

Visual Literacy in Practice: Use of Images in Students' Academic Work

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Digital technology has changed the way in which students use visual materials in academic work and has increased the importance of visual literacy skills. This paper reports the findings of a research project examining undergraduate and graduate students' visual literacy skills and use of images in the context of academic work. The study explored types of visual resources used, the role that images play in academic papers and presentations, and the ways students select, evaluate, and process images. The findings of the study indicate that students lack skills in selecting, evaluating, and using images. Students use a range of visual resources in their presentations but rarely use images in papers.

Introduction

“Because we're flooded with images and they're so available. You can copy and paste them in a second, you can throw it on your Facebook wall and nobody's stopping you” (Participant M, Interview).

Digital technology has facilitated an unprecedented growth of information and increased the availability of digital images and other nontextual formats. The web, social media, and mobile technology have contributed to the ease of viewing and sharing images on a global scale. This digital transformation is not only associated with the proliferation of information resources, but also with the increasing importance of the image as a mode of knowledge representation.¹ Image users are no longer only viewers, but are also creators of and active contributors to visual communication. These factors have dramatically changed the ways in which students use information resources and present their academic work. In the academic environment, which has traditionally been dominated by text, the influx of visual resources has sparked a

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debate about the place of the image in university education.² James Elkins calls for images to become central to student education and for literacy that “can be achieved through images as well as texts and numbers.”³

Visual literacy emerges as a set of essential competencies for contemporary learners.⁴ Being surrounded by visual media does not necessarily mean that students know how to find appropriate images, understand their meaning and cultural context, or integrate them into academic work. Many scholars recognize visual literacy as an important but often overlooked issue in higher education and advocate for teaching it alongside critical reading and other literacies.⁵ The Association of College and Research Libraries (ACRL) proposed a set of standards for visual literacy competency for higher education.⁶ The intent of this paper is to shift attention to the world of practice and to report students’ perspectives on the use of images in academic work. Its authors report the findings of an empirical study that investigated visual literacy skills in the context of use. The purpose of this research is to contribute qualitative data to the visual literacy discourse and to inform instruction in higher education.

Literature Review

The concept of visual literacy has been discussed in research literature since the late 1960s. The early definitions of visual literacy were formulated in the predigital era and coexisted with other literacy types, though they often remained on the margins of the discourse about literacy in higher education. The early understanding of visual literacy often overlapped with media literacy and referred to competencies in using and interpreting a variety of visual resources, including still images, photography, film, video, and mass media.⁷ According to Paul Messaris, visual literacy refers to the comprehension of any type of visual media, the awareness of visual manipulation, and aesthetic appreciation.⁸

The emphasis of early definitions was placed on visual cognition and perception, highlighting the processes involved in understanding and interpreting resources constructed in the visual mode.⁹ Skills in creating or manipulating images were generally not discussed, since visual design was considered a domain of artists and craftsmen. David Considine was an exception in this regard. One of the few scholars that included proficiencies in creating images in his definition, Considine emphasized that “visually literate students should be able to produce and interpret visual messages.”¹⁰

The shift toward understanding visual literacy as a multidimensional concept has been evident in research literature since late 2000s,¹¹ at which point certain authors acknowledged a transformative impact of digital technology that not only increased the relevance of visual literacy, but also connected it to image production and communication tools. Anne Morgan Spalter and Andries van Dam proposed a definition of digital visual literacy that encompasses abilities in evaluating and interpreting images as well as skills in producing effective visual communications.¹² In the *Visual Literacy Competency Standards for Higher Education*, visual literacy is defined as “a set of abilities that enables an individual to effectively find, interpret, evaluate, use, and create images and visual media.”¹³ This multifaceted definition was used in the current study to guide research design and to investigate students’ abilities in understanding visual content as well as their skills in selecting, evaluating, and using images.

