WAYS OF SEEING

THE BOOK OF SELECTED READINGS 2024

Edited by

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The Book of Selected Readings Editorial Philosophy

IVLA is an eclectic organization of professionals working toward a fuller understanding of how we derive meaning from what we see and how we interact with our visual environment. IVLA members represent a wide range of disciplines including the arts, sciences, education, museum, library, communication, business, videography, photography, instructional technology, health, and computer applications.

Each year, members come together at a conference held in conjunction with a university, museum or organization to present their ongoing work and to share perspectives in a multidisciplinary forum. Characterized by many different voices, and cross-fertilization of ideas, interests and values, discussion is a lively mix of scholarship, creativity, and applications. Since the founding of the organization in 1968, this dynamic interaction between practitioners and theorists has been IVLA's greatest strength.

The Book of Selected Readings (BSR) is a peer reviewed collection of papers, selected from the presentations at the annual IVLA Conference. It is meant to reflect the spirit of the ongoing conversation among its diverse members and to promote new perspectives in its readers. Included in *the BSR* are creative ideas in the making, works in progress that invite further thought and the results of long-term scholarly research. For the 2023 BSR, the art works awarded and honored at the international online juried art exhibition are included.

What makes *the BSR* special, like the members of IVLA who have contributed to it, is that it represents this broad range of interests and reflects some of the most diverse thinking in the field of visual communication.

In addition, *the BSR* truly presents the international perspectives. Ten selected articles published in the 2024 BSR came from five different countries, Greece, Sweden, Russia, and Japan as well as USA.

We are proud to present these multi-faceted works.

International Visual Literacy Association
Publications Committee
First stated in 1998

Jung Lee, Editor-in-chief 2024

Jury Procedure

This book has been compiled using a peer review procedure to guarantee a high-quality publication. The procedure began with planning the International Visual Literacy Association's annual conference. Part of the conference planning procedure is to appoint a proposal review committee that blindly review papers to be presented at the conference. Authors who have papers accepted at this state of the evaluation are invited to present their papers at the annual conference.

All presenters are then permitted to submit their conference papers for possible publication in *the Book of Selected Readings.* These papers are submitted to the editor-in-chief. The editor-in-chief and editors of *the Book of Selected Readings* are elected by IVLA board members for three-year terms.

Each manuscript has been blindly reviewed by at least three different editors assigned by the editor-in-chief. The authors receive the editors' comments and submit revised versions multiple times before publication. For the 2024 BSR, ten papers were accepted for the book. This year's publication rate was approximately 77%, based on the number of papers submitted for publication. The publication rate is considerably lower if you consider the acceptance rate at the conference proposal level.

Please request further information about the review process from:
Jung Lee, Editor in Chief of *Book of Selected Readings 2024*

Editors' Choice Award

Each year the editors of the Selected Readings choose papers that they judge to be exemplary works of research and literature. The editors are asked to list papers that hold their interest or those they find memorable. Winning papers are awarded the Editor's Choice emblem shown at the bottom of this page.

This year's honor goes to the article, **Augmented Reality Teaching Framework: AR Literacy for Visual Communication Design Majors written by Félicia Barrett, Petronio Bendito, and Alexandra Jacobson**. The article explores the latest developments and innovations in augmented reality (AR) as applied to education and visual literacy. This includes how AR is being integrated into classrooms, what new technologies are emerging, and how these advancements are enhancing visual communication experiences for students.

The authors will receive a certificate of recognition at the next IVLA Annual Conference to be held on October 6-9, 2024 in San Diego State University, USA. Congratulations for the excellent paper.

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Augmented Reality Teaching Framework:
AR Literacy for Visual Communication Design Majors

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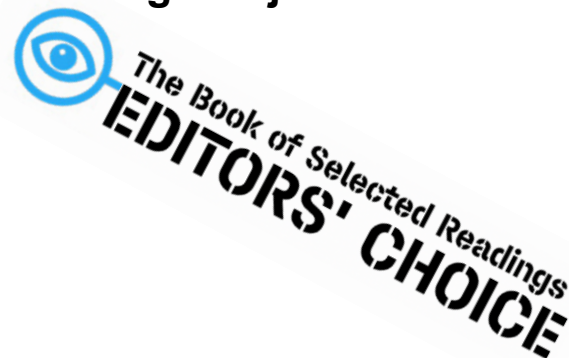
Abstract

This chapter outlines a framework for teaching AR that enhances communication and creates engaging experiences. An overview of the history of AR is provided based on its development in the past two decades. The paper introduces a teaching model for promoting Augmented Reality literacy while using the computer as a creative medium. The main topics include enhancing traditional print and digital media, creating interactive experiences, improving accessibility for diverse audiences, and using it as a sustainable tool in design processes. The model was implemented into undergraduate Visual Communication Design computing courses. Visual literacy serves as a cornerstone in equipping students with the tools and knowledge necessary to excel in the dynamic field of AR design and development. By honing visual literacy skills, students gain the ability to comprehend, analyze, and interpret visual information, which is essential for creating meaningful AR experiences.

Keywords: Augmented Reality education, AR teaching framework, AR literacy, instructional design, visual communication design

Introduction

In recent years, Augmented Reality (AR) has been increasingly recognized as an important development in the field of media and design. As a constantly evolving medium, AR presents a unique set of challenges and opportunities for visual communication design education striving to stay at the forefront of technological innovation. However, achieving proficiency in AR requires combining new technical skills and creative thinking, which provides a new opportunity for curriculum development and instructional design strategies. University-level visual communication design education can and should invest in teaching AR skills to enable undergraduate students to achieve AR proficiency while reflecting on how visual communication design contributes to the field of AR. The Media-to-Application Framework outlined in this paper offers a strategic and comprehensive approach to teaching AR that builds students' technical abilities and helps them reflect on this emerging field and consequently keep up with emerging technologies in this rapidly evolving medium.

Augmented Reality

As AR continues to evolve, the conceptualizations and encounters associated with it have diversified, leading to various interpretations. In essence, AR is recognized as a technology that integrates virtual information into the tangible environment, augmenting a user's sensory perception through computer-generated information.

A Brief Overview of the History of Augmented Reality
The historical evolution of AR serves as the underpinning for the accessibility and emergence of diverse definitions and multiple AR experiences. The inception of AR dates back to 1901 when Frank L. Baum introduced the concept of the Character Marker (IxD, 2022). This innovation involved the creation of

glasses, enabling users to perceive distinctive markings displayed on individuals, reflecting their character traits. For example, a "G" might appear on the forehead of a person with a good character, while an "E" could be displayed for someone embodying an evil disposition.

Following that period, the initial foray into the development of AR encounters commenced in 1957 when Heilig, an American cinematographer, delved into the concept of multisensory theater. He aspired to create an immersive environment capable of conveying images, sound, vibrations, and scents to the audience in a theatrical setting (Vertucci et al., 2023). The inaugural prototype of the multisensory theater took shape as *Sensorama*. This groundbreaking innovation amalgamated five short films to present three-dimensional videos, incorporating stereoscopic color displays, stereo sounds, aromas, gusts of wind, and vibrations. *Sensorama* was conceived with the objective of expanding training and educational opportunities for civilian, military, and industrial personnel while mitigating associated risks. Convincing investors to support the AR technology took time due to its high cost. (Vertucci et al., 2023)

In 1968, the inaugural head-mounted display system, known as The Ultimate Display, was developed by American researcher Sutherland (Haugstvedt & Krogstie, 2011). A significant milestone in the advancement of AR technology occurred in 1975 with Krueger's Videoplace project, which introduced a projection system coupled with video cameras to generate shadows on the screen. During the 1980s, Steve Mann, known for wearable computing, created the EyeTap prototype similar to Google Glass, a wearable, voice- and motion-controlled Android device that resembles a pair of eyeglasses and displays information directly in the user's field of vision developed a few decades later. (Vertucci et al., 2023)

The term "Augmented Reality" was initially documented in the 1990s by Boeing engineers and researchers Thomas P. Caudell and David W. Mizell. They explored an AR system designed to reduce errors in aircraft and aerospace industry systems (Haugstvedt & Krogstie, 2011). Boeing emerged as one of the early adopters of AR technology in its strategic initiatives. In 1992, Louis Rosenberg pioneered the first immersive AR system, known as virtual fixtures, providing the military with virtual control capabilities. In 1993, the Knowledge-based Augmented Reality for Maintenance Assistance (KARMA) project, spearheaded by Steven Feiner, Blair MacIntyre, and Doree Seligmann, produced the inaugural prototype of an AR system designed to facilitate maintenance activities (Carmigniani & Furht, 2011). Ultrasound tracking was employed in the system to display maintenance instructions. In 1994, Paul Milgram and Fumio Kishino introduced the concept of the "virtual continuum" (Figure 1), aiming to seamlessly blend the real world with the virtual realm by integrating both AR and augmented virtuality (AV). This gives a visual representation of the spectrum from reality to virtuality and where the Mixed Realities fall within the continuum.

Figure 1
Migram and Kishino's Virtual Continuum (1994). (adapted from Milgram et al., 1994)
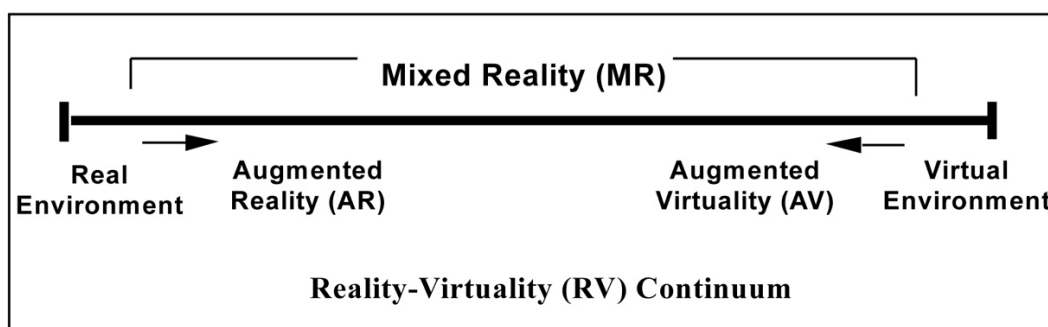
In 1994, AR made its debut not only in theaters but also in the medical field (Carmigniani & Furht, 2011). The first theatrical production featuring AR was *Dancing in Cyberspace*, a stage performance that featured dancers and acrobats engaging with virtual objects of human size. Simultaneously, the University of North Carolina implemented an AR application within the medical domain, enabling pregnant patients to visualize the fetus through a see-through head-mounted display system. (Vertucci et al., 2023)

Following continued years of AR research, Sony Computer Science Laboratories introduced the first AR system utilizing two-dimensional (2D) markers, named CyberCode, in 1996. In 1997, Ronald Azuma established the most widely accepted definition of AR, stating that AR is a field that involves the integration of three-dimensional (3D) virtual objects into a real-time 3D environment (Vertucci et al., 2023). To meet the criteria for being classified as AR, Azuma explains an experience must embody three key characteristics to be classified as AR: (a) combines real and virtual, allowing real and virtual objects to coexist in the same environment; (b) interactive in real-time, in order to eliminate from this classification animated films in which computer-generated animations are superimposed on real scenes; and (c) registered in 3D, requiring that the augmented contents must interact contextually with the scene. (Vertucci et al., 2023).

In 1998, AR was integrated into the National Football League (NFL) to display a yellow first-down line on the field for viewers. However, this application of AR deviates from Azuma's AR definition, as it lacks interactivity in real-time. In 1999, Hirokazu Kato created ARToolKit, the pioneering open-source software library that continues to be widely utilized across various operating systems, desktops, and mobile devices today (Yaoyuneyong & Johnson, 2011). Then, in 2001, Gerhard Reitmayr and Dieter Schmalstieg developed a collaborative mobile AR system catering to multiple users. This system integrated 3D graphics and a pen-and-pad interface, enabling direct interaction with virtual objects. In 2002, Bruce H. Thomas introduced ARQuake, marking the inception of the first outdoor AR game system. ARQuake utilized a global positioning system (GPS), a digital compass, and vision-based monitoring. Interestingly, the Pokémon GO system later adopted a similar setup to ARQuake (Vertucci et al., 2023).

In 2003, Daniel Wagner and Dieter Schmalstieg developed the initial handheld AR system on a Personal Digital Assistant (PDA) equipped with a commercial camera. This laid the foundation for the integration of AR into smart devices, facilitated by the system's architecture built on wireless networking. Subsequently, in 2004, Mathias Möhring introduced the first 3D marker tracking system for mobile devices (Arth, et al., 2015). In 2005, Andres Henrysson transitioned ARToolKit to the Symbian operating system, expanding the potential for additional AR applications to be developed for mobile phones. In 2006, Nokia introduced MARA (Mobile Augmented Reality Application), a multi-sensory AR system for mobile phones. MARA enabled users to identify and save information about objects, and when the mobile device was equipped with a global positioning system (GPS) and suitable software, users could also locate friends using the system. In 2008, coinciding with the introduction of the first Android device, Mobilizy debuted the Wikitude World Browser with AR. This innovative AR browser integrated GPS and Wikipedia data, providing a real-time camera view for Android smart devices and earning the distinction of being the first AR browser. In 2009, SPRXmobile introduced Layar, an additional AR browser. Layar utilized GPS, a camera, and a compass to recognize the environment, seamlessly integrating real-time information onto the screen (Arth, et al., 2015).

There was a rapid integration of AR devices across various industries. In 2013, Google introduced Google Glasses, leveraging AR content through Bluetooth connectivity (Arth, et al., 2015). Microsoft followed suit in 2016 with the release of HoloLens, their version of smart glasses. HoloLens featured a combination of AR and mixed reality (MR), rendering them more advanced and correspondingly more expensive than Google Glasses. In 2017, Apple unveiled the ARKit software development kit (SDK), while Google introduced *ARCore*. These AR systems significantly boosted the number of active users, leading to substantial enhancements in SDKs throughout 2018 and 2019. The upward trajectory of user numbers persists, driven by the expanding possibilities for AR experiences on smart devices. By 2020, the Reality-Virtuality Continuum (Figure 2) expanded to define mixed reality and further refine and contextualize extended reality.

Figure 2
Updated Reality-Virtuality (RV) Continuum: Representation of Extended Reality Technologies on the Reality to Virtuality spectrum, adapted from IxDF, 2022 (https://www.interaction-design.org/literature/topics/virtuality-continuum)
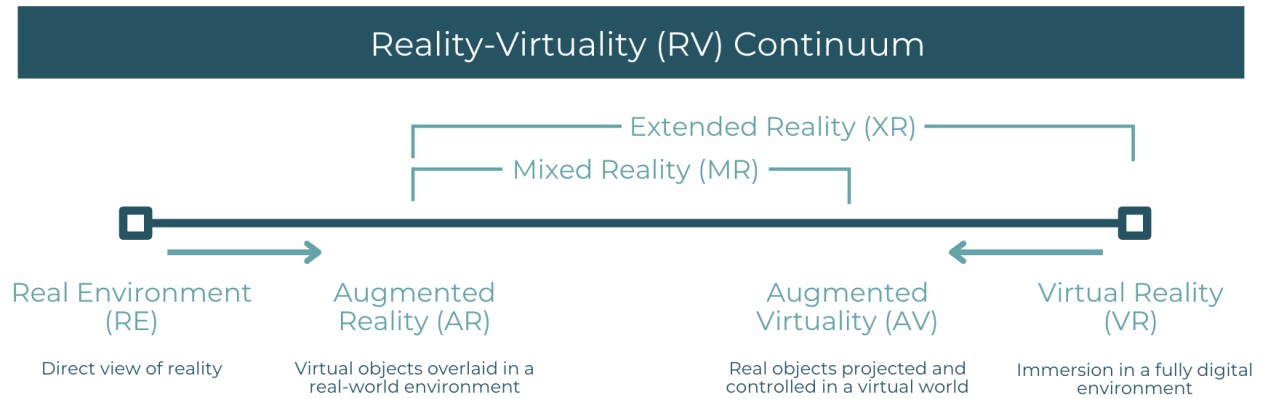
AR Technology Components

Based on the history and application of AR, for users to view or engage with the virtual objects in augmented reality experiences, there needs to be a viewing screen and a key, or trigger, as a marker. In the context of augmented reality education presented in this paper, we introduce three fundamental ways to view virtual objects, also referred to as holograms, displayed on product applications: marker-based AR, markerless-based AR, and location-based AR.

Marker-based AR, also known as image recognition AR, involves using a physical object or marker to display virtual objects in the real world, using real-world triggers to activate the experience (Figure 3). The most common example is scanning a QR code that reveals additional information when viewed through a mobile app. This type of AR relies on predefined markers and can be limited in terms of its capabilities.

Figure 3
Marker-based AR. Illustration by Félicia Barrett
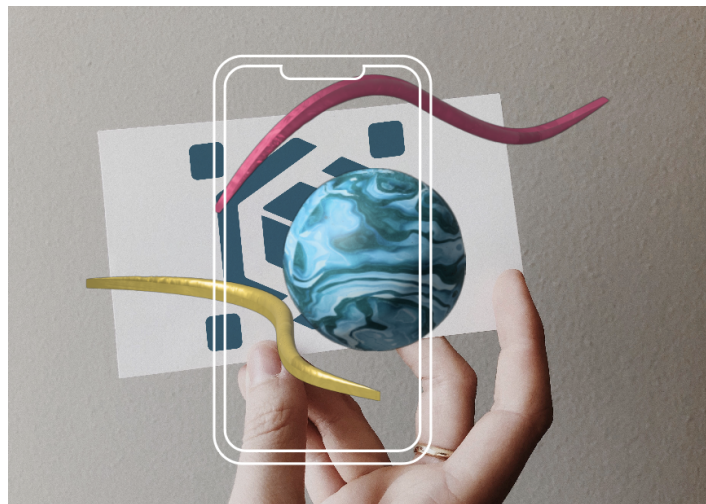
Markerless-based AR, also known as surface tracking AR, uses computer vision and depth-sensing technology to detect and track physical surfaces in the real world without the need for predefined markers (Figure 4). This allows the use of any and all parts of the physical environment and a more natural and seamless integration of virtual objects into the real-world environment.

Figure 4
Markerless-based AR.Illustration by Félicia Barrett

Location-based AR, also known as geolocation AR, uses GPS or other location data to place virtual objects in specific locations in the real world (Figure 5). This ties augmented reality content to a specific location. This type of AR is commonly used in navigation apps to provide directions and information about nearby points of interest.

Figure 5
Location-based AR. Illustration by Félicia Barrett

Real-World Augmented Reality Applications
Beyond just viewing virtual objects, users can also interact with them through gestures, voice commands, or touchscreens. These interactions can vary based on the specific AR application and its intended use. For example, a furniture shopping app may allow users to place furniture virtually in their home and adjust its size and placement through touch gestures, while a museum AR tour may allow users to learn more about an exhibit by speaking a voice command.

In addition to these traditional forms of interaction, advances in technology have also allowed for more immersive AR experiences. This includes the use of haptic feedback, which provides physical sensations through vibrations or movements within a device, as well as the integration of AR with other technologies such as virtual reality and artificial intelligence. The following are some examples of real uses of AR on the market today.

Snapchat

Snapchat serves as a notable illustration of AR interactivity that enhances experiences primarily for entertainment purposes. Through its World Lenses, in-app addition, AR tools facilitate the integration of personalized Bitmoji animated characters into the user's surroundings with a simple snap (Figure 6). Users have the flexibility to customize their Bitmoji characters and choose various actions, allowing them to shape their AR Bitmoji experience according to their preferences.

Figure 6
Snapchat World Lenses, 2017 (source from Etherington, 2017)

Pokémon GO

In 2016, Pokémon GO played a pivotal role in expanding the realm of gamification through AR. The game enables players to explore the real world while on a quest to collect various virtual Pokémon characters (Figure 7). As users move through physical spaces, these characters appear on their devices when in close proximity. The objective of the game is to gather a diverse collection of Pokémon characters, enhancing the interactive and immersive gaming experience.

Figure 7
Niantic Pokémon GO, 2023 (source: https://pokemongolive.com)


GlassesUSA

GlassesUSA employs AR tools to augment its marketing strategy, offering users the ability to virtually try on and assess eyeglass frames via a downloadable app (Figure 8). Users can upload an image of

themselves or use real-time AR on their mobile devices to visualize how different frames look on their faces. This implementation of AR enhances the customer's decision-making process, increasing the likelihood that they will be satisfied with their eyeglass selection.

Figure 8
GlassesUSA, 2023 (source: https://apps.apple.com/us/app/glassesusa/id1618058891?mt=80)
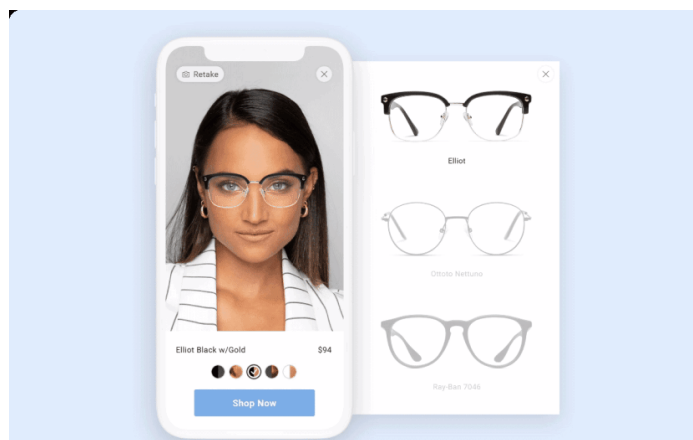
Ikea Kreativ

The IKEA Kreativ app (Figure 9), created by Inter IKEA Systems, utilizes AR to help users style their space by considering the dimensions and scale of the products they are interested in. When using IKEA Kreativ, users can explore a variety of combinations and options for items to determine what works best for them both functionally and aesthetically. The initial step in using Kreativ involves selecting the type of space being designed, whether it is starting with an empty room or using one of IKEA's pre-designed room templates.

Figure 9
IKEA Kreativ & Inter IKEA Systems, 2017 (source: https://apps.apple.com/us/app/ikea/id1452164827)
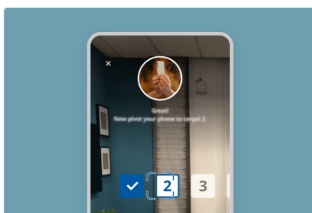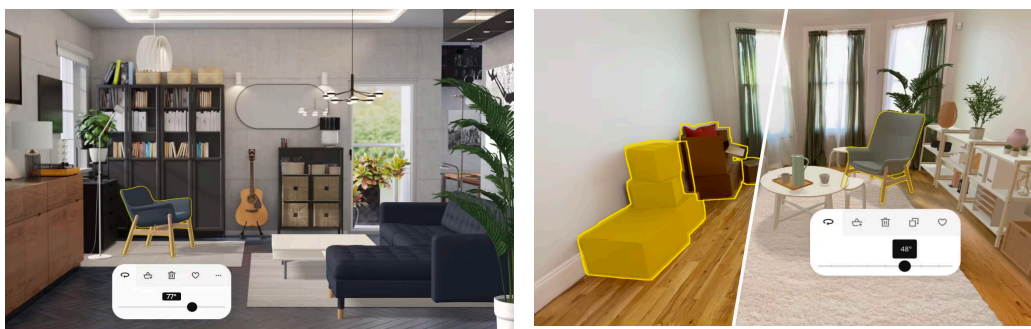
Scan
Use the IKEA app to scan your room. On-screen, step-by-step instructions make it easy.

Erase
Virtually remove unwanted furniture and other items with just a click.

Design
Create your ideal room in app or on IKEA.com. Save your ideas and share with others for input.

Augmented Reality Tools

There are several tools available for creating AR experiences. Below we introduce the ones considered for classroom integration. We have chosen Adobe Aero as a tool for design and development in the context of the teaching framework presented in this paper. Tool descriptions and an outline of the strengths of Adobe Aero and the rationale for its selection are presented below.

Artivive is a web-based augmented reality (AR) platform designed for users to craft compelling AR experiences using either 3D models or animations. Unlike Adobe Aero, Artivive exhibits certain limitations in terms of customization and the complexity of creating AR experiences. While it provides a user-friendly interface for AR content creation, it may not offer the same extensive range of features and design flexibility found in more advanced tools like Adobe Aero.

8th Wall and *Augment* are web-based AR platforms that distinguish themselves from Adobe Aero through their broader software compatibility, catering to both iOS and Android devices. They both utilize markerless tracking technology, eliminating the need for a physical anchor in the environment for AR experiences to function. This technology enhances the flexibility and spontaneity of deploying AR content, as it can seamlessly integrate into various surroundings without the reliance on specific markers.

Lightship, the AR platform renowned for developing Pokémon GO, specializes in creating location-based AR experiences. This approach opens up possibilities for interactive activities centered around specific locations, such as games or tours. Lightship incorporates AR Cloud, a digital copy of the real world, enabling the consistent deployment of AR content in predefined locations instead of starting from scratch. Lightship supports multi-user AR experiences, fostering collaborative engagement among users. A distinctive feature is the real-time modification and adjustment of AR content and updates by users, providing a dynamic and interactive element to the experiences created on the platform. The most recent development in AR platforms would be AR Makr, which is offered as an application. Within the application, users are able to sketch, scan, and transform 2D or 3D objects.

Adobe Aero is a cross-platform and multi-device application that enables creators to utilize a block-building approach for adding motion and interaction, decreasing the need for traditional coding skills. This innovative tool provides a versatile range of interactions, including buttons and behavioral triggers, offering creators diverse options for crafting engaging experiences. Notably, Adobe Aero supports various file types, from 3D models to images and animations, enhancing its flexibility. Designed with creator convenience in mind, Adobe Aero prioritizes compatibility with iOS devices, ensuring a seamless experience for Apple users. The real-time preview feature within the program allows creators to test their augmented reality files on the fly, providing valuable insights into how the AR experience will function in a given environment.
The rationale for selecting Adobe Aero is its integration with the Adobe Creative Cloud platform, which is already a major design and development tool of the visual communication design curriculum. This integration facilitates a cohesive workflow when students are simultaneously working with other Adobe software such as Photoshop or Illustrator. By being part of the Creative Cloud ecosystem, Adobe Aero streamlines the creative process, allowing for a unified and efficient approach to AR design.

Teaching Model Framework for Introducing Augmented Reality in the Classroom

This teaching model was developed in a collaborative effort out of the need to teach how to design with augmented reality in the classroom. The development of augmented reality (AR) technology opens up new opportunities for communication, interaction, and expression in various fields, including visual communication design. Nevertheless, the successful implementation of AR requires a comprehensive understanding of its key concepts, features, and potential applications. To address this need, a teaching model was developed to facilitate the acquisition of AR literacy among undergraduate students in Visual Communication Design.

Media to Application Framework

This framework offers an approach to teaching AR by guiding students through the entire process of developing an AR application from ideation to execution to testing and refinement. By breaking down the complex process of creating an AR application into more manageable stages, students can build their confidence and competence in AR development while also developing the skills they need to succeed in the field of visual communication design.

Moreover, it is important to note that AR literacy is an ever-evolving skill set that requires students to keep pace with the rapidly changing technological landscape. The media-to-application framework takes this into account by not only emphasizing the fundamentals of AR development but also encouraging students to stay abreast of emerging trends and technologies in the AR field. By helping students develop AR literacy, the media-to-application framework aims to provide them with a solid foundation for success in this constantly evolving medium.

Through this model, students gain in-depth knowledge of AR's technical and conceptual aspects and develop skills in designing, developing, and implementing AR experiences, which we labeled Augmented Reality Experience (ARX) (Figure 10). There are specific components required in order to create an ARX. First, a virtual object, which can either be 2-dimensional or 3-dimensional, and a real product application, be it an image, surface, or location for a marker-based, markerless-based, or location-based ARX, is needed. Then, the ARX must include how the audience prompts, initiates and views the virtual object and the product application through camera, proximity, tap, etc.

Figure 10
Augmented Reality Experience (ARX) Components

| VIRTUAL OBJECT	+	PRODUCT APPLICATION	+	INTERACTIVE FEATURES	=	AR EXPERIENCE (ARX)
2D or 3D overlay		Image Surface Location		Camera Proximity Tap Etc...		Virtual Digital information integrated with Real Environment

It is important to note that creating an ARX is not just about its technical aspects. In fact, one of the most critical components for a successful ARX is a well-defined concept or idea. This includes identifying the target audience, defining the message to convey, and understanding how users will interact with the augmented reality content.

Once there is a clear concept, it is time to start thinking about the design. In the context of an undergraduate classroom in the visual communication design major, ARX was simplified into four connecting segments to aid student AR literacy and varying approaches to design in AR.

The undergraduate course for which this teaching model was developed is a sophomore-level introductory course in design tools and software. The course deals with visual communication design using the computer as a creative medium. Students have opportunities to learn and expand technical skills and improve problem-solving abilities in visual communication design through class exercises and projects.

The media-to-application framework (Figure 11) is grounded in four fundamental concepts, namely 2-dimensional to augmented reality media conversion, augmented reality motion design, augmented reality interaction, and augmented reality communication and engagement. These concepts provide a structured framework for teaching AR and encourage students to think creatively, experiment with new techniques and technologies, and explore the possibilities of AR in enhancing communication and engagement.

Figure 11
Media to Application Framework
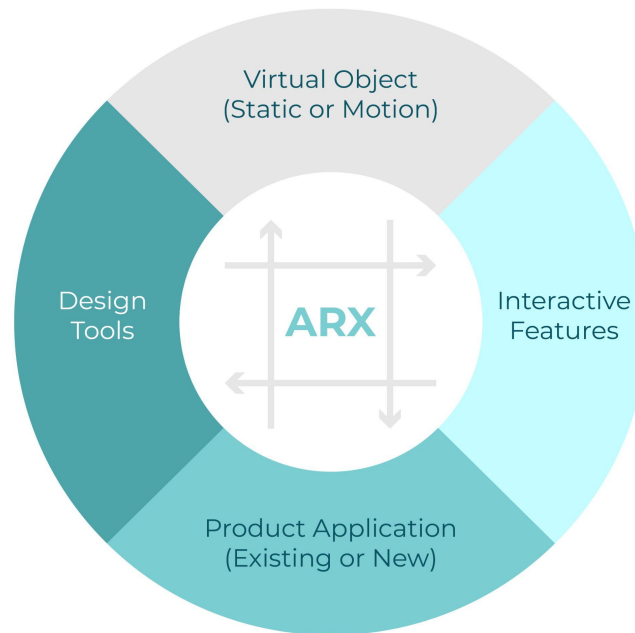
The model identifies relationships between the different AR components and enables a variety of approaches for students to consider and learn from. The first relationship examined is from the approach of the virtual object, in motion or static, and the real-world product application it is related to.

Creating an Augmented Reality Experience
When introducing AR in the classroom, there are four relationships that can occur for an AR experience: media conversion, motion design, interaction, and communication and engagement.

2-Dimensional to 3-Dimensional Media Conversion
The first relationship we introduced was between a product application and the virtual object (Figure 12). To familiarize students with the concept, we started with works they were already acquainted with, such as poster design. In this context, students were introduced to an augmented reality (AR) software workspace that consisted of an existing product application and a layered poster design. The printed poster served as the foundation for creating a marker-based AR experience. By manipulating the digital assets derived from the poster, students had the opportunity to experiment with moving, rotating, and scaling assets in 3D space to serve as the foundation for the virtual object, resulting in the creation of their own AR experiences.

Figure 12
Existent 2D Product Application to 3D Virtual Object
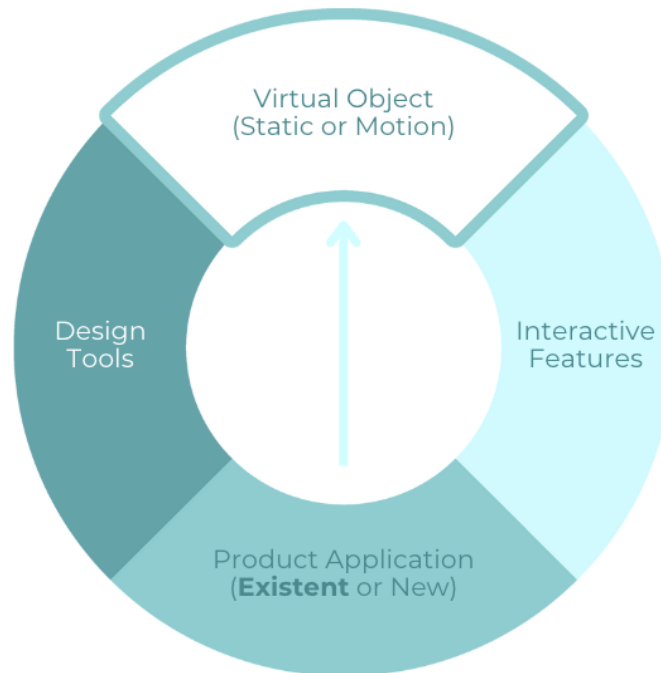
The lesson involved using an existing product application, specifically a layered poster design. Before importing the file into Adobe Aero, students prepared it in Adobe Photoshop by checking and grouping layers. Once in Adobe Aero, students engaged in experimenting with the 3D manipulation of assets—moving, rotating, and scaling—to craft an augmented reality experience (Figure 13). This stage enabled students to understand marker-based AR by setting the poster design as an image anchor, linking the digital content with the physical print of the poster.

Figure 13
Demonstration File: 2-Dimensional to 3-Dimensional Media Conversion Assignment

AR Motion Design
Students were tasked with creating a virtual object with the intention of adding motion through animation to a new marker or markerless-based product application (Figure 14). Students experimented with the speed,

placement, scale, etc., to apply motion to an originally static virtual object. They were tasked to apply their virtual object to a new product application to enhance an intended meaning.

Figure 14
Virtual Object in Motion to New Product Application
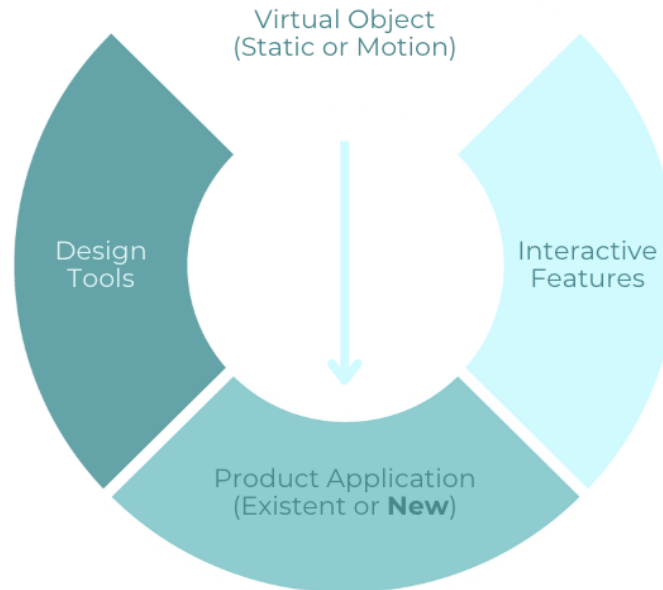
Advancing to the next stage of the teaching model, AR motion design, students delved into the process of generating a portable network graphics (PNG) sequence using Adobe Photoshop. This step aimed to prepare files for later integration into Adobe Aero, enabling the creation of a virtual object detached from a static object (Figure 15). By introducing motion through animation, students explored new possibilities for marker or markerless-based product applications. Once imported into Adobe Aero, students engaged in experimenting with the speed, placement, and scale of the sequence to apply dynamic motion to the initially static virtual object.

Figure 15
Demonstration File: AR Motion Design Assignment
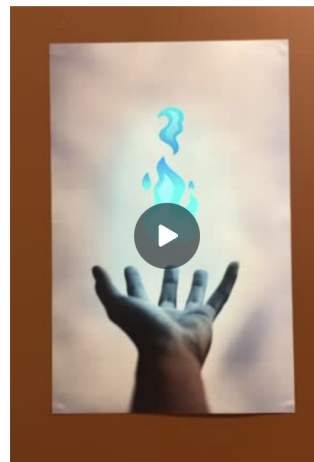
AR Interaction

Students were exposed to a range of design tools, which showcased the various possibilities they have when it comes to creating virtual objects and product applications. Through the utilization of these design tools, they successfully generated a static virtual object that could be incorporated into a markerless product application. The extent of the interactive features that students were able to develop aligned with the specific types of design tools they employed (Figure 16). Their objective was to enhance the resultant augmented reality (AR) experience by appending interactive features to their virtual objects.

