right in the corner. 'We don't want it.' It is that sort of thing with the client, and you need to respond to that as well, and so it isn't just the design partners saying 'No.' You get multiple inputs into the image and how to change it.

[Architect 6, 671-675]

As this example demonstrates, critical knowledge was exchanged via images among individuals involved in the project.

Numerous topics were discussed by the participants regarding images used to increase knowledge. These ranged from investigating historical events, geographic locations, cultural contexts, styles, people, themes and designs, to various artistic and architectural techniques and processes. While all of the academic user group participants acknowledged the important role of images in their pedagogy, oddly they were the most taciturn in their responses surrounding how they used images to increase knowledge. The few passages that delve a bit deeper into this issue, focused on increasing vocabulary, and awareness of historical or thematic aspects.

I am trying to develop their visual and verbal-textual vocabulary of the particular time period or works that we are looking at.

[Art Historian 1, 355-357]

The architects were more forthcoming about using images to support knowledge construction. Like the academic user groups, the architect-participants also indicated a strong historical interest. Here the participant discussed how he absorbed architectural details during a project's site visit.

You discover these little details and these little compositions of elements and use of materials that just gives you a window into

how they were seeing the world a hundred years ago or seven years ago, and it's fascinating.
[Architect 1, 1442-1445]

This information fostered the project's design development. Beyond addressing the functional needs of a structure, the architects noted they used images to explore the structure's context (historical, social and architectural). In these explorations the architects discussed examining aspects such as the surrounding building styles, heights of facades, commonly employed materials, public transportation facilities, etc. Multiple aspects needed to be considered during the development phase and visiting the site to photograph it for later reference was considered vital.

A subset within the knowledge category was the use of images for problem-solving aims. The arrangement of forms and technical processes were commonly investigated topics, especially among the artist-participants. The artists noted they would accept visual information in any form to find an answer.

It's all about information. It's very utilitarian. It's tool-like for the most part. I mean, I look at paintings just because I like to look at them. They are just nice. But, when I'm in search mode to solve problems, they are all the same. You know, a newspaper ad, an ad in a magazine, a picture from art history, a Post-Impressionist picture. It's all the same. I've got a question. I'm looking to answer it.
[Artist 2, 1485-1490]

The artists commonly discussed using images to better comprehend the characteristics of things and this could apply to any subject.

The above passages indicate that knowledge developed through images was used by the academics for intellectual aims, whereas the creative participants used images to increase their understanding of the visual realm. In addition to seeking out imagery for current projects, participants also noted they gathered images for their later potential

Image Use Among Artists (pre-print)

usefulness.

Conceptual Model The development of ideas surrounding works in-progress was a specific use of images discussed by the Artists and Architects. In this role images served as models for projects. All of the artist- and architect-participants discussed how important images were to the development of their creative ideas. Images were the conceptual backbone for their creations or they had a more supportive role, as this artist states.

Mostly the images that I have are works in progress to serve as either that idea itself or as a compliment [to] whatever concept I am developing.
[Artist 1, 398-401]

In the case of the architect-participants the development process consisted of finding a concept, reflecting upon this to solidify the idea, establishing the design and then realizing the project through increasingly specific imagery. When working through this process, from concept to realization, images were used and created.

I have to work through it internally before I can come up with something that makes sense to take to the client. So it is a matter of taking ideas and working though it all in my head and then making sense of it and then being able to come up with something cohesive and then present the image to the client...
[Architect 2, 787-791]

The development of an idea was discussed by the participants in these groups as being a cyclical process requiring several rounds of image viewing and modification.

It will start out with one of the partners doing a sketch... a hand-drawing... really quick. 'Build this.' And we translate that into a 3-D model and then print it out and show it to him. 'Is

this it?' 'No, no, no, no,' and then he will sketch back over the image we have just printed out. It is very much a back and forth, iterative process.

[Architect 6, 599-602]

As these creative users explain, images were critically useful to the development process of their projects.

Communication The power of images to communicate information was acknowledged by a moderate number of participants from three of the study's four user groups. The archaeologist-participants did not identify the use of images to communicate. While a single individual from the Art Historian and Artist user groups mentioned communication behind their use of images, nearly every architect-participant identified this reason. Communication through images played an important role for the architects and it could range from conveying complex information about design concepts to notifying a community about a project, as was the case below.

It is very good to inform the public. So the client can then, in a press release, use an image that we have given them to go to the newspaper or the local cable TV so people can see what the new school is going to look like.

[Architect 4, 1034-1036]

Images could be used by the artist-participants for communication. All works of art communicate some message, even if only expressing a highly personal view of one individual. Interestingly, only one artist discussed communicating through images. In this case the artist was working abroad with language skills that did not include words to discuss highly technical processes needed to manufacture his artistic works.