The Visual Literacy Competency Standards for Higher Education provide a foundation for teaching visual literacy at the college level. The standards identify seven areas of competencies for visually literate individuals, including needs assessment and skills in finding, interpreting,

evaluating, and using images. Design and creation of meaningful images and visual media features prominently as a separate standard. The framework also outlines a standard for the understanding of ethical, legal, and social issues surrounding image creation and use.¹⁴ The ACRL *Visual Literacy Competency Standards* are based on the *Information Literacy Competency Standards*, originally approved in 2000 and rescinded by the ACRL Board of Directors in 2016.¹⁵ The new *Framework for Information Literacy for Higher Education (Framework)*, approved in 2016, reflects the changing higher education environment and emphasizes a greater role of students in creating knowledge.¹⁶

Research on visual literacy in higher education emphasizes the need to teach visual literacy across disciplines and embed it into core curricula.¹⁷ In a recent publication, Michelle D. Ervine notes that, despite many efforts, higher education has not fully embraced visual literacy. She emphasizes the importance of integrating visual literacy into instructional design programs.¹⁸ Barbara Blummer identifies five categories of strategies for teaching visual literacy at academic institutions and includes a variety of instructional scaffolds aimed at supporting students in developing visual literacy skills.¹⁹ Case studies provide insight into faculty instructional designs and include examples of embedded activities or seminars designed specifically to develop students' visual literacy skills.²⁰ Joan E. Beaudoin discusses teaching skills in interpreting and analyzing historical images to students in the library and information science (LIS) program.²¹

Academic libraries are involved in promoting and teaching visual literacy through a variety of strategies, from one-shot library sessions to course-integrated instruction. Visual literacy intersects with information literacy, which has traditionally emphasized skills in selecting and evaluating resources. Benjamin R. Harris advocates for the integration of visual literacy and information literacy instruction and offers a number of practical suggestions for incorporating visual literacy into library sessions.²² Molly J. Schoen discusses a range of skills that can be taught in one-shot library instruction sessions, such as finding trustworthy sources, evaluating the content and quality of images, examining manipulated images, understanding the implications of copyright, storing digital images, and managing citations.²³

Research evaluating students' visual literacy skills is still limited, though some classroom case studies include assessment components.²⁴ Two empirical studies examine the visual literacy of college students while also conceptualizing the students as "digital natives," a popular notion originally proposed by Marc Prensky. The "digital natives" argument posits that a younger generation of students—those who grew up with digital technology—have strong digital skills and prefer images over text.²⁵ Eva Brumberger examined this assumption by conducting a survey of college students and testing their skills in interpreting images and in producing visual communications. She found students' visual literacy inadequate and concluded that "exposure to visual information does not necessarily lead to visual literacy."²⁶ Richard Emanuel and Siu Challons-Lipton took another look at visual skills of digital natives in a research survey and found that students lack skills in identifying images.²⁷

The research examining the use of digital images in an academic environment is relatively new and often multidisciplinary. Researchers in the LIS field tend to focus on students' image-seeking behavior rather than image use.²⁸ Studies have found that students begin their searches on Google Image or Web, conduct short queries, and rarely check the originating sites of images.²⁹ In Youngok Choi's study, 87 percent of students used Google to locate images, and only 12.7 percent connected to a specific site. Sixty percent of the students in the sample reported conducting image search for academic tasks, such as designing a PowerPoint

presentation or writing a report.³⁰ The participants considered several evaluation criteria, with reliability identified as a critical relevance factor in determining image usefulness.³¹

Some research projects investigate faculty use of images for teaching purposes. These studies note the increasing availability of images on college campuses and faculty interest in teaching with visual materials.³² The faculty surveyed in David Green's study reported using images in 83 percent of courses.³³ Mary Kandiuk and Aaron Lupton examined instruction and note that faculty use more varied sources of images, though they also rely quite heavily on Google Images search.³⁴ Empirical studies exploring image and multimedia use in the classroom environment indicate that visual resources improve students' engagement and enhance student learning through multiple sensory modalities.³⁵

There is, however, limited research on students' use of images and visual literacy skills and competencies. This study builds on the prior research but also expands it beyond the image-seeking phase and focuses on visual literacy skills in the context of image use in academic papers and presentations.

Methodology

The purpose of this study was to examine university students' visual literacy skills and use of images in the context of actual academic work. The study aimed to explore the types of visual resources being used in students' academic papers and presentations and the ways in which students select, evaluate, and process images. The following questions guided the research inquiry:

RQ1: What types of visual resources do students use and what role do these resources play in their academic work and learning process?

RQ2: What are students' skills and competencies in analyzing and evaluating images and their sources? What is students' understanding of ethical and legal issues surrounding the use of images?

RQ3: What are students' information practices in regard to selecting, creating, organizing, and processing of visual resources used in their academic work?