Figure 16
Design Tools to Determine Interactive Features Available
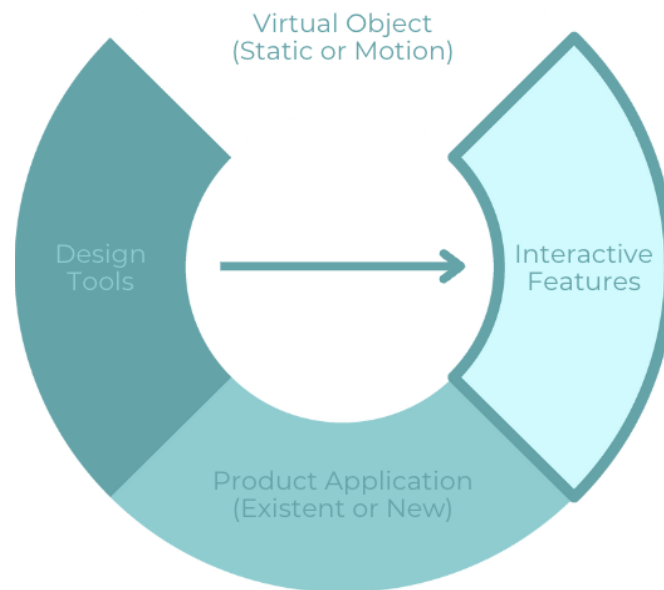
In the interaction stage, students were acquainted with a range of design tools that offer diverse options based on whether they are crafting virtual objects or product applications. The students utilized these tools to craft a static virtual object for integration into a markerless product application (Figure 17). They discovered that the interactive features at their disposal were contingent upon the specific design tools employed. After designing their virtual object, students were challenged to incorporate interactive features, elevating the overall AR experience.

Figure 17
Demonstration File: AR Interaction Assignment

AR Communication and Engagement
The students were assigned two projects aimed at enhancing their concept-building skills. These projects involved utilizing an existing virtual object and product application that were introduced to them during the course, specifically in relation to the design tools used. The first project focused on creating a 2D surreal poster design product application, while the second project involved developing a 3D product look using a virtual object. In order to achieve their final designs, the students were required to problem-solve and incorporate appropriate design tools and interactive features, starting from both a product application and a virtual object as the main deliverable (Figure 18).
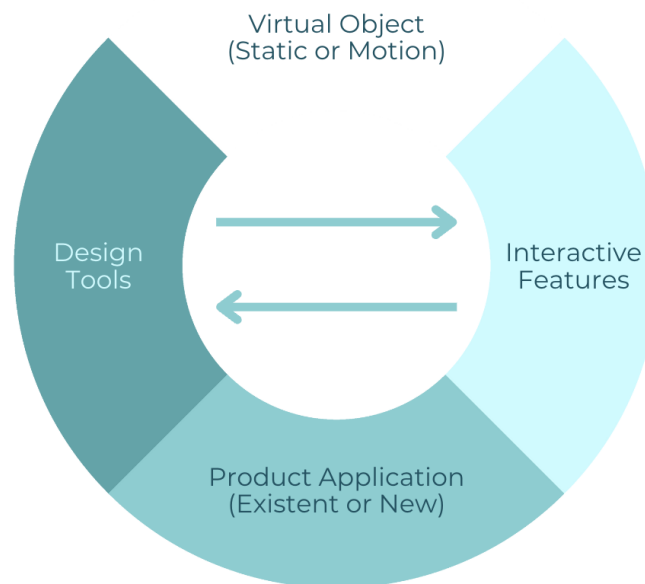
Figure 18
Design Problem-Solving Project between Design Tools and Interactive Feature Relationships

The objective of these projects was to encourage the creation of an AR experience that not only showcased the practical application of their designs but also effectively communicated their design concepts.

Case Studies

The following are samples of student work that came after the series of assignments using the media-to-application framework.

Surreal Movie Poster: AR Communication and Engagement
Students learned Adobe Photoshop at the beginning of the semester. After completing the course software learning objectives, students were assigned a project to challenge their conceptual and technical skills. This project was in the form of a surreal movie poster design.

Students were tasked to create a surreal or impossible scene in the real world with multiple composited images to be featured on a poster for an upcoming fictitious movie. The genre and title were open, but their designs and concepts were to reflect them.

The introduction of the augmented reality experience component aimed to foster problem-solving skills among students, enabling them to enhance the communication and engagement of their surreal movie poster concepts. Within this context, students were encouraged to explore diverse possibilities offered by Aero, thus granting them the flexibility to consider different approaches for leveraging specific features. For

instance, they had the option to extend their design by bringing Adobe Photoshop layers or elements into the three-dimensional realm. Moreover, they could incorporate animations using PNG sequences or .gif animations derived from the layers of their poster's PSD file. Furthermore, students were empowered to incorporate additional assets of their own choosing, thus affording them the opportunity to augment their posters with personalized elements. Sound and audio also played a vital role, serving as supplementary enhancements. The project's open-ended nature prompted students to ideate, encouraging them to explore and determine the most valuable elements to incorporate into their concepts. Ultimately, this approach enhanced the audience's overall experience when viewing the posters, solidifying the value and impact of their creations (Figure 19).

Figure 19
Student Work: Existent 2D Product Application to 3D Virtual Object
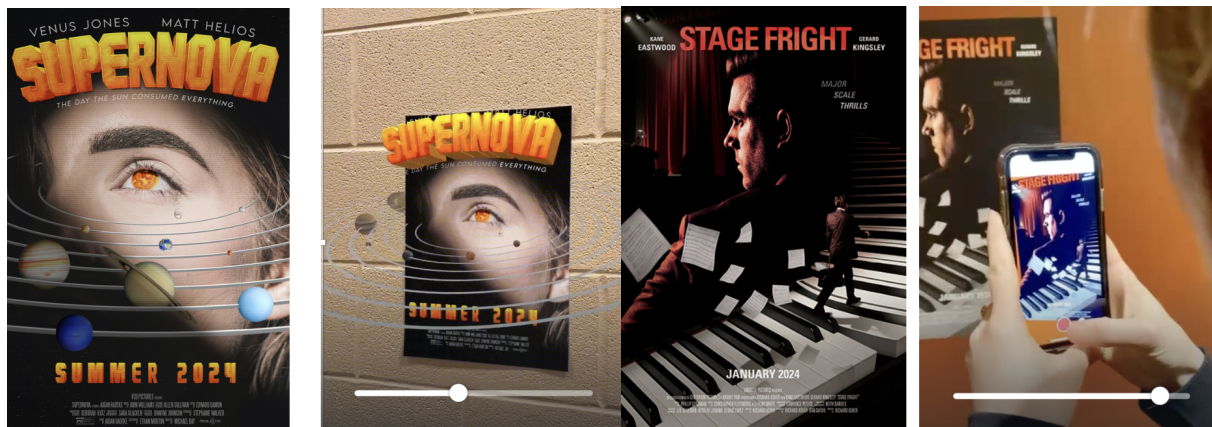
In the examples above, the students were able to incorporate various design tools and interactive features to create an engaging AR experience through 3D and motion design approaches. The students started with the existing product application. Then, the creation and implementation of the virtual object could be done from their Adobe Photoshop files or through other means and design tools. The combination of 3D models, animations, and sound elements resulted in engaging and visually striking concepts that effectively conveyed the surrealism of their movie posters. This exercise provided students with practical skills in utilizing design tools, interactive features, and the relationship between them to enhance their creative projects.

Product Look: AR Communication & Engagement
The second component of the AR communication and engagement stage involved the design tools and interactive features focused on starting from the creation of the virtual object as the final deliverable. The purpose of this project was to encourage students to think about augmented reality in the context of the professional world and its role in client relationships and sustainability. One of the key benefits of AR is its ability to enhance communication and collaboration between clients and designers. By using AR technology, businesses can showcase their products or services more engaging and interactively, allowing clients to understand better and visualize the result. This not only improves client satisfaction but also helps designers to stand out in a competitive market.

Consumers are more likely to buy a product if their first impression of the packaging is positive. Students were tasked to choose a company they would like to create packaging and set up a product look. The goal here was to engage students in taking client work and presentation into consideration. They needed to determine potential materials and/or colors supporting the brand/product identity and fully render high-quality virtual objects (Figure 20). Moreover, AR has the potential to contribute to sustainable practices in various industries. For example, in architecture and construction, AR can be used for virtual building walkthroughs, reducing the need for physical prototypes and minimizing waste in the construction process.

Figure 20
Student Work: Existent 2D Product Application to 3D Virtual Object

The student examples above showcase the virtual objects created as the main component of the augmented reality experience. These particular projects were chosen for the successful implementation of AR in a professional presentation setting as if they were presenting to clients. In terms of product visualization and marketing, AR has the potential to be a valuable tool and sustainable tool for businesses.

Conclusion

This framework for teaching augmented reality (AR) to enhance visual communication and create engaging experiences allowed students to tap into the resources available in the classroom, such as Adobe Creative Cloud, to expand their understanding of augmented reality and its many applications, including critical thinking about sustainability in design development. The framework allowed students to explore AR methods of communication and design through hands-on activities. Students build upon previous design work to create AR experiences, enhancing their understanding of visual communication design applications. Developing augmented reality literacy enables students to evolve marketing strategies for design communication applications. Integrating AR into a visual communication course can expand on the use of design elements, considering aspects such as user interaction and engagement. This exercise allowed students to develop their visual communication skills, broadening their experience from 2D to 3D concept development and further understanding its potential for enhancing client satisfaction and sustainability in design practices. In the future, we want to broaden the scope of the current framework on more complex AR development applications, including creating AR experiences for teaching and learning. Exploring opportunities for student collaboration with local businesses to implement practical AR applications is also an important aspect of design education and a way to promote service learning. By providing students with the tools and skills to communicate effectively through augmented reality, we prepare them for a future where AR is becoming an increasingly important aspect of design practices across various industries. Ultimately, incorporating AR into visual communication education enhances student learning and prepares them to succeed in the ever-evolving design world.

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(Re)Activating Educational Displays

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Abstract
This chapter presents a case study examining the impact of visual literacy instruction on pre-service teachers. The study is contextualized within the Banned Books Week programming at an academic library. Considering the widespread presence of educational displays in schools, the authors focused on the social injustice of censorship to highlight the influence of school bulletin boards and classroom doors. The students engaged in two activities: first, a lecture and discussion about contemporary censorship in schools; second, explicit visual literacy instruction to prepare for creating their own educational display. Students implemented their designs on the classroom doors of the institution. The authors' analysis of the decorated doors suggests a positive correlation between the instruction and visual impact of student designs. The authors recommend further efforts to offer visual literacy instruction in teacher education programs and additional opportunities for hands-on experience to cultivate a culture of social justice in schools and classrooms through educational displays.

Keywords: Social justice, Educational displays, Teacher education, Visual literacy instruction

(Re)Activating Educational Displays

Bulletin boards have been a part of the American landscape for a hundred years, with the first patent issued in 1923 to George W. Brooks (Brooks, 1923). The easily changeable nature of the bulletin board display, coupled with negligible costs and upkeep, made the bulletin board a staple in classrooms and schools. As teacher education programs evolved throughout the twentieth century alongside audio-visual technological advancements, more explicit instruction in visual literacy appeared in curriculums. Higher education course catalogs from the late sixties and early seventies showed that audio-visual courses were the primary means for visual communication instruction (Indiana University, 1969; New York University, 1968).

As educational technology became increasingly sophisticated and surpassed the creation of simple visuals, curricular revisions eventually relegated visual literacy instruction to art education courses. However, this relegation did not mean that students and educators stopped developing bulletin boards. While there were some resources about producing effective designs, such as Jay's (1976) *Involvement Bulletin Boards and Other Motivational Reading Activities* (see Figure 1), case studies such as this appeared to decline. This lack of instruction and guidance ultimately left students to look for outward sources of inspiration (ex. Pinterest and Teachers Pay Teachers), rather than relying on an internal skill set to develop effective designs.

Free online tools such as Pinterest were quite revealing regarding the state of bulletin boards--namely, that they were largely decorative and lacked informational and instructional qualities. Examples of these tools abound with school and classroom bulletin boards themed around vague statements such as "Amazing Things Happen Here" and "Taco 'Bout a Great School." Aside from the visual white noise offered by decorative displays, research shows that their proliferation negatively affects student outcomes (Fisher et al, 2014). The authors quickly identified the benefits of visual literacy instruction as part of a Banned Books Week workshop that culminated in students creating a door display (explained in the next section). The first goal was to help show students how they might effectively utilize a bulletin board rather than limiting it to mere decoration. A second epiphany occurred upon realizing that one could leverage the creation of visuals and visual literacy instruction for social justice.

Figure 1.
Example of a 1970s bulletin board designed for student engagement.
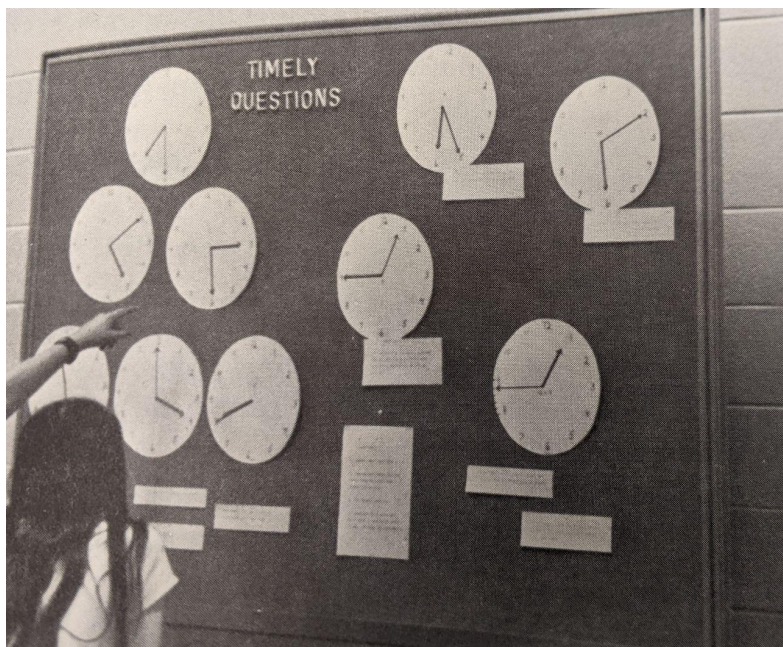
Note. From *Involvement Bulletin Boards and Other Motivational Reading Activities*, by Ellen Jay, 1976, p. 93. Reprinted with permission.

Free online tools such as Pinterest were quite revealing regarding the state of bulletin boards--namely, that they were largely decorative and lacked informational and instructional qualities. Examples of these tools abound with school and classroom bulletin boards themed around vague statements such as "Amazing Things Happen Here" and "Taco 'Bout a Great School." Aside from the visual white noise offered by decorative displays, research shows that their proliferation negatively affects student outcomes (Fisher et al, 2014). The authors quickly identified the benefits of visual literacy instruction as part of a Banned Books Week workshop that culminated in students creating a door display (explained in the next section). The first goal was to help show students how they might effectively utilize a bulletin board rather than limiting it to mere decoration. A second epiphany occurred upon realizing that one could leverage the creation of visuals and visual literacy instruction for social justice.

Educational theory and practices by scholars such as Paulo Freire intrinsically link to social justice (Adams, 2016). One of the most salient examples is in Freire's (1983) *Pedagogy of the Oppressed,* in which he describes the awakening of critical consciousness as crucial to understanding and assisting those in oppressed communities and situations (p. 18). This is the first alignment of social justice education and visual literacy. Visual literacy, and literacy more broadly, lends itself to global understanding which, in turn, creates space for more equitable communities. Kevin Tavin (2003) from The School of the Art Institute of Chicago promotes this type of engaged learning in visual cultural studies, in which students apply their analyses to deconstructing oppressive structures in the following statement: "the analysis and interpretation of popular culture should engage students in confronting specific and substantive historical, social, and/or economic issues" (p. 200). While visual cultural studies are not the same as education, understanding culture is a key component of pre-service educators' learning and literacy. Teachers must be mindful of their role as "cultural workers" (Garber, 2004, p. 7) and be provided with the space to develop empathy that incites them to become engaged in social issues (Winard, 2020). However, they can only be truly empowered if they have the proper toolset to become engaged cultural workers. This empowerment must occur through their education. The Association of College and Research Libraries states in their visual literacy standards that students will be able to design meaningful images and understand the ethical, legal,

social, and economic contexts of images (American Library Association, 2011). Upon reflection, the workshop did just this: it made students aware of their role as "cultural workers" in relation to their ability to fight censorship to protect cultural minorities in their future classes and empowered their ability to do so through instructing them on the state of censorship in the United States and instructing them about basic critical visual literacy.

Banned Books Week Door Decorating Workshop

In order to activate student awareness of the threat of censorship in school communities, one of the authors presented a lecture on the prevalence of challenges to children's books, data on the national sentiment regarding such challenges, and an outline of an individual's right, in the U.S., to freedom of expression. At the time of the presentation, book challenges had increased at an alarming rate according to the American Library Association's Office of Intellectual Freedom (2023). At the same time, a poll of registered voters on their view of censorship was published, which found that over 70% of voters of both major political parties opposed efforts to censor books in schools and libraries (American Library Association, 2022). Through a show of hands, students were uniformly concerned about the climate of censorship in their future schools and classrooms. One of the authors then presented students with an outline of their rights, and the rights of their students, to the freedom of speech under the First Amendment and the further protection of that right under the Fourteenth Amendment. The presentation discussed almost one hundred years of legal precedent defending the right to read, as well as bureaucratic measure in school systems to formalize complaints against books in schools. At the close of the lecture, students were encouraged to create a culture of *fREADom* by celebrating their First Amendment rights and raising the consciousness of their school community.

Following the lecture on censorship in schools, one of the authors provided an overview of visual literacy principles. Through a series of slides the author demonstrated how visual elements may be organized or arranged to communicate information to the viewer effectively using student birthdays as an example of a common educational display in classrooms (See Figure 2). The first slide depicted a purely decorative bulletin board conveying each student's birthday. Subsequent slides demonstrated various ways to elevate the decorative design to an educational display. For example, student birthdays could be rendered in a pie chart indicating the number of birthdays in a given season of the year. After the lecture, students critiqued an example bulletin board based on principles addressed in the lecture. During the discussion, the authors observed students evaluating the example based on meaning rather than aesthetic preferences.

Figure 2
Slide Depicting Alternative Arrangements of Visual Elements from Banned Books Week Lecture

During the last portion of the workshop, students perused a set of curated children's picture books on an assortment of social justice themes. After selecting a book, students were assigned a classroom door and given materials to create a display based on important themes contained in the book. Students had several days to complete their design, culminating in a celebration of their work and the freedom to read.

Assessment

Developing an analysis method was arguably one of the most difficult pieces of this exploration. Due to this shift in this paper's goals between the workshop and the presentation, recognizing visual literacy in the students' work was no longer the end goal. Rather, it was a sign that students understood the basics of visual literacy well enough to implement it in their work, and through this we could expand on their understanding and place the new knowledge in the context of social justice and a sense of empowerment to engage in activism. If given the opportunity to run the workshop again, the method of collecting information will also adapt based on the shifted interest from students' understanding of visual literacy to helping them use visual literacy for social activism.

Since the visual literacy component initially was based on introducing the concept to students and reducing their stress about making a display from scratch, the assessment did not have an identifiable baseline from which we could compare students' understanding of visual literacy before and after the workshop. Based on students' responses to being asked "Who is familiar with the concept of visual literacy?" it is evident that there must have been some degree of expanded understanding and awareness of the concept, as only one student out of approximately 30 said they had heard of the term. However, awareness of visual literacy did not mean that all students were unfamiliar with concepts of design either from formal training or simply learning visual language from experiences of making posters for classes or observing informational materials in the spaces they occupied. It also is important to note that individuals' K12 education is highly varied, and this also influences their level of visual literacy (although, based on observations of state standards, it is unlikely that there is much visual literacy education outside of the art classroom).

As a result of this multi-entry point of interfacing with visual literacy for what was the first time for most students, the authors determined the assessment should reflect scaffolded instruction. A quantitative scale would not work, as all the doors were different designs centered on a base theme of "Books Unite Us" but did not use the same book. A qualitative scale based on the presence of visual literacy components, particularly those reviewed during the workshop, was better suited to the analysis of the doors. This qualitative analysis was based on a few different practices of assessment outlined by the European Network

for Visual Literacy (ENViL) in their Common Framework of Reference for Visual Literacy in conjunction with the Academic College and Research Libraries' Visual Literacy Competency Standards for Higher Education and their performance indicators (Groenendijk et al., 2018, p. 355-357). The doors were assessed based on the following areas of the standards of the Association of College and Research Libraries (ACRL): to interpret and analyze the meanings of images and visual media, to evaluate images and their sources, and design and create meaningful images and visual media (American Library Association, 2011). These standards and the concepts of holistic and summative assessment as described by ENViL, were used to develop the following rubric (See Table 1). The rubric was then used to answer this question: Does the design indicate the presence of an understanding of visual literacy based on the questions?

Table 1
Evaluation Rubric for Banned Books Week 2022

ACRL Visual Literacy Standard	Questions for Assessment
Standard 3: The visually literate student interprets and analyzes the meanings of images and visual media.	- Did students identify images relevant to either amplifying the message of the book or the theme of the workshop: Books Unite Us? - If applicable, how did students use cultural themes/messages in the visual elements they chose to support their designs?
Standard 4: The visually literate student evaluates images and their sources.	- Did students use quality images? - Were students mindful of the amount of text/the message of text they used for their displays?
Standard 6: The visually literate student designs and creates meaningful images and visual media.	- Did students use visual elements creatively to create an aesthetically pleasing yet informative display? - Did students use any creative methods of arranging/making visual elements for their display to enhance the meaning of their door? (*Note: As the library was under renovation, students had an extremely limited selection of materials with which to create their designs. This lack of available materials and space to make the displays will influence the assessment of designs in relation to this standard.*)

Case Studies

Case 1: X460 All Stars

This door was one of the most exemplary in its creativity and showed distinct connections to the standards outlined in the rubric (See Figure 3). For their door, this group of students chose *We Are Water Protectors* by Carole Lindstrom (2010). In the story, the Ojibwe are fighting against the Dakota Access Pipeline's construction, describing it as a "black snake" that would harm the land and its people. The story calls for everyone "To stand for The Water, To Stand for the Land, To Stand as One against the Black Snake" (Lindstrom, 2010, p. 12). While the door is heavily based on the storyline of *We Are Water Protectors,* the students identified common themes between intellectual freedom and environmental wellness. Both risk of suffering because of the black snakes of censorship and oil pipeline construction, respectively.

Figure 3
Door 1. Based on We Are Water Protectors, by Carole Lindstrom (2020)

In order to make this clear to the audience, the students labeled the snake "book banner," so even if the audience had not read *We Are Water Protectors,* they could infer that the snake is a negative part of the landscape shown in the door design versus a coexisting piece. The new label on the black snake then transforms the quote from standing as one against the pipeline to standing as one against censorship, showing the students' awareness of how elements can be redefined by text and create a deeper meaning. This transformation also calls back to the unifying force of books and the need for everyone to speak up against censorship.

It is also worth mentioning the visual design elements of the door. As noted in the rubric, students had minimal access to design resources, as the library was under renovation during this time. Despite this, all three groups described in this paper created beautiful displays. One of the most notable features of this door is its use of texture to create visual weight and interest. The variety of textures keeps viewers engaged with the piece and emphasizes the black snake and the issue of book banning, as the bright blues are a stark contrast against the black and red of the snake and the "book banner label." The diagonal use of text to create movement is also worth noting, as it follows a downward motion that is repeated by the curvature of the snake and the flow of the water. This leads the audience's eyes from the text, which contextualizes the issue of environmentalism and pollution and helps viewers understand the dual significance of the snake when they observe it.

Case 2: Dean's Advisory Council

This door, unlike the previous display, overtly tackles the theme of "Books Unite Us! Censorship Divides Us!" by emphasizing the unifying power of books rather than the issue of censorship (See Figure 4). Book bans target minoritized groups without understanding the damage they cause to these groups. *Hair Love* shows how books celebrating cultural and racial differences empower young children, making it clear that censorship does more harm than good. Even if a viewer cannot relate to hair being a part of their cultural identity, they can identify with it being a part of self-expression, which relates to the theme of censorship and how it is harmful. Books are part of self-expression through what individuals choose to read and what identities are represented in banned books. Without representation, minoritized groups being targeted in these book bans feel ostracized, and perhaps fearful of what others in their community think of them when there are fewer visual reminders of solidarity.

Figure 4. *Door 2. Based on Hair Love by Matthew Cherry (2019).*

The minimal visual elements emphasize the text "I love that my hair lets me be me!" and help create the understanding that hair is an important part of expression and identity. The group's color choice for the words strengthens this connection by emphasizing "hair" and "me" in red. Using purple for the other words strengthens the hierarchy by using a heavier color so that the highlighted words do not disrupt the flow of reading. The placement of the elements also creates an excellent flow that creates a dialogue between the visuals and the text. The person at the bottom of the door looks up at the text to meet readers' eyes as they finish reading the sentence. The diagonal skew of the individual portraits adds visual interest while keeping the focus on the key parts of the elements (that is, the words and the person at the bottom of the door).

Case 3: Kelley Kids

Like the previous door, this design focused on unification versus censorship (See Figure 5). *Everyone…* by Christopher Silas Neal explores the various emotions one experiences throughout life (2016). The first three sentences from the top of the door to the middle are summaries of common feelings and feelings that the boy has in the book. The last two sentences are a direct quote from the book. To emphasize the theme of community, the group highlighted the word "everyone" in blue creating greater unity within the design. The cloud at the top is one of the illustrative elements in the book; however, the lightning bolt that emphasizes the boy getting mad was a choice made by the students. The cloud rains down on the boy and the bear hugging below. In the book, the boy and bear are sitting in a field of flowers. However, at a distance, the field could also be read as a puddle of water from the rain cloud that the boy and bear are floating upon.

Figure 5
Door 3. Based on Everyone… by Christopher Silas Neal (2016)

The decision to align the elements in such a way strengthens the design immensely by creating visual flow and a bookend to the design (the rain cloud and the puddle or field of flowers below). The diagonal flow of the letters adds to the ease of reading the design, as there is a clear direction for viewers to follow when taking in the elements. The addition of the lightning bolt also helps viewers start at the top of the design and work their way down, rather than only focusing on the middle parts of the door that are at eye level.

Overall, the case studies show that the visual literacy standards embedded in the presentation were met in the door designs, proving that the instruction was effective. In the future, the authors will conduct pre- and post-workshop surveys to further understand the efficacy of the instruction. Sample questions might include: Do you feel more empowered about making designs? Does this knowledge help you to feel more confident in participating in activism through making visuals? Do you feel like understanding visual literacy helps you to feel more confident in your learning?

Discussion

Throughout the creative process, the authors observed a high level of engagement by the participating students. Students chose books with care and took time to discuss with one another how to best connect the spirit of their chosen book to the overall theme of the event. During the design process, students planned and negotiated the placement of visual elements. The authors were encouraged by the students' enthusiasm to create engaging designs in service of the freedom to read. The effect of the decorated doors was palpable. The authors received numerous comments from students, faculty and staff telling them that the hallway of classrooms felt activated and provocative. The doors remained decorated for two weeks, culminating in a celebratory tour of the doors with their creators. Due to this high level of engagement, the school community pressed to make a Banned Books Week door decorating event and annual occurrence.

Each year, graduates from the authors' institution account for thirty percent of new teachers in the state. Given the high visibility of the decorated doors, the potential to raise awareness of the social injustice of censorship in schools throughout our state is considerable. Moreover, students will have had the opportunity to practice creating impactful educational displays before entering the classroom as professionals. The authors hope that elevating classroom displays from decorative to activist in nature will create school communities rooted in equity and justice.

Looking Forward

Overall, this project sparked interest in furthering visual literacy instruction for pre-service educators due to its social justice implications that align with teacher education programs of study at the authors' institution. As future teachers, students will face the issue of intellectual freedom and censorship. Awareness of social issues and how they can participate in social activism will help them foster a culture of equity and justice in their classrooms. This event activated students to speak up for intellectual freedom for themselves and their future students, but perhaps more importantly, it gave them the power to feel like they had the ability to speak up and become social activists.

The latter is why it is important that we continue instructional sessions that are gateways to students and educators becoming mindful, empowered, and engaged citizens. The goal of social justice education is "full and equal participation of all groups in a society that is mutually shaped to meet their needs… [and] includes a vision of society that is equitable, and all members are physically and psychologically safe and secure" (Bell, 2016). Social justice is not just about making space for the affected to speak up; it is about taking action after listening to what must be done and how people are negatively impacted by oppressing legislature and ideologies. It is not easy to stand up, and there are many barriers that make it difficult to engage in activism. However, standing up becomes easier when there is a clear plan of how to do so. This plan can take shape through instructional sessions and workshops, such as the one described in this chapter.

As there is minimal space in pre-service educators' curriculum dedicated to learning how to make educational displays, and educators are positioned in a way that they engage in social justice, it follows that they would benefit from opportunities such as this workshop. As previously discussed, visual literacy is often relegated to art education classes; pre-service educators who are not studying art also have minimal opportunities to engage in artmaking. While libraries cannot offer sustained instruction as semester-length classes, targeted instruction yields heightened awareness of visual literacy and modest gains in skill.

The workshop also created an opportunity for students to become active participants in their learning and support the idea that in their future roles as educators; students have agency and are not simply "technicians" that provide information for students to regurgitate (Garber, 2004, p. 7). This sense of agency links to the importance of full, equal participation that is important in creating globally aware, lifelong learners (Bell, 2016, p. 3). Passive learning is not positioned to help students become critical thinkers, nor does it help students feel like they have the ability to contribute and make change. There is also the concern that "in [educators'] zeal to convince [their] students about the need for social change, [they] may silence [the students'] voices" (Garber, 2004, p. 13). In our workshop, students' voices were not silenced--they were empowered to share their unique perspectives on the issue of censorship through their creative displays that fostered discussion. These displays also supported visual literacy education, as it connects to Garber's concept of art as engaged citizenship. Thus, through visual literacy instruction in the context of social action, the authors endeavored to help students feel more comfortable exercising their creativity, as they were given a toolset and a form of parameters within which they could work.

With all the challenges and fears that permeate our polarized society, it is easy to become hopeless and feel like one person's voice cannot make a difference. However, if one educates students in a way that their voices matter, it potentially creates the space for students to feel more comfortable in their voice. Instead of feeling apathetic and hopeless, there is hope that their singular display, their singular voice, may positively influence their community. The displays these educators make in the future have the potential to create a more socially just world by creating instances in which students imagine these better futures and

can then strive to actualize them (Beyerbach & Ramalho, 2011). In this way, visual literacy education becomes more than fostering visually literate individuals; it empowers students to cultivate social awareness and be competent enough to make a change through visual pieces that resist oppression such as censorship. Academic libraries have the potential to help resist oppression, so it follows that they can become one of the central points of advocating for social justice education that is enhanced through visual literacy instruction. In the future, the authors hope to continue expanding this workshop so that more pre-service educators may feel empowered to make displays and engage in social justice and activism.

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Visual Literacy: A Foundation for Human Communication Art as a Catalyst for Social Change

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Abstract

Humans are inherently storytelling beings. From early childhood, narratives permeate our lives, encompassing a spectrum from imaginary tales and fairy tales to reality-based accounts. Throughout history, the content and modes of storytelling have evolved, reflecting distinctive aspects of each era. Visual narratives, integral to human communication, have manifested across time, from ancient cave drawings, hieroglyphics, and murals to medieval tapestries, modern graphic novels, and virtual interactive reality narratives. Storytelling serves as a crucial vehicle for envisioning diverse realities and imagining alternative futures. In this paper, visual literacy, including the abilities to create, share, understand, use, and analyze visual narratives, is discussed as a profound foundation for human communication. The discussion is framed within McFee's work and her sociocultural approach to visual literacy, and artmaking. One conclusion is that art making can function as a democratic tool for reevaluating values related to equality and justice, thus acting as a catalyst for societal transformation. The content is elucidated through illustrations, crafted by the author.

Keywords: Visual literacy, Visual culture, communication, visual narratives, June King McFee

Introduction

Reflecting on my childhood, vivid memories surface of my two older sisters and me, immersed in drawing and painting all the time and everywhere. Wherever we went, we packed crayons along with drawing and coloring paper pads. Specific drawings linger in my memory. Especially rememberable are those where color combinations stood out as exceptionally beautiful - pink paired with turquoise or orange harmonizing with dark blue. The act of creating these initial artworks invoked feelings of wonder, enchantment, and joy. Making pictures was a social endeavor, rooted in interaction. As Norris (2011) posits, social actions like our collaborative artistic pursuits, shape identity.

Actions acquire a social dimension when communicated (Norris, 2011). Multimodal interaction analysis integrates nonverbal and multimodal communication, such as visual and bodily communication. It is noteworthy to understand that actions are mediated by the specific social context, which vary across families, social groups, cultures, and even within a group over time.

This paper aims to illuminate the interconnection between visual literacy, visual culture, and people's narratives through the lens of June King McFee's comprehensive and multi-faceted theoretical foundation.

A Shared World Filled with Visual Images

People live in a shared world surrounded by visual images, crucial for comprehension, meaning making and communicating perceptions of their environment (McFee, 1961). The rise of visuality is particularly evident in social media, where an abundance photographs, video recordings, memes, and infographics are constantly uploaded and shared globally (Crilley et al., 2020). Over the last four decades, visual culture has gradually emerged as the predominant medium (Sturken & Cartwright, 2001). This shift signifies that human values, attitudes, and views are increasingly shaped by the images encountered in daily life. The drawings and artworks of children and students exemplify the influence of visual culture on their beliefs and opinions (Ivashkevich, 2009; Kukkonen, & Chang-Kredl, 2017). Thus, active participation in a culture involves both creating and being shaped by it. Cultural influences, whether local, national, or global, impact how children adapt to and engage with visual culture and the world. Visual images and storytelling play influential roles in the routines of children (Bakar et al., 2020).

Homo Narrans

Storytelling has always been essential to human beings, transcending cultural background and era (Benjamin, 2006). It serves as an inherent means of sharing experiences, exchanging ideas, and exploring dreams. As humans use stories to navigate the complexities of the world and interpersonal relationships, visual communication consistently plays a role. It is posited by Kress (2010), who emphasizes the inherently multimodal nature of communication. For instance, in verbal communication, individuals utilize elements such as eye gaze, facial expressions, gestures, and overall body language, all of which constitute visual communication. The nuances of these expressions are culturally contextualized. This visual dimension implies that even as small children, individuals learn to interpret body language as signals. This forms a foundation for communication that transcends the need for verbal expression.

People continually weave narratives, both explicitly through conversations recounting events or incidents and implicitly by navigating their daily lives. Presently, numerous global narratives unfold, ranging from issues like global warming and pandemics to other crises. People find themselves positioned within these narratives. Sometimes they are on the periphery, scarcely aware of ongoing events, and occasionally they play minor supporting roles. At times, they take on lead roles in particular narratives. Given their involvement in multiple, sometimes overlapping narratives, individuals may engage in conflicting discussions, especially concerning ethical dilemmas tied to the prevailing narrative. These conflicts often revolve around the narrative itself rather than the underlying dilemma (Frønes, 2001). This concern appears particularly pertinent in the face of contemporary wars, conflicts, and politics (e.g., Bar-On & Molas, 2021; Callahan et al., 2010; Jaworowicz-Zimny, 2023). As a result, it becomes crucial to grasp the social context in which a narrative unfolds and to consider it from various perspectives.