Images serve as a communication device because very often I can't explain what I am trying to get at in words...

[Artist 1, 385-386]

Image Use Among Artists (pre-print)

He used images of processes to indicate what work he wanted completed, and through these the artisans identified immediately what they were to accomplish. A single art historian discussed using images to stimulate communication within the classroom.

Inspiration The creative user-participants also mentioned the role images played in stimulating their creative processes. Half of the Architects and most of the Artists discussed using images this way. Generally images were discussed as inspiration in the beginning stages of the creative process.

I usually have a little spark of inspiration or a color combination that I have to make, for some reason. Or shape, that I have to put on something. And then I would look at it, and look at other things like it, and then I would draw on my own.

[Artist 5, 629-634]

In the discussions of images used for inspiration the image(s) played a purely motivational role. This differed from the use of images as Conceptual Models in that images used for Inspiration provided the impetus for creation, rather than idea development.

Cognitive Recall Images were identified as useful to retaining and recalling information by a quarter of the study's participants across three user groups. Half of the archaeologists and one art historian discussed how images solidified abstract information for their students. These participants noted information was more memorable when presented together with strong imagery. One faculty member indicated students often lacked an intellectual grounding in basic facts and so she used images as cognitive hooks for unfamiliar information to help her students.

I show Philip of Macedon. There is his tomb and all this gold stuff... I have friends who have done a reconstruction of his head from the bones found in his tomb. He had one eye at this point, from the siege of Byzantium. All of a sudden [they see] this color image of this guy looking at them... they all

remember that.
[Archaeologist 3, 113-118]

Problems with recalling information were not limited to students, however. Two artist-participants also noted they used images as an *aide-mémoire*. Appearances of things were recorded photographically or through sketches, and the image was then used at a later date.

Once in a while, if it is my own photograph, I will use it pretty much exactly as it is. In that case it is because of the memory problem.
[Artist 6, 497-498]

The remaining categories of image use were discussed by a limited number of participants.

Critical Thinking Half of the academic-participants noted using images to develop students' critical thinking skills. Often this happened as a routine part of the lecture process.

I show the image, and then I ask questions. 'What do you see? What do you think?'
[Art Historian 3, 1120-1121]

These questions were believed to increase students' visual and intellectual interaction with images, which could ultimately lead to a deeper examination and contemplation of the content. A more formal use of images concerning critical thinking was testing students' knowledge.

I will have them explicate the picture. They will have to identify it, give me the title, name, date and place, but also why I am showing them that image.
[Archaeologist 3, 594-596]

Image Use Among Artists (pre-print)

Through this method, the depth of learning achieved by each student was assessed.

Emotion One architect and one artist mentioned using images to create emotion. Although not discussed in detail, it was clear specific images were chosen to “create a mood” [Architect 1, 1410]. Architect 1 discussed how images were used to express a spiritual quality in the design of a parish center. The artist discussed the way she used images for a personal rather than professional purpose. She recalled a case when images were used to create a humorous work.

One year ... I was not going to my class reunion. I have two cousins that I graduated at the same time with from the same school. None of us were going. This was the same year that the Charlie’s Angels movie came out and so I took the Charlie’s Angel image from my daughter’s CD and put our heads on all of those lovely bodies. And I ... sent an 8 by 10 to the reunion stating that we were on a job for Charlie and that we couldn’t make it. So that is how I might use it for humor. They said that they put it out where people registered. They knew us, they definitely knew us. Let me tell ya, we looked better than we ever did.

[Artist 6, 518-527]

Engage Audience One archaeologist and one art historian discussed using images in the classroom to maintain student interest.

It is really the engagement factor. ... I am looking at my notes for the lecture and thinking it has been a while since there has been a [new] image ... I should change it and wake them up.

[Archaeologist 3,108-110]

Images were also used as a means by which students could personally interact with course content.

I try to show the image and start with them. I want to get them engaged. I want to give them enough background information that they can make connections from the image to the history.
[Art Historian 3, 1130-1131]

In this way images were used to focus students' attention on the course concepts being addressed.

Marketing Two architects mentioned using images for marketing. As future work was noted as being dependent on images of already completed projects, discussions of images used by architects for marketing purposes were expected.

At the end of a project we have a professional photographer come in and take pictures of the finished products. ... They go up on the firm's website. They tend to be for marketing.
[Architect 5, 564-570]

Surprisingly, images for marketing were not often noted by the architects. It may be that they understood this need for images, but that their own work tasks did not involve the creation of marketing materials. It is a finding that warrants further research for clarification.

Proof Only participants from the Archaeologist group mentioned using images as evidence to support their research arguments.