This study was exploratory in nature and adopted a Consensual Qualitative Research (CQR) approach for data collection and analysis. CQR is a method developed in the field of psychology and designed to address some limitations of qualitative research, such as the subjectivity in collecting and analyzing data by a solo researcher.³⁶ CQR uses multiple researchers, emphasizes rigor in data analysis, and strives for reaching consensus between research team members in analyzing and interpreting data.³⁷

The research team for this study consisted of four members and included a LIS faculty member, two academic librarians, and a LIS graduate student. The principal investigator consulted with researchers in counseling psychology who used CQR in their studies, and the team examined several publications that described the implementation of the method.³⁸

To explore potential biases that may affect interpretation of the data, all team members discussed their background, experiences with image use in academic work, and perceptions

about students' information practices. One of the researchers acknowledged that her background in art history influenced the value she placed on visual materials as information sources. The principal investigator discussed her prior research on the use of visual resources and her beliefs about the role of images in student learning. Another researcher noted that her experiences as a recent graduate student and as a teacher of a credit-bearing information literacy class influenced her beliefs about students' practices in image use. The fourth researcher recognized that, as a currently enrolled graduate student, much of his perspective on the topic was informed by his personal experience in using images in academic papers and presentations.

Data Collection

For the purpose of this study, the researchers collected students' papers and presentations and conducted interviews with 15 undergraduate and graduate students. Participants were selected for interviews upon submitting samples of their academic work with images. Data were collected between April and June 2016. The data collection techniques included:

- *Questionnaires* to gather demographic data and information about participants' understanding of visual literacy (see appendix A).
- *Visual evidence*: student papers and presentations with images were collected for discussions during interviews and for further content analysis. Four papers and 28 PowerPoint presentations were collected for this study.
- *Interviews* provided qualitative data on students' needs, image-seeking behavior, and visual literacy skills and competencies. A semistructured protocol was used during the interviews (see appendix B). The interviews were conducted in person with two members of the research team present. Interviews were recorded and transcribed.

The study employed a purposeful sampling strategy. It was conducted at a private, mid-sized university in the United States with a large graduate student population. Participants were recruited with flyers posted around campus. Submitting a paper or a presentation with images was a requirement to participate in the study. The sample size consisted of 15 participants, including seven undergraduate and eight graduate students. Ten participants identified themselves as female and five as male. Their age ranged from 18 to 31. They represented a cross section of programs in the humanities, social sciences, and sciences. Table 1 provides a summary of the participants' backgrounds.

Student Status	No. of Students	Programs
Undergraduate	7	Art History, Biology, Ecology, English, Environmental Science, Finance
Graduate	8	Economics, Information and Communication Technology, Marketing, Professional Psychology, Research Methods and Statistics, Social Work
Total	15	

Data Analysis

This study employed Consensual Qualitative Research (CQR) for data analysis. The CQR approach requires a team effort and it includes three steps:

1. Coding data into domains for each participant/case.

2. Constructing core concepts and writing summaries for each participant/case within the domain.
3. Developing categories and conducting cross case-analysis.³⁹

Three members of the research team were actively involved in coding the data, while the fourth member served as an auditor who reviewed the data during different stages of coding and analysis. To address the power imbalance inherent in collaborative work and to avoid “group-think,” the researchers worked on coding of the domains independently except for the first few interviews, which were used to agree on the specific meanings of each code using examples from the transcripts. Once practices for coding were agreed upon, the team coded independently and then met regularly to discuss the domains, reach agreement, and refine the codes.

Domains represent primary topics that are developed based on questions, interview protocol, and themes that emerge from data.⁴⁰ As the first coding step in this study, a preliminary list of domains was created based on the primary interview questions and a review of student papers and presentations. The first few interviews were coded during team meetings, and the initial list was revised. Next, all interviews were coded systematically using the established domain list. The following domains were identified in this study:

- Designing presentations and papers
- Ethical and legal aspects of image use
- Image selection and evaluation
- Image use in papers and presentations
- Motivation to use images
- Practices in processing images
- Prior experience studying or working with images
- Role of images

During the second step of CQR—when the summaries and core ideas were constructed—each researcher read the data coded by domain for each participant and wrote summaries independently. The intention of creating summaries was to capture the essence of the participants’ statements and behaviors.⁴¹ The summaries then were reviewed by the team and an auditor. Finally, cross-case analysis was conducted by identifying categories within domains and examining their frequency across all cases. The process of developing core categories involved conceptualizing and organizing the main themes within a domain. Core categories for each domain and cross-case examination were recorded separately in Excel spreadsheets by individual researchers and reviewed by the team. The number of categories per domain ranges from seven in “Practices in processing images” to 13 in “Role of images.” Appendix C provides an example of the core categories identified for the “Role of images” domain.