Narratives, whether fictional or based on lived experience, are changeable, allowing for the possibility of steering them in new directions. For example, the narratives of climate change, inequality, and poverty. However, narratives also bear the potential for manipulation, the creation of alternative truths, and even posing threats (Ciovacco, 2020). Throughout history, marginalization and imbalances of power have been outcomes of numerous narratives (Vercher et al., 2020). Narratives assume a pivotal role in the transmission of cultural values and heritage, serving as channels from one generation to the next, primarily through storytelling. Language, as emphasized by Benjamin (2006) has a profound influence on culture. Through storytelling, humans actively create and perpetuate the cultural identity of their society. Visibility of culture, society, and even a nation becomes imperative for securing social acceptance and success (Mariati et al.,2021).

The notion of cultural anchoring implies that language extends beyond the realms of oral and written forms. It involves the visual domain as well. Visual expression serves as a communicative channel, positioning visual art as a form of language. Language, often defined as "a symbol system that conveys complex ideas" (Goodman, 1976, as cited in Eubanks, 1997, p. 31), aligns with the perception of the socio-semiotic theory of language (Halliday, 1978; Hodge & Kress, 1988). Halliday asserts that language is inseparable from society, viewing it as socially situated and utilized by individuals through interaction within a social context. Language and society are intricately interwoven and must be investigated as a unified entity. Social semiotics study the modes of communication that people employ to articulate their comprehension of the world and establish connections with others. Hodge and Kress (1988) stressed that social semiotics studies all kinds of human semiotic systems, which I suggest includes visual semiotics.

June King McFee

This discussion highlights the intricate theoretical groundwork laid by June King McFee, who served as a Professor and Head of the Department of Art Education at the University of Oregon from 1965 to 1983, where she also pioneered the establishment of the doctoral program in art education. At the core of McFee's perspective lies the cultural function of art education. She placed significant emphasis on the communicative dimensions of art and visual literacy. These were intertwined with the principles of democracy, human rights, and citizenship (e.g., McFee, 1961, 1965/2016). McFee was born in 1917 and grew up during a time when marriage was a primary goal and priority for most women, despite the image of the 1920s women as independent and rebellious (Horn, 2010). This societal norm proved challenging

for McFee, who harbored aspirations of becoming a pilot, engineer, or mathematician (McFee, 1975). As depicted in Figure 1—a nod to Tamara de Lempicka, an artist from the art deco period, celebrated for her bold defiance of prevailing social norms and cultural stereotypes surrounding women. However, McFee's aspirations for a future beyond traditional gender roles were thwarted by her father's disapproval. While becoming an artist was deemed more acceptable, it was viewed as a leisure pursuit or amusement. This attitude deeply unsettled McFee, and the sense of discrimination based on her gender persisted throughout her career. She consistently encountered disparate treatment between men and women, an experience that profoundly influenced her trajectory. Consequently, McFee undertook a mission to ensure inclusivity for all students, regardless of cultural background or gender. Her pedagogical approach was rooted in a multicultural perspective, emphasizing the importance of embracing and celebrating diversity.

Figure 1
Brave women in 1920s. Watercolor and gouache (Margaretha Häggström, 2023).

McFee's Pedagogical Approach and Theoretical Foundation

McFee perceived art and artistic expressions as exemplifications of human behavior, serving as channels through which individuals convey feelings, thoughts, beliefs, and narratives, often imbued with cultural and symbolic functions. Her theoretical framework drew inspiration from the anthropologist Herkovits (1972), renowned for his humanistic and relativistic perspectives on culture and cultural identity. Herkovits championed the cause of ethnic equality in the USA, an influence palpable in McFee's commitment to equipping students from diverse cultural backgrounds to navigate society without compromising or devaluing their cultural heritage (e.g., McFee, 1965). This dedication is explicitly articulated in McFee's collaborative work with Rogena Degge, the book *Art, Culture, and Environment: A Catalyst for Teaching*, published in 1977. Over her extensive career, McFee continually refined her theoretical foundations,

incorporating insights from various behavioral sciences such as anthropology, psychology, sociology, and art pedagogy (Eisner, 1963; Häggström, 2023; Jenkins, 1978).

Art as a Catalyst for Change

According to McFee (1999), art possesses the dual capacity to act as a conduit for cultural change and, concurrently, a mechanism to resist change, preserving cultural essence. Thus, art holds the transformative power to reshape narratives. As society evolves, art reflects these changes, with social progress driving artistic development. McFee contends that art serves as a vital symbol of a particular culture, elucidating a shared community identity that deserves preservation. Simultaneously, art possesses the capacity to critically scrutinize and question these identities and symbols. Historical instances, such as art movements advocating against war and for women's rights, underscore the instrumental role of art in challenging societal norms. Art emerges as a democratic force, shaping, expressing, and disseminating human values while also scrutinizing, criticizing, and revising these values to foster social justice (McFee, 1998, p. x). McFee envisions a future where increased communication across perspectives and a revitalized education system position art as a major communication system—a unifying force for mutual understanding in a multicultural society. In today's world, marked by successive global crises, alternative modes of expression gain significance. Creating art can support people's perceptions of their culture and foster the capacity to envision alternative futures. Artistic expressions may function as tools to defend human rights, resist oppression, and amplify the voices of untold narratives recounting experiences of discrimination, violence, and domination. Nevertheless, many of McFee's aspirations remained unfulfilled, depicted in Figure 2, where the once bold woman transforms into a mural painting.

Figure 2
Brave women as a mural painting. Photo montage (Margaretha Häggström, 2023).

Visual Narratives and Sociocultural Perspectives

Visual narration serves as a catalyst for intercultural dialogue, fostering a sense of belonging to a global community. It creates a feeling of being a part of a larger collective "we" (Wilson & Snæbjörnsdóttir, 2022). Visual narratives encompass various forms of storytelling using visual media. These include still photography, photo essays (Davies, 2022), video, animation (Blazer, 2019), comics, graphic novels (Eisner, 2008), as well as drawings, paintings, and mixed media. A visual narrator, or storyteller, captivates an audience, guiding them into an imaginative world. The ability to create visual narratives traces back to cave paintings and rock engravings, among the earliest forms of human expression. These depictions portray scenes of hunting, rituals, and offer insights into ancient civilizations, human life, and spiritual experiences. They function not only as a means of communication but also as a reflection of a culture's collective values. Furthermore, they indicate that visual culture evolves alongside societal changes, influenced by specific places, traditions, themes, and conventions (Robb, 2020). Heyd (2012) posits that aesthetic senses are culturally specific, while Robb (2020) suggests that aesthetic expressions are linked to ontological and cosmological beliefs, emphasizing that the act of seeing is constructed within a given social and historical context. Sayre (2010) succinctly captures this idea: "Everything you see is filtered through a long history of fears, prejudices, desires, emotions, customs, and beliefs." Figure 3 playfully illustrates this concept through a reinterpretation of an imaginative cave painting, featuring an expressionistic happy yellow cow by Franz Marc (1911) alongside a dreamy white and blue cow (with a parasol) by Marc Chagall (1946).

Figure 3
Happy cows – influences from cave paintings, Marc and Chagall. Mixed media. (Margaretha Häggström, 2023).

Sociocultural theory underscores the profound influence of culture and society in the formation and development of identity. It posits that learning is a social and cultural process, mediated by cultural tools

such as language and the arts (Aulgur, 1998). Originating from the work of Vygotsky (1930, 1934), this theory asserts that children acquire knowledge and skills through interactions with more proficient individuals, such as teachers, parents, or older friends. This learning process from a more skilled person is known as the zone of proximal development. It is defined as the space between what an individual can accomplish independently and what they can achieve with guidance or collaboration with more capable peers. Teachers and peers play a pivotal role in shaping individual learning, cultural beliefs, and attitudes. Educators, whether teachers or parents, should assess an individual's capabilities in a social setting, emphasizing what the person can achieve with support, rather than solely focusing on independent abilities. For this social-culturalist author, the interpretation of experiences is inherently shaped by cultural perspectives, with individuals constructing their understandings through social frameworks. These interpretations find expression in various forms, including oral, written, or visual narratives. Language is recognized as a universal tool. Vygotsky (1934) extended the concept of language to encompass all sign systems prevalent in a specific culture, regarding them as mental tools. Consequently, diverse modalities, such as music and sound, dance, art, and drama, are considered forms of language or modalities (Kress, 2010). These modalities serve as tools mediating and representing individuals' thinking, providing children with multiple avenues for constructing knowledge. In this context, art expressions, are viewed as methods for structuring ideas, capable of evolving and manifesting in new contexts (Aulgur, 1998).

Much of McFee's work delved into the intricate interplay between culture and identity formation through visual art (e.g., McFee, 1988). Her conceptual framework aligns with cultural-historical activity theory. This theory examines the relationship between the human mind and activity, exploring the interplay between individual thoughts and feelings and their actions and behaviors (Roth & Lee, 2007). Originating from Vygotsky, this theory was developed by Cole (1998) and expanded by Engeström (1999). Fundamental to this theory is the idea that people engage collectively and learn through practical experiences, communicating through their actions and adapting tools for communication. The community plays a pivotal role in meaning-making, learning, communication, and action. McFee embraced Vygotsky's idea that an individual's consciousness and perceptions are shaped by activities mediated through artifacts or tools. This includes visual signs and symbols. The use of signs leads to a specific structure of actions, influenced by the cultural-historical context. However, McFee consistently integrated societal dimensions, including socioeconomic structures and cultural and institutional perspectives within a given culture, into her writing and advocacy. She questioned whether economically and socially deprived students might feel "overwhelmed that the society that demands that they go to school really has no place for them when they finish" (McFee, 1965, p. 89). In line with Engeström (2001), who emphasized the consideration of multiple activity systems, McFee argued that societal norms and intersubjective community relations are crucial for understanding human behavior. In the realm of art education, she advocated for what Engeström terms as multi-voicedness—embracing diverse points of view, traditions, and interests. Figure 4 illustrates a dynamic identity transformation within cultural-historical art contexts and commences with a portrait of June King McFee.

Figure 4
Changing portraits. Mixed media and collage (Margaretha Häggström, 2023).

Visual Literacy and Communication

To McFee, visual literacy is an interconnected process that cannot be isolated. It is consistently tethered to a specific context, culture, society, and the ongoing formation of identity (1999). She explaine that every choice an individual makes emerges from their cultural and social milieu. This includes decisions related to image composition, the selection of colors and shapes, and the conveyance of content and messages. McFee emphasized that these choices are not arbitrary. Rather, visual expressions are sociocultural constructs that unveil an individual's visual literacy abilities. Additionally, when people analyze artworks, their perceptions and interpretations are rooted in their own cultural framework. McFee underscored the critical importance of being cognizant of this dynamic interplay.

A comprehensive definition of visual literacy encompasses the ability to read, write, and create visual images. It entails proficiency in interpreting and producing visual content. Visual literacy can be conceptualized as involving four essential visual abilities, nurtured through four key social practices: visual code-breaking, visual meaning-making, visual use, and visual analysis (Häggström, 2019, 2020, 2023). Emphasizing social practices underscores that visual literacy is intricately tied to and influenced by cultural contexts, including social relations, roles, and power dynamics. Visual code-breaking, essential for creating, using, and analyzing images, involves recognizing elements and structures within visuals, such as shape, color, light and shadow, and composition. Aligning with McFee (1999), considerations of gender, class, and cultural background are pivotal in this process, acknowledging that sociocultural affiliations shape human thinking and, consequently, how they decipher visual communication. Visual meaning-making stems from personal experiences with images, which are, in turn, grounded in sociocultural contexts. It involves communication and interactions within practices and relies on reflections and understandings of the context. In the realm of art education, it becomes imperative to represent images from diverse cultures, thereby fostering inclusive learning environments.

McFee argues that students have a democratic right to visualize and discuss their contrasting beliefs, fostering diverse thought communities. Examining how human experiences and expressions converge in various ways becomes crucial for understanding visual literacy. Visual use involves developing the capability to leverage one's knowledge in meaning-making. This includes using and creating images based on one's social and cultural resources, thereby empowering the creation of visual communication. McFee advocates for each student feeling secure in showcasing and utilizing their own visual traditions and cultural heritage. Collaborative activities that draw on each other's knowledge and backgrounds can lead to the emergence of new understandings and collective identities. Visual analysis guides individuals to diverse sources and is grounded in asking relevant critical questions. Critical questioning entails a discerning awareness of social justice within visual language, power dynamics, and identity (Häggström & Schmidt, 2021). This critical awareness holds the potential to heighten students' consciousness of sexist, racist, and postcolonial structures. McFee consistently incorporated this issue into her teaching. Visual analysis serves as a tool to unveil underlying or concealed messages, intentions, and ideologies (Dan & Arendt, 2021).

The extent to which individuals can respond both aesthetically and cognitively to artistic communication hinges on the information they have acquired and the breadth of their understanding of artistic symbolization and structure. These elements serve as the foundation for a critical response, as articulated by McFee (1965, p. 10). Figure 5 represents an endeavor to explore and respond to artistic communication and the theme of female identity.

Figure 5
Identity building. Mixed media and collage. (Margaretha Häggström, 2023).

Discussion

In this paper, I have expounded and interpreted sociocultural perspectives on human communication and visual narration, focusing specifically on June King McFee's pedagogical approach to art education. Despite her influence in education, women's issues, art education, and environmental movements, McFee's recognition has not been commensurate with her significance. She emphasized the need for a comprehensive and complex theoretical foundation to comprehend human identity formation, interactions, and learning. This is exemplified in her work, as seen in McFee (1999). In Figure 6, this understanding is depicted as an individual's amalgamation of mixed identities and multifaceted roles. McFee asserted that addressing social issues through education should be an integral part of the mission of art education. Her approach involved blending anthropological and psychological perspectives to grasp learning and social behavior (McFee, 1961), with a multicultural point of departure evident in her articles and books (e.g., McFee & Degge, 1977; McFee, 1998). Throughout her publications, she reflected on the role of art and art education, posing questions such as, "How can art experience and symbolic communication contribute to a sense of identity and social participation?" (McFee, 1966, p. 132). McFee underscored personal integrity as a fundamental quality in artmaking (McFee, 1966).

Figure 6
I and my representations. Acrylic painting and photograph. (Margaretha Häggström, 2003).

McFee, ahead of her time, demonstrated a profound interest in environmental issues, as evidenced in her works (McFee, 1974; McFee & Degge, 1977). In the mid-1960s, she foresaw a future marked by inequalities in access to water, food, housing, health care, education, and communication. Her warning remains relevant today (Keifer-Boyd et al., 2016). In 1974, she emphasized the need for humans to cultivate the capacity to "use art as a humanizing force in improving the quality of life on this earth" (McFee, 1974, p. 11), as depicted in figure 7. Expressing concern for humanity's well-being, she highlighted risks stemming from "overpopulation, decreased natural resources, and inflation on a worldwide basis." In 2023, these concerns are glaringly evident in the form of refugee crises, pandemics, global warming, climate change, and wars. Exploring McFee's path could reveal how art and visual literacy can contribute during the ongoing global crisis.

Figure 7
Global warming. Photo collage (Margaretha Häggström, 2023).
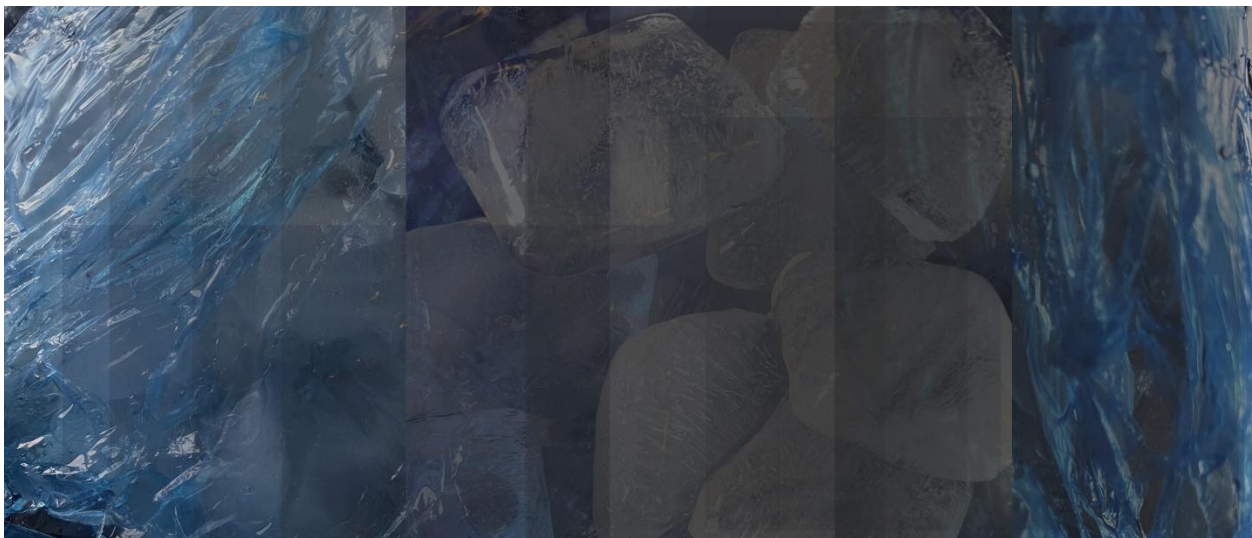
Through an exploration of McFee's writings, this paper contends that art can function as a catalyst for change, with humans naturally expressing stories of their life-worlds, culture, and circumstances through visual narratives, adapting techniques with each era. Art has the power to unite people and their ideas, influencing mental health, energy, and agency. The historical continuum of artistic expressions, from cave paintings and rock carvings to contemporary digital platforms, underscores its enduring relevance. Amid present crises, such as global warming, climate change, pandemics, and war, art provides a medium to process these challenges. It bridges the gap between research findings and human emotions. This fusion of facts and emotions is pivotal for human agency and the ability to act, emphasizing the urgency of care. Building on the discussion of visual literacy abilities earlier in this paper, it becomes clear that they are essential for conveying emotions ranging from anxiety and fear (as depicted in figure 8) to hope and confidence. Echoing McFee's perspective, "If we assume that education is more than a tool for survival but a tool for making survival worthwhile, then the arts need our careful consideration" (1965, p. 9). Through art, communities are forged, and diverse visual narratives serve as vehicles for sharing experiences and events, fostering a sense of interconnectedness.

Building on the insights of Kukkonen and Chang-Kredl (2017) and Bakar et al. (2020), it is evident that visual narratives, particularly contemporary artworks, wield the power to influence and even shape people's values, attitudes, and beliefs. This observation aligns with McFee's overarching argument, which emphasizes the potential of artists to alter global dystopian narratives. Visual narratives have the capacity to propel individuals into leading roles within current narratives. They can transform these narratives from

dark scenarios into sources of strength and motivation. Visual culture and art education, pivotal in the development of visual literacy, emerge as the mediating tools, echoing Vygotsky's assertion that they can evoke emotions and instill hope in people. Drawing inspiration from McFee's teachings (1998), it is imperative to embrace diversity and ensure the inclusion of all people and cultures, not just the privileged few. Only through such inclusive practices can art become a democratic force for reexamining values and promoting equality and justice.

Figure 8
Dystopia. Photocollage (Margaretha Häggström, 2023).
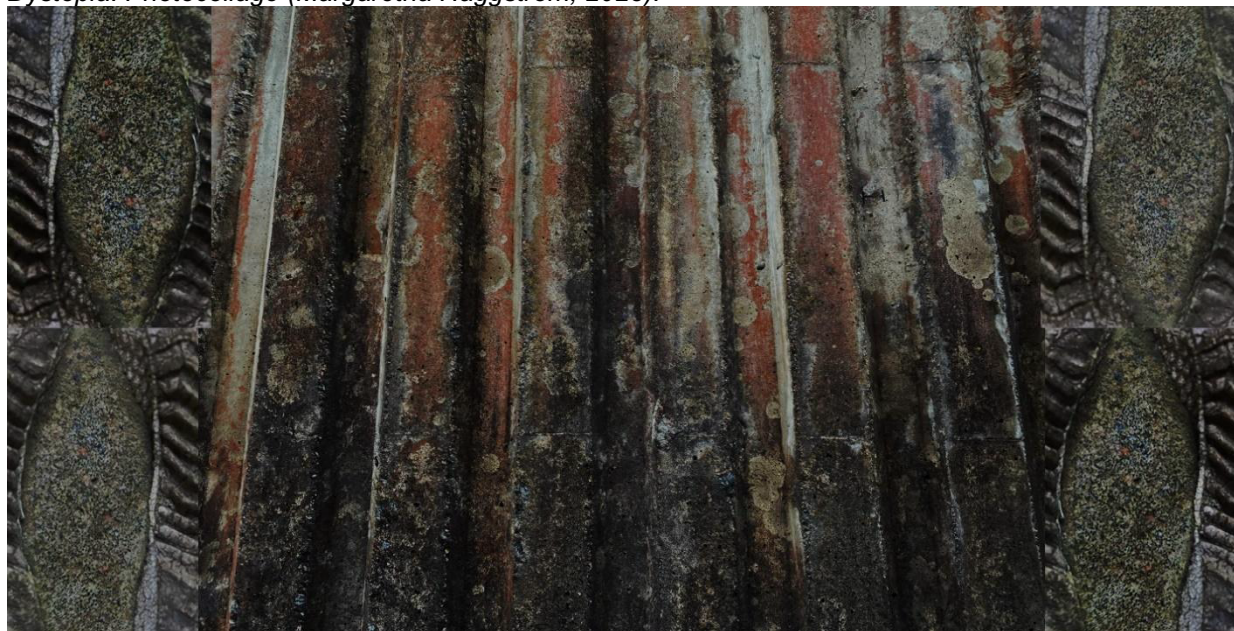
Conclusion

This paper has explored visual literacy as a fundamental cornerstone for human communication, underscoring visual narratives as potent catalysts for cultural change. A visually literate perspective is essential for critically analyzing historical and contemporary visual narratives, especially when wielded by influential figures such as politicians. Employing cultural-historical activity theory as an analytical lens sheds light on human art creation and actions toward a more promising world, elucidating the intricate connection between human thought and action. According to cultural-historical activity theory, community plays a pivotal role in meaning-making, learning, communication, and action. Within this framework, visual narration emerges as a force capable of fostering intercultural discourse. This is especially significant in today's era of global crises. It has the potential to instill a realization that individuals are integral parts of the global community, contributing to a broader collective identity (Wilson & Snæbjörnsdóttir, 2022). McFee's emphasis on being part of a larger "we" resonates through various dimensions in art education. This offer not only a fundamental question but also a key solution to address the challenges of our contemporary crises.

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A Critical Visual Literacy Inquiry Model
for Pre- and In-Service Teachers

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Abstract

Critical visual literacy is an important skill set for current and future educators, as well as preschool to 12th-grade students. It emphasizes critical analysis of visuals in their sociocultural context to evaluate power dynamics and plan for change. A team of three education faculty developed and implemented a critical visual literacy inquiry model in three graduate-level courses during the 2022-2023 academic year. The flexibility of this model allowed for the adaptation of different visuals and activities based on each course's specific needs and its students. This paper explains the process of developing and implementing the model, offering insights and recommendations to enhance the teacher education curriculum. It aims to improve the knowledge of critical visual literacy for both pre-service and in-service teachers, empowering them to design culturally responsive learning experiences that cater to diverse student populations effectively.

Keywords: critical visual literacy, inquiry model, curriculum design, culturally responsive teaching and learning

Introduction

The increasing presence of visuals in education and everyday life has created a need to improve teacher and student visual literacy skills generally and critical visual literacy skills specifically (Brown, 2022). Each visual sends a message from a particular perspective. However, it can be challenging for students to identify this message as visuals are subjective and incomplete by nature. Thus, readers need to possess the visual literacy skills not just to read, but also to analyze and assess them.

In this regard, teachers have to be able to develop effective learning experiences that help students study visuals critically so that they understand how visuals work. Students also need to be able to assess the message regarding power and authority, reliability and accuracy of content, bias, distortion, and omission. They need to be able to assess the impact on viewers and possibly society at the time of publication and over time and place. Whether it be a map, photograph, cartoon, video, or multimodal display, each visual reflects personal and cultural beliefs, attitudes, and ideas, among other things. As a result, the visual can send explicit or implicit messages regarding race, ethnicity, gender, political opinion, or socioeconomic class. These messages often support ideas of the dominant members of society to the detriment of others.

Critical visual literacy imparts a specific perspective to investigating the sociocultural contexts of visual texts to assess power relations (Chung, 2013). It deepens the analysis by exploring the political, social, economic, cultural, and other aspects to assess how and why the visual depicts a society's power and authority relationships. Critical visual literacy also stimulates inquiry. It prompts students to raise questions about the origins of the attitudes and beliefs that stimulated the creation of the visual's message and regarding the response of the targeted group. In addition, critical visual literacy encourages viewers to take actions to advocate for change (Costa & Xavier, 2016; Kim & Serrano, 2017). In education, critical visual literacy not only provides marginalized students with key academic skills and access to the core curriculum, but also empowers them to serve as change agents for equity and social justice.

In this paper, we describe the project and introduce an inquiry model specifically developed to enhance the critical visual literacy skills of pre- and in-service teachers. Then, we delve into comprehensive details about each course, explaining how each researcher adapted and implemented the inquiry model to cater to the

unique characteristics of their course. Lastly, we present the project's findings, discussing insights and offering suggestions to help improve teacher education programs.

About the Project

Three researchers from different disciplines in education (Social Studies Education, ESL/Bilingual Education, and Curriculum and Instruction) collaborated on the critical visual literacy project to support a diverse group of pre- and in-service teachers in their graduate-level courses. This group of students represents a good cross-section of individuals in the teaching profession at various career stages. The overall goal of this project was to enhance the ability of pre- and in-service teachers to implement critical visual literacy skills to advance equitable outcomes of their students. To achieve this goal, the researchers developed a critical visual literacy inquiry model and implemented it in their courses, adapting the model to their course content and needs of their students.

Methods of Teaching Social Studies in Secondary School enrolls pre-service social studies teacher education candidates. In this course, the candidates learn how to use an essential triad of social studies education—inquiry, primary sources, and literacy—in a high school classroom. Critical visual literacy is included as a basic component of teaching and learning. The candidates learn to plan inquiry-based learning using primary sources as texts to improve content knowledge while building literacy skills, in this case critical visual literacy.

Methods and Materials for Teaching English as a Second Language enrolls pre-service teacher education candidates and in-service classroom teachers. This course prepares teachers to examine and apply conceptual and pedagogical tools for teaching English as a second language and supporting students' bilingualism. Visuals serve not only as tools to enhance comprehension but also as texts and cultural artifacts that carry meaning, perspectives, and biases. They are used in the ESL context to ensure equal access to the core curriculum and enhance students' multimodal literacies. Therefore, it is critical for teachers in the course to learn how to thoughtfully select culturally relevant visuals and critically examine the power relations embedded in them.

Implementing and Assessing Content Area Curriculum enrolls in-service classroom teachers from various levels and subject areas. This course guides in-service teachers to identify biases and gaps in their existing curricula and develop ideas to overcome those issues. For this project, as one way to address biases that may exist in their teaching contexts when using visuals, they are asked to consider how the visuals they use in their classrooms can influence their students.

Critical Visual Literacy Inquiry Model

The critical visual literacy inquiry model is a comprehensive framework designed to guide the incorporation of critical visual literacy activities involving various visuals (see Table 1). The researchers specifically developed this model to offer pre- and in-service teachers a structured approach for implementing critical visual literacy strategies in their instructional planning, aligning it with the Illinois Culturally Responsive Teaching and Leading (CRTL) standard G: Content Selections in All Curricula (ISBE, 2022). The CRTL standard G underscores the deliberate approach of culturally responsive teachers in content selection across all curricula. It encourages teachers to curate inclusive curricula and purposefully represent marginalized communities through an equity lens. This standard advocates for fostering balanced perspectives, assessing narratives from multiple viewpoints, and using resources and tools to identify biases. Additionally, it promotes a broader modality of student assessments, emphasizing the alignment with students' diverse identities.

Table 1
An Overview of a Critical Visual Literacy Inquiry Model

Introduction	The critical visual literacy inquiry model described below has a modular structure to facilitate its use in meeting student needs. It can be employed in its entirety to provide a progressive learning experience or one or more of the levels can be implemented independently as stand-alone exercises. In either scenario, the approach is to have students examine a visual more than once to gain deeper understanding.	
Level 1: Single Visual Inquiry	a. Getting started	• activate/build prior knowledge on topic and a visual • provide background information and context as pertinent • scan the visual • identify bibliography (creator, title, publication date, publisher, place of publication) • pose compelling and supporting questions aiming at describing the visual's message
	b. Read for content (What do you see?)	• study the visual for a few minutes • answer supporting questions to describe major items in the visual (people, places, structures, writing, etc.) • summarize what was seen in a single sentence
	c. Read for analysis (What does it mean?)	• review notes and summary to answer compelling question and identify evidence to support answer, communicating findings • pose questions to critically analyze the visual from the perspective of social, cultural, economic, and political aspects that indicate power and authority relationships • synthesize findings to evaluate the visual critically and collect evidence to support findings, communicating findings
Level 2: Comparing Visuals	a. Getting started in pairs	• organize students in pairs so members in each pair review one of two visuals • getting started as above in Level 1
	b. Read for content (What do you see?)	• read for content as above in Level 1 (pairs explore different visuals, each with a different perspective) • share findings within pairs and among pairs
	c. Read for analysis (What does it mean?)	• read for critical analysis as above in Level 1 • pairs compare findings and note different visuals, discussing implications • share findings within pairs and among pairs
Level 3: Single Complex Visual Inquiry	a. Getting started	• get started as above in Level 1
	b. Read for content (What do you see?)	• read for content as above in Level 1
	c. Read for analysis (What does it mean?)	• read for analysis as above in Level 1, but engage in a deeper critical analysis of a complex visual to gain better understanding by uncovering layers of meaning

As noted in the Introduction, the critical visual literacy inquiry model has a modular structure. The model has three different levels designated by numbers and stages within each level shown as lowercase letters, making it adaptable to meet student needs. It can be employed in its entirety, or students can perform one or more of the activities. The underlying idea is that students work with the visual more than once to improve their skills and enhance their understanding. An important point is that authenticating the visual and the site on which it was found is not included in the model. Teachers can add that step as desired. The model moves progressively from examining a single visual to comparing two visuals to exploring a more complex single visual that is subtler in its messaging or open to differing interpretations.

The discussion here focuses on the model as it was used in the Methods of Teaching Social Studies in Secondary School course. To introduce project participants to critical visual literacy and to orient them to the model, they examined cartoons and a postcard on woman suffrage in the United States. After examining a single visual, they compared two visuals and then moved to a more complex visual. The discussion below briefly presents the visuals used to orient participants to all three levels. The process is fully described for Level 1: Single Visual Inquiry (see Figure 1). The other levels are briefly described emphasizing their unique aspects. For orientation purposes, the compelling question for each level focused on the cartoon's message and its implications.

Level 1: Single Visual Inquiry
In the single visual inquiry level, participants explored E. W. Gustin's cartoon *Election Day!* (see Figure 1), working in pairs to go through each stage and summarizing findings as they proceeded. The Getting Started (stage a) opened the examination of the visual. Participants were asked about the woman suffrage movement in the United States in the early 20th century. They scanned the visual to get a big picture of the content and looked at the bibliography to place the cartoon in its people, place, and time context. Getting Started was closed by having participants pose compelling and supporting questions. The compelling question was: According to the cartoon, what are the implications of woman suffrage on home life?

Figure 1
Election Day! (Gustin, 1909)

Next, participants in pairs completed the read for content (stage b) and shared their findings. During this stage, they observed the visual and caption closely. The importance of following up questions on what was seen with the query "How do you know?" was emphasized. Questions focused on the caption and setting to get a time and place perspective. The people also were scrutinized for appearance, gestures, facial expressions, and clothing, as was the overall scene. The father's distress at taking care of the children crying in his arms and the well-dressed woman getting ready to walk out the door were noted.

After summarizing findings, participants moved to reading for analysis (stage c). There are three tasks for this stage. The first task involved describing the message of the cartoon and providing a draft answer for the compelling question. An example of a draft answer is voting rights for women would disrupt the efficient running of the home. The second task critically analyzed the cartoon posing questions to examine social, cultural, and political aspects of the cartoon related to power, authority, bias, and omission. For example, regarding power and authority, among other things, participants noted the emphasis on how the cartoon suggested women voting would profoundly alter the traditional gender relationships and status in the home. The third task involved synthesizing findings to answer the compelling question with pertinent evidence.

Level 2: Comparing Visuals
In the comparing visuals level, participants compared Figures 2 and 3. The compelling question was: According to the cartoons, how might woman suffrage impact the home and society? Participants in groups first examined one of the two visuals.

Figure 2
I Want to Vote, But My Wife Won't Let Me ("Suffragette Series No. 11," 1909)

Figure 3
The Home or Street Corner for Woman? Vote No on Woman Suffrage (Thomas, n.d.)

After their examination, they shared their findings before jigsawing into groups that included participants who had collectively reviewed both visuals. The activity concluded with groups sharing and synthesizing their findings. Among other things, they concluded that the visuals suggested women voting threatened traditional power relationships for the worse in the home and society.

Level 3: Single Complex Visual Inquiry
The complex visual inquiry level follows the same steps as the single visual inquiry but requires deeper critical analysis to gain better understanding. Participants examined a complex cartoon related to women, voting, and World War I (see Figure 4). The compelling question was: What does the cartoon tell us about the status of women in U.S. society in World War I? The participants worked in pairs to go through the stages of analysis.

Figure 4
Uncle Sam as "Public Opinion" Embracing Nurse "American Womanhood" (Morris, 1917)

The deeper critical analysis of the cartoon was most important here. The answer to the compelling question suggested participation in war was changing the status of women regarding voting rights. Looking closely at the cartoon, layers of meaning were uncovered regarding the social, cultural, and political aspects of the cartoon related to power, authority, bias, and omission. For example, among other things, participants noted the size, placement, and facial expressions of the two figures, the posture of Uncle Sam, and what the caption suggested. They observed that Uncle Sam towered over the woman and was much larger. The words "public opinion" on his sleeve underscored that power and authority resided with older white males. Women were personified as nurses in a dependency role under men. The dependency aspect was strengthened by the caption. It suggested that only the largesse of white males was granting women the vote, ignoring the ongoing activism of women that dated back to the Revolutionary Era.

The orientation activities showed participants the distinction between visual literacy and critical visual literacy. It also highlighted how a model can help students move progressively to higher levels of competency. Initially, students might start with simpler visuals, but as they gain confidence and expertise, teachers can also ask them to compare two or more visuals, helping students practice thinking critically and noticing differences and similarities. They also can progress to more nuanced and complicated visual images. This progression allows students to take on more responsibility for their learning, promoting a deeper understanding of visuals.

Project Design and Implementation

During the 2022-2023 academic year, the implementation spanned three phases corresponding to different graduate-level courses in distinct disciplines. The first phase occurred in the Fall 2022 synchronous and asynchronous online secondary education social studies methods course. The second phase was in the Winter 2023 online asynchronous ESL/Bilingual education method course. The third phase took place in the Spring 2023 curriculum and instruction program course, which was also an online asynchronous course.

The researchers designed the project in three phases for two primary reasons. Firstly, each phase of the course where the research was conducted was offered in a different modality to a distinct group of students. The researchers aimed to investigate how the Critical Visual Literacy inquiry model could be implemented and adapted across diverse course modalities and student groups. Secondly, conducting the research project in three phases provided several benefits. It enabled the researchers to reflect on the process iteratively, leveraging strengths and strategically addressing potential issues as they arose. In addition, during each phase, the researchers conducted the same pre- and post-surveys to assess participants' understanding of critical visual literacy and the CRTL standard G, as well as the impact of critical visual literacy learning experiences, using quantitative and qualitative indicators (5-Likert scale questions and short answer questions).

Phase 1 – Fall 2022

Phase 1 was implemented in the 11-week course Methods of Teaching Social Studies in Secondary School during the Fall 2022 term. Sixteen pre-service social studies teacher education candidates seeking to teach in high schools enrolled in the course. While eight candidates agreed to participate in the project, all candidates completed the project activities. Those who did not participate in the project and did not complete the surveys did not have their work included in the research project. Project activities extended across the entire course and were divided into two stages. Because all candidates completed the activities except for the surveys, the term candidate is used below.