I had an idea from this ancient text that I was reading and I thought 'I bet you I can carry this through.' And then, my illustrations are basically illustrating the argument.
[Archaeologist 4, 1148-1150]

When used in this way images required specific characteristics that set them apart from images used in for other purposes.

Image Use Among Artists (pre-print)

For my publication work I need mug shots. ... For me to prove in my publication the date of the object, or it came from this other city, I have to make a very bland case. A measurement kind of thing.

[Archaeologist 3, 625-627]

Images she used in teaching were, by contrast, described as more visually appealing and “artsy.”

Social Connection Two participants, one architect and one artist, recognized the ability to connect to people through images. This could include highly personal and humorous exchanges, as was recounted by one of the artists.

My daughter and I will send images back and forth to each other that are crazy composites ... They can be really funny.

[Artist 6, 511-513]

A desire to connect to people on a personal level was expressed by one of the architects when asked how he used images. He saw them as a means to relate to individuals within the community where his designs would be constructed.

There is no other way that you could show that better... a couple guys sitting in front of the barbershop playing dominos. Having images like that ... that is your community. We all understand images like that. When they talk about a picture is worth a thousand words ... it is worth a million, if used right.

[Architect 4, 1098-1101]

In both of these cases images were used to close a gap that existed in the physical, intellectual, or psychological states of people.

Translation Only the architect-participants discussed using images to translate text-based or verbal information into a visual form. This typically

concerned conceptual ideas expressed by clients in the beginning stages of the design.

Here is me taking the words you used and translating it into something that could be buildable.
[Architect 2, 792-793]

The architect must interpret and translate the client's words into a design that is believed to meet the client's desires. This could be done through images shown to the client, or images used to support a design. The architect would then assess how closely the design met the clients' idea through these images.

Trust A final category of image use, developing trust, was discussed by a single participant. Although similar to connecting people, this image use was so specific that its own category was warranted. The architect-participant recalled using images in a presentation made to community members to gain their support for a school his firm was designing.

That little space between two buildings... some lawn chairs kind of set up there. Oh, there is a tradition in this neighborhood that is important. I want to take a picture of that. Those kinds of images... they relate to people immediately. Oh, you understand my neighborhood. I trust you. You've done the research. You know us.
[Architect 4, 1088-1094]

He conveyed that he cared about and understood the community's needs through images. This passage also notes how important background research is for architects. This relates back to the first category of image use, knowledge development, discussed above. With *Trust* we have come full circle in the analysis of why images were used among the study's participants.

Discussion

Previous studies of the user groups examined here sometimes indicate the tasks these users perform in their professional roles. However, little investigation exists on how images are used within their work tasks or products. This is unfortunate given the amount of time and effort these professions spend finding and preparing images to support their work. As the larger study associated with the current findings discovered that participants' ultimate use of images impacted the specific characteristics of the images they required and selected, a fuller understanding of work tasks and processes is needed.

The findings above clarify how and why images are used among several professions. Two research questions framing the study examined how images were used to support users' work tasks and the work products they produced. The findings revealed that image use varied according to profession. Academic users identified lecture presentations as their primary image use. These users also used images for research and publication purposes. Image use by the creative user groups did not run entirely parallel. While both architects and artists noted using images for research and design-creation activities, their resulting products differed. The architects used images for renderings, presentations, concept boards, contractor booklets and marketing materials, whereas artists noted their use in preparatory studies and their artworks.

A third research question for the study sought to clarify why these professions use images. Several reasons were revealed and these are: Knowledge, Conceptual Model, Inspiration, Cognitive Recall, Critical Thinking, Emotion, Engagement, Marketing, Proof, Social Connection, Translation, and Trust. Several reasons were found across all (Knowledge) or similar user groups (Conceptual Model, Inspiration, Critical Thinking, Emotion, Engage Audience, and Social Connection), or primarily among a single group (Communication, Marketing, Proof, and Translation) or user (Trust). The findings regarding the participants' image use indicate that visual information plays a critical role in their professional lives.

While many of the study's findings are supported by previously conducted research, several notable differences were discovered. Before addressing these specific findings, it is useful to examine how Fidel's model of image use fits with what was discovered. Fidel's model, a

continuum ranging from the Data Pole (images as information) to the Object Pole (images as objects), places the majority of image use cases between the two extremes. In this study participants spoke about images in an information-oriented fashion, even when discussing items created for purely aesthetic reasons. Thus, a painting would provide information for rendering a particular form. While participants appreciated the aesthetic characteristics of images and, or aesthetic objects themselves, their main concern was the information they contained.