Following the updated version of CQR, the team used four types of categories in cross-case analysis, including the following:

- General: apply to all cases;
- Typical: apply to at least half of the cases;
- Variant: apply to at least 3 but less than half;
- Rare: apply to 1–3 cases.⁴²

Analyzing data by categories is a final step in data analysis and allows for identifying patterns and representativeness of themes across all participants. The use of Rare category in this study represents a slight departure from the recommendations of the CQR original authors because of the number of participants, the nature of the study, and additional sources of data.

In the updated version of CQR, Hill et al. recommend using the fourth category “Rare” for studies involving more than 15 participants.⁴³ This study was conducted with 15 participants but in a different discipline than psychology, and, unlike most CQR studies, it included rich documentary evidence. In addition to interview data, this study examined students’ papers and presentations in cross-case analysis. The team members decided to report the Rare cases to provide differentiation among categories and to demonstrate student behavior from both ends of the spectrum. The Rare categories captured instances of exceptional literacy practices as well as cases of carelessness. For example, in the domain “Image selection and evaluation,” the categories “Considers source information” and “Ignores source information” were identified as rare but were both important to interpreting student information practices.

In addition, the Rare category allowed the team members to address the issue of extreme cases that stood out and could potentially lead to some bias in interpretation. During the initial interviews and team meetings, students’ misuse of images was emerging as a striking theme. However, upon analyzing the category across cases, we found out that this behavior was not as prevalent as we initially expected.

Findings

The results are based on the analysis of three sources of data: questionnaire responses, student papers and presentations, and interviews. The questionnaire responses indicate that participating students received limited instruction in visual literacy. One student in the sample participated in a library workshop where the selection of visual resources was discussed. Seven students mentioned having some classroom instruction in selecting and evaluating images. Nine students reported using image processing software, such as Adobe Photoshop, Adobe Illustrator, or iPhoto. Their skills in using the software were mostly self-taught.

Student Understanding of Visual Literacy

This study found no significant difference between undergraduate and graduate students in their understanding of visual literacy. Table 2 presents a selection of students’ answers in response to the question posed in the questionnaire, “What does the phrase ‘visual literacy’ mean to you?”

As the quotes in table 2 demonstrate, students emphasize one aspect of visual literacy related to “reading” images, which involves skills in understanding and interpreting. The abilities in using or producing visual content were rarely mentioned. Two students were not familiar with the concept.

TABLE 2	
Student Understanding of Visual Literacy	
Student Status	What does the phrase “visual literacy” mean to you?
Undergraduate	<ul style="list-style-type: none"> • “Reading a message from an image” • “The ability to accurately interpret and talk about images” • “Being able to analyze and understand images” • “Ability to express and understand expressions through a visual medium”
Graduate	<ul style="list-style-type: none"> • “The ability to read, describe, and verbally present a visual element” • “The ability to determine the meaning of an image and ability to use appropriately” • “Being able to read and understand an image” • “Understanding and interpreting visual content effectively”

Student Motivation and Image Use in Papers and Presentations

All study participants used images in PowerPoint presentations for class assignments. This finding was identified as a general category (all cases) using the CQR typology. However, use of images in papers was rare. The research team received 28 presentations (in some cases, 2–3 per student), but only four papers with images. In the questionnaire, ten students marked use of images in written assignments, but this claim was not supported by their submissions and cross-case analysis of interview data. In fact, during the interviews, only four students mentioned that they would use images in papers, usually charts and diagrams, copied from scholarly articles. Two of the submitted papers include charts, while the other two feature photographic images and artwork. One of the visually rich papers was prepared for a creative writing class by Participant K, who included personal photographs that he modified with software on his camera (see figure 1). During the interview, Participant K discussed the processes of writing and creating images that iteratively informed and transformed one another to create the final essay, “I didn’t take all these images at the same time with the intention of, like, you know, I’m going to use all these images in this one piece ...the images just kind of came together with the piece as I was writing ...I guess it’s, like, serendipity, maybe, like, how things line up and then how the images and the text may align.”