Table 2
Project Activities for Phase 1

Stages	Project Activities
Stage 1 (weeks 1-4)	Orientation introduced candidates to the project. They learned about the project and project activities; completed the pre-survey; were introduced to visual literacy, critical visual literacy and the CRTL standards through relevant readings and, for critical visual literacy, a handout (see Appendix A). They also identified their peer teaching topic from the course text, Takaki (2008), *A Different Mirror: A History of Multicultural America*[1].
Stage 2 (weeks 5-10)	2-3 candidates taught their critical visual literacy activity to their peers and completed the post-survey.

Methods specific to Phase 1

This course was different from the other two courses in the project in several important ways. First, it was the first iteration of the research study. Second, the course met in eight synchronous Zoom sessions and two asynchronous online sessions, and the final class was a Zoom exit interview conducted individually with each candidate. This course format allowed candidates to extend beyond planning a critical visual literacy activity to teaching it to their peers. Also, their content area and school level imparted a homogeneity to the group. Because all candidates were in the same subject area, the content for the critical visual literacy activities was taken from the course text.

To orient participants to the project, they were introduced to critical visual literacy through readings and an introductory handout that included a description of the critical visual literacy model. In a Zoom class, the candidate completed the above exercise that applied the various levels of the critical visual literacy model to a cartoon on women suffrage.

In addition, candidates had a peer teaching assignment that differentiated Phase 1 from the other phases. Using a selected level of the critical visual literacy model, candidates taught a 20-minute interactive critical visual literacy activity that met standards in the CRTL standard G. In consultation with the instructor, each candidate identified a topic related to the group and time period that connected to a chapter or excerpt from a chapter in the Takaki book. No overlaps were allowed, although it was possible to have more than one candidate choose the same group but focus on a different time period. Each peer teaching activity was evaluated in two ways. First, the formal assessment was an assessment checklist completed by the instructor. Second, a more informal open-ended format had the instructor, the candidates acting as students, and the peer teacher evaluate each peer teaching activity. The instructions were to identify the strengths, the areas needing improvement, and to provide ideas for improvement.

Phase 2 – Winter 2023

Phase 2 was implemented in the 10-week online course Methods and Materials for Teaching English as a Second Language during the Winter 2023 term. Out of the 17 students who were enrolled in the course, five students participated in the pre-survey and six completed the post-survey (two did not complete the pre-survey). Four students participated in both the pre- and the post-surveys. Students who did not volunteer to participate in the project completed the project activities except the surveys. This report draws data from the five participants' critical visual literacy activity plans, peer-review documents, and surveys.

Table 3
Project Activities for Phase 2

Stages	Project Activities
Stage 1 (weeks 1-4)	Background building: Students were introduced to the project before they took the pre-survey. They were provided with relevant readings and multimedia resources about the CRTL standard G, visual literacy, and the critical visual literacy framework (see Appendix B). In addition, they participated in a visual literacy activity through discussion.
Stage 2 (weeks 5-8)	Designing the critical visual literacy activity: Students were presented with a sample critical visual literacy activity created by the instructor and a video with the instructor modeling how to implement the activity. They then drafted their own critical visual literacy activity, participated in the peer review, and finalized the activity. The project was concluded with the post-survey.

Methods specific to Phase 2

This course was unique in three ways. Firstly, the students enrolled in the course included both pre- and in-service teachers. Their teaching experiences, content areas, and grade levels varied significantly. Secondly, the course was 100% asynchronous online. Students interacted with the course content on a learning management system and participated in the course through module discussions, reflections, and assignments. Thirdly, this course focused on methods and materials aimed at supporting multilingual learners. As a result, there was a heavy emphasis on activating or building sociocultural contexts, fostering academic language, providing comprehensible input, and facilitating multimodal communication.

To cater to student needs, the course instructor curated readings, multimedia resources, and discussion topics for students to better understand the CRTL standard G and critical visual literacy. Adapting the critical visual literacy model from Phase 1, the instructor tailored it to align with the course learning outcomes. The model had four major steps for working with a single visual, which were: 1) previewing academic vocabulary, pre-reading, and providing context if needed; 2) reading for content; 3) reading for analysis; and 4) engaging in critical examination, redesign, and reflection. Further, the model incorporated a progressive critical visual literacy learning sequence, demonstrating how to guide students towards higher levels of critical visual literacy. For example, as the task becomes increasingly sophisticated (e.g., transitioning from analyzing a single visual to analyzing two or more visuals), the level of scaffolding decreases. Additionally, the model included special considerations for supporting multilingual learners while designing and implementing the

critical visual literacy activity. The instructor shared a video on the learning management system explaining the steps in the model and showing how to implement a sample critical visual literacy activity using a political cartoon in a mock classroom setting.

Phase 3 – Spring 2023

Phase 3 was implemented in the 10-week course Implementing and Assessing Content Area Curriculum during the Spring 2023 term. Out of the 13 enrolled students, eight students participated in the pre-survey. In the post-survey, permission was gathered from the non-participating students to use their activity plans for the project. Of the nine students who completed the post-survey, four agreed to provide permission despite not completing the pre-survey. However, one student who completed both surveys declined to provide permission, and that student's data were excluded from the analysis. Consequently, data from eight students' critical visual literacy activity plans and peer-review documents were collected for this report.

Table 4
Project Activities for Phase 3

Stages	Project Activities
Stage 1 (weeks 1-5)	Students were introduced to the project, completed the pre-survey, and learned about visual literacy, the critical visual literacy framework, and the CRTL standard G through relevant readings and materials, including a handout for critical visual literacy (see Appendix C). They brainstormed ideas for their activity plan, selecting a unit from their current curriculum and a visual for their critical visual literacy activity plan.
Stage 2 (weeks 6-8)	Students planned their critical visual literacy activities, participated in peer reviews, and revised their plans based on feedback. Lastly, they submitted their final activity plans and completed the post-survey to reflect on their learning and experiences.

Methods specific to Phase 3

From the previous two implementations, insights were gained about the challenges encountered while implementing this project in an asynchronous online course working with in-service teachers who have different teaching experiences and backgrounds. Drawing upon those insights, the course materials and activities related to this project were designed to enhance the support in developing critical visual literacy activities. A series of discussion board postings provided feedback from peers and the instructor. Starting from week two, students engaged in weekly discussion board activities specifically designed to guide them in their learning and planning of critical visual literacy activities. During these discussions, they were encouraged to reflect on the concept of critical visual literacy and its implications for classroom teaching and learning. Then, they moved on to the selection of visuals, the drafting of critical visual literacy activity plans, and concluded with a peer-review process.

The approach allowed students to review and provide constructive feedback on each other's ideas as they began their planning. In addition, the course instructor adopted and used the critical visual literacy model from Phase 2. However, considering the diverse backgrounds of the students, who were in-service educators from various grade levels and content areas, the model was presented with various readings and visual examples. These examples included social media posts, real-life images, and illustrations from picture books. Additionally, the instructor created a video demonstrating a critical visual literacy activity, utilizing social media posts and photographs from news articles as examples, which was then shared with the students on the learning management system.

Conclusions and Implications

In a world increasingly driven by visuals, educators need to be equipped with critical visual literacy knowledge and skills to create engaging and equitable learning experiences for a diverse student

population. To address this need, we developed an inquiry model, serving as a tool for pre- and in-service teachers. A model provides a framework for integrating various strategies into the flow of teaching and learning. The inquiry model explored here facilitated the teaching of critical visual literacy skills. It also advocated for equity and social justice by guiding the assessment of messages related to power, authority, reliability, bias, and impact represented in visuals. The pre- and post-survey results demonstrated the effectiveness of this model in enhancing our pre- and in-service teachers' knowledge and understanding of both critical visual literacy and the CRTL standard G. In addition, this model encourages educators to promote visual literacy and critical visual literacy, ensuring they can adeptly apply their knowledge in real-world teaching scenarios.

As demonstrated in the three different implementation phases, an important virtue of a well-designed model is that it is adaptable to different subject areas and grade levels. This flexibility supports educators in using and adapting the model to their current or future classroom settings based on their students' prior knowledge and sociocultural and socioeconomic backgrounds. Participants' reflections from the post-survey also showed that their learning from this project was effectively transferred to their own teaching practices in their respective classrooms.

The emphasis on critical visual literacy in this curriculum design project carries several implications for teacher preparation and education programs. It calls for intentional efforts in curriculum design and professional development to integrate and enhance critical visual literacy skills among educators. By fostering a deeper understanding of critical visual literacy, teacher educators can empower educators to navigate complexities of visuals and contribute to more inclusive and equitable educational experiences for their students. This approach also goes beyond traditional teaching, encouraging students to become agents promoting social justice and equity.

In addition, the use of the inquiry model facilitates progressive learning and differentiation, creating a strategically plotted path of practice for greater competency over time. As students practice the skills, they progress to higher levels of difficulty. The various levels also facilitate meeting individual student needs. Student progress is based on competency. They need to be able to gain critical visual literacy skills to examine a single visual before progressing to comparing visuals and to exploring more complex visuals.

The critical visual literacy project underscores the importance of creating a learning environment where pre- and in-service teachers can actively participate in learning. They can apply critical visual literacy to practice, reflect on their experiences, and continually grow using the inquiry model. The reflections of our candidates highlighted the significant value they placed on the experience of learning about critical visual literacy through the inquiry model:

> "*I think that critical visual literacy is extremely valuable, as it teaches students to think critically about the media they consume, both inside and outside the classroom. I would like to continue to integrate critical visual literacy into my teaching.*"

> "*I believe I will devote a significant amount of time in the classroom employing critical visual literacy strategies. I intend to make it an integral part of my teaching methodology.*"

> "*I am excited to teach during Black History month as African-Americans are a small, but present, minority in my placement school. I am very interested in how the much larger Latinx population will relate to the stories I intend to present in images. I think the process will also help me grow (as an older white woman) in my understanding and relationships with my students' cultures.*"

Candidates expressed a clear intention to apply what they had learned in their classrooms to foster culturally responsive teaching and learning for their students. This positive response not only highlights the perceived importance of critical visual literacy but also demonstrates a commitment to applying these newly acquired skills in professional settings.

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Appendix A
Phase 1 Critical Visual Literacy Introduction Handout

NATIONAL LOUIS UNIVERSITY

Scholarship of Teaching and Learning

Introduction to Critical Visual Literacy

Mark Newman, Xiaoning Chen, Hyeju Han

The Need for Visual Literacy

The increasing presence of visuals in education and everyday life have created a need to improve teacher and student visual literacy skills generally and critical visual literacy skills specifically. Each visual sends a message from a particular perspective.

Teachers need to be able to develop effective learning experiences that help students study visuals critically so that they understand how visuals work. They also need to be able to assess the message regarding

- power and authority
- reliability and accuracy of content
- bias, distortion, and omission
- impact on viewers and possibly society at the time of publication and over time and place.

From Visual to Critical Visual Literacy

Visual literacy can be defined as the ability to read, analyze, and communicate with visuals.

Whether it be a map, photograph, cartoon, video, or multimodal display, each visual reflects personal and cultural beliefs, attitudes, ideas, etc.

As a result, the visual can send explicit or implicit messages regarding race, ethnicity, gender, or socioeconomic class. These message often support ideas of the dominant members of society to the detriment of others.

Critical visual literacy imparts a specific perspective to studying visuals. It deepens the analysis by exploring the political, social, economic, cultural, and other aspects to assess how and why the visual depicts a society's power and authority relationships.

How Critical Visual Literacy Works

A critical visual literacy perspective stresses identifying how a visual shows the power and authority of a dominant group in society to the detriment of a group with secondary status.

Typically, the visual highlights either the dominant group's superiority, the secondary group's inferiority, or both. Explore the visual to the left. Look at who is included and how they are depicted. Examine the placement of the figures, how they are dressed, what they are doing.

What does the visual tell you about race in the 1840s

Mount, W. (1845). Dance of the Haymakers. Wikimedia Commons https://commons.wikimedia.org/w/index.php?search=dance+of+the+haymakers&title=Special:MediaSearch&go=Go&type=image

Critical Visual Literacy Teaching and Learning

Critical Visual Literacy Model

The critical visual literacy inquiry model has a modular structure to facilitate use to meet student needs. It can be employed in its entirety to provide a progressive learning experience, or one or more of the activities can be implemented independently as stand-alone exercises. In either scenario, the approach is to have students examine a visual more than once to gain deeper understanding.

Goals

1. To design a modular critical visual literacy inquiry model that can be applied in varied ways.
2. To provide the means for teachers to plan a progressive critical visual literacy learning experience that helps students move to higher levels of critical visual literacy proficiency.
3. To help teachers and students improve their critical visual literacy skills.

Model Overview

Single visual inquiry exercise:
   a. Pre-read, provide context (may be optional)
   b. Read for content
   c. Read for analysis and findings
   d. Pose additional questions connected to critical visual literacy
   e. Revise inquiry model to address critical visual literacy questions
   f. Read for critical analysis to synthesize findings, develop answer and supporting evidence
   g. Communicate findings
   h. Reflection, including taking action by identifying a different visual with different more critical perspective from initial example; creating visual with different more critical perspective

Comparison of two visuals with different perspectives:
   a. Pre-read, provide context (may be optional)
   b. Pairs explore different visuals, each with a different perspective (read and analyze as above using critical visual literacy inquiry model
   c. Compare findings, note different visuals discussing implications
   d. Reflection, including taking action by designing activity using both visuals or something else

Single complex visual inquiry:
   a. Pre-read, provide context (may be optional)
   b. Pose critical visual literacy questions
   c. Read for critical analysis to synthesize findings, develop answer and supporting evidence
   d. Communicate findings
   h. Reflection, including taking action by identifying a different visual with different more critical perspective from initial example; creating visual with different more critical perspective.

Appendix B
Phase 2 Critical Visual Literacy Introduction Handout

NATIONAL LOUIS UNIVERSITY

Scholarship of Teaching and Learning
Introduction to Critical Visual Literacy
Xiaoning Chen, Mark Newman, Hyeju Han

The Need for Visual Literacy

Visuals have been a common medium of communication in education and everyday life. While working with multilingual students, educators acknowledge that visuals are an effective way to provide access to content and support comprehension. However, there is a critical need to improve teacher and student visual literacy skills generally and critical visual literacy skills specifically. Each visual sends a message from a particular perspective.

Teachers need to be able to develop effective learning experiences that help multilingual students study visuals critically so that they understand how visuals work. Students also benefit from assessing the message regarding

- power and authority
- reliability and accuracy of content
- bias, distortion, and omission
- impact on viewers and possibly society at the time of publication and over time and place.

From Visual to Critical Visual Literacy

Visual literacy can be defined as the learned abilities to read, analyze, and communicate with visuals. Whether it be a map, photograph, cartoon, video, or multimodal display, each visual reflects personal and cultural beliefs, attitudes, ideas, etc.

As a result, the visual can send explicit or implicit messages regarding race, ethnicity, gender, or socioeconomic class. These messages often support ideas of the dominant members of society to the detriment of others.

Critical visual literacy imparts a specific perspective to studying visuals. It deepens the analysis by exploring the political, social, economic, cultural, and other aspects to assess how and why the visual depicts a society's power and authority relationships. It enhances critical thinking for all students, as a result, empowering students to promote equity and social justice.

How Critical Visual Literacy Works

A critical visual literacy perspective stresses identifying how a visual shows the power and authority of a dominant group in society to the detriment of a group with secondary status.

Typically, the visual highlights either the dominant group's superiority, the secondary group's inferiority, or both. Explore the visual to the left. Look at who is included and how he is depicted (e.g., how he is dressed and what he is doing). Examine how symbolism is used through the depiction of different items in the visual.

What does the visual tell you about the social status of Chinese in the 1880s?

Frank Leslie's illustrated newspaper, vol. 54 (1882 April 1), p. 96. Wikimedia. Retrieved from https://commons.wikimedia.org/wiki/File:The_only_one_barred_out_cph.3b48680.jpg

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Critical Visual Literacy Teaching and Learning

Critical Visual Literacy Model

The critical visual literacy inquiry model has a modular structure to facilitate use to meet student needs. It can be employed in its entirety to provide a progressive learning experience, or one or more of the activities can be implemented independently as stand-alone exercises. In either scenario, the approach is to have students examine a visual more than once to gain deeper understanding.

Goals

1. To design a modular critical visual literacy inquiry model that can be applied in varied ways.
2. To provide the means for teachers to plan a progressive critical visual literacy learning experience that helps students move to higher levels of critical visual literacy proficiency.
3. To help teachers and students improve their critical visual literacy skills.

Model Overview

Single visual inquiry exercise:
   a. Preview academic vocabulary, pre-read, provide context (if needed)
   b. Read for content
   c. Read for analysis and findings
   d. Pose additional questions connected to critical visual literacy
   e. Synthesize findings, develop answer and supporting evidence
   f. Communicate findings
   g. Reflection, including taking action by identifying a different visual with a more critical perspective from initial example or creating a visual with a more critical perspective

Progressive critical visual literacy learning:
As students gain more proficiency through the visual literacy continuum, teachers can lower the level of scaffolding by having students work in small groups/pairs and/or individually. The task complexity can also increase from a simple to a complex visual, and/or compare two or more visuals.

Basic
- single, simple visual
- whole group
- high level of scaffolding from teacher

Proficient
- single, more complex visual or multiple visuals
- small group
- lower level of scaffolding from teacher and peers

Advanced
- complex, multiple visuals
- pair or individual
- low level of scaffolding from peers
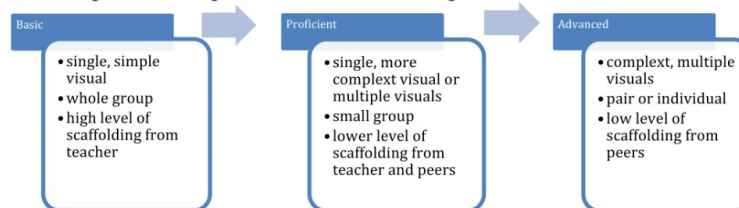
Considerations for Supporting Multilingual Students:
- Selected visuals represent or connect to multilingual students' lived experience or topics in local community
- Background knowledge
- Content and visual literacy vocabulary and discourse (e.g., word bank, sentence/discourse frames for group discussion and writing; graphic organizers)
- Space for translanguaging
- Multimodal formats to communicate learning

Appendix C
Phase 3 Critical Visual Literacy Introduction Handout

Scholarship of Teaching and Learning

Introduction to Critical Visual Literacy

Hyeju Han, Mark Newman, Xiaoning Chen

NATIONAL LOUIS UNIVERSITY

The Need for Visual Literacy

The increasing presence of visuals in education and everyday life have created a need to improve teacher and student visual literacy skills generally and critical visual literacy skills specifically. Each visual sends a message from a particular perspective.

Teachers need to be able to develop effective learning experiences that help students study visuals critically so that they understand how visuals work. They also need to be able to assess the message regarding

- power and authority
- reliability and accuracy of content
- bias, distortion, and omission
- impact on viewers and possibly society at the time of publication and over time and place.

From Visual to Critical Visual Literacy

Visual literacy can be defined as the ability to read, analyze, and communicate with visuals. Whether it be a map, photograph, cartoon, video, or multimodal display, each visual reflects personal and cultural beliefs, attitudes, ideas, etc.

As a result, the visual can send explicit or implicit messages regarding race, ethnicity, gender, or socioeconomic class. These messages often support ideas of the dominant members of society to the detriment of others.

Critical visual literacy imparts a specific perspective to studying visuals. It deepens the analysis by exploring the political, social, economic, cultural, and other aspects to assess how and why the visual depicts a society's power and authority relationships.

How Critical Visual Literacy Works

A critical visual literacy perspective stresses identifying how a visual shows the power and authority of a dominant group in society to the detriment of a group with secondary status. Typically, the visual highlights either the dominant group's superiority, the secondary group's inferiority, or both.

Explore the visual to the left (Please scan the QR code or click on the link below to view it). Look at who are included and how they are depicted. Examine the placement of the figures, how they are depicted, what they are doing.

What does the visual tell you about race in the context of the Covid-19 pandemic, during and after its outbreak?

Bill Bramhall [@BillBramhall]. (2021, March 24). *Cartoon.* [Political Cartoon]. Tweeter. https://twitter.com/BillBramhall/ status/1396901906694426626

Bramhall, B. (2021, March 25). The Tourists are Back! [Political Cartoon] *New York Daily Times.* https://www.nydailynews.com/opinion/ny-bramhall-editorial-cartoons-political-satire-20210525-fk64ztf65vft7dmo6qt5ickpp4-photogallery.html

Critical Visual Literacy Teaching and Learning

Critical Visual Literacy Model

The critical visual literacy inquiry model has a modular structure to facilitate use to meet student needs. It can be employed in its entirety to provide a progressive learning experience, or one or more of the activities can be implemented independently as stand-alone exercises. In either scenario, the approach is to have students examine a visual more than once to gain deeper understanding.

Goals

1. To design a modular critical visual literacy inquiry model that can be applied in varied ways.
2. To provide the means for teachers to plan a progressive critical visual literacy learning experience that helps students move to higher levels of critical visual literacy proficiency.
3. To help teachers and students improve their critical visual literacy skills.

Model Overview

Single visual inquiry exercise:

    a. Pre-read, provide context (may be optional)
    b. Read for content
    c. Read for analysis and findings
    d. Pose additional questions connected to critical visual literacy
    e. Revise inquiry model to address critical visual literacy questions
    f. Read for critical analysis to synthesize findings, develop answer and supporting evidence
    g. Communicate findings
    h. Refection, including taking action by identifying a different visual with different more critical perspective from initial example; creating visual with different more critical perspective

Progressive critical visual literacy learning:

As students gain more proficiency through the visual literacy continuum, teachers can lower the level of scaffolding by having students work in small groups/pairs and/or individually. The task complexity can also increase from a simple to a complex visual, and/or compare two or more visuals.

Footnotes

[1] Takaki, R. T. (2008). *A different mirror: A history of multicultural America.* (2nd ed.). Back Bay Books. This book offers a rich exploration of the diverse experiences of ethnic and racial groups in American history. Spanning from colonization to the present, Takaki's book provides a nuanced perspective on the contributions and struggles that have shaped the multicultural fabric of the United States.

The Community Game Development Toolkit

Daniel Lichtman
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Abstract

The Community Game Development Toolkit (CGDT) is a set of tools that make it easy and fun for students, artists, researchers and community members to create their own visually rich, interactive 3D environments and story-based games without the use of coding or other specialized game-design skills. Building on the popular 3D game design engine Unity, the toolkit provides intuitive tools for diverse communities to represent their own traditions, rituals and heritages through interactive, visual storytelling. Projects can be built for desktop, mobile and VR applications. The toolkit is used to teach game design and interactivity at universities across the country, used by students, artists and researchers, and supported by several grants. This paper provides context about what kind of work students, artists and researchers have created using the toolkit and provides documentation for how to use the toolkit. See https://danielp73.github.io/Community-Game-Development-Toolkit/ for updated documentation and other information about the toolkit.

Keywords: game design, collage, collaboration, worldbuilding, speculative futures

Introduction

The Community Game Development Toolkit (CGDT) is a set of game design tools that that make it fun and accessible for creators to develop visually rich, interactive 3D environments and story-based games without the use of specialized game design skills such as 3D modelling or coding. The toolkit is for anyone interested in creating interactive 3D stories, exploratory environments, and artistic games, regardless of technical experience. This includes college and graduate students in the fields of education, art, media, the humanities, communications, or any other field; researchers in education, the humanities or other fields; educators interested in exploring interactive storytelling and/or game design; and artists and artist communities.

The toolkit provides intuitive tools for diverse communities to represent their own traditions, rituals and heritages through interactive, visual storytelling. In order to quickly create vibrant, visually rich scenes without the use of 3D modeling, the toolkit draws on creators' own photos, collages, drawings, and sound recordings to create objects, textures, and soundscapes in 3D space. This technique allows creators to bring their own visual references and sensibility into the game environment and makes creative experimentation rewarding and fun even for creators who may have no prior experience in game design or visual art. This creative approach promotes an intuitive exploration of collage in 3D space, leading many creators who use the toolkit to create their own rich, collage-based visual languages as they experiment with the creation of open-ended audio-visual narrative.

The toolkit provides a set of drag-and-drop game components that make it easy to add many types of interactivity to games without the use of code, including interactive text, mechanisms for changing scenes, and more. These components empower creators with no prior technical experience to create fully interactive and engaging 3D visual narratives and games.

The toolkit has been used in college-level courses on game design and interactivity in programs around the USA and in workshops at conferences around the world. Additionally, the toolkit is used by artist groups to create exploratory visual worlds for screen, VR, and even performance art environments. Toolkit development is supported by an REU (Research Experience for Undergraduates) grant from the National Science Foundation through the Visualization and Virtual Reality Lab at Hunter College, City

University of New York, and by a Rural Drug Addiction Research Center Pilot Project Grant, University of Nebraska-Lincoln.

This chapter outlines the core features of the toolkit, provides and discusses examples of work created using the toolkit, and introduces other related game design toolkits.

Toolkit Functionality

The Community Game Development Toolkit is a software package that augments the functionality of the popular Unity game engine. Unity is a commercial game development tool capable of sophisticated and complex 3D game development used by large and small commercial game studios to produce commercial video games. Unity is available for free for personal and educational use, and is also used among artists, individual game developers, and in game design courses in universities because of its perceived ease of use and accessibility compared to other commercial game engines such as Unreal Engine. Unity is nonetheless a very complex software platform with a steep learning curve that can take months or years to master, even for otherwise technically knowledgeable practitioners (see Figure 1). Furthermore, most functionality in Unity requires the use of code, which is extremely challenging to work with for those who have no prior experience with computer programming.

Figure 1
Screenshot of the Unity game engine environment
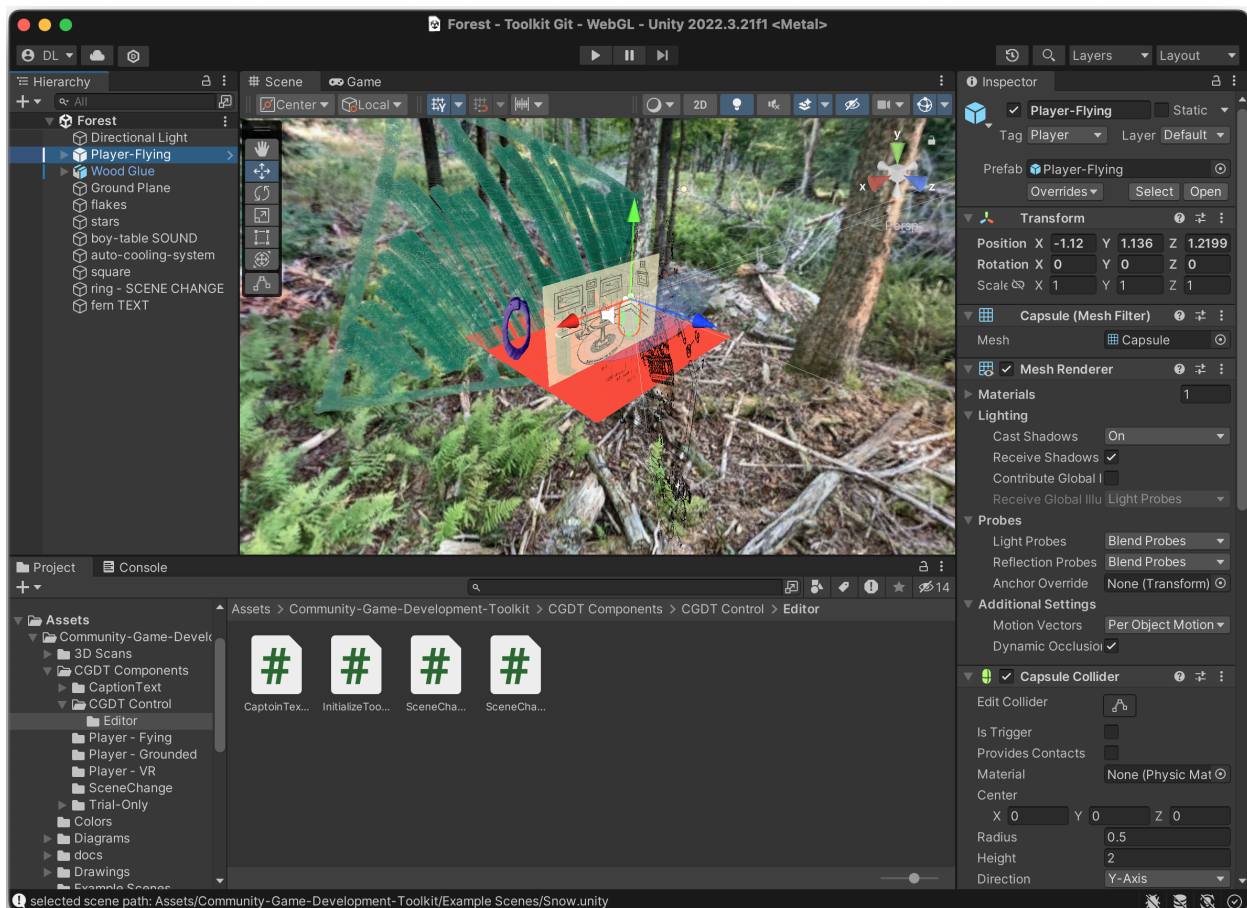
The CGDT provides a core set of functionalities, a number of user interface elements and a comprehensive set of web-based documentation and tutorials that make the process of building interactive 3D scenes within the Unity game engine environment significantly more accessible and

intuitive than those provided by the engine itself. Specifically, the CGDT is focused on the creation of visually rich, collage-based scenes using easily created art assets including drawings, paintings, photos, diagrams, and 3D scans. For assets such as drawings and paintings, toolkit documentation provides tutorials for how to scan the artwork and isolate the drawing or painting from its white background so that it appears as an organic shape in the 3D scene, rather than as a white rectangle with a drawing or painting on it. For photos, toolkit documentation walks users through the process of extracting certain objects or selections from photos and isolating them from their background so that they too can appear in the scene as organic 'cut-out' 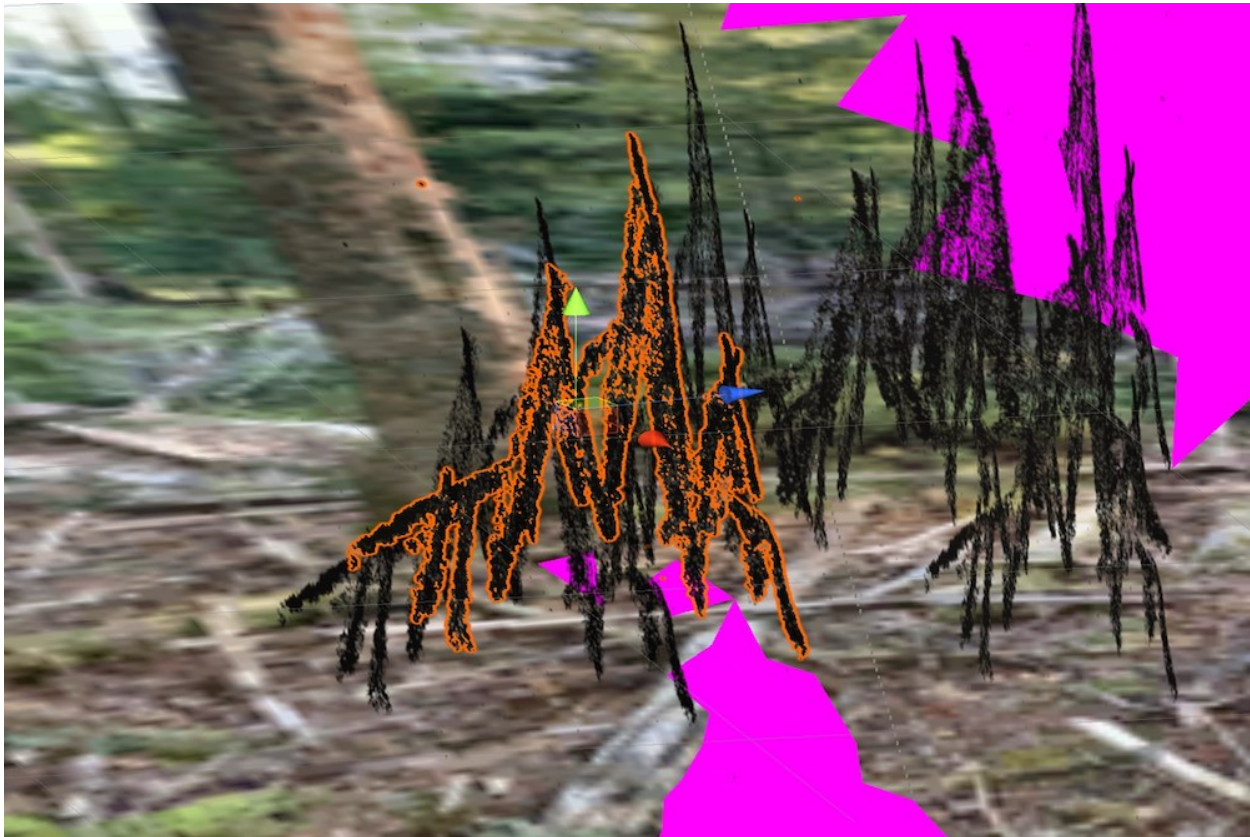shapes rather than as a square image (see figure 2). The toolkit also provides components that automatically process imported images so that they are immediately ready to be inserted into the scene using drag-and-drop.

Figure 2
Drawing, isolated from its white page background, placed within a 3D scene using the toolkit

In addition to 2D assets, the toolkit provides documentation for how to easily create 3D scans of both spaces and objects using common devices such as an iPhone or iPad. The documentation details how to easily import these 3D scans into a scene, and how to manipulate their size and position. The toolkit also documents how to create 360-degree photospheres using common devices, and how to import and process these assets, which function as 'skyboxes', or sky-like backgrounds behind objects placed within a scene.

Creating interactivity in Unity generally requires writing code. This is a daunting challenge for creators unfamiliar with computer programming, and even for those with prior coding experience but without expertise in writing code in the Unity environment. The toolkit provides components for creating interactive visual narrative without the use of code. The toolkit provides two types of pre-coded 'players', or ways of navigating the scene as a user—a player that moves along a ground plane, and a player that 'flies' through the scene, independent of any ground plane. The toolkit also provides an intuitive method for setting up scene changes in projects, creating the possibility for branching, or "choose-your-own"

adventure style narratives. Finally, the toolkit provides an easy system for creating interactive, text-based captions for objects in scenes, in which the user can click through a series of lines of text (see figure 3).

Figure 3
Object with associated text caption

Toolkit Use and Examples

The intuitive, collage-based creative process engendered by the toolkit and its very low technical barrier of entry, make the toolkit an ideal starting point for creating experimental, unconventional and non-linear forms of audio-visual interactive narrative. The collage-focused workflow is particularly useful for creating and experimenting with artistic visual languages, and building open-ended, fragmented, and intertextual stories using these languages. The toolkit can be particularly useful for members of diverse communities seeking to create interactive visual narrative that explores visual aspects of community members' traditions, rituals, or heritages. The collage-based use of pre-existing and easy-to-create 2D artwork allows community members to easily create visual worlds composed of visual fragments of objects, textiles, clothing, patterns, and other visual ephemera. This can be integrated with 3D scans of any real-world object, or interior or exterior space. The creative process of building interactive narratives with the toolkit also lends itself to experimental and unconventional forms of artistic collaboration and collaborative storytelling. The following examples will bear out these uses of the toolkit.

Collective Futuring in Nebraska's Panhandle (work currently in progress): Project by Ash Eliza Smith, Samantha Bendix, and Daniel Lichtman (see Figure 4.)

Figure 4
Screenshot of Collective Futuring in Nebraska's Panhandle

Over the course of this project, team members worked with several rural communities in the panhandle of Nebraska, specifically with the substance use disorder (SUD) community, a cohort of middle school students, and members of a non-profit agency that funds community projects. Participants included a range of people of different ages, ethnicities, races, and mental and physical health statuses. In workshops, community members use a collage-based story-engine developed from the Community Game Development Toolkit to engage in worldbuilding exercises. Community members and project team members composed scenes by arranging 3D scans of objects, particularly objects in public spaces, as well as scans of drawings and cut-out photos.