Several reasons for image use found in this study, Marketing, Translation and Trust, were not encountered in the literature. As marketing is tied to commercial endeavors it is likely this reason would be found among artistic directors and other advertising-focused communities of image users. Translation, the use of images to render various languages (visual, textual and verbal), is a specific form of communication and so it may be better placed as a subgroup within that category of image use. Finally, Trust, the use of images to develop confidence about a firm, architectural design or person, was not found in the literature. It may be that Trust should be viewed as a subgroup of Proof, as an underlying element of reliability is found in both.

Beyond a lack of discussion in the literature concerning these reasons for image use, several image roles appearing in previous studies were not found. Image uses not discussed by the participants are decorative or aesthetic, patient diagnostics, adding value, and enjoyment. As each of these image uses were discovered in studies with participants from beyond the four included here, the image tasks of these users likely influenced what was found.

Using images for decorative or aesthetic reasons, a use identified by Fidel as falling within the Objects Pole, was found by Connis et al. (2000) and Westman and Oittinen (2006). This reason, to make a space (actual or represented) more attractive, was not discussed among the present study's participants. However, in discussions concerning image selection, they did mention choosing visually appealing images. This suggests that while images were used for particular reasons (e.g., knowledge, emotion, etc.), aesthetics also played a role in their reception and use. An archaeologist-participant's discussion supports this idea, stating that in images used for research she used straightforward imagery while those for teaching were more "artsy". This suggests that images used for specific

purposes must lack or possess aesthetic qualities.

Patient diagnostics, a use identified by Fidel as falling within the Data Pole, was found by Müller et al. (2006) in their study of individuals within the medical domain and by Pailing et al. (2008) in their study of dental faculty. Connis et al. (2000) also recognized this use of images within their Information Processing category in their VISOR I study. Although participants in the current study did not discuss reviewing images to analyze patients' health status, they did analyze information contained within images to answer unclear aspects in their minds, or those of their students, co-workers, or clients. This analysis of visual information to answer a question fits within the image use role Knowledge as defined in this study. While developing knowledge through images seems particularly fitting in the case of patient diagnostics, how Knowledge uses compare to this category would benefit from additional clarification.

An additional image use category not directly mentioned in the study is the increased value of work products with accompanying visual content. Westman and Oittinen (2006) report that journalistic images offered additional "value by bringing a new dimension (aesthetical or informational) to text," (p. 105). Participants in the current study did note, however, that images provided information or affective content that supported their work. For example, as was noted by Architect 1 in the category Emotion above, images were used to support the spiritual quality of a parish center design. The academic users, too, noted that images provided visual support to the arguments they made in their writing. This form of use was acknowledged in the Knowledge and Proof categories. Further research is needed to determine whether this image role is an additional kind of use, or if it falls within one of the categories described in the framework.

Enjoyment, another role of images absent from the current study, was noted by Mowat (2002) in her examination of an academic image library. While not identifying their own enjoyment as a form of image use, several participants acknowledged the enjoyment they experienced when viewing images. For example, as Artist 2 discussed using images for their information he added, "I look at paintings just because I like to look at them. They are just nice," [1486-1487]. It may be that image viewing for enjoyment was not perceived as a reason for image use, or that this form

of use was seen as trivial. The reason behind its omission is an intriguing finding which should be investigated.

Chew et al. (2010) report that in some cases individuals accessed images “to facilitate other activities” (p. 107). Images were sought to help individuals move toward resolving a particular goal and is identified as Image Access as Secondary Goals. Among this category of use these researchers place searches for items facilitated by images (e.g., recipes, particular versions of a bible), images used to provide geographical grounding (e.g., navigational aids), and images as indexes (e.g., visual lists and grids) which facilitate browsing. In each kind of image use they describe it is the information contained within the image that allows the individual to answer a particular question and achieve their goal. Each of these cases appears to fit within the functional role of Knowledge.

The limited literature addressing the reasons behind the use of images is noteworthy. Of the studies that discuss how images are used, the overwhelming majority acknowledge the important role that images play in knowledge development. If Frietas and Castanheira (2007) are correct in their belief that some information can only be learned visually, what impact should this have on information professionals? Information transmitted through visual means has not experienced the research interest or disciplinary importance on par with information conveyed in a textual form. Images continue to have negative connotations associated with them and instead of focusing on the positive and unique qualities provided by visual information, images are often noted as being problematic, time-consuming to process, prone to technical difficulties, untrustworthy, etc. Hopefully this study has shown that visual information is essential to particular kinds of users, needs and activities. While images present unique challenges, the wealth of information they contain means that facilitating their use has the potential to produce great dividends.