FIGURE 1
Image Created by a Student and Used in a Paper. Participant K. Used with Permission



The use of images in papers vs. presentations emerged as an interesting dichotomy in the study. Participant E stated in the interview: “I use a lot of images in PowerPoints because I think it’s more effective in presentations, less words, more pictures, and symbols [...] As far as papers, I usually don’t include images, just because that’s not what you usually do in an academic setting.” Students view papers as a more formal type of work than presentations

and connect this perception to faculty expectations. They don't feel encouraged to use images in papers because of the lack of instructions from teaching faculty, or they hold implicit or explicit expectations that use of images does not constitute academic work. A few students were concerned that their use of images in papers could be interpreted as "filler," a way to increase paper length, and adversely impact their grade.

In contrast, students used a range of visual resources in their presentations, including photographic images, icons, symbols, charts, cartoons, and maps. When discussing their motivation to include images in presentations, they mentioned faculty or peer expectations, and in some cases talked about an unspoken and widely shared notion that PowerPoint presentations must have images. Peer expectations were particularly prevalent in group projects. The other motivating factors for including images in presentations include aesthetics and the engaging or even entertaining role of images. Students are motivated to use images to add an aesthetic quality—to make the presentations attractive; to give audiences something to look at; to keep their attention.

Image Selection and Evaluation

The finding that Google Images is a primary source of visual materials for students' presentations does not come as a surprise. In a few cases, students used scholarly articles, news sites, library databases, digitized resources, museum websites, or followed links on Google Images to find additional images at source websites. A small group of students also included images that they created themselves. Figure 2 demonstrates an example of a slide with a picture taken by a student. Table 3 provides a summary of image sources and indicates their use across cases.

FIGURE 2
PowerPoint Slide with a Photograph Taken by a Student. Participant H. Used with Permission.

	<h2 style="text-align: center;">Outline</h2> <ul style="list-style-type: none"> Background & context Our Approach Methodology Connecting to Theory Analyzing our data Building Social Movement Theory Reflexive of OccuPAR The Action in PAR
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TABLE 3
Sources of Images

Source	Category	No. of Cases
Google images	General	15
Photographs, infographics, and diagrams created by participants	Variant	6
Scholarly articles and papers	Variant	4
News or magazine resources	Rare	3
Library databases (ARTstore)	Rare	3
Digitized print resources	Rare	2
Links to source websites	Rare	2
Museum websites	Rare	1
Yahoo	Rare	1
YouTube	Rare	1

As a rule, students start their search with Google Images. The statement expressed by Participant A, “Typically, I just go straight to Google,” was echoed by many students. Participant M added, “Google’s kind of the best search engine for most everything. For—not looking for science, scholarly articles, not as much—but for images that’s usually my go-to.” Participant F, who represents a rare case in this study, selected images from museum websites not only because of their quality, but also because they are associated with reliable citation information. Students mentioned several selection criteria, with image quality and representativeness of the topic emerging as typical categories. Other criteria included emotional response to image, image size, accuracy, audience, and ease of citation.