Participants use these exercises to collectively imagine alternate and speculative futures for themselves and their community, taking a creative approach to questions such as: What kind of public works projects might improve community health? How can community members reimagine community health clinics to improve treatment for SUD? How can world-building and collective digital storytelling connect members of geographically dispersed, rural communities to support each other's mental health?

Extending beyond the existing functionality of the CGDT, team members are currently developing the project to further support communal discourse within the digital story-engine. This includes collective voice-commentary, empowering participants to reflect on and respond to each other's ideas as presented in the story-world, as well as an upvoting feature which will serve as a springboard for funding the physical realization of projects developed in world-building workshops and scenes.

The Raisin Truck Makes Raisins – Project by Daniel Lichtman with Contributions By Ian Giles, Helena Haimes, James Prevett, David Baumflek and Johann Arens (see Figure 5.)

Figure 5
Screenshot of scene from The Raisin Truck Makes Raisins. Drawings in this frame by Johann Arens

The Raisin Truck Makes Raisins is a collaboratively produced, 3D game/virtual environment that uses collage, spatial orientation/disorientation and visual abstraction to reflect on the experience of caring for young children during pandemic and lockdown. Scenes in the game are produced in collaboration with a community that includes economically diverse, queer and immigrant care takers.

Collaborating caretakers contributed sketches, drawings, photos, and sound recordings that, by their own definition, reflected on their emotional relationship to the landscapes, objects and environments in which they cared for children during the pandemic. These materials were scanned and isolated from their backgrounds and collected into a series of interactive scenes. Through visual abstraction and collaboratively produced collage, these scenes present a diverse range of experiences with childcare-in-isolation: busy, beautiful, frustrating and chaotic, marked by vulnerability, aggravation and resilience. ("The Raisin Truck Makes Raisins," n.d.)

MetaEternity – Project By Teresa Braun, Ayodamola Okunseinde, June Bee, and Zelong Li (see Figure 6.)

Figure 6
Screenshot, and view of performance with virtual world in background, from MetaEternity

This project, an interactive virtual world for VR and live performance considers how social, emotional, and psychic life might continue in the metaverse after physical death. The project incorporates the use of the CGDT with other media technologies, to create a virtual world in which visitors to the gallery can draw and write in response to this theme and upload their content into the shared virtual environment, and appear in the 3D scene. The project asks, "How do we make sense of our social and material relationships in physical space vs. virtual space? Is there some form of continued existence we can embed in the metaverse? If VR offers us a glimpse into these worlds, how can we move away from the insularity and single-player mode that it usually affords?" (Braun, n.d.)

Collaborative Worldbuilding workshop at Museums Without Walls Conference (see Figure 7.)

Figure 7
Screenshot of virtual world created during the workshop
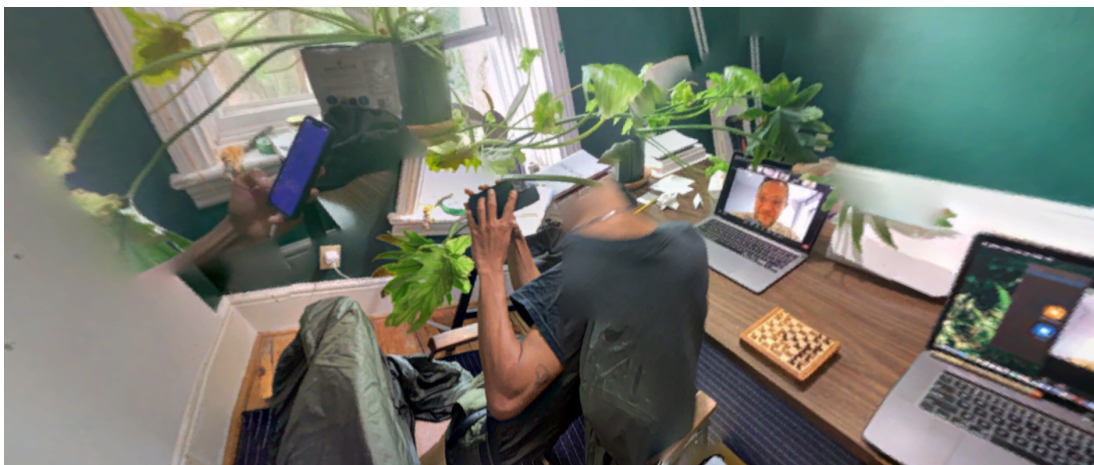
This scene (Figure 7) was collaboratively produced by participants during a workshop at the Museums Without Walls Conference, hosted by the Museu sem Paredes and Queens University in 2022. During the workshop, participants worked together to produce an interactive 3D environment composed of audio recordings and photographic fragments of participants' immediate, physical surroundings. Over the course of the workshop, participants captured audio and photographic source material and worked together to compose this material into a 3D scene using the CGDT. Participants then collectively explored the resulting environment as avatars, charting a network of chance encounters with disembodied audio-visual fragments of participants' surroundings as they move through the virtual space. Each play-through of the scene yields a unique path through this collaboratively produced collage, representing a unique, virtual composition of participants' collective experience of space, material, and sound.

Student Project – Fangrou Zhou (see Figure 8.)

Figure 8
Screenshot of Zhou's project

Zhou, a student in New Media Arts Program, Baruch College, City University of New York, created a game world that imagined participating in a Chinese music reality television show. In this project, Zhou made extensive use of images found on the internet to create this collage-based scene.

Student Project – Nehemiah Lucena (see Figure 9.)

Figure 9
Screenshot of Lucena's project

Lucena, a student in New Media Arts Program, Baruch College, City University of New York, created a game scene that recalled a life before giving up the use of substances. This scene made use of photo cutouts, drawings, 360-photos, and scans of hand-written text.

Brief History and Examples of Game Design as an Inclusive Medium

In her 2012 book *Rise of the Videogame Zinesters*, Anna Anthropy criticizes the homogenous nature of commercial video games, the audiences video games are designed for, and the demographics of commercial video game designers: "Mostly, video games are about men shooting men in the face," (p. 9) and "since digital games have existed, their creation has been dominated by a small part of the population: generally white male engineers." (p. 36). Anthropy would like to see more games created by, and about people like her: "I have to strain to find any game that's about a queer woman, to find any game that resembles my own experience." (p. 10). Anthropy calls for the creation of 'zinester' games—small, short, experimental video games, often created by one person, and often drawing on the creator's own autobiography. Anthropy's own 2012 game *dys4ia*, which she calls a 'game journal' recounts Anthropy's experience with gender dysphoria and hormone replacement therapy. The game has become canonical in the history of autobiographical games that chart the experiences of marginalized people.

Anthropy calls for the creation of games by amateurs, non-professionals, and community members of all types. Her book suggests several game-making platforms that, at the time, attempted to make game development accessible to non-specialist audiences, and to support the development of alternative styles of game design. One important example she discusses is Twine, which supports the creation of interactive, web-based fiction. A canonical example of a game created in Twine is Zoë Quinn's 2013 *Depression Quest*, an "interactive novel" that presents the story of a character suffering from depression. Among other game-making platforms, Anthropy also discusses Game Maker, which supports the creation of games using an icon-based system for creating simple interaction.

Contemporary Tools for Making Game Design More Accessible and Inclusive and Comparison to the Community Game Development Toolkit

A number of contemporary tools aim to make game design and world-building accessible to non-specialist audiences today. One such example is The Verb Collective, by Justin Berry and Bobby Berry, described in their paper, "The Verb Collective," 2019. This toolkit is a set of pre-coded action, or "verb," components for Unity that users combine to create interactivity. This system is designed to support both beginning and advanced users and is focused on "emergent dynamics and fostering exploratory play" ("Verb Collective", n.d.). Using a workflow that resembles that of visual coding environments, creators make use of combinations of verb components to experiment with and create interactivity in their scenes in Unity. CGDT differs from The Verb Collective in that it focuses primarily on a creative process for experimentation with visual scene design based collaging 2D artwork and 3D scans into 3D space, and provides pre-coded components for a simple set of possible interactions. CGDT also differs in that it presupposes no knowledge of any coding skills, while the use of The Verb Collective toolkit involves an exploration and understanding of modular concepts of coding (though it does not require users to write their own code).

Scratch is a popular tool used by children and students for creating digital stories, games, and animation. The tool introduces coding concepts using a highly accessible visual interface in which creators manipulate code blocks and make use of supplied visual assets ("About Scratch," n.d.). CGDT differs from Scratch in its focus on visual scene composition and world-building, rather than core concepts of computer programming.

Another project, Games4Nature, supports school-aged students to make nature-based games for mobile devices using a predefined set of nature-themed resource cards and a document suggesting how to create interactive narrative using these resources. ("Games4Nature," n.d.) CGDT differs from this toolkit in that it focuses on open ended exploration of visual worldbuilding in which creators build their own visual language through collage, rather than a predefined theme and visual assets.

Google's application, Tilt Brush, provides an intuitive tool for digital drawing and painting in 3D space in a Virtual Reality environment ("TiltBrush," n.d.), While Tilt Brush makes art composition in digital 3D space accessible to non-specialist users, it differs from CGDT in its focus on drawing and painting tools vs. using a collage-based approach to creating art and interactive visual narrative in 3D space.

Context, Support & Who uses the Toolkit

The toolkit is being developed as part of the NSF-funded VR-REU program in immersive visualization and virtual/augmented/mixed reality at the Visualization and Virtual Reality Lab at Hunter College, Summers 2022, 2023 and 2024 (NSF Grant No. 2050532, P.I. Dr Wole Oyekoya). The toolkit is also supported by Rural Drug Addiction Research Center Pilot Project Grant, University of Nebraska-Lincoln via the project, Re-Imagining Place: Rural Substance Use Disorder, Worldbuilding, and Community Participatory Design (P.I. Ash Eliza Smith), as listed above. The toolkit is used to teach game design, worldbuilding and interactivity at Baruch College, CUNY, Winona State University, the University of Nebraska, Lincoln, Stockton University, and other universities.

The toolkit has been presented at numerous conferences, workshops, and exhibitions, including iDMAa at Winona State University (2021, 2022), Society for language Science and Art Conference at Purdue University (2022), Society for language Science and Art Conference at Arizona State University (2023), International Visual Arts Association, University of Illinois, Chicago (2023), Museums Without Walls at the Museu sem Parades (2022) the Show Don't Tell Symposium at Culture Push (2021) and the New Media Caucus Showcase at the College Art Association Conference (2021).

The toolkit is currently being used to create submissions for a special issue of the Hyperrhiz Journal of New Media Cultures, edited by Catalina Alvarez, Sue Huang, Daniel Lichtman (organizer) and Lee Tusman, to be published in 2024. Two papers about the toolkit have been published, detailing its functionality, and studying its usability and effectiveness: Park, Lichtman and Oyekoya, "Exploring Virtual Reality Game Development as an Interactive Art Medium: A Case Study with the Community Game Development Toolkit.", 2023; and Roth and Lichtman, "The Community Game Development Toolkit," 2022.

Conclusion

The Community Game Development Toolkit is a game design tool focused on making collage-based 3D scenes and interactive world-building accessible to diverse communities of students, artists, and scholars. Working with photos, drawings, paintings and 3D scans for visual scene composition and drag-and-drop components for creating interactivity, the toolkit is designed to be accessible to community members who have little or no prior experience in specialized game development skills such as 3D modeling or computer programming. As demonstrated by the work created by students, artists and scholars, the Toolkit supports creators to explore interactive worldbuilding as a means for representing their own traditions, rituals and heritages and the development of their own exploratory visual languages using collage.

Among other available tools for accessible game design, CGDT is unique in its focus on 3D collage, enabling creators to use their own visual references and languages, and simple drag-and-drop components for creating interactivity that do not require an investment in learning concepts of computer programming. CGDT is growing in popularity as a tool for teaching digital storytelling, game design and interactivity among college programs around the country, and among artists, community members and researchers for exploring innovative forms of interactive 3D worldbuilding.

Staying in touch

If you create a project using the toolkit, get in touch with me to tell me about it! I can be reached at daniel.lichtman@stockton.edu. I am also happy to provide support to you as you get started with Unity and the toolkit, and develop your project.

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Centering Students through Collage and Assemblage

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Abstract

This chapter considers specific learning outcomes from centering students' agency and growth via the process and perspectives of collage and assemblage. I argue that these actions empower students to arrange, array, and dialogue with disparate sets of information, creating a unique synthesis of a priori *and* a posteriori *knowledge. Collage questions authority, emphasizes process, asks open-ended questions, creates dialogue, and sets up an exploratory, questing dynamic. I ground these thoughts in visual literacy, culture, and theory with Deleuze and Guattari, McLuhan, Barthes, and hooks. I then illustrate these connections via several case studies, including information literacy sessions in new media, sculpture, and architecture.*

Keywords: collage, assemblage, bricolage, visual literacy, art making, zines

Introduction

In this chapter, I will discuss collaging and related activities as a method for thought and action in the classroom. First, I will contextualize some terms. Then I will introduce overlapping concepts drawn from visual culture, philosophy, and pedagogy. Finally, I will give some examples from my own teaching practice.

I want to convey why I am interested in collage and define some nuances of my approach to collage, assemblage, bricolage, and montage. I will primarily focus on modernist art-making activities, but there is a rich history of gluing materials together across the world (Elliott, 2019). By *collaging*, I mean taking disparate elements and assembling them to create something new out of things you have gathered. Closely related terms include *assemblage*, which in art tends to mean found objects and adds a three-dimensional quality, transforming from works on paper to sculpture. Assemblage shares a root word with assembly, which adds the valence of gathering people together. Another term is *bricolage*, bridging between assemblage and the every day, which is making art with what is around you (Johnstone, 2008). Lastly, the idea of the *montage* relates to collage, made famous through Russian constructivist visual communication strategies embraced by Vertov and Rodchenko (Becker, 2008; Petrić, 1987). Montage composites disparate things to express something new, still with traces and indications of their original parts (Anderson, 2016). Collage's aesthetic draws from politically and socially influenced art movements such as constructivism and Dada of the early 20th century (Digby & Digby, 1985). These techniques were picked back up in the 1960s and again in the 1980s in London and the 1990s in New York (Rose, 1991; Eichhorn, 2016). The art form uses free or low-cost materials, conveys immediacy, and has a very low barrier to entry. Unlike bronze casting or oil painting, it does not require access to expensive materials and equipment nor extensive training in manipulating the material.

Collage, while tied to what is readily available to reassemble, is also freeing. You can create art with anything—in other words, anyone can be a cultural producer. As Digby and Digby (1985) state, "...collagists took what they needed and assimilated disparate theories into personal expression" (p. 28). Taking this liberty even further, the semiotics-focused Groupe Mu highlights collage as a form of language that "...tends

to maximal openness, overflowing with any attempt at classification, reduction, or closure" (Elliott & Etgar, 2019, p. 35).

Collaging techniques are used in other creative fields under different names. Cut ups bring them to creative writing (Adema, 2018); for example, O'Grady's Cutting Up the *New York Times* project (2020). Sampling and remixing bring the concept to music (Gallagher, 2018). Hip hop, a 1970s innovation stemming from the Bronx in severely under-resourced Black and Brown communities, geometrically expanded how music is made (Chang, 2005; Rose, 1994). Naeem et al. (2022) argue that "...it has evolved into a set of creative practices that produce alternate systems of power…emerging technologies have given ordinary individuals an unprecedented ability to document, circulate, and give voice to what they experience and what they make" (p. 21). All you need is yourself, a stack of records, and a sound system. As Busta Rhymes (2021) says,

> Watch; as I combine all the juice from the mind
> Heel up, wheel up, bring it back, come, rewind
> Powerful impact (boom!) from the cannon!
> Not braggin', tryna read my mind, just imagine
> Vo-cab-u-lary's necessary, when diggin' into my library… (Real Hip Hop Lyrics, 2:59–3:13)

Rapping over a lush amalgamation of sources introduces the role of a critical consumer and cultural producer as a way to be in the world. Like collage, cut ups, and sampling, hip hop asserts the self into the culture as an active participant rather than a passive recipient.

Visual Literacy, Culture, and Media

How do collage and visual literacy relate? Murphy defines visual literacy as "an interconnected set of practices, habits, and values for participating in visual culture that can be developed through critical, ethical, reflective, and creative engagement with visual media" (Murphy, 2024, p. vii). Viewed in this light, collage and visual literacy are deeply participatory, engage through analysis, celebrate the action of (re)combining, and are deeply connected to the perspective you bring and the tools and resources ready to hand— expressing a kind of *terroir*. Expressing ideas and centering yourself as a creative being surrounded by pre-existing culture is just as much of a life skill as navigating information online.

Nevertheless, collage is also deeply tied to reproducibility. In his *Ways of Seeing*, Berger (1972) explores the stochastic and reciprocating effects technology and reproduction have on visual culture and how popular culture influences our regard for original works of art. He also ties in economics, society, and art's role in commodity and exchange. He characterizes the conundrum thus: "Because works of art are reproducible they can, theoretically be used by anybody… Yet mostly—in art books, magazines, films or within gilt frames in living-rooms—reproductions are still used to bolster the illusion that nothing has changed, that art, with its unique undiminished authority, justifies most other forms of authority, that art makes inequality seem noble and hierarchies seem thrilling" (Berger, 1972, p. 29). Collage is frequently used to critique or counter prevailing constellations of systemized authority; it is intrinsically tied to reproduced media, and fodder for this art-making practice often includes magazines, newspapers, and words and images that bears traces from commerce and exchange.

Berger's social history of art is imbricated with the Frankfurt School of thought, specifically Benjamin's investigations on the interrelation of politics and art. These power relations shape our perception through the medium of making—whether oil painting, image reproduction, or television itself. According to Benjamin (2008), the manner by which and quantity of images reproduced

…substitutes a plurality of copies for a unique existence. And in permitting the reproduction to meet the beholder or listener in his own particular situation, it reactivates the object reproduced. These two processes lead to a tremendous shattering of tradition…" (p. 22).

Benjamin's critique of how visual culture functions, who it is created for, and what the visual systems and arguments enact echo collage's critique. By deliberately dissecting image reproductions to reassemble into something new, the collagist can reinscribe cultural dynamics through amalgamating tradition and innovation.

Benjamin's and later Berger's attention to how media is constructed and consumed echoes aspects of media studies. As McLuhan et al. (1967) state, "All media work us over completely. They are so pervasive in their personal, political, economic, aesthetic, psychological, moral, ethical, and social consequences that they leave no part of us untouched, unaffected, unaltered" (p. 26). Berger constantly uses this concept in his entreaties to the audience to be careful consumers of the visual and how what you see affects your perception, including more recent trends such as image reproductions, and historical influences such as the role of the female nude in Western visual culture. His use of showing behind-the-scenes filming or the scene where he "flips" the channels shows a reflexivity toward the systems through which media is conveyed (at least at that time) through the one-to-many format of television production (Figure 1).

Figure 1
*Screenshot of John Berger's "*Ways of Seeing," *Episode 1 (aired 1967)*

Collage's reliance on already-produced media questions originality in authorship and creation and the audience's ability to read decontextualized/(re)contextualized elements assembled together. If we think of collage as a kind of critical consumption and cultural production, we can use Barthes' work (1977) to

consider a collagist as a reader. Barthes places firmly within the reader's grasp their power to interpret a text to fit the needs and experiences of their own lives, saying that

> ...a text is made of multiple writings, drawn from many cultures and entering into mutual relations of dialogue, parody, contestation, but there is one place where this multiplicity is focused and that place is the reader, not, as was hitherto said, the author. The reader is the space on which all the quotations that make up a writing are inscribed without any of them being lost; a text's unity lies not in its origin but in its destination. (p. 148)

Barthes notably decenters authorial intent as the main locus of study to understand a work; rather, the reader's response is the most crucial element. In this frame, collagists are akin to readers: able to take meaning from others' work and create culture as they digest and translate those original ingredients into new expressions.

Bricolage and Assemblage in Critical Theory

Concepts related to collage influence continental philosophy, particularly through the work of Levi-Strauss (2022) and Deleuze and Guattari (1987). Levi-Strauss' concept of bricolage compares systems of assembling disparate structures to sensemaking and mental models: the bricoleur assembles constructs based on what they already are familiar with when encountering something new. Levi-Strauss' mobilization of assemblage is further expanded by Deleuze and Guattari (1987). As Deleuze states, "It is a multiplicity which is made up of many heterogeneous terms and which establishes liaisons, relations … the assemblage's only unity is that of co-functioning: it is a symbiosis, a 'sympathy'" (Deleuze & Parnet, 1987, p. 69). This gesture, action, or pattern can occur at the intersection of people, objects, nature, and beyond. Collaging can be thought of as itself a Deleuzian assemblage.

Pedagogy

The bricolage and assemblage theories referenced above are analogous to constructivism in learning theory: in each instance to learn means to piece things together. Critical and feminist pedagogy are both constructivist in origin: they center students as fully-fledged individuals with important experience and connections to bring to bear on the topics at hand. Both Freire and hooks tried to de-emphasize the role of the teacher as the authoritative source in the classroom. Instead, students and teachers share the power to shape and develop course goals, community, and culture in the learning space. This approach opens up the potential for everyone to be teachers and learners, simultaneously creating a more utopian and realistic view of the world. hooks celebrates freedom in the classroom as essential to self-actualization and growth. As hooks (1994) says, "I celebrate teaching that enables transgressions—a movement against and beyond boundaries. It is that movement which makes education the practice of freedom" (p. 12). One can perhaps read hooks' use of "transgression" here as freedom to assemble ideas. For Freire, the prime strategies and structures the teacher sets in place are all to create opportunities for students to know themselves better: "The teacher is of course an artist, but being an artist does not mean that he or she can make the profile, can shape the students. What the educator does in teaching is to make it possible for the students to become themselves" (Horten et al., 1990, p. 181). Here, I read "becoming themselves" as a liberating act of self-determination and acts in the service of self-creation or assembly.

This mosaic of critical pedagogy moves us toward creating a miniature version of society that we want to see taking place in the classroom. Horizontalized contributions are celebrated: the source of information or knowledge or how you attain that understanding is valued. Collaging here is an activity and an end result

that aims to facilitate knowledge and growth, adding to your ability to articulate and appreciate how we all can contribute to a better society.

Freire and hooks set the stage for a vision of education that contributes to a liberatory potential—that is, people freeing themselves from oppressive power structures. Using critical analysis tools, such as collage, furthers that vision.

Assemblage and the Library

The perspectives I outline above are shaped by my profession as a librarian. A library itself is an amassment of ideas put together in a partial, peculiar, situated way to serve a group of people. The assembled and organized nature of its holdings and physical layout fosters combinations and juxtapositions of ideas. When we browse we are where a particular synthesis takes place. The library brings the world to you: pulled from context and enriched with other information and associations. Certain things are emphasized, like the written word, and others are de-emphasized—like the multi-sensory. You certainly can imagine being in the caves of Plato or of the Dunhuang Buddhas or experiencing the vernacular building forms of Cameroon, but you cannot actually smell, touch, or taste those experiences from your situation in the library. Berger's critique of cropping and focusing on specific elements speaks to the strictures of the lens or the frame.

Speaking of control: libraries can also be reduced to representing and facilitating an antiquated idea of whose voices and what topics are deemed worthy of being kept as part of the cultural record, instead of others that have been left out. It can feel as though you are on the receiving end rather than the creating end. Yet, in the light of Berger's analysis of art and reproducibility, the library can also find a productive friction between authenticity and reproducibility. (And, one way how collage and assemblage are both a potent critique for those who would only allow one reading of history.) Berger discusses how people hang art reproductions and, through this action, reify authority from the art object's *bona fides*. Do libraries, in turn, limit their potential by gathering *bona fides* from the famous and masterly objects, monuments, and authorities in their collection—operating as repositories of institutionalized "nouns" as it were, over their collections' ability to inspire research and expression or as places to assemble "verbs"?

But what is the antidote? Collecting the subaltern perspective? Oral histories, self-publishing, local and regional material, and other non-dominant discursive material can all provide counterpoints to dominant discourse. Thinking through the gesture of collage, all these sources are worthwhile to collect, but there will always be a tension toward the library's place in culture as a collector of knowledge and what that has meant over time. This dynamic between old and new, established and emergent, is ever present in the library, and thus makes it a productive site for exploration, growth, and criticism.

Case studies

The sets of ideas explored above add nuance and complexity to the role of collage in the broader realm of visual literacy and critical theory. But how does this come into being in the classroom? Like collage and visual literacy, my pedagogical approach is process-driven, iterative, and learns by doing. Here's a spectrum of collage and assemblage activities I have led across a number of disciplinary practices and student levels in higher education: from architecture to art history, from sculpture to new media: these activities empower students, question authority, and foster dialogue.

Zine workshops

Zines are self-published mini-publications that are intentionally low-stakes and low-entry. I also like the gesture of the zine since you are transforming a flat piece of paper into something that introduces narrativity

and dimensionality. Making strategies include collage, drawing, writing, and various combinations thereof. Zines cover anything you need to express: politics, self-expression, and finding others experiencing something left out of mainstream media. The publishing aspect is where I see the community coming in. While it is perfectly fine to express and keep that to yourself, others find satisfaction in communicating that to others to be seen. By putting it out in the world, you create an opportunity to find like-minded people and gain solidarity. It is a deeply prosocial gesture.

The library I lead has been hosting zine workshops in collaboration with the student group National Organization for Minority Architects Students (NOMAS) for four academic years (Figure 2). The group is a student chapter of a larger organization, the National Organization for Minority Architects (NOMA). Founded in 1972, NOMA is dedicated to advancing the cause of marginalized architects in their professional journey. The UIUC NOMAS chapter advocates for the interests of marginalized identities in the school through working with the administration toward social justice goals, holding an annual symposium, and hosting events throughout the year.

Figure 2
NOMAS Students Engaging in Collage-Based Zine Workshop (April 2022)

Since they were working toward increasing exposure and solidarity while developing themselves as future architects, I wanted to offer them the idea of zines as a tool: a way to self-publish their ideas and to create community. This dynamic reflects an aspect of marginalized identity and publishing opportunities—since much mainstream information is produced and published by white individuals, this is an opportunity to create platforms for counter-storytelling. Using collage in this context solicits the enfranchising aspect of taking everyday materials and shaping them to channel your voice.

New Media and Non-Narrative Storytelling

In this set of examples, I worked with a faculty member in new media within the studio art program. The classes included non-narrative storytelling and working with images, both created by the student and

reassembled from already-made images. At this point in the paper, I start to break off from fairly traditional collage and assemblage, into inserting the self and the body into what is being expressed. In both classes, we used prompts, many of which were drawn from the School of the Art Institute of Chicago *bibliodérive* activities (Salisbury & Ferreira, 2017) and also influenced by chance operations (Figure 3).

Figure 3

Prompts from Situationist International Activity

1. Write and/or draw a description of a family member. Label what you have made with "this is NAME" using the person's first name only. Search the library catalog using the first name of that family member as a keyword. Select a book from the search and leave the description folded inside.

2. Grab 10 books and arrange them by the most recent due date. Tell a story about them in chronological order

3. Imagine the collection as an orrery and trace planetary motion through the collection.

4. Superimpose the periodic table of elements over the floor plan of the library and collect a sample from every element.

5. Find 10 books with the same or similar color book covers. Take the first letter of each title and make an acrostic out of it. Take 10 scraps of paper and write out each word in your acrostic and stick them in the books.

6. Walk into the stacks, find a subject that interests you, and locate one book. Turn around 180 degrees and find the book that is exactly opposite of the first book. Pair them together and analyze how they relate to one another.

Figure 4

Example of student activity from prompt #4 in Figure 3 (February 2022)
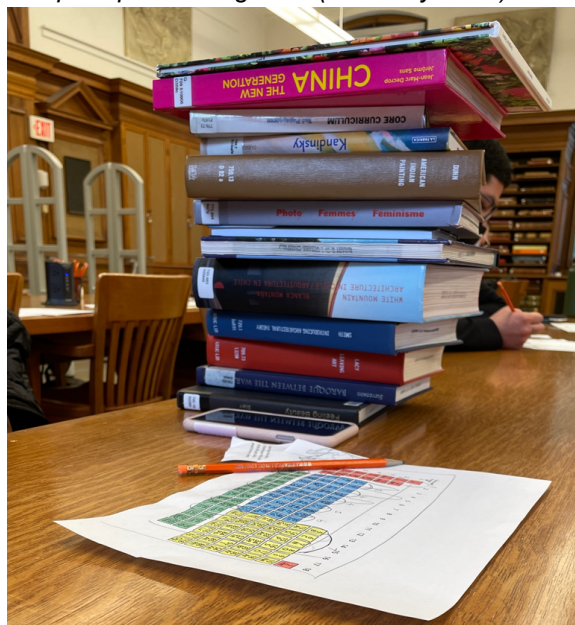
The students were asked to take a prompt and work toward achieving that goal, and at the end, we shared projects. Students created sculptures, wrote stories and poems, led tours, and, in the process, leaving traces and activating spaces with their movements. These materials, interventions, and interactions were performative assemblages in and of themselves (Figure 4).

In the non-narrative storytelling class, the professor and I conceived an activity in the middle of the semester, on the way toward developing a larger piece that would be conveyed through digital media. Following the non-narrative storytelling activity, the faculty member approached me about hosting an image practices class in the library the following semester as a kind of "class-in-residence," akin to an artist-in-residence. In practice, the class in residence meant that the class visited the library about five times throughout the semester for library instruction and project critique, and had a show that took place simultaneously in the art school gallery and in the library.

The image practice class started with the prompts discussed above on the first day of class, and then collaged images from photos and scanned taken from the library's collection. This assignment had its critique in the library. The next major assignment required them to design bookmarks and place them in specified library books chosen by the students (Figure 5). They produced a checklist of all the student's book choices so that people could independently find all the bookmarks in the library. They also had their bookmarks and the collages they had previously created exhibited at one of the gallery spaces in the art and design building on campus (Figure 6).

In addition to works on paper traditionally associated with collage, the bookmarks could be considered an assemblage in multiple senses of the word. This gesture created a two-fold trace with the opportunity for a cascading effect. The first trace happens in the intersection of student and book, as they seek and decide the books that are the best conveyors of their meaning, creating a contextual relationship. Then, the relationship gets extended as other people come across these bookmarks, with the possibility of eliciting a response and possibly influencing that person to do something similar. It starts to verge on a kind of virality. We still encounter the bookmarks two years later, making us a very long-form and slow gallery.

Figure 5
Example of Bookmark Placed in Ricker Library Book (October 2022 to present)
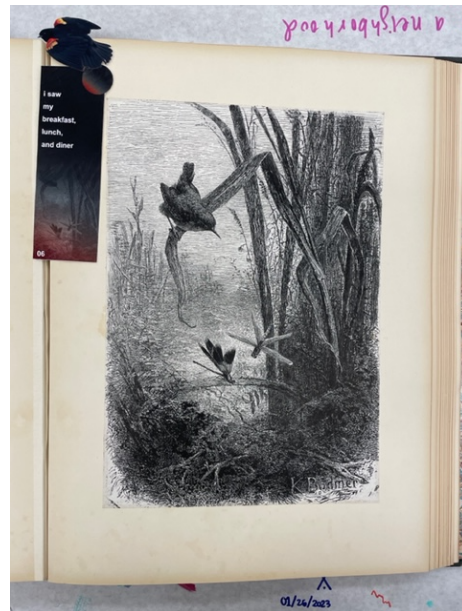
Figure 6
Bookmarks from Image Practices Class in Gallery (October 2022)
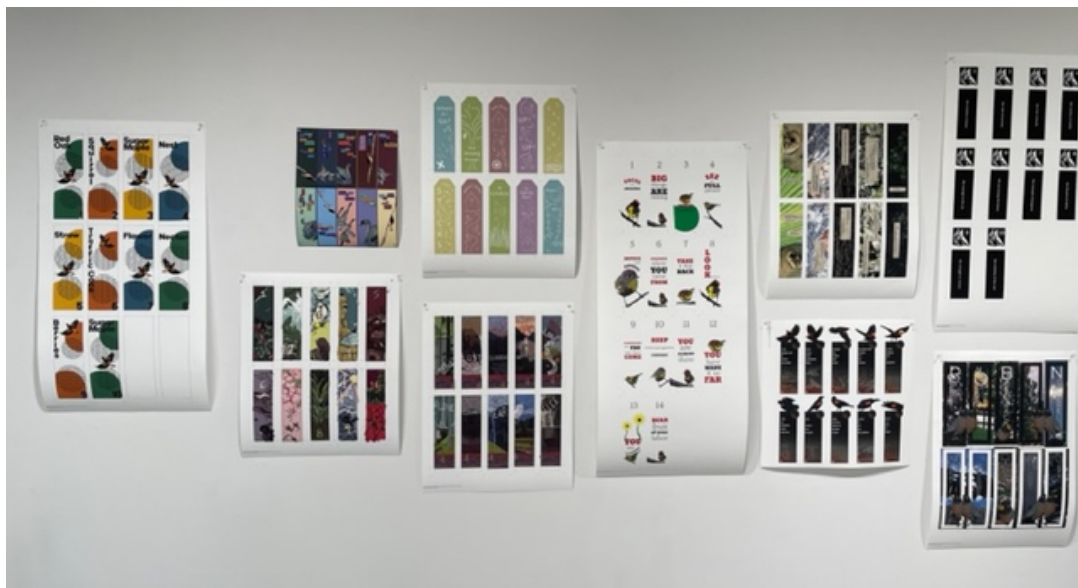
Sculpture bricolage

I extended this activity into the sculptural realm by collaborating with a faculty member teaching a sculpture for non-majors class. This collaboration was a quick, two-week assignment devoted to practicing art of the everyday. They were inspired by Brown's work intervening in space not thought of as art spaces and sculptures created from consumer objects (Brown, 2015). The goal was to help them see connections and find beauty and serendipity in their surroundings. This opportunity was particularly exciting because the students were non-majors: in order words, they had the opportunity to use creativity to enrich their everyday experiences and those around them with art practices, even though they were not majoring in art. They practiced expression, in this case, using books in a library as tools and objects for conveying meaning (Figure 7). It is everyday in that it is part of the environment of the campus at which they attend.

Figure 7
Example of Student Work from Sculpture Bricolage Activity (March 2022)
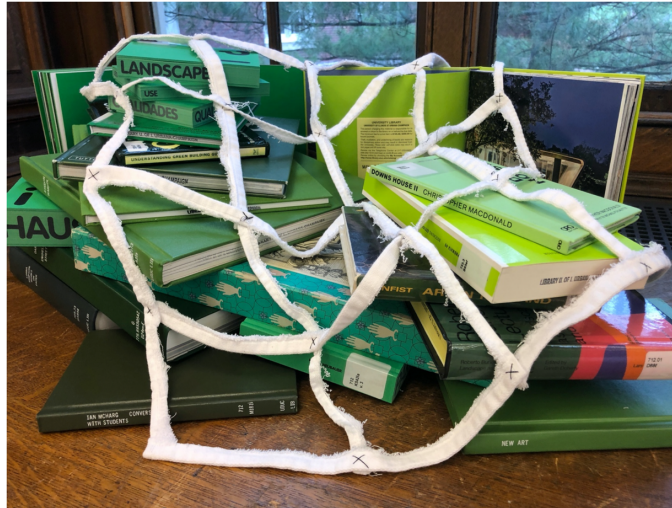
Gallery installations

Finally, I want to draw attention to a set of projects I did in gallery spaces, both in the art and design school and the art museum on campus.

First, the gallery installation: I collaborated with student leaders of the Society of Art Historians and Archaeologists; a graduate student group dedicated to creating discourse around visual culture on campus. The premise was to create a platform and space for community expression using collage as a method. We highlighted critical thinking on art magazines and how they frame and shape artists' public reception. Interactive elements included voting boxes *á la* Hans Haacke's Voting Poll (1970), a collaging station, and plenty of Post-its. We invited a number of classes to visit the installation and participate in the collage-making; in the end, we had seven classes over a week, drawing across new media, art education, studio graduate critique classes, and an art history seminar (Figure 8). I enjoyed this iteration of the collaging gesture because while each participant had the opportunity to contribute their collage, the amassment of collages and the dialogues created between them became more and more concentrated and layered as time passed. I particularly enjoyed the reflexivity of the gesture, to deconstruct publications about art and to use those as the base material to "talk back" to the publications.