Closing

As this study discovered that the development of knowledge is a primary use of images, additional research into how to best support users in finding, accessing, assessing and interacting with images is needed. From

Image Use Among Artists (pre-print)

the current state of system development for images it is clear that interactions with visual content are in a modest state of development and that this area warrants further research. Creative explorations in the area of system development for image content should be encouraged. For example, systems supporting user interactions which identify and visualize relationships to associated content via time, place, individual or documentary evidence would provide users additional means of discovery and analysis. Content-based image indexing abilities too should be incorporated into image systems as they offer an additional means of exploring image collections. At the very least, content-based image indexing would help users cope with the overwhelming number of images returned when dealing with particularly well represented monuments in a collection. By automatically sorting and grouping images based on their visual similarities users' experiences when browsing returns could be improved.

Particular issues are unique to image collections, their management and systems. Yet, basic facts such as the need for high quality, well-described images among users, continue to be overlooked. The technological dependencies of images for their exchange and display are important issues tied to their ultimate use and these too are not well acknowledged. Downloading, exchanging, manipulating, managing, displaying and archiving digital images are technical challenges that professional image users face in their work. Means of alleviating these issues through user-focused guides, instructional / support staff and system features would be useful. Additionally, the kinds and levels of task support needed by image users are not well explored. An individual needing to merely identify a particular object through an image requires a very different set of image parameters than a situation where an image is needed for publication. These basic issues are essentially untreated in the literature and so there is nearly complete gap in our knowledge of how these aspects impact image users' behaviors. Hopefully, analyses of how and why individuals use images will help develop systems and tools that are better able to meet the challenges presented by visual information.

While research has focused on identifying and describing visual features and indexing terms used in the image retrieval process, clearly there are additional issues of interest concerning visual information. While, as Bates (1998) states, information retrieval is a critically important

issue, aspects surrounding the use of information also need to be acknowledged and addressed. Due to the visual nature of images, aspects surrounding use are markedly different than those of textual materials. The library and information science community has only recently begun to address visual information, and while there have been many successful forays into discerning the phenomena surrounding image retrieval, research to date has failed to adequately address image users' needs and how or why images are being used. Thus this study was undertaken to provide a richer understanding of the varied reasons behind why images are used by several user groups. It is hoped that this increased understanding will inform the practices, services and systems that benefit image users.

References

- Bakewell, E., Beeman, W., Reese, C. and Schmitt, M., (Ed.), (1988), *Object, Image, Inquiry: The Art Historian at Work*, Getty Art History Information Program, Santa Monica, CA.
- Bates, M. (1998), "Indexing and access for digital libraries and the Internet: database and domain factors", *Journal of the American Society for Information Science and Technology*, Vol. 49 No. 13, pp. 1185-1205.
- Beaudoin, J.E. (2009), *An investigation of image users across professions: a framework of their image needs, retrieval and use*, Doctoral dissertation, Drexel University, Philadelphia, PA, available at: http://idea.library.drexel.edu/bitstream/1860/3160/1/Beaudoin_Joan.pdf (accessed August 27, 2012).
- Bradfield, V. (1976), *Slide Collections: A User Requirements Survey*, British Library Research & Development Report 5309, Leicester Polytechnic, Leicester, UK.
- Brilliant, R. (1988), "How an art historian connects art objects and information", *Library Trends*, Vol. 37 No. 2, pp. 120-129.
- Brockman, W., Neumann, L., Palmer, C. and Tidline, T. (2001), *Scholarly Work in the Humanities and the Evolving Information Environment*. Digital Library Federation and Council on Library and Information Resources, Washington, DC, available at: <http://www.clir.org/pubs/reports/pub104/pub104.pdf> (accessed on November 29, 2012).
- Burke, P. (2001), *Eyewitnessing: The Uses of Images as Historical Evidence*,

Image Use Among Artists (pre-print)