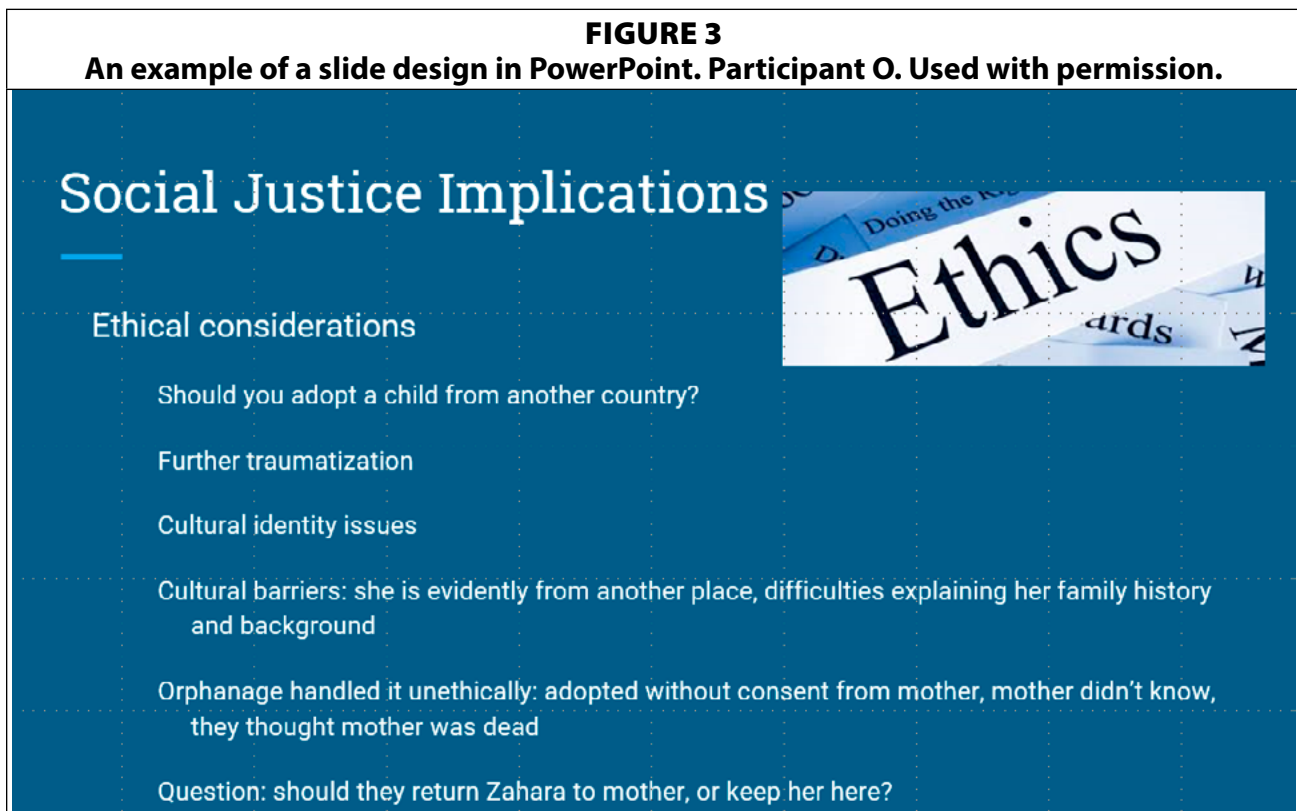
Typically, students copy and paste images that they find on Google Images without looking at originating sites or verifying sources. Most don’t follow links, read the text surrounding the image, or check permissions. Participant B described this common behavior: “I typically don’t dig too much in...like you can click ‘visit page’ if you want in Google images to see... but usually I don’t even do that, I just take the image before checking out where it came from exactly.” In some cases, students misused images or used them outside their cultural and historical context, primarily because they did not check the source sites. Participant G, who mentioned checking originating sites, was an exception in the study. She explained: “Sometimes I’ll read the article and see what it’s about. I’m always, like, wary that I’ll, like, use an image and not know its source and it will be, like, that’s not what it was saying.”

Practices in Processing Images and Designing Presentations

Students typically acquired images by copying and pasting them into a paper or presentation. A smaller number of students downloaded images to their computer and processed them using image-editing software. The processing activities usually involved resizing or adding text. In rare cases, students copied only a portion of an image or cut parts that they found relevant. Occasionally, they altered an image’s visual content by changing its background or colors. Although those instances were rare, they point to a disturbing finding that students disregard the integrity of an image as an information resource. On the other hand, those who had previous experience creating original images or studying art tended to be more careful in their processing practices. They copied entire images and did not change their visual content.

Student image processing practices had a rather temporary, fleeting character. Students rarely stored images or reused them in other projects.

Students typically started the process of designing PowerPoint presentations with a textual outline, listed bullet points or fragments of text, and added images at the end. A smaller group of students discussed balancing images and text in designing presentations, and only a few saw images as central to the presentation of their ideas. A typical slide had some text and an image to one side (see figure 3). Although students appreciate the role of images in conveying information or making content more accessible, they still view images as secondary. Participant O expressed this common theme: “I see the text as more important than the pictures because that’s the main focus of my presentation and the pictures act as supplements.”