Figure 8
Class in situ *at Collaging Station, exhibition Reviewing the Reviews: What Critics Say about Art,*
(November 2021)

Lastly, inspired by the success of the gallery installation, faculty members approached me to create something similar for a show they were assembling in the art museum. This show celebrated the creative practices of the four black faculty in the School of Art & Design. I invited fellow librarians across subject disciplines of literature, pop culture, music, and art to curate a collection of browsing materials to accompany the artwork and provide a more casual and reflective way to engage the ideas brought forth in the exhibition. These resources invited people to browse, relax, learn, and get inspired by their surroundings. Together with the featured artists and museum staff, we offered these materials as a community resource to reimagine how the public engages with the museum and to grow together.

While the books themselves could be thought of as an assemblage of ideas, how I activated them through pedagogy stands out. That semester, I worked with an art education class called Museums in Action, whose professor was one of the faculty members in the show. We met in the museum at the bookshelf, and after prefacing the ideas behind the display, I asked them to consider the show's themes, match the books with the artists, and place the books physically in the gallery spaces in dialogue with the artwork (Figure 9). The students considered each book carefully and drew connections to extend and augment ideas they resonated with the galleries. Here is where we can incorporate assemblage and actor-network theory: we have a deeply social combining of not just objects but also people and actions. These actions come together, as Deleuze and Guattari (1994) suggest, as people think through ideas, essentially constructing their own philosophies. In other words, everyone is a philosopher.

Figure 9

Class in situ *in Community Resource Center, embedded in Black on Black on Black on Black, Krannert Art Museum (September–December 2022)*

Conclusion

In this paper, I brought together a broad variety of sources to create my own assemblage of ideas, actions, and contexts. Together, these ideas suggest an enfranchised, empowered subjectivity in relation to others. I would suggest this again could be thought of in the context of the library. A living library is activated, not divorced from context, in dialogue with ideas and people. That's how we invigorate and vivify connections, an annotated bibliography in action. Moreover, to use our circumstances and the objects around us deliberately to create that vision. I see the pedagogy approach as a way to channel growth as individuals and society. I argue that this is a way to use visual literacy skills as a foundational principle to a life well-lived, full of meaning and purpose. And what's more important than that?

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Critical Visual Literacy in Activism:
Artist Violet Ray's Counterimages

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Abstract

Critical visual literacy develops the ability to investigate the social and cultural contexts of visuals to illuminate power relations. Artist-activist Violet Ray's critical response to visual culture provides a potent example of how visual literacies can be activated to interpret and creatively confront received cultural imagery. Informed by John Berger's Ways of Seeing*, which considered power's privileged manipulation of visual imagery as a tool of social and economic dominance, this paper considers Ray's photo collages of visual protest as counterimages that subvert cultural value messaging through the juxtaposition of advertising and news photo source imagery. Viewed in relation to the* Framework for Visual Literacy in Higher Education*, this paper examines the methods by which Violet Ray's confrontational collages pursue social justice through visual practice. Through this exploration, the paper contributes to the growing discourse on critical visual literacy, emphasizing its role in activism and the pursuit of social change.*

Keywords: artist-activists, counterimages, critical visual literacy, social justice movements, visual culture

Introduction

Critical visual literacy, defined as the capacity to probe the sociocultural underpinnings of visuals to expose power dynamics (Kim & Serrano, 2017), helps reveal the profound influence of images in shaping cultural values. Power structures harness images to mold and reinforce societal norms, manipulating visuals as a tool of sociocultural dominance. Artist-activists also use images, but they leverage them to subvert the values that power is trying to sell. In this arena, artist-activists emerge as unique agents, wielding images to challenge the values propagated by power. In the hands of these activists, critical visual literacy transforms into a tool for crafting counterimages in the pursuit of social justice.

The rise in academic inquiries into the nature and applications of critical visual literacy invites conversation about the historical uses of imagery to activate critical visual literacy in the service of social change. While studies have explored teaching visual literacy for social justice (Yang, 2014), the deployment of critical visual literacy in the efforts of artist-activists of historical social justice movements has received little attention thus far. Despite the Association of College and Research Libraries' *Framework for Visual Literacy in Higher Education* recognizing the intrinsic link between visual practice and the pursuit of social justice (ACRL, 2022), the application of critical visual literacy by artist-activists within social justice movements has been largely unexplored.

This paper seeks to fill this gap by examining the methods of an artist-activist known as Violet Ray, whose critical response to visual culture serves as a potent illustration of activating visual literacies for interpreting, responding to, and acting upon received cultural imagery. Disenchanted with what he perceived as the ineffective visual strategies of the anti-war movement, Ray opted to "speak the language of the supermarket rather than political jargon" (1984, p. 1), creating anti-war advertisements during the Vietnam War. Dismantling the contents of *Life* magazine, Ray cut and pasted war photos into product advertisements, yielding critical counterimages.

Initially reproduced as posters and distributed at anti-war marches, later used as the basis for a pedagogy of advertising as a medium for protest, and eventually collected by a university museum, Violet Ray's collaged counterimages starkly juxtapose disparate imagery to powerful effect, compelling American consumers to make complex associations between the war in Vietnam and their own lifestyles and values. Ray's realization extended beyond protesting the Vietnam War; he aimed to challenge the capitalist consumer culture sustained by that conflict. This is the essence of critical visual literacy in activism—probing the sociocultural contexts of images, illuminating power relations, and responding with transformative counterimages.

Unveiling the Power of Critical Visual Literacy in Activism

Recent studies underscore the importance of adopting a critical visual literacy approach to scrutinize power relations in the sociocultural context, serving as guideposts for future directions (Brumberger, 2019; Chen, 2022). Moreover, the effectiveness of visuals in contributing to social justice is recognized as part of a broader shift toward a critical paradigm in visual literacy, emphasizing the role of critical visual literacy in cultivating a discerning citizenry (ACRL, 2022; Statton Thompson et al., 2022). In various realms—social, cultural, economic, and political—critical visual literacy can unveil how power exploits visual images to mold and influence cultural values. Given its effectiveness in this regard, a profound engagement with the visual culture of social justice movements becomes imperative for nurturing critical thinking about the intentions behind visual representations.

Critical visual literacy serves as a crucial skill for assessing our visible surroundings. However, to be effectively deployed in the pursuit of social justice, it must transcend mere comprehension by critically intervening in the dominant visual culture to unlock the subversive potential of art for the transformation of everyday life. The protest work of artist-activists engaged in visual practice for social justice vividly displays the critical process of visual literacy—characterized by investigation, interpretation, illumination, and activation. This approach necessitates the cultivation and application of critical visual literacy to analyze, appropriate, and re-present received cultural values, as well as to interpret newly created counterimages. It goes beyond simply understanding an advertisement as an emotional appeal; it involves critically and creatively recontextualizing advertising as an integral part of a corporate capitalist culture dependent on the passive reception of cultural messaging.

Artist-Activists: Pioneers of Critical Visual Literacies

Artist-activists develop and deploy critical visual literacies to communicate counter-messages in the pursuit of social justice. In the hands of artist-activists, critical visual literacy becomes a transformative tool for challenging the values advanced by those in power. The study of activist art facilitates examining power relations, challenging dominant narratives, and developing the crucial visual literacy skills required for an informed citizenry. Furthermore, it aids in crafting responses necessary for dismantling and responding to the manufactured cultural images and values increasingly monetized in today's image-saturated society.

In looking back at the visual culture of protest movements, artist-activists emerge as trailblazers, spearheading the development and deployment of critical visual literacies to convey counter-messages in the pursuit of social justice. By studying their often-confrontational techniques, individuals can actively cultivate and practice the visual literacy skills essential for substantive engagement in participatory democracy. Studying activist art develops the critical visual literacy skills necessary for an informed citizenry as well as the ability to craft radical responses.

Counterimages and Image Appropriation: Navigating Ethics and Context

A counterimage (see Figure 2), at its core, contradicts another image (see Figure 1). Counterimages leverage intricate critical visual literacies to articulate alternative interpretations of events and experiences, giving voice to dissent within the dominant culture and playing a pivotal role in the ongoing struggle for social justice. Counterimage creation frequently involves the appropriation of existing imagery, subverting its meaning, and commandeering its emotional charge to confront viewers with conflicting viewpoints. This process raises ethical questions surrounding image appropriation, with critics questioning the morality of such practices. Considering how the ethics of image appropriation might vary for those in positions of power versus the oppressed adds an important layer to the complex discourse surrounding this powerful tool in the arsenal of critical visual literacy.

Figure 1
James Montgomery Flagg, I Want You*, 1917 (Public Domain)*

Figure 2
Anonymous, I Want You*, 1972 (Public Domain)*

Visual Literacy Activism: Harnessing the Power of Counterimages in Social Justice Movements
Social justice movements leverage the impactful force of counterimages to disseminate protest messages within participatory democracies. The visuals associated with social justice movements can be viewed as forms of what can be termed visual literacy activism. Artists within the counterculture have a longstanding tradition of appropriating, recontextualizing, and subverting images from their society's dominant media culture. Consequently, the protest art emerging from social justice movements offers a compelling body of critical imagery, displaying sophisticated and subversive applications of visual literacies tailored for social protest.

While the significance of visual literacy to understanding images has been studied extensively, the focus must shift to activating these literacies in the pursuit of social justice and cultural change. Counterculture artists can illuminate this process, and protest art serves as a potent example of using visual practice for social justice. The techniques of critical visual literacy employed by artist-activists in the pursuit of social justice illuminate how people perceive visuals and are affected by them.

In the mid-1960s, the United States' escalation of the Vietnam War laid the foundation for the anti-war movement across America, prompting citizens to engage in critical visual protests. The counterculture's youth and students responded to what they perceived as the pervasive materialism and conformity of mainstream U.S. culture. A key slogan of the era was "From Protest to Resistance," and resistance meant active participation in efforts to disrupt all aspects of the war machine (Reed, 2019). New Leftists aimed to incite a participatory democratic uprising among the underprivileged. Studying the visual art of protest movements like this one unveils the potential of creating visual images to uncover, critique, resist, respond to, and ultimately counter capitalist commercial culture. A study of historical precedents of the engagement of critical visual literacy for social justice equips people with actionable visual strategies that "speak" and have a visual "voice."

Unveiling Power Dynamics: Violet Ray's Visual Protest as a Manifestation of Critical Visual Literacy

In my ongoing research into the development and deployment of critical visual literacy methods by artist-activists creating counterimages of protest for social justice movements, I discovered the work of an artist-activist known as Violet Ray, a pioneering source of anti-war counterimagery in the social movement politics of the mid-1960s and 1970s, who radically repurposed the visual culture of *Life* magazine to protest America's war in Vietnam. This research involved ongoing communication with Ray, allowing for deeper insight into his experiences of using sophisticated critical visual literacies to provoke radical social change.

Ray immediately disapproved of the term "visual literacy," considering it an oxymoron that privileges verbal interpretation over visual response, leading to a denigration of visual culture (V. Ray, personal communication, July 21, 2023). In this way, Ray prefigures later studies that decry the unequal emphasis placed on verbal over visual modes (Debes, 1974; Statton Thompson et al., 2022). Ray's collages appealed to viewers' emotions to ignite a radical reconsideration of consumer values sold by corporate capitalist visual culture. In Ray's hands, collage is an art that reveals through substitution, recombining imagery to clarify relationships and critically engage with the duality of competing value systems evident in visual culture.

Ray realized he could use advertisements as the medium for his counterimages, seamlessly inserting war photos into real ads, harnessing their graphic power instead of merely deconstructing their meaning. Recognizing that consumer culture relies on advertising that depicts the fantasy of consumer desires, Violet Ray, unable to reconcile these fantasies with the horrors of the Vietnam War, viewed his appropriation of advertising as guerrilla warfare. He coopted the manufactured fantasy imagery and Freudian power of advertising, invading it with the harsh realities of the war. For Ray, the real issue is what values and beliefs the symbols and images serve (V. Ray, personal communication, July 21, 2023).

Ray intended his collages to function like magazine advertisements by appealing to viewers' emotions, not to sell products but to question values. Ray centered his work on the emotional charge of images. "For a couple of cents invested in some old magazines," he stated, "you have available to you all the resources which cost Madison Avenue millions of dollars and years of research to produce" (Ray, as cited in Stamberg, 1968, p. 4). His collages confront viewers with disturbing connections between the war and their everyday lives. In this way, Ray activated critical visual literacy to pursue social change, transitioning from image interpretation to radical response.

Ray's counterimages exhibit a deep understanding that the viewer is always already in a critical relationship with the visible world. His method of juxtaposition equips viewers with critical tools to assess their world. Ray used photomontage to prompt spectators to engage in critical modes of perception, challenging the status quo and revealing hidden political agendas, social ideologies, and cultural ideals propagated by the mass media. Inspired by the American culture industry, Ray sought to turn advertising strategies against the mass media itself. The critical visual literacies deployed and activated by his contradictory counterimages empowered the oppressed, underprivileged, and countercultures to criticize the power structures at the center of visual culture and communication.

Ray's approach activated a sophisticated critical awareness of visual culture. Disturbed by how advertising had altered the dynamics of the class struggle (V. Ray, personal communication, May 24, 2023), Ray

focused his work on attacking the power imbalance with subversive visual communications. Ray's collaged commentaries take the shape of an ideological critique, focused on power recuperation through image appropriation. His advertisements against the war in Vietnam link the selling of the war to the selling of popular products, and the passive consumption of war images with the passive consumption of consumer goods.

Ray's collages, reproductions, and their distribution in various media platforms during the anti-war movement demonstrated a protest against the Vietnam War and a profound critique of consumer culture and advertising. By turning advertising imagery into counterimages, Ray confronted the passive consumerism and commodity fetishism underpinning the status quo. His collages, like improvised bombs, were combustible, challenging norms and revealing the violence inherent in the cut-up creation process. Through scissored interventions, Ray's work mirrored the violence depicted in the images, emphasizing displacement, destruction, and the broader socio-political context of the Vietnam War.

Life Magazine, the Vietnam War, and Advertising: Uncovering Contradictions Through Critical Visual Literacy

In the tumultuous mid-1960s, the Vietnam War inundated American media, with *Life* magazine serving as a prominent conduit for both stark documentary photography (see Figure 3) and persuasive advertising (see Figure 4) that defined the nation. Violet Ray pioneered an approach to critical visual literacy and activism through the strategic juxtaposition of war imagery and consumer advertisements. Ray's counterimages (see Figure 5) in response to *Life*'s visual culture expose the stark contradictions between advertising's idealized interpretations and the harsh reality of the world.

Figure 3
Henri Huet, 1966 (Associated Press)
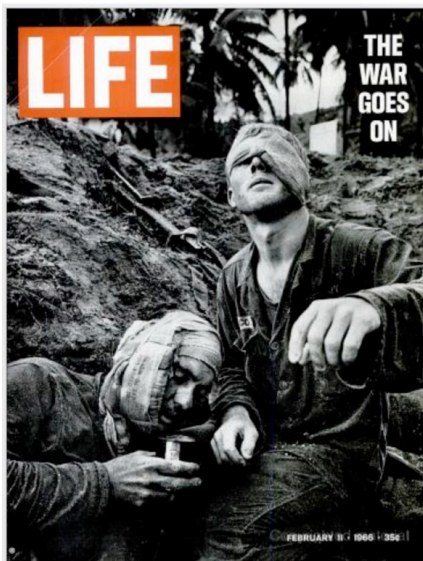
Figure 4
*Revlon advertisement, 1966 (*Life *magazine)*

Figure 5
Violet Ray, Revlon Oh-Baby Face*, 1967, ad collage, 13.5 x 10.25 inches (courtesy Violet Ray)*

Ray felt that much activist art of the time was alienating, consisting mainly of atrocity photos and political slogans. An Art Workers Coalition protest poster (see Figure 6) uses a photograph of the My Lai Massacre (also published in *Life* magazine), using journalistic evidence rather than symbolism or metaphor to convey the horrors of the war. Ray contrasted these techniques with his own methods. "This bluntness," he says of the former, "failed to communicate to the average citizen what this remote conflict had to do with their daily lives" (Ray, 1984, p. 1). Ray's technique involved pasting war photos directly into *Life*'s advertisements, compelling consumers to confront complex associations tied directly to their lifestyles and values. Ray sought to communicate the profound impact of the Vietnam War on the average citizen's daily life. His confrontational collages aimed to bridge the gap between the remote conflict and the consumer experiences of the American public.

Figure 6
Art Workers Coalition, And Babies, *1969*

Violet Ray was determined to probe the deeper motives for U.S. involvement in the war and to communicate his counter-messages of protest. Consider the cynicism on display in *Life* advertising Fresh Spray Deodorant at the same time the U.S. is dropping napalm in Vietnam. In Ray's collaged response (Figure 7), critical interpretation is activated in the pursuit of social justice.

Figure 7
Violet Ray, Fresh Spray*, 1967, ad collage, 13.5 x 10.25 inches (courtesy Violet Ray)*

Examining *Life* magazine spreads underscores the visual contradictions between war-torn Vietnam and the seemingly carefree lives depicted in advertising. The juxtaposition of a bleeding child in Vietnam (see Figure 8) adjacent to an advertisement for a slide carousel as a family memory protector (see Figure 9) starkly highlights the cultural cynicism prevalent at the time. The shock of such contrasts can be considerable not only because of the coexistence of the two worlds shown, but also because of the cynicism of the culture that shows them next to one another between the pages of the same magazine (Berger, 1972).

Figure 8
Paul Schutzer, Child left bleeding*, November 26, 1965 (*Life *magazine)*

Figure 9
*Airequipt advertisement, November 26, 1965 (*Life *magazine)*

By the middle of the 20th century, Americans found themselves swimming in a veritable ocean of advertising. However, just as fish do not think about the water they swim in, people do not often think about the created cultural context promoted by advertising because it is unavoidable in their daily lives (Pollay, as cited in Boihem, 2007). Further, if one of the goals of education is to get the fish to think about the water, experts agree that advertising is the best place to look (Jhally, as cited in Boihem, 2007). Likewise, the goal of critical visual literacy in activism, the goal of counterimages and critical visual literacy education and the goal of Violet Ray's ominous counter-advertisements is to raise awareness of the visual environment. The problem for activist artists like Violet Ray was that the everyday public was rendered passive to the war in Vietnam by capitalist desires at home. The pervasive influence of advertising was and is a cultural force shaping societal values. Advertising sells more than products; it sells values. Ray decided that the best way to challenge these values was to coopt the tricks advertisers used, altering their visual images to challenge passive consumption.

A poignant example involves Ray's integration of the harrowing image of a Vietnamese family escaping U.S. bombs (see Figure 10) into a Chanel advertisement (see Figure 11), disrupting the usual product-centric focus. Ray adds the disturbing photo directly to the Chanel advertisement, taking up the space normally occupied by the product shot (see Figure 12). The half-drowned Vietnamese family can be seen struggling to escape the same waters the model appears to be bathing in. Without the qualifying image of

the product, the direct gaze of the Chanel model becomes a challenge to the viewer, accusing them of being complicit in the atrocities depicted (Wilson, 2012).

Figure 10
Kyoichi Sawada, 1965 (UPI)

Figure 11
*Chanel advertisement, 1965 (*Life *magazine)*

Figure 12
Violet Ray, The Spell of Chanel*, 1967, ad collage, 13 x 10.25 inches (courtesy Violet Ray)*
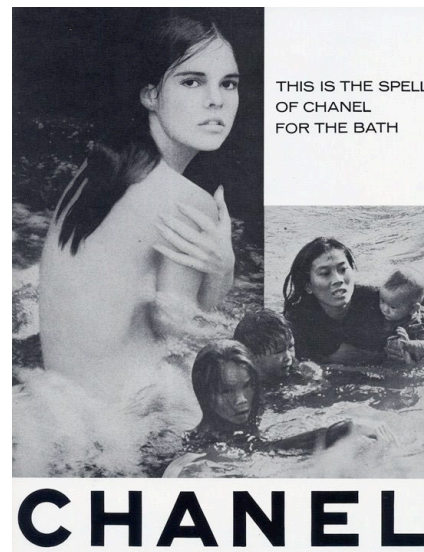
Cutting and pasting connections between the war in Vietnam and consumerism at home, Violet Ray's counter-advertisements serve as a powerful manifestation of critical visual literacy, unraveling power structures and provoking viewers to reconsider the societal costs underlying consumerism. By strategically appropriating images, Ray's work induces emotions of disgust and concern, challenging the accepted narrative of free-market capitalism, revealing its hidden human toll as part of the nation's costly and unending war machine.

Activating Change Through Visual Reproduction: Violet Ray's Anti-War Message
Much like advertising's commitment to customer acquisition relies on insinuation and repetition to lodge its messages in the brain, Violet Ray's commitment to disseminating his anti-war counterimages was significantly shaped by the strategic use of reproduction. In 1967, he took a bold step by printing 10,000

reproductions featuring three impactful collages: *The Spell of Chanel, Revlon Oh-Baby Face,* and *Fresh Spray*. This extensive print run was intended for distribution at the National Mobilization Committee to End the War in Vietnam demonstration in New York City, a historic event that drew an estimated 250,000 marchers, including Martin Luther King, Jr.

Despite the profound impact Ray anticipated, securing funding for these leaflets posed unexpected challenges. Organizers, worried over being sued by advertisers, and deeming the collages too sophisticated, were hesitant to support the initiative financially. Undeterred, Ray took matters into his own hands and self-funded the printing. During the protest, he personally distributed these leaflets to curbside onlookers, ensuring that his anti-war visual message reached a broad audience at this pivotal moment in history. Despite the initial challenges, the collages achieved a powerful effect by turning the system's own weapons against it (Stamberg, 1968), in effect fighting advertising with advertising, and being reprinted in underground and other newspapers and on street posters.

Intersecting Tides: The Social Justice Movement and the Visual Literacy Movement

In the autumn of 1969, the Day of Dissent emerged as a pivotal moment, rallying over a million Americans in the largest anti-war protest in the nation's history. Amidst this wave of profound public outcry, the inaugural conference of the International Visual Literacy Association (IVLA) unfolded. Co-founder John Debes of Kodak articulated the essence of a visually literate person as one possessing the ability to creatively communicate discriminating interpretations (1974). This characterization finds resonance in artist-activist endeavors, emphasizing the capacity to discern and interpret symbols within their environment for creative communication.

While the direct influence of social justice movements on Debes and the IVLA remains unclear, Debes's conceptualization of visual literacy's importance for social communication emerged in a broader context. A burgeoning segment of the population took to the streets in a critical visual protest, setting the stage for a convergence between visual literacy and societal transformation. In this dynamic interplay between social justice and visual literacy movements, a transformative synergy emerged, challenging established norms and demanding a perpetual evolution of methods for navigating and shaping the visual narratives of societal change.

Navigating Visual Culture: Unveiling Power Dynamics in *Ways of Seeing*

Amidst this cultural shift catalyzed by the counterculture, the year 1972 witnessed the emergence of the *Ways of Seeing* television series and its accompanying book. Critic John Berger used this platform to scrutinize how commercial visual culture perpetuates dominance through manufactured visual messages. He underscored visual culture's role as a significant arena for analyzing power and dissecting the political and economic control of images. Berger's conclusion, that power manipulates visual imagery as a tool of social and economic dominance, resonated with the evolving socio-cultural landscape.

Berger astutely pointed out the passive role of viewers confined to receiving and consuming preexisting images and meanings (see Figure 13). Urging action, he emphasized that the future of modern democracy hinged on transforming this dynamic, compelling viewers to evolve from mere interpreters to active transmitters. In essence, participation becomes the key to enacting social change, underscoring the indispensable role of critical visual literacy in analyzing and responding to manufactured cultural images through the creation of counterimages.

Figure 13
Screenshot from Ways of Seeing, *Episode 1, 1972 (BBC-TV)*

As the mid-1970s unfolded, the advertising realm assimilated countercultural images, utilizing revolutionary visuals to sell even products like pantyhose (see Figure 14). This raises ethical questions about image appropriation. Artist-activists, as pioneers of critical visual literacy, laid the groundwork for advertisers eventually co-opting their radical strategies for integration into the dominant visual culture. This integration necessitated social justice activists to innovate, developing novel techniques of critical visual literacy for communicating counter-messages through images.

Figure 14
Chevrons by Finery. From Ways of Seeing, *1977 (Penguin Books)*
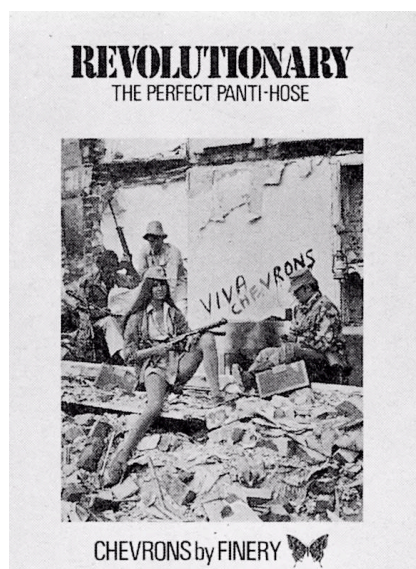
Understanding the interplay between art and advertising techniques is crucial because they influence one another, shaping the visual world and challenging the myths people live by. They guide people in reclaiming space for counter histories, counternarratives, and counterimages. Counterpropaganda, created using advertising mechanisms, appropriates their power, hijacking their influence. This is the essence of how critical subversive images operate: by taking existing visual materials and re-presenting them in a new context.

The Enduring Influence of Violet Ray's Visual Literacy Activism

Initially conceived as a form of anti-war protest, Violet Ray's early collages evolved into a powerful commentary on advertising and the underlying corporate cultural values it perpetuated. In the 1980s and '90s, these pioneering anti-war advertising collages became a focal point in exhibitions showcasing the protest art of social justice movements from the 1960s and '70s. Notably, the University of Oregon's art museum recognized the educational value of the series, acquiring 32 original collages for its teaching collection. The integration of Ray's ad collages into university galleries suggests their potential effectiveness in critical visual literacy studies. Reflecting on the enduring relevance of his work, Violet Ray expressed, "Eventually, the war in Vietnam ended, yet I found to my surprise that the collages had not lost their punch. I came to realize that the subject of my original artwork was not the Vietnam War but the nature of advertising itself" (V. Ray, personal communication, July 21, 2023).

In the contemporary landscape of 21st-century social justice movements, counterimages are notably scarce. Instead, the impact of powerful documentary visuals such as the photographs from Abu Ghraib or Wikileaks videos challenges the credibility of nation-states (Rasmussen, 2014). Violet Ray's groundbreaking political art laid the groundwork for subsequent waves of visual protest, notably the emergence of publications like *Adbusters* and the work of street artists like Banksy. In 2008, Ray took his insights to the classroom, teaching a class titled Advertising as a Medium for Protest at the School of the Art Institute of Chicago. The adoption of critical visual literacy methods in education reflects a convergence with the techniques employed by artist-activists engaged in visual practice for social justice movements.

The Evolving Landscape: *The Framework for Visual Literacy in Higher Education*

Studies have concluded that the creation of images is just as important to critical visual literacy as interpretation (Simons, 2008; Statton Thompson et al, 2022). In response to the evolving demands of information literacy instructors and the growing need for critical visual literacy, the Association of College and Research Libraries (ACRL) took a significant step in 2022 with the publication of *The Framework for Visual Literacy in Higher Education.* This transformative framework encourages learners not only to dissect the choices made in the production of visual communications but also to harness the skills to remix visuals, actively crafting messages finely attuned to the needs of specific audiences (ACRL, 2022).

According to the *Framework* this can be achieved through the cultivation of visual discernment and criticality, empowering students to actively contribute to pursuing social justice through visual practice. In the realm of activism, critical visual literacy, exemplified by the creation of counterimages, challenges the authority of cultural visuals with contradictory and at times confrontational responses, all in the name of advancing social justice. The *Framework* emphasizes the imperative for students across higher education to cultivate critical engagement with visual information. It envisions these students as discerning citizens in today's visually saturated society and considers a visually literate individual as not just a critical consumer of visual media but also a competent contributor to a shared cultural narrative (ACRL, 2022).

The document extends beyond theoretical foundations, advocating for hands-on engagement with authoring visual texts. By participating in these practices, students gain a profound understanding of the power and influence wielded by the media, as well as the pivotal role played by corporations in shaping societal norms. This approach empowers students to scrutinize decision-making processes influenced by media marketing, encouraging them to challenge ingrained media and cultural constructs and, importantly, to present alternative perspectives to the "real" world (Chung & Kirby, 2009). In essence, *The Framework for Visual Literacy in Higher Education* emerges as a guiding light, steering students toward active participation in the reshaping of our visual and cultural landscape.

Exploring Frontiers in Critical Visual Literacy: Further Research

Numerous avenues remain unexplored in the realm of critical visual literacy, particularly in uncovering the sophisticated visual literacies activated and deployed by artist-activists within social protest movements. The intricate connection between visual communication and social change, as well as the intertwined histories of the social justice movement and the visual literacy movement, beckon for comprehensive exploration. Questions abound: How can critical visual literacy effectively challenge the oppressive

dominance of consumer culture? What implications does the visual work of artist-activists hold for unraveling and contesting the visual culture perpetuated by capitalism? In what ways does critical visual literacy influence decision-making, spur public action, and contribute to civic discourse?

Brumberger (2019) has identified the critical domain of social impact as a vital area for study, emphasizing its centrality to the future of visual literacy. Statton Thompson et al. (2022) echo this sentiment, highlighting the imperative of investigating visual literacy's relationship to other literacies and underscoring the significance of cultivating criticality in an astute citizenry. Recognizing students not only as scholars but also as citizens means that responsible education involves pedagogy designed not just to increase understanding of circumstances but also to empower students as citizens to participate in changing them (Simons, 2008). The quest to unearth the diverse applications of critical visual literacy in promoting social justice remains paramount. The study of the historical uses of political graphics in fomenting social change provides key touchpoints for future developments.

The landscape of critical visual literacy, social impact, and social justice movements is multifaceted and warrants continued exploration. Delving into these complexities promises to uncover new insights, fostering a deeper understanding of the transformative potential embedded within the realm of visual communication and activism. As social upheaval persists and illusions of participation abound online, the weaponization of cultural imagery in ongoing "culture wars" demands a closer look. In the realm of visual culture, revolution lies in restoring the possibility of response (Baudrillard, 1981).

Conclusion

This paper has examined the pioneering methods of an artist-activist, Violet Ray, whose frustration with the Vietnam War and the shortcomings of the anti-war movement led him to "use the language of the supermarket" (Ray, 1984, p. 1) to create impactful advertisements against the war. In this endeavor, he not only protested the war but also exposed the entwined nature of the conflict with capitalist consumer culture. Recognizing that advertising and protest art employ similar visual communication tactics, Ray's unique approach disrupted viewers' assumptions, bringing the war into the familiar realm of consumer culture.

While counterculture movements have often pioneered new means of visual critique, there remains a dearth of research into the avant-garde artist-activist origins of those who could be termed critical visual literacy activists. These pioneers, through graphics often using appropriation of received visual culture, seek to expose the real enemy: the corporate commercial culture of capitalism. Critical visual literacy emerges as essential for participatory democracy, surfacing alternative voices and counter-messages to equalize power structures. However, the rarity of counterimages in 21st-century social justice movements, as noted by Rasmussen (2014), prompts questions about the evolving landscape of visual activism. Understanding the implications of artist-activists' work and exploring new strategies for critical visual literacy in the digital age remain vital areas for future research.

This paper transcends the realm of image interpretation to advocate for activating critical visual literacy among artist-activists as public educators. Critical visual literacy in activism challenges people not only to interpret the world critically but also to respond creatively with counterimages. Critical visual literacy emerges as a pivotal force in the pursuit of meaningful social change by actively intervening in sociocultural contexts, stepping outside the confines of dominant cultural narratives, and following interpretation with artistic action.

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Magic Brewing: Coffee and Visual Literacy in the Darkroom

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Abstract

If sole use of digital cameras leads to impoverished means for visually recording and expressing experiences, ways are needed to introduce everyday camera users to affordances of other photomedia. As a typical first move, camera film enjoys consumer attention as an analog alternative to digital photomedia. However, developing the film at photo labs also distances users from conversations about environmental impact. Caffenol is often proposed as one sustainable alternative to traditional film development. Comprising coffee, washing soda, and vitamin C, it is receiving more attention in educational environments and enjoying discussion about its techniques and recipes. Though much emphasis has been on technical and environmental merits, less is said about the experiential dimension of using caffenol, including how to perceive and engage with the creative and sensory aspects of the development process in educational settings. This chapter adopts an anecdotal yet visual approach to explore caffenol through practical activities with varied student groups. Promoting informal repetition, analysis, and conversation, we posit that the caffenol process is not only environmentally friendlier and accessible—not to mention aromatic––but it can also support visual literacy and cultural understanding.

Keywords: Caffenol, Sustainable Photography, Darkrooms, Photomedia Literacy, Visual Literacy

Introduction

As a concoction of coffee, washing soda, and vitamin C, caffenol has been brewing as an alternative photographic process since the last decades of the 20th century. Although specific examples of early experiments with similar alternative film developers are not extensively documented, anecdotal evidence has suggested photographers experimented with various household items in times of resource scarcity (Reinhold, 2012). Caffenol was formally introduced in 1995 by Dr. Scott A. Williams from the Rochester Institute of Technology. Its potential as an environmentally friendly developer emerged as a response to environmental concerns associated with conventional darkroom chemicals. It also raised the profile of all caffeine-based drinks as viable photographic developers because they were rich in phenolic acids (Williams, 1995). When learning that Vitamin C and Sodium Carbonate (substitutes for potassium hydroxide and baking soda) improved image clarity, caffenol became an effective yet less environmentally damaging alternative (Alves, 2021)[1]. Its popularity was helped further by a revival in analog photographic techniques at the end of the 20th century and a more recent rekindled interest in the search for home development methods (Antonini et al., 2015). Studies have since considered caffenol's chemical properties and darkroom applications (Cepillo et al., 2018; Leglise, 2019; Wilson, 2012; Witten, 2016), as well as its environmental sustainability (Alves, 2021; Martorell, 2018; Silva, 2022), but there is less discussion about creating access to and interest in the process. With the development of caffenol formulas and variations emerging from places as far apart as Japan, Brazil, and Germany, it is also worth noting how it relates to global visual literacy. Despite symbolizing innovation and environmental consciousness among photography practitioners and gaining a following among artists and photographers are drawn to its unique qualities and the "eco-aesthetic" it represents (Catanese & Jussi, 2018; Suing Ruiz et al., 2019). Unfortunately, industrial chemicals remain the (aging) standard for "retro" driven consumers.

If caffenol development remains niche and training specialized, we ask what it can teach us about visual documentation and expression. Our investigation aims to expand an understanding of caffenol's applications, highlighting its effectiveness as a tool for photomedia literacy (McLeod, 2023) and an eco-

friendly alternative in darkroom practices. As such, this paper explores the experiential nuances of caffenol's chemistry, environmental impact, and image-making potential with undergraduate and graduate students from varying majors in Japan. It describes three instances of using caffenol in teaching contexts. The first was instruction in developing black and white 35mm film with caffenol, a procedure generally done with industrially manufactured chemicals. The second was an individual activity involving creating and developing photograms (i.e., photographs made without a camera). The third activity immersed students in coffee culture and involved them in making caffenol and its application. It should be mentioned that within the text, we have also chosen to incorporate illustrations from a participant from the third activity. Images (whether created by researchers, participants, or through collaboration) are at the core of analyzing the social-cultural visions and perceptions of students, educators, or community members in visual ethnography (Barrantes-Elizondo, 2019). Thus, the images included here serve a purpose: to complement and enrich the narrative by offering observations and interpretations of the contexts and concepts discussed in the activities. In doing so, this paper contributes to broader discourse on sustainable practices in analog photography and its potential for developing what McLeod (2023) calls "photomedia literacy."