- Cornell University Press, Ithaca, NY.
- Challener, J. (1999). Information-Seeking Behavior of Professors of Art History and Studio Art. Master's Thesis, Kent State University, Kent, OH.
- Chew, B., Rode, J.A. and Sellen, A. (2010), "Understanding the everyday use of images on the web", In *NordiCHI 2010, Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries, October 16-20, 2010, Reykjavik, Iceland*, Association for Computing Machinery, New York, NY, pp. 102-111.
- Chidlow, J. (1991), "The information needs of architectural practices", *Art Libraries Journal*, Vol. 16 No. 3, pp. 18-24.
- Choi, Y. and Rasmussen, E.M. (2003), "Searching for images: The analysis of users' queries for image retrieval in American history", *Journal of the American Society for Information Science and Technology*, Vol. 54 No. 6, pp. 498-511.
- Chung, E. and Yoon, J. (2011), "Image needs in the context of image use: an exploratory study", *Journal of Information Science*, Vol. 37 No. 2, pp. 163-177.
- Cobbedick, S. (1996), "The information-seeking behaviors of artists: exploratory interviews", *The Library Quarterly*, Vol. 66 No. 4, pp. 343-372.
- Conniss, L., Ashford, J. and Graham, M. (2000), *Information Seeking Behavior in Image Retrieval: VISOR I Final Report*, Library and Information Commission Research Report 95, Institute for Image Data Research, University of Northumbria at Newcastle, Newcastle, UK.
- Eklund, P., Lindh, M., Maceviviute, E. and Wilson, T. (2006), "EURIDICE project: The evaluation of *image* database use in online learning", *Education for Information*, Vol. 24 No. 4, pp. 177-192.
- Etzi, J. (2004, 2nd ed.), *A Guide for Dissertations Using Phenomenology in Psychology*, Author, Immaculata, PA.
- Fidel, R. (1997), "Image retrieval task: Implications for the design and evaluation of image databases," *The New Review of Hypermedia and Multimedia*, Vol. 3, pp. 181-199.
- Frank, P. (1999), "Student artists in the library: An investigation of how they use general academic libraries for their creative needs", *Journal of Academic Librarianship*, Vol. 25 No. 6, pp. 445-455.
- Freitas, C.A. and Castanheira, M.L. (2007), "Talked images: examining the

- contextualized nature of image use", *Pedagogies: An International Journal*, Vol. 2 No. 3, pp. 151-164.
- Garber, S.R. and Grunes, M.B. (1992), "The art of search: A study of art directors", in Bauersfeld, P., Bennett, J. and Lynch, G. (Eds.), *CHI '92, Conference Proceedings of Human Factors in Computing Systems*, Association of Computing Machinery, New York, NY, pp. 157-173.
- Glaser, B. and Strauss, A. (1967), *The Discovery of Grounded Theory: Strategies For Qualitative Research*, Aldine de Gruyter, Hawthorne, NY.
- Guba, E. (1981), "Criteria for assessing the trustworthiness of naturalistic inquiries", *Educational Communication and Technology Journal*, Vol. 29 No. 2, pp. 75-91.
- Harris, V. and Hepburn, P. (2012), "Trends in image use by historians and the implications for librarians and archivists", *College and Research Libraries*, pre-print available at: <http://crl.acrl.org/content/early/2012/04/05/crl-345.full.pdf+html> (accessed on August 27, 2012).
- Hemmig, W. (2009), "An empirical study of the information-seeking behavior of practicing visual artists", *Journal of Documentation*, Vol. 65 No. 4, pp. 682-703.
- Hemmig, W. (2008), "The information-seeking behavior of visual artists: a literature review", *Journal of Documentation*, Vol. 64 No. 3, pp. 343-362.
- Huvila, I. (2009), "Analytic information horizon maps," *Library and Information Science Research*, Vol. 31 No. 1, pp. 18-28.
- Mason, H. and Robinson, L. (2011), "The information-related behaviour of emerging artists and designers: Inspiration and guidance for new practitioners", *Journal of Documentation*, Vol. 67 No. 1, pp. 159 - 180.
- McCay-Peet, L. and Toms, E. (2009), "Image use within the work task model: images as information and illustration", *Journal of the American Society for Information Science and Technology*, Vol. 60 No. 12, pp. 2416-2429.
- Miles, M. and Huberman, A. (1994, 2nd ed.), *Qualitative Data Analysis: An Expanded Sourcebook*, Sage Publications, Thousand Oaks, CA.
- Mowat, E. (2002), "Teaching and learning with images", *Vine*, Vol. 32 No. 3, pp. 5-15.
- Müller, H., Despont-Gros, C., Hersh, W., Jensen, J., Lovis, C. and Geissbuhler, A. (2006), "Health care professionals' image use and search behaviour", in Hasman, A., Haux, R., van der Lei, J., De Clercq, E. and Roger France, F.H. (Eds.) *Proceedings of Medical*

Image Use Among Artists (pre-print)