Ethical and Legal Aspects of Image Use

The lack of citations or captions for the images used in PowerPoint presentations emerged as a major theme in this study, which indicates how difficult this aspect of visual literacy is for students. Only two students in the sample provided source information for images in their presentations. One of the students majored in art history and was accustomed to it because of the standard practice in her discipline. The second student included source information because her professor required it. However, thirteen students provided no citations whatsoever for images in presentations. There was also a certain discrepancy between student perceptions and practice. Five students stated during the interviews that they provided source information, but content analysis of their presentations proved otherwise. Other students were quite open about their lack of concern for credits and copyright, like Participant A, who said, “I don’t care where it’s coming from, who took it, any of that stuff.”

Students in this study said that they did not check source websites and did not cite images in presentations primarily because there is no requirement to do so from teaching faculty. Student H commented, "It's not really expected. I think that's kind of what determines student behavior." However, faculty expectations tend to be different for papers. Students would include source information for figures in papers due to faculty requirements. Other reasons for not citing images include student perceptions of classroom presentations as informal and of images as not as important as text. Student O says, "I guess that's how I think about images, like as a supplementary role, and so I don't think that they should—I guess internally I don't think them valuable enough to cite."

In some extreme cases, students even used images with clear copyright restrictions, as evidenced by Participant I: "Sometimes, the people who own it will put a watermark on it, I'll find a picture that I can work around that and I'll cut a section that I can use." Participant I made a distinction between text and images, stating that he would provide a reference for quoted text but not for images in presentations. In addition, students mentioned challenges in judging image authorship and intellectual property rights online as barriers to providing source information. Two students even talked about their perception of images as objects without rights, as expressed by Participant M: "I think people have come to expect that images are public property and that they're not, in fact, somebody's property that requires permission."

Discussion

This study shows that, despite living in a visually rich world, students are not experts in using images and require assistance developing skills in selecting, evaluating, and interpreting visual materials for academic work. Frequent interactions with images in online environments do not automatically translate into better visual literacy skills; in some cases, it may even lead to disregard of images as information resources. The findings of this study confirm prior research that questioned the generalizations about "digital natives" as somehow inherently adept in visual literacy.⁴⁴

The use of images by participants in this study was highly influenced by peer and faculty expectations, as specified in course syllabi and assignment instructions. Visual content was shown to be present in the classroom, but almost exclusively in PowerPoint presentations. For papers, students followed faculty's instructions and preference for textual representation. Benjamin Harris' apt description from more than a decade ago, "the default one-inch margined text in 12-point font reigns supreme in student-produced work,"⁴⁵ still rings true today. In this study, even when teaching faculty had not actively discouraged image use in papers, students intuited that it would be frowned upon. The lack of faculty encouragement, student perceptions of text as a more valuable scholarly representation, and limited instruction in how to use images in academic work support arguments that higher education has not embraced visual literacy.⁴⁶ One can further argue that higher education is slow to change and that academia rewards more traditional modes of scholarly work, leading to a continued reliance on text-heavy assignments. Although this study found limited data on a broader acceptance of images as information resources, it's important to acknowledge that practices may differ across academic disciplines and contexts.

Furthermore, the results of this study echo findings from prior research on student image-seeking behavior.⁴⁷ Similar patterns include using Google as a primary source and limited efforts in checking originating sites. This study, however, found that students rarely

considered reliability when choosing images, which contrasts with the results of Youngok Choi's survey.⁴⁸ This discrepancy is perhaps due to students' perceptions of credibility as an important criterion and their actual information behavior wherein they do not necessarily act on their beliefs. The use of Google is a dominant pattern in student image-seeking behavior. As Molly J. Schoen emphasizes, the answer is not to condemn students for using such sources, but to teach them to use the resources they are already using with a critical eye and attention to context.⁴⁹