Our work on caffenol in educational spaces is inspired by the cultural practices related to coffee consumption in Latin America. One of the researchers in this work is a Latina living in Japan, which offers a different vantage point for exploring social interactions and traditions facilitated by coffee in Latin American communities. Moreover, this paper is enriched by studies on how coffee acts as a social glue, bringing people together in diverse settings. For instance, we developed a workshop inspired by the *sobremesa*, the Latin American and Spanish tradition of sitting at the table after a meal, usually over coffee. Such a cross-cultural perspective informs understanding of the role of coffee in social interactions and carries ideas of team building into the darkroom and learning processes.

Figure 1
Caffenol Ingredients.

Hand-drawn illustration in notebook. ©Amber Ma (2023). Used with permission.

Figure 2
Instructions on how to prepare caffenol.

Hand-drawn illustration in notebook. ©Amber Ma (2023). Used with permission.

A Break from Digital

Originating from Ethiopia, coffee's rich history extends beyond its traditional role as a beverage, forming a crucial social and cultural fabric. According to legend, coffee was discovered by a goat herder named Kaldi in Abyssinia, present-day Ethiopia, who noticed that his goats were energetic after eating some red berries and decided to try them, sharing the same effects (Muñoz-Pajares et al., 2023). This discovery was shared with Sufis monks, who created a drink that helped keep the monks awake; thus, coffee became a religious enhancer among them (Topik, 2009).

Yemen has the oldest recordings of coffee consumption, dating back to the 15th century (Muñoz-Pajares et al., 2023). From Turkey to Syria, coffeehouses appeared throughout the Middle East as fundamental spaces for socialization, storytelling, and political discourse during the 15th century (Pendergrast, 2010). In Turkey, coffeehouses became known as social centers of intellectual exchange and entertainment (Hattox, 1985), setting a precedent for the European coffeehouses of the Enlightenment, noted for their role in cultivating the public sphere and democratizing discourses (Habermas, 1989). Coffee culture spread from Africa and the Middle East to Europe and Latin America, fostering community and dialogue.

In Latin America, during the 20th century, coffee was a pivotal element in social rituals, illustrating its profound impact on various aspects of society (Topik, 2009). The emerging middle class used these shops to socialize and establish norms and codes of conduct to bridge the gap between social classes, thus fostering sociability among social classes (González Parra, 2012). *Cafés* became centers for sharing stories and experiences, reinforcing social ties. Thus, more than its physical utility, it has become an essential economic good; its prominence is mainly attributed to community building (e.g., coffee shops), and its popularity is linked to modern social life, connections to global markets, groups, and national identities, as well as to economic and political dimensions (Tucker, 2011).

The global expansion of coffee culture, including its importance as an economic product, is marked by its ability to adapt and find relevance in diverse cultural contexts that extend to Japan. The adaptation of coffee rituals in Japan, a country with rich and distinct beverage traditions, underscores the role of coffee as a cultural conduit. For international students and emigrant communities in Japan, the experience of Latin American coffee rituals can provide insight into the diversity of global coffee cultures, fostering spaces for

dialogue and cultural exchange. Moreover, academic settings such as workshops or classes can be conducive to horizontal and peer learning, openness, and intellectual exploration. Given these social potentials, it is helpful to unravel the significance of coffee in caffenol development and related darkroom practices, particularly for acknowledging diverse backgrounds and perspectives.

Looking closely at preparing a cup of coffee can highlight the communal and relational dimension of the experience while understanding the steps of making, while always resulting in an at least slightly different outcome. This is a notable contrast to the use of digital photographic media. Most digital cameras are one-dimensional because they produce similar results, and in-built image processing lessens the need for learning skills. As Johannessen and Boeriis (2019) have noted, with camera-enabled smartphones, users need to learn only how to operate an interface rather than how a camera creates an image. Digital cameras are thus compellingly convenient and render a feedback loop that enables camera users to remember quickly through doing, which should not be discouraged. However, a standard draw for enrolling in photography classes at our university is that we list analog photomedia as part of the syllabi. Enrolled students think of it as providing something different from what they already know with digital cameras, likely presenting a challenge that digital may not. Although some digital cameras (if understood fully) can simulate the same affordances that make analog cameras appealing (e.g., the delay inherent in reviewing a film-developed image can be simulated by turning off the camera monitor review function), such affordances are rarely seen as immediately apparent (McLeod, 2023). By all appearances, digital looks fast and can be assumed to be precisely that. Caffenol challenges that.

To be fair, any so-called "alternative" analog development technique could present a comparatively slower experience than digital. Preparing and developing mixtures can take valuable time (often by the darkroom technician, not a student), and the consistency problem in the results (e.g., clear images) becomes more significant with less stable solutions, thereby requiring more experiments and even more time. Traditional darkroom photography is revitalized with natural and sustainable methods, keeping it relevant to contemporary photographic practice (The Sustainable Darkroom, 2022). However, as caffenol also carries a culture, could it manifest engagement by exploring how to pass the time? The following instances contribute to a picture of such time passing. It should be noted, however, that our description of these instances is deliberately anecdotal, a high-resolution strategy that Cubitt (2013) noted provided "depth" and "color" to any general findings of methods that deal with multiple instances and large-scale tendencies. We share his understanding that anecdotes test "hypotheses against the unique qualities of artworks and experiences" (Cubitt, 2013, p.6), thereby grounding them.

Changing Taste

Our first example comes from classes taught at our university with graduate students from the School of Comprehensive Human Sciences. Two classes, Photomedia Exercises A and Photomedia Exercises B, serve as an introduction to photography. Photomedia Exercises A (discussed further in the third example) is an intensive class carried out over two or three days during a summer period, which aims to teach students about photographic apparatuses before the 20th century. Students learn about making photograms, a camera-less approach that involves exposing a light-sensitive surface directly to light. In such techniques, light rays obstructed by an object create a shadowed form from which a subject can be understood. Photomedia Exercises B, on the other hand, prioritized instruction in camera-based photography of the 20th century.

In contrast with Photomedia A, this class was technically more challenging because students borrowed cameras of different types and formats. Despite student interest in the classes, the expected use of industrial-strength (not to mention harmful) chemicals as a developer was a pre-existing concern. Not only are such chemicals expensive to purchase, but an educational environment in Japan also requires protective gear (e.g., gloves, aprons, goggles) and managed disposal, which adds further cost and which are problematic for managing groups of students larger than six people due to spatial limitations. To counter these challenges, the decision was made to replace industrial chemicals with caffenol. Students were each given one 35mm black and white film to make photographs, and after a week, students returned to develop their films. A demonstration was then given of how to make the caffenol developer. This demonstration gave the process transparency, and students could experience (see and smell) the different components

of the caffenol solution. This contrasted strongly with colorless industrial chemical compounds poured from opaque plastic bottles. Moreover, it modeled the process as accessible because students could recognize everyday products from supermarkets and relate to them.

The nature of the Photomedia B course (as taught in fall 2022) meant students could pick specific photomedia to use for their class project, and it was telling that most chose to work with digital cameras instead of analog processes. If assignments are not didactic, students again exemplify the power of convenience embodied by digital cameras. One student, however, saw value in pursuing the caffenol approach for her class project. As an international student from Latin America, she found an appropriate application for expired Costa Rican coffee. Her work consisted of making photograms with the screen of her laptop as a light source. Using photographs previously taken with a digital camera during travels in Japan, the student decided to invert them digitally, generating digital negatives that could then be used to generate positive images on the photo paper when developed. The resulting images were then cropped and reassembled as a diorama.

Knowing that caffenol has a shorter lifespan than industrial developers means that caffenol gets exhausted faster. The student's work prompted us to consider the tonal possibilities of caffenol, measuring tonal times and consistencies from the concoction's preparation and the differences in coffee, origins, and bean type (see Figure 3). Thus, the influence of coffee in the darkroom can also be observed as something that intensifies learning and generates new questions. As our classes tend to have students from different academic backgrounds and from connecting through coffee (or not), it originates a sort of cultural exchange in the academic environment. As Figure 4 suggests, sometimes students feel intimidated when asked to work in groups with people they have just met, so it is thought that caffenol could increase participation and engagement within student groups.

Figure 3. *Robusta tonal gradient.*
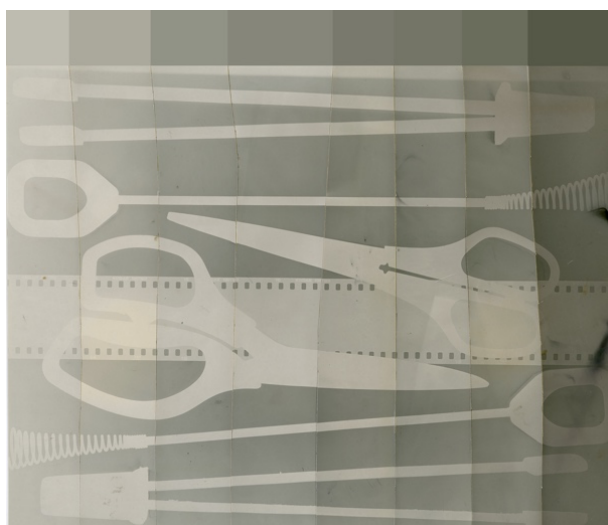
Photograms made with a darkroom enlarger, exposed for 20 seconds. Developed at 10-minute intervals. ©Marita Ibañez Sandoval (2023). Used with permission.

Figure 4. *Entering the Darkroom.*

Hand-drawn illustration in notebook. ©Amber Ma (2023). Used with permission.

Quick Cup of Joe

Our second example was a two-hour workshop for a high school group visiting the university in June 2023. The aim was a simple introduction to photomedia and an encouragement to explore alternatives to digital cameras. Emphasis was placed on camera-less photomedia; mainly photograms made using things to hand. All professional lights in the photo studio were turned off, and safe lights (typically red lights found in a darkroom) were placed around the room. This setup allowed for darkroom photo paper (which is not sensible to red light) without accidentally exposing the paper. As a group, students were given a piece of photo paper and asked to place their objects in an arrangement that mattered to them. When ready, a single strobe light (typically used for flash photography) created a short, intense light toward their arranged papers. We then proceeded to an adjacent darkroom to develop the results (Figure 5).

Although none of the students had experience with analog film photography, they were aware of darkrooms being portrayed in horror movies (a popular association). Darkrooms can be intimidating places to work because students are not used to low levels of light or color (the paper itself is not sensitive to red light). However, the intimidatory nature of the dark room did not appear to matter as the results of their photograms emerged. Despite the caffenol not being mixed in front of them, the students could all quickly grasp the possibility of using coffee to make a developer (notably the strong smell). Conversation with them also revealed a particular enthusiasm for the process. Aside from the lighting requirements, the simplicity of the exercise suggested that this process was achievable and portable. Moreover, making images without a camera excited them, prompting them to remember how they had previously made cyanotypes in a school class (an iron-potassium solution that results in Prussian blue-colored images).

From a single attempt with photo paper, students could observe (and marvel at) the relationship between the paper and the light and quickly get a sense of achievement. While their images may have just been that of a bottle or a keychain, such everyday items were personal for whatever reason and, therefore, underwent a stage of defamiliarization, leading to questions about what else was possible and whether it could be done at home. The images made during that activity were fixed using a traditional "hypo" (sodium thiosulfate) solution. However, using this industrial chemical (necessary for halting the development process) undoes the sustainable impression that caffenol creates. As the hypo clears away the remaining silver particles from the exposed paper, used fluid — though diluted — cannot be drained into the water table, requiring separation or destruction. Organic fixers have been recently touted as a possibility, but the required fixing times (over an hour) were not practical in this workshop. It can even be argued that fixing a developed photograph (such as those discussed) ought not to be necessary, as implied by Kaja Silverman

in her discussion of photography as analogous to being (i.e., existing) and, therefore, in constant flux (2015). Thus, we recognize that "Photography develops […] with us, and in response to us" (Silverman, 2015, pp. 11–12). Fixing an image is perhaps merely an accepted norm within photographic history and culture that using caffenol could contest.

Figure 5. *Flashed photograms produced by workshop participants.*
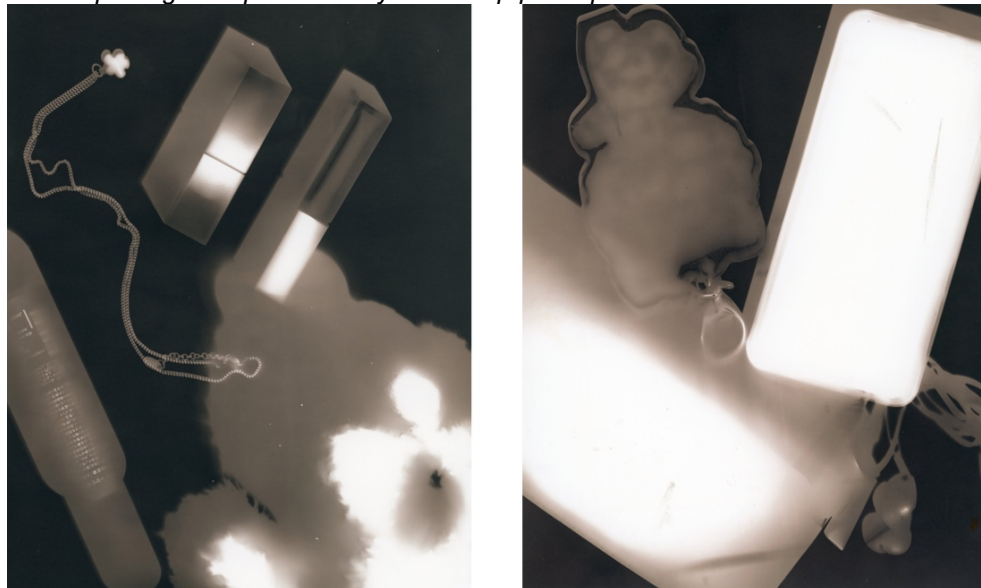
Featuring everyday items such as bottles and keychains. Fixed photo paper. © Gary McLeod & Others (2023) used with permission.

Magical Café

Our third example occurred in a Photomedia A class with graduate students in the summer of 2023. As an intensive class, the aim was to immerse students in making photographs without cameras. For two years, the emphasis of the class has been associations between photography and magic. While magic has always been a touchpoint for artists using photography (e.g., Cotton, 2015), the goal was to demystify the magic of photographic development. Building on previous experiences, the class decided to create a large photogram together using a piece of light-sensitive black and white photo paper (150cm×60cm) left over from another project. As the photo paper was appropriate for a bar-height table in the darkroom, we created an experience that alluded to the *sobremesa* as a social space charged with coffee. In Latin America, the word *sobremesa* is understood not only as that time together for socializing but also as that drink or dessert accompanying it. In our case, that is caffenol (although not for drinking).

Before the class, students were asked to each bring a jar of instant coffee to the darkroom. Like a barista, the darkroom technician demonstrated how to prepare the caffenol solution using instant coffee. In red safelight conditions, the sheet of photo paper was laid flat on the table, and students were asked to arrange various cups, glasses, and cutlery. Similar to the exposure technique used in the previous example, a strobe light was brought into the darkroom and flashed once on the paper. As with other photograms, the image was apparent when the caffenol solution was applied this time through trigger sprays and wiping. Collectively, students gathered around the paper to apply the caffenol and develop the image. After a shared gasp of wonder at the image's appearance, water was similarly applied, and the paper was then moved to a nearby sink to rinse (Figure 6). With the room lights on and the paper washing, students could see unexposed areas change from white (the paper color) to yellow, pink, and then purple as the paper was, on this occasion, not fixed (Figure 7). Witnessing this change presented a feeling of privilege in seeing a change that could only occur once because it cannot be undone. At the very least, it generated questions about why that change was visibly taking place—itself a memory created. Thus, demystifying the magic of development became a learning point and a subject of illustration (Figure 8).

Figure 6. *Illustration of Photomedia A students washing the large photogram.*

Hand-drawn illustration in notebook. ©Amber Ma (2023). Used with permission.

Figure 7. *The surface of the photogram after development and exposure to regular lighting.*

As it was not fixed, the unexposed areas turned purple. Photo © Gary McLeod & Others (2023). Used with permission.

Figure 8. *Illustration of Photomedia: A students and Darkroom Technician conveying how the photogram was made*

Hand-drawn illustration in notebook. ©Amber Ma (2023). Used with permission.

Caffeinated Darkrooms

Coffee and caffeine boost energy and alertness (Harpaz et al., 2017) and increase happiness and well-being (Mai, 2016). Bringing coffee into the darkroom, as in a "Caffeinated Darkroom," brought new experiences and lessons learned. Throughout the three activities, the experience increasingly embraced the essence of *sobremesa* (central to Latin American culture), eventually integrating it into our workshop to explore possibilities beyond mere film development. The third activity made the ritual of *sobremesas* explicit, a time cherished for relaxation, coffee, and deep post-meal conversations, symbolizing food's cultural and social essence in Hispanic and Latin American communities (Perez, 2010). Students were temporarily immersed in this tradition by bringing their coffee and typical café items and blending the communal aspects of *sobremesa* with the creative process of making photograms, producing photographic images, and embracing Latin American coffee culture's warmth and communal spirit, pointed to *sobremesa* as a more complex and significant experience than a mealtime tradition: a period of meaningful connection and sharing, reinforcing social ties and community bonds (Perez, 2010; Salas Gonzalez, 2020).

From the perspective of photomedia literacy, the activities also revealed the following. In choosing to make and develop photograms rather than process black and white film, the second and third activities were particularly instrumental in presenting camera-less photography as more accessible than camera media (e.g., roll film). Making photograms (by way of "magic") was also more transparent for learners. This point seemed conversant with caffenol and ironic references to "magic materials" and "magic water." Thus, when learners used their smartphone cameras to record experiences (Figure 9), a latent comparison may have been established between different types of photomedia (not just digital vs. analog, but also camera vs. camera-less) that might be enough to retain understanding and repeat.

What was evident through the above activities was that caffenol not only reiterated the darkroom as a social space of visual play but also offered a rich medium for learning. Experiencing photography in this way can

directly improve photomedia literacy by familiarizing students with other non-digital photomedia and welcoming comparisons between them. According to McLeod (2023), photomedia can have a meaningful effect on a student's visual literacy in that they can critically recognize how a photograph is made with a particular apparatus. In this case, the hands-on learning experience with so-called "magic" materials to demystified the darkroom while attesting to its versatility (Margadona & Pereira de Andrade, 2019; Morelock, 2022). In terms of darkroom sustainability, caffenol emerges as an alternative means of photographic development, particularly when considering larger scales of production (like those encountered in art departments) and when considering the varied tonal effect afforded by coffee bean varieties (e.g., sometimes close to sepia, others maintaining the black and white coloring). Our explorations have found that while Caffenol addresses the growing demand for eco-friendly practices in photomedia expression, it can also do so in a way that draws attention to cultural connections and possible diversity among student groups. Experiential aspects of caffenol can, therefore, contribute to a relaxed atmosphere in the darkroom and potentially open new avenues for teaching and learning, encouraging creativity, cultural exploration, and environmental awareness.

Figure 9. *Photomedia A students making a collective photogram for Cafe Magic and taking digital snapshots of their experience with their smartphones (2023)*

Photo © *Gary McLeod 2023. Used with permission.*

More Grinding

Considering the educational effects of caffenol, our exploration was important for students to develop greater photomedia literacy; that is, an ability to "read" and "write" images with a variety of photomedia — as opposed to just digital photomedia, which, despite being convenient and capable of accelerating learning, risks sidelining notable affordances of alternative photomedia, thus narrowing the experiential spectrum available to students (McLeod, 2023). Incorporating a diverse array of photomedia, such as the hands-on experience with caffenol, teaches darkroom processes and potentially broadens students' visual vocabulary.

Future research could delve deeper into the nuanced cultural connections fostered by caffenol, examining its role in promoting cross-cultural understanding within diverse educational settings and regions. For

instance, what would a similar caffenol activity feel like in Italy or Brazil? Additionally, exploring the long-term effects of caffenol integration on students' continued engagement with photography and ecological practices could provide valuable insights into its impact on educational environments. Tangentially, there is space for further studies on the importance or necessity of fixing images in the darkroom while also acknowledging the possibility of "fixing" them digitally. Further investigations might also address the potential adaptation of caffenol in different educational contexts, considering its applicability across various disciplines and institutions (e.g., visual sociology). Similar explorations of the cultural significance and experience of using other alternative developers (plant-based developers, "wineol," or "teanol," among others) could also be made. As with caffenol, they can be an aromatic catalyst for hands-on learning, cultural appreciation, and student involvement, invoking curiosity and active engagement within darkroom practices and photomedia literacy. Now, where is the coffee?

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Footnotes

1. Notably, the presence of phenols in coffee is the basis for using caffenol as a developer (Anderson, 2022).

Analysis of Visual Systems of Painting by Schematization

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Abstract

The understanding of painting works as visual systems implies the analysis of these systems by the method of graphic schematization, which allows to the revealing the interaction of all visual elements of the system. Schematization corresponds to the spatial construction of visual images, which is the basis of visual activity. With the help of graphic schematization one can effectively develop the basics of visual literacy, as schematization is the most important tool for any visual studies. The article describes the author's method of visual-graphical analysis of works of painting. One of the key innovations of the author's method is the identification of implied lines rather than depicted lines, which are no less significant elements of visual systems created by the authors of painting works. Examples of this analysis demonstrate the different possibilities and great creative potential of graphic schematization for interpreting and actualizing painting works from different epochs that remain things-in-themselves until today.

Keywords: visual literacy, schematization, visual systems, analysis of painting

Introduction

Visual culture has a huge heritage. Is it possible to perceive visual heritage only in the form of art historians' retellings? Visual heritage is one of the most difficult areas of cognition. This is the main informational paradox of visual culture—objects created for perception without verbal comments lose their informational accessibility after the loss of the historical context. "Entire arts—and the greatest of the arts, such as Egyptian and Etruscan painting—were created to remain invisible" (Francastel, 2005, p. 18). Pierre Francastel takes the position that "it is necessary to consider works of art, and painting in particular, as objects of civilization, cognizable, evaluable only by deciphering them, that is, by comparing them with their primary perceptual sources–most often very difficult to reconstruct—and with our own laws of comprehension of the external world" (Francastel, 2005, p. 7).

The complexity of perception and understanding of works of painting is connected with the peculiarities of semantic construction. This applies not only to ancient art but also to art of all epochs. Henri Matisse said in an interview: "Every work of art is a system of signs invented at the time of its creation and according to the requirements of the moment. Once out of the composition for which they were created, these signs lose all efficacy. A sign possesses definiteness only when I use it, and only in relation to the subject with which it is to contribute" (Diehl, 1954, p. 105).

The desire to discover and understand visual heritage defines the epistemological goal of visual literacy. Understanding the content of visual heritage is based on the "decoding" capabilities of the intellect—cultural experience, historical knowledge, associative thinking, and imagination. For example, knowing the story of St. George, one can recognize the main episode of this story in Vittore Carpaccio's painting *St. George and the Dragon*. Among the stories of the *Golden Legend* collected by Jacobus de Voragine (1993), one of the most famous stories tells of the Christian knight George saving a Libyan princess sacrificed to a dragon. *The Golden Legend* was one of the most popular literary works of the Middle Ages and numerous images of George with the dragon were clear to everyone and were perceived as illustrations to this text. However, it is this diversity of visual interpretations of one plot, one set of semantic elements that testifies to the presence of completely different ideas expressed by different authors with the help of specific visual means.

But to understand that what is depicted here is not an illustration of myth but a visualization of the model of eternity as a dichotomy of good and evil is impossible without the skills of analyzing a visual system by means of its schematization. Verbal analysis, used by historians and art theorists, is based on describing and interpreting the semantic structure of visual works. Such an analysis is of great importance for understanding visual heritage. However, visual works are not only sets of semantic elements, but also organized spatial structures, visual systems designed for visual perception. Understanding a visual work

as a visual system organized according to the possibilities of visual perception and thinking, opens up new possibilities for understanding visual art. It is obvious that the process of visual perception of any visual system is based on its schematization; identification of its inherent connectivity of parts.

The notion of a painting as a complexly organized structure—an entire visual system—has been described by various authors. One of the most profound and still relevant is the way the visual system is understood by Giorgio Vasari, quoted by Erwin Panofsky. Here is how Vasari describes the concept of drawing (blueprint)—a graphic means of expression with the help of which one can cognize and express the regularities of the organization of the surrounding world:

> Drawing (disegno) is the father of our three arts extracts a general concept from many things, like the form or the idea of all the creatures of nature, assigning in its exemplarity to each its own measure, hence it follows that it cognizes the relations of the whole to the parts and of the parts to each other and to the whole, not only in human bodies and animals, but also in plants, as well as in buildings, sculptures and paintings. And since from this cognition is born a certain concept and judgment, so that something is formed in the mind, which, being then expressed by hands, is called a drawing (disegno), then we can conclude that this drawing is nothing else than a visible expression and explanation of the concept, which is in the soul, which man imagined in his mind and which is created in the idea. (Panofsky, 1999, p. 45)

Another significant concept of visual system as a spatial and temporal phenomenon was developed by philosopher Pavel Florensky in his book *Analysis of Spatiality and Time in Artistic and Pictorial Works* in 1924 (Florensky, 1993). He distinguishes two levels of the visual system and two schemes of their organization - the scheme of the formal organization of the image, which he defines by the traditional notion of composition, and the cognitive scheme of the organization of semantics, which he defines by the notion of construction.

> An artistic work is always dual, and in this duality is rooted the necessity of a dual approach to the work, and consequently of a dual scheme. … An artistic work is the organized unity of its pictorial means; in particular, it is the organized unity of color, lines, points, and geometric forms as a whole. This unity also has a basic scheme for its structure; this is called 'composition. … The unity of the depicted must by no means be confused with the unity of the image … this scheme, or this plan of the artistic work, from the side of its meaning should be called a construction. (Florensky, 1993, p. 116)

Florensky's idea of the point-event is of fundamental theoretical importance for the concept of the visual system. "All reality is spread out in the direction of time no less than it is spread out in each of the three directions of space. Every pattern of reality, once it is really perceived or really accepted, has its own line of time, and every point of its abstractly statistical section is in fact a point-event" (Florensky, 1993, p. 195). A painting in this sense is an aggregation of such points linked together into a single system. And our perception of the artistic reality of such a system is related to our perceptual response to these spatio-temporal events.

The evolution of painting has formed a huge number of ways of organizing images on the plane, based on the visual consonance or dissonance of object forms and spatial pauses, the use of implied rather than depicted lines, geometric abstractions, the techniques of rhythmic coherence, and dynamic resonance. The ability to analyze the structure of a picture through the schematization of its visual system opens up a vast resource of knowledge about the human experience and perception of the world that has been hidden from the vast majority of the world's population for centuries. Everyone can develop schematic analysis skills as one of their cognitive competencies.

The desire to discover and understand visual heritage defines the epistemological goal of visual literacy. Verbal analysis, used by historians and art theorists, is based on describing and interpreting the semantic structure of visual works. But visual works are not only sets of semantic elements, but also organized spatial structures, semiotic systems designed for visual perception.
Francastel justifies the need to develop a specific analytical approach to the study of artistic heritage.

> Visual analysis cannot be considered as one application of some general method, it cannot follow the model of linguistics, mathematics or any other science, … It must find its place alongside the other great disciplines developing in our time. It forms an interpretive system no less worthy of our attention than mathematics or physics, psychoanalysis or linguistics, which have flourished in recent decades. Art criticism must finally catch up in this field with the artists who have been among the pioneers of spiritual renewal. (Francastel, 2005, p.7)

Understanding a visual work as a visual system organized according to the possibilities of visual perception and thinking allows us to organize visual research more effectively. It is obvious that the process of visual perception of any visual system is based on its schematization, identification of its inherent connectivity of parts.

What is schema and schematization? The concept of schema is used in different fields of activity, but in painting research I find the concept of perceptual schema, which was developed by Ulric Neisser, the most productive. "Perceptual schemata are plans for gathering information about objects and events, for acquiring new information" (Neisser, 1998, p. 74). In describing schema as a mechanism for organizing perception, Neisser speaks of the perceiver's having an anticipatory schema that creates the very conditions for perception.

> In constructing the anticipatory schema, the perceiver performs some act involving his own cognitive mechanisms. He himself changes as a result of receiving new information. This change is not a matter of creating an internal copy where there was nothing before; it is a change in the perceptual schema, so that the next act will flow in a different direction. Because of such changes, and because the world reveals to the skilled observer an infinitely rich informational background, in fact two perceptual acts are never identical. (Neisser, 1998, p. 76)

These are the key ideas. Perceptual scheme is always a process of self-renewal, development through research activity. It is an endless process of creative cognition. On the basis of this natural process of thinking, I develop a method of creative self-development through graphic reconstruction of perceptual schemes of visual systems of figurative painting. To denote this method, I use the concept of schematization.

The tool of visualization of the reconstruction process is a graphic scheme immanent to the basic concept of scheme as a principle of organization of any elements in space. A graphic scheme is a visual fixation of the thought research process by means of conditional geometric graphics (lines, arrows, in general, any graphic elements). With the help of a graphic scheme, spatial relations are established not only within the pictorial system, but also the position of the picture in the context of the surrounding space, as well as the interaction between the observer and the image.

However, how can one define the limits of one's competence for interpreting visual heritage using schematization? The epistemological goal of visual literacy solves this motivational problem, opening the way for creative construction analysis. The paper reveals the author's concept and practical experience on the examples of analyzing visual structures of several works of fine art created in different historical epochs. It also presents different approaches to schematization, driven by practical purposes.

Method

My main thesis is that in this research there can be no right or wrong solution, but only interesting and fruitful or meaningless and without content. Each revealed scheme should give birth to meanings, associations, hypotheses that is a conduit for your new personal content. Every work of art is a multi-layered system where each layer has its own organization. Naturally, all layers, all levels, are interconnected. And the method I propose allows you to pay attention to each of these layers, without putting the task of collecting everything in one single scheme. It is clear that this general unified scheme will turn into a jumble of lines.

The process of schematization of any aspect revealed in a work of fiction becomes a creative discovery and personal discovery of the author of the scheme. Even a trifle can become a starting point for deep and relevant reflections. Therefore, I understand schematizations as a media accompaniment of creative perception. But schematization is not exclusively a graphic interpretation. An integral part of the schematization process is the verbal process of constructing a set of metaphors to describe the schema. The intellectual process of comprehending with line and word is one.

The unity of the process of graphic interpretation and the formation of verbal metaphors was the subject of the theoretical work of film director Sergei Eisenstein. "Eisenstein investigated how the syntactic combination of two images (e.g. two pictograms or hieroglyphs) conveys the 'graphically unimaginable" (Ivanov, 2019. p. 23). Eisenstein wrote in *Pushkin the movie editor* about the use of schemes to visually comprehend poetry (Figure 1)—"These schemes are by no means schemes for reading poetry, they are schemes for a graphically sensuous vision of the action within the poem" (Eisenstein, 2000. p. 285).

Figure 1
Graphical Scheme of Organization of Semantics of a Poetic Work (Eisenstein, 2000)
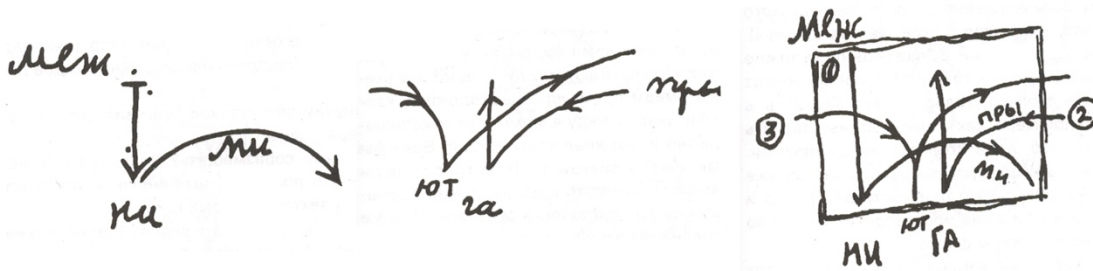
Eisenstein was perhaps the first to make extensive use of graphic analysis of paintings (Figure 2).

Figure 2
Graphic Analysis of Successive Phases of Movement in Works of Painting (Eisenstein, 2000)
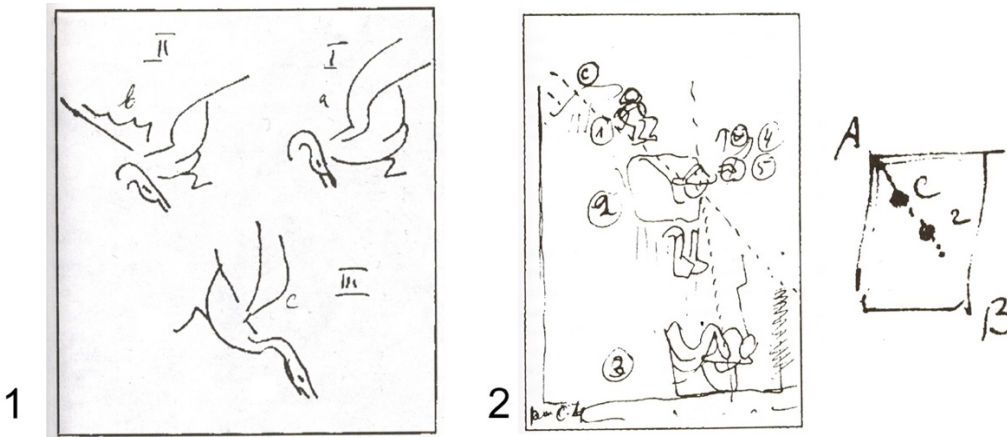
Note. A fragment of the scroll "One Hundred Geese" by the Chinese artist Ma Feng (1) and the painting "Suvorov's Crossing of the Alps" by the Russian artist Vasily Surikov (2).

Perhaps the most meaningful example is the analysis of El Greco's painting. For example, Eisenstein identifies signs of bodily expression from various works by El Greco that express exaltation and ecstasy (Figure 3).

Figure 3
The Ecstatic Movement of Figures in El Greco's Paintings (Eisenstein, 2000)
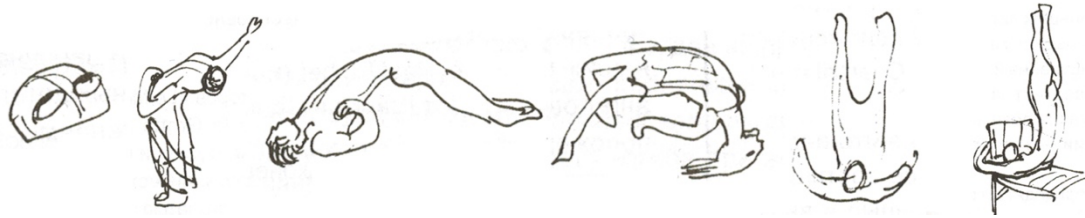
Another example is how Eisenstein graphically analyzes the dynamics of the visual system in El Greco's painting *Laocoon*.

> In *Laocoon*, the two sons together again give the idea of a leap from the *arc* phase to the *circle* phase. … here the compositional technique is achieved by a sense of continuous outward bending and *gathering into itself* of the sons arranged in a circle, which creates a sense of changing positions ad infinitum. The movement reads as a continuous *wheel*: VAVAVA....
> A: Leaning the figure forward. Arms unfolded.
> V: Concave figure (Eisenstein, 2000, p.448) (Figure 4)

Figure 4
Rotational Movement in El Greco's Painting 'Laocoon' (Eisenstein, 2000)

So, what is the subject of my analysis, what do I visualize with the help of graphic schemes?
Each artist, holding the whole visual system in attention, establishes connections between its parts, based on different principles—by semantic meaning, by different kinds of correspondences, or, for example, by suggesting the viewer to imagine the result of a continued movement. If we try to designate these connections graphically, new information appears, which begins to interact with the picture, creating new content.

Each scheme is conceptualized in the context of the entire visual system of the artwork. The result of comprehension is a verbal metaphor that defines the highlighted pattern. Schematization is an effective means of developing visual literacy. It combines two processes—spatial analysis of the visible and its interpretation in a sign-symbolic form.