- Informatics Europe 2006, Maastricht, The Netherlands*, pp. 24-32.
Available at:
http://www.sim.hcuge.ch/medgift/publications/MIE2006_Mueller.pdf
(accessed on August 27, 2012).
- Nilsen, M. (1986), "Client-centered services in a branch library", *Art Documentation*, Vol. 5 No. 4, pp. 151-153.
- Pacey, P. (1982), "How art students use libraries – if they do", *Art Libraries Journal*, Vol. 7 No. 1, pp. 33-38.
- Paling, S.W., Miszkiewicz, M.J., Abbas, J. and Zambon, J.J. (2008), "A model for assessing digital image use and needs", *Library Resources and Technical Services*, Vol. 52 No. 3, pp. 173-183.
- Patton, M. (2002), *Qualitative Research and Evaluation Methods*. Sage Publications, Thousand Oaks, CA.
- Pisciotta, H. and Copeland, A. (2003), "Assessing user needs for an image delivery system," in Thompson, H.A. (Ed.), *Learning to Make a Difference: Association of College and Research Libraries Eleventh National Conference, April 10-13, 2003, Charlotte, North Carolina*, Association of College and Research Libraries, Chicago, IL, available at: <http://www.ala.org/acrl/sites/ala.org.acrl/files/content/conferences/pdf/copeland.PDF> (accessed on August 27, 2012).
- Poole, H. (1985). *Theories of the Middle Range*. Ablex Publishing Corporation, Norwood, NJ.
- Promey, S. (1998), "Digital images in the art history classroom: Personal reflections", in McClung, P. and Stephenson, C. (Eds.), *Images online: Perspectives on the Museum Educational Site Licensing Project*, Getty Information Institute, Los Angeles, CA, pp. 13-22.
- Sklar, H. (1995), "Why make images available online: User perspectives", in McClung, P. (Ed.) *RLG Digital Image Access Project: Proceedings from an RLG Symposium Held March 31 and April 1, 1995, Palo Alto, California*. Research Libraries Group, Mountain View, CA, pp. 11-18.
- Spradley, J. (1979), *The Ethnographic Interview*, Harcourt Brace, Fort Worth, TX.
- Stam, D. (1993), "What do art information professionals want to learn about information technology and how do they want to learn it?", *Art Documentation*, Vol. 12 No. 1, pp. 3-5.
- Toyne, D. (1977), "A philosophy for Falmouth", *Art Libraries Journal*, Vol. 11 No. 3, pp. 11-12.
- Vogt, W. (2005, 3rd ed.), *Dictionary of Statistics and Methodology: A*

Nontechnical Guide for the Social Sciences, Sage, Thousand Oaks, CA.

Wang, P. (1999), "Methodologies and methods for user behavioral research", *Annual Review of Information Science and Technology*, Vol. 34, pp. 53-99.

Westman, S. and Oittinen, P. (2006), "Image retrieval by end-users and intermediaries in a journalistic work context", in *Proceedings of the First International Conference on Information Interaction in Context*, Association of Computing Machinery, New York, NY, pp. 102-110.

APPENDIX A: Data Collection Instrument – Survey

1. With which group do you identify most closely? (Chose one.)
Archaeologist architect art historian artist

2. How many years have you been associated with this group you identify?

3. What work tasks do you complete with images?

4. What types of images do you usually find yourself needing? (For example, images of pottery, cornices, Degas' pastel drawings, etc.)

5. Approximately, how often do you find yourself needing images? (Chose one.)
Daily Weekly Monthly Other (please specify)

6. If you had to name one specific image resource as your favorite, what would it be?

7. What types of resources do you use to find images? (Please rank in order of importance, using 1 as most frequently used to 5, least frequently used.)
Books
Image libraires (analog collections-slides, photographs, etc.)
Image database(s)
Personal collection
Web site(s)
Other(s) (please specify)

8. Please describe briefly how you go about looking for images when you are using your favorite resource.
9. Once you have found the images that interest you, what do you typically do with them?
10. How do you incorporate images into your work?
11. Which tools and technologies do you use to work with your images?

APPENDIX B: Data Collection Instrument – Interview Guide

Greetings – do this off tape. Give date and time at start of recording.

Ethnographic explanations – several discussions about the project have taken place prior to the interview meeting. An in-depth and detailed account does not need to be given.

The following need to be re-stated:

Project explanations – the project focuses on the participant's image experiences and how images are found.

Question explanations – do this alongside questions when warranted. State at outset the participant should feel free to discuss anything that parallels the general topic of the project.

Recording explanations – mention that the study is confidential and that participant's identity will be protected.

Interview Questions

TRANSITION: I will begin by asking you some general questions about your work and your background. Then I will ask you a series of questions about why you need images and how you go about finding them. The study is trying to gain a better understanding of users of images and so you should feel free to discuss anything that comes to mind in response to the questions asked.

1. Can you tell me a little about your educational background?
2. Could you please tell me what type of work you perform and what your specific interests are in the field you work in?
3. Can you tell me a little bit about why you need and use images in your work?

TRANSITION: Think back to the last time you needed an image or images.

4. Could you please describe for me what you were working on when you needed the image or images? **PROBE (if not discussed):**

Can you talk about the task you were working on? Why did you need an image or images in this instance?