The examination of the findings in light of the *ACRL Visual Literacy Competency Standards for Higher Education* points to a gap not only in student understanding of visual literacy, but also in competencies for locating and using images in academic work. Students' narrow understanding of visual literacy does not align with the multidimensional concept discussed in the ACRL foundational document.⁵⁰ Moreover, students' practices in selecting, evaluating, interpreting, and using images do not meet most of the standards. Although the purpose of this study was not to measure students' behavior against the standards, upon analyzing the results this study found limited competencies in relation to Standard Two, Three, Four, and Seven. For example, in image-seeking practices, students typically selected the first usable result they encountered; it is unlikely that they were choosing the "most appropriate image sources" (Standard Two).⁵¹ In some cases, students used the images outside the cultural context and did not identify "information relevant to an image's meaning" (Standard Three).⁵² As discussed before, students typically did not consider reliability and did not evaluate their sources when selecting images (Standard Four). Standard Seven relates to ethical and legal aspects of image use, an area in which study participants' incompetence was particularly apparent. While students are instructed how to reference articles and books, there is almost no expectation or direction from faculty on how to choose, use, and cite visual resources. This finding emphasizes the importance of faculty in shaping students' behavior and implies that librarians should be working closely with faculty to promote the importance of visual literacy skills.

The findings of this study point to the importance of teaching visual literacy concepts and competencies not only through library instruction sessions, but also in the context of practical workshops focused on designing PowerPoint presentations, creating infographics, and processing images. This recommendation is based on the cross-case analysis that found the relationship between students' prior experience in working with images and visual literacy skills; students who had experience creating images through photography or other forms of art tended to have a deeper understanding of visual literacy concepts and paid more attention to image integrity. Librarians can also work to raise the profile of visual literacy skills by partnering with faculty to create research projects that build competency in the use of visual material.

Moreover, the *ACRL Framework* encourages creativity and offers an opportunity to simultaneously teach visual literacy, information literacy, and transferrable design skills through information creation.⁵³ Visual resources offer a way to explore Information Creation as a Process. Students can conduct research with the goal of creating images or infographics for final projects. A project like this explores Knowledge Practice Eight in the "Information Creation Frame": wherein learners will develop, in their own creation processes, an understanding that their choices impact the purposes for which the information product will be used and the message it conveys. This kind of project also lends itself to a more robust

understanding of the labor included in creating digital visual content, which implicitly encourages appreciation of visual resources.⁵⁴ This serves as only one example of how librarians can use the ACRL *Framework* to explore ways of embedding visual literacy skills more fully into curricula.

By providing an adaptable model, the ACRL *Framework* allows us to approach visual literacy as a core component of information literacy rather than a separate set of competencies. As discussed in the literature, visual literacy concepts need to be integrated into information literacy instruction and embedded into core curricula.⁵⁵ The findings of this study support this position. Based on the consensual interpretation of the findings, the authors of this study believe that the best way to teach visual literacy skills is with a holistic, multifaceted approach incorporating classroom activities, workshops, and a variety of library instruction sessions as an inextricable part of information literacy. Reaching faculty requires a “train the trainer” approach, which can be accomplished by collaborating with other units on campus, such as Teaching and Learning offices, graphic design, and instructional design departments.

Study Limitations

The qualitative approach selected for this study presents limitations to interpretations and generalization of results. Inability to generalize qualitative findings to larger populations is an acknowledged limitation of qualitative research.⁵⁶ However, a qualitative study conducted in a specific context provides in-depth information on actual practices of participants and reveals patterns in information behavior that can inform practice in LIS, especially the design of visual literacy instruction. The CQR methodology adopted for this study offers an opportunity for presenting multiple perspectives and promotes in-depth analysis of findings across cases. Data analysis using the CQR approach requires a team effort and demands a considerable commitment from the researchers. The methodology, developed in the field of psychology, focuses exclusively on interview data and is challenging to use with other types of empirical evidence. Further research could examine image use behavior of faculty, particularly regarding faculty practices in image attribution in slide files, faculty engagement in providing visual literacy instruction, and the impact of faculty actively encouraging students to incorporate images in papers. In addition, research on student behavior could be extended beyond academia to explore student interaction with images in the social media environment and the impact of online behavior on academic practices.

Conclusion

This qualitative study aimed to explore multiple aspects of visual literacy and students' skills in using visual resources for academic work. The findings of this study indicate that undergraduate and graduate students lack basic visual literacy skills in selecting, evaluating, and using images. This study also points out that images play a secondary role in academic culture and lack the same expectations from faculty regarding citations. Visual resources are used within the domain of informal classroom presentations but are rarely used in papers. James Elkins' call for presence of images in university education from a decade ago has thus been fulfilled—but only to a certain extent.⁵⁷ There is a real need for intensifying the efforts in visual literacy education, especially given that, within an environment flooded with visual media, students are beginning to view images as transitory objects without authors and rights.

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