5. What image or images were you looking for the last time you needed to locate an image for something you were working on? About how long ago was this?
6. How did you go about finding what you were looking for (in other words did you search for the image using a specific word or name, did you look for the image under a general heading, or ...)?
7. What resources did you use to find the image or images (did you use personal or library materials and were the images found in books, databases, photographic collections, or ...)?
8. Were you able to find what you were looking for? **PROMPT:** What about if there were a system available where you could search on things like color and shape? Do you think you might use this sort of system to find images?
9. If you think back to other times you have needed images how typical was this image need? **PROBE (if it wasn't highly typical):** Can you give me examples of more typical situations?

TRANSITION: Now I will ask you some more general questions about how you go about finding images.

10. Where do you typically go to find your images and when does this occur? In other words, where do you look for images and do you generally do this as the need arises, on a set schedule, or so on?
11. How do you find an image of a work you know about? In other words, if you were looking for a work you knew of and you knew the title, date, name of the creator, media or some combination of these, how would you generally try to find the image?
12. How would you find an image of a work that was unknown to you? In other words, if you were looking for a work you had seen or had been told existed, can you describe how you might find that image?

Image Use Among Artists (pre-print)

13. Now I would like you to think back to the last time you had difficulty finding an image, or were unable to find an image. Can you take me through the steps you went through in trying to find the image? What barriers prevented you from finding the image? Were you ultimately successful? Why or why not?
14. Can you walk me through how you typically select the images you use from the images you are able to find? **PROMPT:** for instance, do you look for images in color over black and white, aesthetic or historical views?
15. Can you list the technologies and formats you currently use for your image needs? In other words do you use 35mm slides, digital images, still photography and so on, and what systems are in place to support these? **PROMPT:** are there others?

Are you saving your image files to CDs, flash drives or external drives for an extra back-up. Do you back-up your image files? If you do, how?

Also, I was curious as to whether or not you might know of or use an electronic archive / repository on campus (or elsewhere) for your images? Do you see the images you have amassed as having enough value (however you want to define that) to warrant placement in an archive / repository?
16. Do the methods you employ to find images in these various formats different from one another? If they do, how and why?
17. Can you walk me though how you typically use images (in the classroom/in the studio)?
18. Does your use of images for your own research differ from the ways you might use them (in the classroom/in the studio)? If yes, how do you use images for that? (**NOTE re: RESEARCH:** Although research for archaeologist and the art historian user groups has more formal connotations, I believe the architect and artist user groups perform image research to develop their visual vocabulary.)

19. In your experience, are the currently available tools adequate for finding and using images? In your opinion, what would improve your ability to work with images?
20. Is there anything else you think I should know about your image needs, how you search for images, or your use of image for your work? Is there anything else you would like to discuss surrounding images?

Thanking and taking leave – thank subject for participating and stop the tape.

Appendix C: Member Check Interview Guide

Thank participant for taking time to speak with me about what was found.

1. Did you find any of the content of the summary noteworthy or perplexing?
2. Did you find any of the information contained in the summary a shock?
3. Was there anything in the summary that you feel was inaccurate and should be changed?

If yes - Could you please explain what you feel are the inaccuracies?

4. Were there any areas in the summary you felt did not fully explain your work with images?
5. In the section on themes which discussed positive and negative aspects of working with images, are there additional items that should be added or removed?
6. Is there anything about you work with images that you feel needs to be added to the summary?

Thanking and taking leave. Again, thank the participant for taking part in the study.

End Notes

¹ For a discussion of the use of frameworks for the development of higher level theoretical constructs see Poole (1985).

² It should be noted that the study's questionnaire provided a list of sources to be ranked by the participant and gave them the option of identifying and ranking an "other" response. Some of the questions provided more visual response entries than others and so it is unclear what influence the variation in entries had on the findings of Hemmig's study.

³ As the reasons for image use were not mutually exclusive, the survey's respondents were able to identify multiple circumstances behind their image usage. It should also be mentioned here that the survey of dental educators allowed the respondents to give their own reasons but these responses are not reported.

⁴ The study was originally designed to include data collected through observations of participants' work routines, however, it was determined that the image seeking routines of artists were too random to be effectively recorded.

⁵ See in particular the results presented in the chapter on image needs in Beaudoin (2009).

⁶ The identifying labels for the questions were changed for clarity. These questions were numbered 9 (Q1) and 10 (Q2) in the original survey instrument.

⁷ It is possible that the divergent responses reflect the varied image formats they used in their work. The artists were found to be the most dependent on analog materials. See the chapter on image retrieval in Beaudoin (2009) for a discussion of the resources used by artists and how these were found to differ from those of the other participant groups.

⁸ The identifying labels provided for these questions have been changed for clarity. These research questions were numbered 17 (A) and 18 (B) in the original interview instrument.