Psychological and physiological bases of my method:
- "At all levels of generalization there is a translation of the relation displayed in the concept from the symbolic language into the language of the simultaneous spatial scheme, as a result of which the content of the concept is embodied in the spatial pattern of not figurative but general thought type" (Vekker, 1998, p. 357).
- The process of intellectual understanding is the translation of sign-symbolic forms into the form of a spatial scheme. This is a fundamental property of the thinking process.

My method is based on extracting schemes from a complex visual system. It is not a matter of reduction, simplification and abstraction in order to find some main organizing principle, like trying to fit the depicted objects into a circle or a triangle. Such schemes allow to see stereotypical features of style of any epoch or creativity of the artist. Such schemes are justified to use for deciphering the so-called sacral geometry in

the art of the Middle Ages and works of some artists of the Renaissance. But for analyzing a complex visual system these general schemes are not very informative.

Many patterns can be found, and each pattern will be represented by a separate diagram. One idea is one scheme. And it turns out that one painting can become a generator of many ideas. It is pointless to make a scheme that unifies all ideas. The result of such schematization will be a confusing graphical drawing. The purpose of schematization is to discover and highlight some and interesting aspect in a visual system. Therefore, it is more fruitful to discover at least a few interesting patterns. And after their graphic visualization, comprehending them in the context of the whole image.

In visual-graphic research, there can be no right or wrong solution. I understand schematizations as a media accompaniment of creative perception. Works of art are multivalent—are multiple meanings and involve multiple interpretations, the discovery of multiple meanings. Schematization allows us to perceive this multitude of meanings. The result of schematization is a word—a verbal metaphor defining the selected regularity.

Examples

Examples of the use of schematization to analyze works of figurative painting illustrate the main aspects of my method.

- **St. George and the Dragon (Vittore Carpaccio, 1502)**. It is housed in the Scuola di San Giorgio degli Schiavoni in Venice. An example of the spatio-temporal construction of the point-event that Florensky wrote about.
- **Judgement of Solomon (Giorgione, 1500-1501).** It is in the collection of the Galleria Degli Uffizi of Florence. An example of the investigation of hidden content in the process of graphic analysis, when the size of depicted objects and their location become the basis for deciphering the meaning of the work.
- **The Three Philosophers (Giorgione, 1508-1509).** It is housed in the Kunsthistorisches Museum in Wien. The direction of a character's gaze in works of figurative painting is one of the most important parts of the entire visual system.
- **Composition in Painting (Michael Alpatov, 1940).** Implied lines extending beyond the image boundary.
- **Annunciation (Simone Martini & Lippo Memmi, 1333).** It is part of the collections at the Galleria degli Uffizi of Florence. The characters in the paintings are silent, they communicate 'telepathically'. This example shows that communication takes place literally in the form of a text message.
- **Blessed Agostino Novello Triptych (Simone Martini, 1324-1328).** It is housed within the Pinacoteca Nazionale in Siena. This is an example of an aggregation of points-events (according to Florensky) sequentially linked together into a single system.
- **Lamentation—The Mourning of Christ (Giotto Di Bondone, 1305).** It is painted on the interior walls of the Scrovegni Chapel in Padua. An example of a spatio-temporal visual system consisting of several autonomous point-events organized around a single point. Autonomous points-events are expressed in the form of signs.
- **The Return of the Prodigal Son (Rembrandt, 1669).** It is housed in the Hermitage Museum in St. Petersburg. An example of a scheme of a visual system turned into a sign.
- **The Blind Leading the Blind (Pieter Bruegel the Elder, 1568).** It is housed within the Museo di Capodimonte in Naples. An example of a reconstruction of the anticipatory schema (according to Neisser) used by an artist to express the meaning of his work.

Example 1: St. George and the Dragon (Vittore Carpaccio, 1502)
The figures of St. George and the Dragon are arranged symmetrically opposite each other and parallel to the picture plane. St. George's horse and the Dragon stand on the rack in a single impulse of decisive movement towards each other. St. George holds a spear directed at the dragon's head obliquely from top to bottom. The spear pierces the dragon's head, goes through, but breaks. The fracture of the spear is at the very center of the image between the knight and the dragon.

St. George and the Dragon are connected by the line of the spear, which expresses the movement of the two characters towards each other. They are so united by this line that we involuntarily begin to follow with our gaze the development of this line's two sides. And the completion of the ends of this line on the right and on the left are very similar (Figure 5).

Figure 5
One Line that Connects St. George and the Dragon
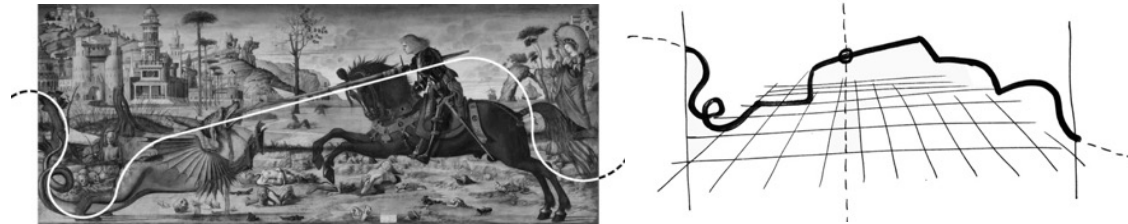
The line on the dragon's side curls into the spiral of the tail and continues with the trunk of the tree beyond the border of the image. The line on the George side continues with the tail of the horse, and also goes beyond the border of the image. This line continues beyond the borders of the painting into infinity, and on the painting itself we see only a fragment of this line. The center is highlighted on this fragment. What ideas do we get when we look no longer at Carpaccio's painting, but at this scheme?

This line breaks in the center, the spear is broken, but the line between St. George and the Dragon is unbroken. The dragon is not yet defeated, and George continues to move. We see an unfinished event, this moment—the spear strike. The dragon's fate is sealed. But this moment will last forever (Figure 6).

Figure 6
The Place Where the Spear Breaks

The action of the characters is located on the plane of the stage, going away from the viewer into the depth of the image. This plane is divided into three parts—the strip where the battle takes place, the strip where the tree grows, the strip of the distant background. Each strip contains explanatory attributes. The battle lane is filled with human and animal remains, among which we see shells. The battle strip is depicted as if a step below the middle and far strip, and the presence of shells here indicates that the battle takes place in the archaeological layer, below sea level (Figure 7).

Figure 7
Two Time Levels of The Same Event
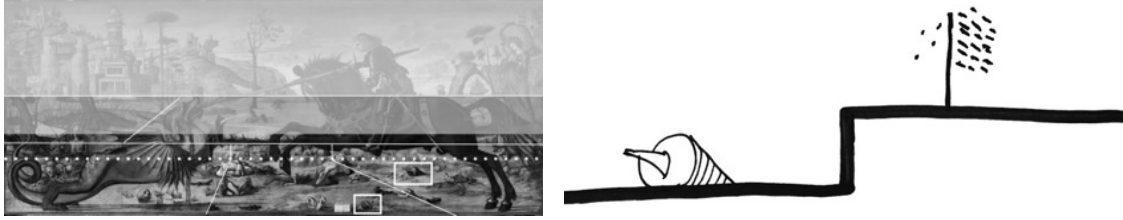
Between the battle strip and the middle strip there is a contrasting border—a layer of soil with grass. On the left side of this boundary, we see a cut tree, and on the right a young girl with her hands folded in prayer (Figure 8).

Figure 8
A Space of Past and Future Separated by a Tree Trunk

The trunk of the tree in the center divides the space in the depth into two parts vertically. The right part with St. George is the sea, the horizon line, ships under sails. This is the space of the possible, the future. The left part on the dragon's side is the shore, heavily built up with fanciful buildings. This is the world of the embodied, the space of history, the past. The schemes allow us to understand the Carpaccio work as a model of time, in which a historical event; it is a moment between past and future, is situated in the context of eternity. Are the past and evil synonymous? (Figure 9).

Figure 9
The Tree is Like an Indexical Sign Dividing the Space of The Painting into Past and Future
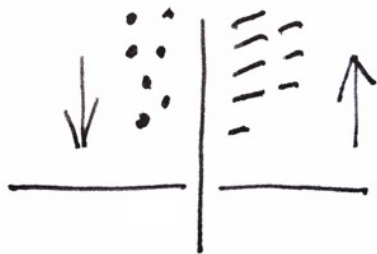
Example 2: Judgement of Solomon (Giorgione, 1500-1501)
Another example is Giorgione's painting *The Judgment of Solomon,* in which the artist interprets the famous parable of King Solomon, who found out the rights to a child in a dispute between two women by means of a monstrously provocative decision - dividing the child in half. The real mother of the child renounces her claim, thus confirming her rights. What insights does schematizing this work bring us? The largest visually active part of the painting is the landscape, and the figure composition illustrating the parable takes up 1/3 of the image (Figure 10).

Figure 10
Silhouette of the Dominant Figure of the Composition
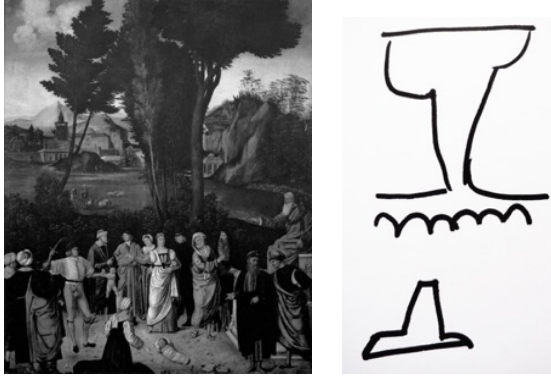
The main thing is the landscape. Its center is occupied by a black spot in a shape resembling the 'funnel' of a tornado, consisting of several dark tree crowns. This 'funnel' of the black tornado visualizes the terrible and paradoxical judgment of the sage.

The graphic analysis of this work also allows us to discover which of the depicted characters is the child's real mother. Giorgione uses a formal technique and repeats the shape and color of the funnel in the dress of the woman in the foreground. But for me, the most interesting thing in graphically analyzing this work was thinking about why Giorgione depicted a separately growing tree with a thin graceful trunk, the crown of which is in contact with the silhouette of the funnel. It looks strange, drawing attention to itself with this strangeness. Is it a hint of a cunning plan, a double meaning of King Solomon's decision? I suppose it is.

In addition, between this thin sloping trunk and the 'funnel' we see an idyllic landscape with shepherds. This is the most deeply formed space of this painting. The receding space is also a kind of funnel, perpendicular to the frontal scene, on which all the characters of this mise-en-scene are placed. I understand this construction as a metaphor for hope. The space of depth, into which our perception is directed by the artist, is formed by means of a certain trajectory, a line moving away from us in the direction set by the artist. When Giorgione painted the picture, his perception was based on this unrepresented trajectory. But when we graphically analyze an image, we can use these not depicted, but implied lines, which opens up many new and unexpected things (Figure 11).

Figure 11
A Spatial Funnel in the Center of the Picture Between the Thin Trunk and the Main Mass of Trees

Implied lines

In my visual-graphic analysis I include not only what is depicted, but also implied lines, continued lines of started movements, directions of looks, aspiration of figures, directed emotion. There is a psychological peculiarity of our thinking—when we see the beginning of a movement, our intellect tries to complete the

started movement, to visualize the whole trajectory. In paintings, these trajectories are not visualized, but are a means of organizing the pictorial system.

Example 3: The Three Philosophers (Giorgione, 1508-1509)
Such an unrepresented, implied line could be the direction of the gaze. Where is the character's gaze directed? The perception of the meaning of the work may entirely depend on it. A striking example is again the painting by Giorgione, his painting *The Three Philosophers*. This painting is analyzed by art historian Pierre Francastel, in his book *Figure and Place. Visual Order in the Quattrocento Era* (2005).

In this painting, Giorgione juxtaposes three Philosophers from different eras against a landscape. A dark spot occupies most of the image on the left—it is a collapsed part of a hill. One of the Philosophers, a young man crouched on a rock with a piece of paper, a charcoal and a circular in his hand, is facing the hill. This is how Francastel describes him—"And it is quite certain that the third Philosopher, the young man who observes and measures the sky, represents a new science" (Francastel, 2005, p. 298). Likely, that Francastel had not seen the original of this work, and the quality of the reproduction left much to be desired. The trajectory of the young man's gaze is not directed towards the sky, but towards the center of the dark spot (Figure 12).

Figure 12
The Trajectory of the Young Philosopher's Gaze

This is perfectly visible on the digital reproduction published on the museum's website. Moreover, if we look into this spot, into this exposed mysterious space under the hill, under the roots of trees, we will see an oval-shaped aperture. Perhaps it is the entrance to a cave? Thus, the young man is not preoccupied with the sky, but with the fundamental mysteries of nature. It is not known whether Giorgione was familiar with Plato's famous metaphorical parable of the cave. Nevertheless, this picture involuntarily evokes associations with Plato's cave, at the exit of which stand philosophers whose eyes are not afraid of light. Moreover, the gaze of the youngest of them is directed towards this cave, a problem he is trying to understand with the help of the tools of science. These are the insights that visual graphic analysis can bring.

I first encountered the idea of identifying implied lines in works of painting in art historian Mikhail Alpatov's work *Composition in Painting* (Alpatov, 1940). Alpatov used the method of formal analysis of pictorial composition for the works of Edgar Degas. Analyzing Degas's painting *Ballerina*, Alpatov graphically develops the movement of the depicted lines beyond the boundaries of the image. He describes this development of lines as a replenishment of the "decorative motif" begun in the painting (Figure 13).

Figure 13
Analysis of Degas's Painting "Ballerina" (Alpatov, 1940)

Example 4: Annunciation (Simone Martini & Lippo Memmi, 1333)
The development of a line along the direction of movement in Alpatov's scheme is just one type of these non-depicted but implied lines that organize a visual system. Here is one very beautiful and symbolic example of a visual system in which the usually hidden, implied content is visualized and represented by a line consisting of an inscription. In Simone Martini's *Annunciation* from the Uffizi Gallery, it is the good news sent from the angel to the Virgin Mary that is visible; it's an inscription (Figure 14).

Figure 14
A strip of text linking an angel and the Virgin Mary

Commentary in the form of the text, integrated into very different images from ancient Egyptian or Assyrian reliefs to modern comic strips, is well known. However, in Simone Martini's *Annunciation* this commentary demonstratively links two characters graphically, and we see the direction of this communicative act from the angel to the Virgin Mary. The meaning of this sacred inscription unites the angel and Mary into a single dynamic visual system. This example is an important argument for identifying and schematizing the cognitive basis of any visual system.

Example 5: Blessed Agostino Novello Triptych [Child Falling from a Balcony] (Simone Martini, 1324-1328)
Another work by Martini, *Child Falling from a Balcony*, is a detail of a triptych with the miracles of Blessed Agostino Novello, is an example of a complex visual system organized with the help of several types of implied lines that continue the initiated movement, establish a connection between characters by means of directed lines of gaze, and by means of associative development of pictorial motifs. The starting point for perception is the figure of the Saint, who flies into the space of the painting from beyond the boundary of the image (Figure 15).

Figure 15

The Trajectory of the Figure's Movement from Behind the Image Boundary and the Diagonal That Crosses the Conceivable Trajectory of the Child's Vertical Fall

The image is divided into two parts—there are two times, the time of the event and the time after the event. The child is depicted twice: flying down and standing (Figure 16).

Figure 16
Two Temporal Events Linked into a Single System
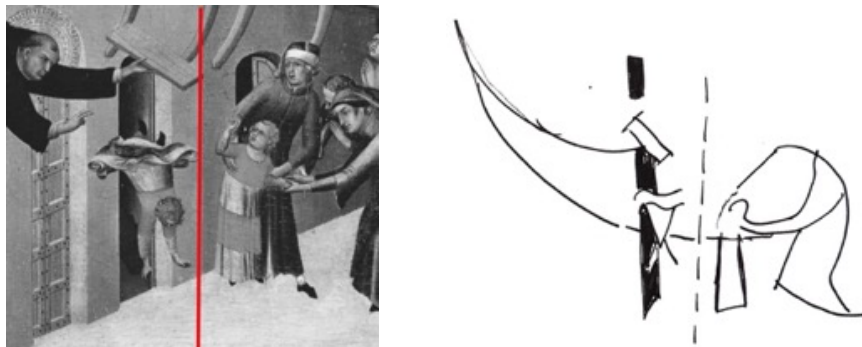
The unified silhouette of the figure bifurcates. With one hand he holds a board that has fallen out of the balcony railing. The line of the saint's other hand begins the movement of the line uniting the group around the rescued child (Figure 17).

Figure 17
The Arc-shaped Movement That Unites All the Characters
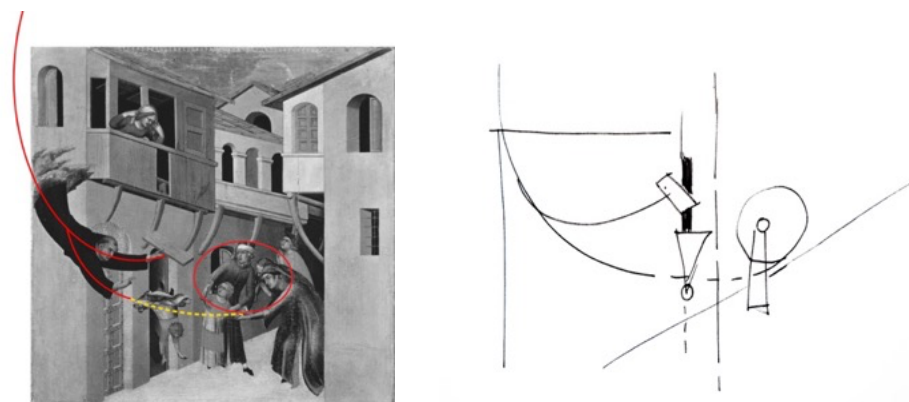
The board crosses the vertical line of the child's fall. It is a sign of denial of the inevitable. It gives the impression that the child is hanging in the air, suspended from the board (Figure 18).

Figure 18
A Sign That Articulates the Meaning of the Work
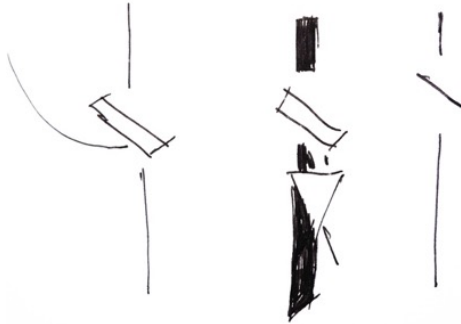
The child's line of sight is directed toward the board—a remembrance of the terrible event. The gaze of the child's father is directed toward the saint—he is the only one who sees him (Figure 19).

Figure 19
The Trajectories of the Characters' Gazes

The arcs of the balcony support that are pointing upward are both a triumph and a sign of support (Figure 20).

Figure 20
The Arc-Shaped Lines of the Balcony Supports Develop the Basic Trajectory of the Figure Blessed Agostino Novello

Example 6: Lamentation—The Mourning of Christ (Giotto Di Bondone, 1305)

This famous fresco is the Mourning of Christ and show how Giotto uses this property of our perception. A group of Angels hover in the sky above the figure of Christ lying on the ground. Each figure of the Angels expresses a different degree of despair and sorrow that is directed toward the body lying on the ground. The artist pushes the group of mourners apart, opening up a space between Christ and the angels. However, this space is divided by the insurmountable boundary of an earthen hill. Christ's body belongs to the earth. The angels are powerless. Their despair is of powerlessness (Figure 21).

Figure 21
Several Autonomous Groups Are Organized into a Single System with a Single Center
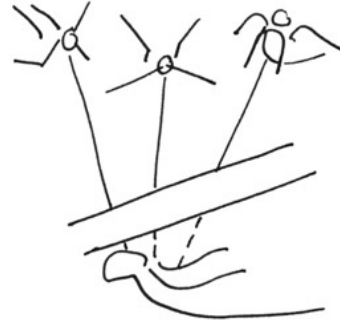
There is another interesting possibility in this composition. If we graphically schematize the figures of Angels, we will get a whole set of graphic emoticons expressing sorrow and despair (Figure 22).

Figure 22
Signs of Emotional States
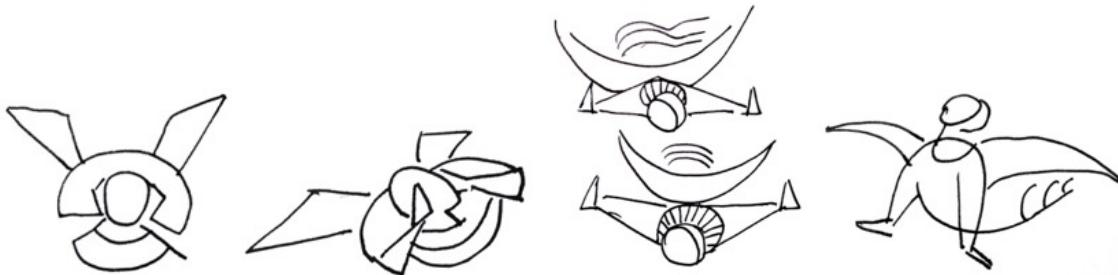
Example 7: The Return of the Prodigal Son (Rembrandt, 1669)

The theme of the prodigal son's return to his father occupied Rembrandt for many years. The engraving of 1636 shows the characters in profile, an illustration of the parable. However, in a drawing created in the early 1640s (Teylers Museum, Haarlem) there is a figurative transformation and the illustration of the event turns into an expressive tragic scene. The figures are also turned in profile, but in this drawing a new scheme appears—the figure of the son is integrated into the figure of the father. The father seems to encompass the son.

And finally, in a painting from the Hermitage collection, the artist places the figures of father and son frontally - the son against the father's background. The kneeling figure of the son covers the bottom of the father's figure, and they merge into a single silhouette. The figure of the father includes the figure of the son. The father cannot give birth to a son, but he can take him into himself (Figure 23).

Figure 23
Schematics of a Visual System Turned into a Sign
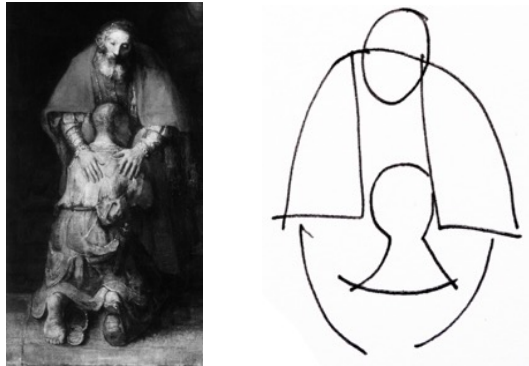
If we schematize this object, we get a sign similar to one of the canons of images of the Mother of God, the so-called Byzantine Oranta or Our Lady of the Sign, depicted full-length with arms raised and with the Child Jesus in a circular halo on the chest (Figure 24).

Figure 24
Lady of the Sign

Example 8: The Blind Leading the Blind (Pieter Bruegel the Elder, 1568)
The Blind Leading the Blind by Pieter Bruegel the Elder is one of the artist's masterpieces, which has become a tragic symbol of human limitation and spiritual blindness. Bruegel's work is based on the biblical parable of the blind leading the blind. As a metaphor, the artist uses the image of the blind, limited in their ability to perceive the world around them. Bruegel depicted not beggars, but well-dressed and obviously successful in the worldly sense of people. But they are blind and cannot see where their path is directed.

A row of figures moves on an inclined plane into a body of water. The rhythmically organized row is divided into two parts by a pause. A line connecting the two groups and pointing downward passes through the pause. In the gap between the two groups of figures is a sharp triangle of a church steeple pointing upwards. The upward direction is the church. The direction downward is the pond (Figure 25).

Figure 25
Reconstructing the Pattern of Anticipation of an Evolving Event
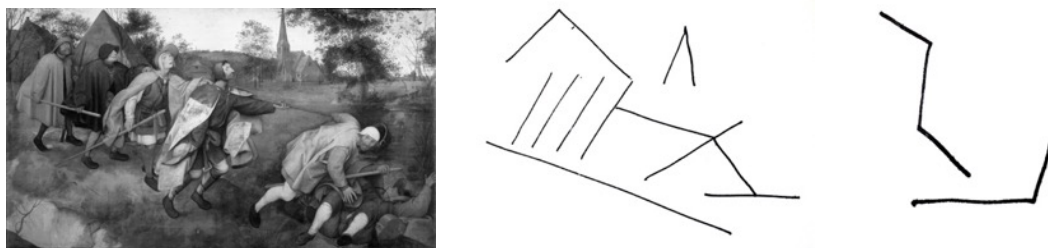
The blind man, who at this moment falls into the swamp, looks at us, the spectators, with eyes that see nothing. This is a harsh metaphor for spiritual blindness (Figure 26).

Figure 26
The Trajectory of the Central Character's Gaze Directed Toward the Viewer
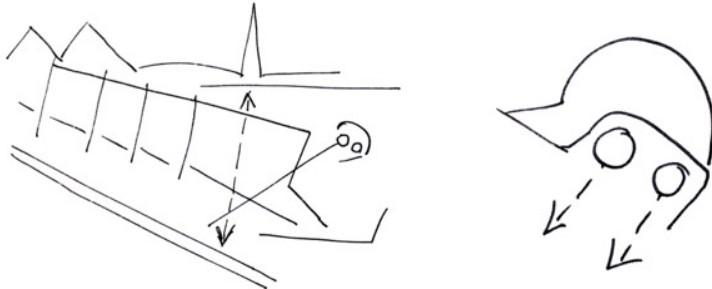
But also, the lack of visual literacy can be likened to blindness which prevents people from perceiving the meaning of visual heritage. For millennia most people look but 'don't see', don't perceive the meaning of what is depicted. "The cathedral-stained glass windows had many viewers, but these viewers undoubtedly perceived mainly the general atmosphere into which the building was immersed by the light refracted by the stained-glass windows, and paid no attention to their innumerable details" (Francastel, 2005, p. 18). This problem can be solved with the help of creative perception, one of the tools of which can be visual-graphic analysis of images - their schematization.

Conclusion

The use of visual-graphic analysis by means of schematization for solving problems of visual literacy and research of works of fine art has a great cultural significance. However, the greatest significance of using schematization is connected with the fact that this method is a tool of creative cognition. Thinking about the semantic structure of complex visual systems, such as works of painting with the help of graphic means, creates new intellectual products and develops instrumental thinking capabilities, imagination, and construction, creating a basis for motivated and active perception of information. Related to creative cognition, this method allows us to develop skills for creative activity and create new knowledge.

The method of schematization corresponds to the psychological and physiological basis of human perception of visual information. The use of visual-graphic analysis does not require artistic training and professional skills for pictorial activity. Initial skills in the use of graphic means, which most people acquire in childhood, are sufficient for this purpose. Schematization does not necessarily involve any research work but can be used as an accompaniment to perceiving works of visual art. That is why this flexible and convenient tool can be actively used to develop visual literacy.

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Portraits Historiques in Education: Seeing Greek Mythology Through Renaissance Flemish Paintings

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Abstract

In this research, we deal with the connective way in which art can meet history in terms of methodology and multiliteracies. The historical framework of this study is the Renaissance in Flanders, the Dutch Golden Age, humanism (16th & 17th centuries A.D.), and the influence of Greco-Roman antiquity. Our aim was to determine if students can use Flemish paintings as an educational medium in order to selectively expand their visual and historical knowledge as they interpret portraits historiques *(portraits of noble persons in mythological disguise). We examined the students' observation-interpretation of these paintings and the way they could exhibit the development of visual-historical literacy. Within this study, we followed basic assumptions of Perkins (visual part) and Moniot (historical part). The case study method used here included 12-year-old students of a Greek primary school. Qualitative content analysis was performed on data from student interviews and student text production. Regarding the findings, students' reading and interpretation of the image seemed to strengthen their visual literacy development, which in turn helped their historical literacy acquisition through a method of observing and comparing information.*

Keywords: visual literacy, *portraits historiques*, art in history education, Greek mythology, Renaissance.

Introduction

When human beings returned from peculiar stagnation to the ideological, social, and cultural environment, it redefined an entire era for Europeans who were trying to get rid of the dark veil of the Middle Ages. The Renaissance signaled the power of the artist, who illuminated the humanistic ideology of those times through the contagious quality of the paintbrush, highlighting the essential side of the human existence. The time period of the Flemish Renaissance emerged important artistic production during the 16th century A.D. and inspired artists of The Dutch Golden Age (Sluijter, 2001), which roughly spanned the 17th century A.D. According to E. H. Gombrich (2006), art does not exist in reality; the artists do exist. However, there is also the myth, which allegorically constructs the ideas and events of those illuminative times, through the faces of Zeus or Jupiter, Athena or Minerva, Aphrodite or Venus, Artemis or Diana, and others. Mythological figures often constitute mythological masks, as was the case of Dutch *portraits historiques*, portraits with mythological disguise originated during the Flemish Renaissance. The mythological masquerades are not related to any kind of carnival. People usually having either some authority or noble birth wanted to legitimize their relation with humanism.

In this way, acclaimed Dutch painters during the Renaissance period carried out this important task of relating noble persons with humanism. Rembrandt may not have dealt with this particular artistic expression on a large scale. However, a number of his students, as well as painters of that time, especially Ferdinand Bol, were involved in it. Consequently, the historical framework of this study is the Renaissance in Flanders, the Dutch Golden Age, humanism (16th & 17th centuries A.D.), and the artistic influence of Greco-Roman antiquity. Having our interest in Dutch painting and Greek mythology as a motivation, we are trying to find some innovative ways of using visual literacy skills in history education. This statement can be achieved by avoiding the usual memorization practice (Kasvikis, 2015) and taking into account the cooperative learning practice (Matsangouras, 2000), as well as the art teaching practices in primary education (Chapman, 1978). Nowadays, the inclusion of art, especially painting, in a modern educational environment is a necessity for a world full of visual information.

Aims and Research Questions

Our overall aim of this study was for the students to use Flemish paintings as an educational medium in order to expand selectively their visual and historical knowledge.

Our specific aims were growing students' familiarization with works of art as historical sources, the interpretation of *portraits historiques* (portraits that have mythological disguise), and the search for visual elements of ancient Greek art in the historical period of the Renaissance.

The research questions of the study were:

1. Can students observe and interpret the Renaissance paintings in connection with Greek antiquity?
2. Does the art of painting help students to acquire visual and historical literacy, and if yes, in what way?

Methodology and Theoretical Framework

Regarding the research method, the case study is used and here it concerns 12-year-old students of a Greek primary school. This method, generally, concerns a social group, a school class, even a small group or a person that offers research interest and can be a research sample because it reflects the qualities of a wider group. Therefore, the small number of the sample is not prohibitive for this research study. Qualitative content analysis (Berelson, 1971) is performed on data derived not only from the student interviews, but also from their text production. The conclusions are not generalized because this data analysis offers some indication derived from qualitative elements but not any evidence derived from quantitative elements (Cohen et al., 2011).

Regarding the intervention method, we followed some basic assumptions of Perkins (1994), Chapman (1978), and Skarpelos (2019) in relation to the visual part, as well as some assumptions of Moniot (2011) and Cavvoura (2011) in relation to the historical part. During the recent decades, a rapid growth has been observed in education that utilizes the arts for learning purposes on the revealed interpretations and meanings (Kokkos, 2011) about works of art. Therefore, the multidimensional role of the arts (cognitive, symbolic, aesthetic, imaginative, interpretive) is highlighted, which contributes to the completed development of personality, according to the Perkins strategy. This strategy, when used in education, gives students the opportunity of expressing their personal view through their reflective intelligence about art (Mega, 2011)**.**

Perkins, who has worked extensively in philosophy, educational sciences, mathematics and artificial intelligence, developed his theory in 1994 about approaching art by describing the phases of observation and analysis on a work of art. Specifically:

- Phase A (Time for observation), in which the conditions are created for the development of knowledge through experience (pp. 42-46).
- Phase B (Open and adventurous observation), in which a creative reconstruction of the data takes place by activating open thinking (pp. 54-56).
- Phase C (Clear and in-depth observation), in which the conclusions arise through analytical thinking (pp. 67-68).
- Phase D (Review of the process), in which the understanding of the work of art occurs through critical reflection and the work is totally presented with either a written text or relevant activities (pp. 73-74).

In our method, we included the phase of deeper observation and comparison. It was an insertion between the third and fourth phase related to both the deeper observation and comparison of the artistic work to some historical texts (Stamos, 2021). We also added an optional final phase of consolidation. History education is characterized by engaging students in a bidirectional procedure of focusing on theory and empirical research. The image can be utilized as a historical source by using it in the appropriate way. The knowledge of basic visual elements, according to Avgerinou (2001), is significant for the viewer to construct and use visual language. Besides, the teaching of history, according to Moniot (2011), has the following challenge: to help students understand how to approach historical discourse, sources, and concepts of time and truth. It also includes the ability to develop historical thinking through representations of the past.

The Renaissance in the North: Dutch Painting and Humanism

The cultural movement of Renaissance lasted from 1350 A.D. to 1550 A.D. and established a new era in Europe. The Renaissance moved gradually from Italy and reached the European North. It was identified

with the Italian Florence of the 15th century and the Medici family, cities of Venice and Rome, as well as the first humanist Pope Nicholas V. The Netherlands built on the Renaissance movement as they used both artistic and worldview standards radiating from the South, however, without slavishly copying them, but adding their own original ideas (Vallianos, 2001).

The spread of ideas was achieved through both image and discourse, which, especially in the Netherlands, was perceived through the philosophical views by Erasmus, Descartes, and Spinoza (Clark, 1987). The philological movement of humanism gained ground. The aim of the discovery and publication of the ancient Greek literature was for these philosophical insights to be direct and accessible. The Aristotelianism of the medieval universities was replaced by Platonism. The Renaissance human being called *uomo singolare* (unique human being) was turned into *uomo universal* (universal human being) (Vallianos, 2001).

In northern countries, such as the Netherlands, artists faced the problem of how to continue the art of painting. During the Reformation period, many painters in Protestant areas turned to creating book illustrations and to portraits for livelihood reasons. Thus, they proceeded towards the creation of mythological disguise portraits.[1] According to Sluijter (2001), the artistic production of the Flemish Renaissance (16th century A.D.) inspired artists of the Dutch Golden Age (ca. 17th century A.D.).

Portraits Historiques and Their Analysis

According to Sluijter (2001), the portraits with mythological disguise are portraits of members of the upper social classes, who play the role of mythological figures. This type of painting is internationally known as *portraits historiques* and belongs to a hybrid genre of portraiture and history painting. Depictions of Artemis or Diana, and Aphrodite or Venus were most in demand. Among the artists who dealt with these portraits were Rembrandt, and especially Bol, Flink, Maes, and Bishop.[2] For this research study we chose *Minerva in Her Study* by Rembrandt, *Allegory of Education* by Bol, and *Group Portrait of Four Unknown Children* by Maes. These paintings can give the observers the opportunity to perceive the importance of rare *portrait historiques* having a peculiar artistic value in cultural history. In addition, they include representations of education, wisdom, nature, life, soul, and child figures who are studying or playing. Consequently, they can be educational media of international use to attract the observers' interest in the connection between visual and historical literacy.

At this point, we present on a Table some elements of the three images, concerning *portraits historiques* (see Table 1).

Table 1
Identification of Three Portraits Historiques

Image Elements	Image 1	Image 2	Image 3
Objects	wreath, helmet, shield, book	armor, book, stylus, fingers	Bow, bird, trees, fruit
Depicted persons	Minerva/Athena	Minerva/Athena Tutor-Children	Diana/Artemis Children-Opora
Painters, year	Rembrandt, 1635	Bol, ca 1656	Maes, 1674
Connection	Flemish Renaissance to Greco-Roman antiquity	Flemish Renaissance to Greco-Roman antiquity	Flemish Renaissance to Greco-Roman antiquity

Figure 1
First image: Rembrandt

Note: Rembrandt van Rijn. *Minerva in Her Study* (1635). Japan, Private collection.

Rembrandt van Rijn (1606-1669) (Figure 1) reflected the Cartesian and Spinozian worldview through his works. He also possessed the mysterious knowledge of the function of the soul based on the Ancient Greek tradition (Gombrich, 2006).

In the painting titled *Minerva in Her Study* (1635), a woman with an unusual appearance is represented. The laurel wreath that reveals her divine origin is combined with symbols of the helmet and shield on her left. The woman stands near a book as she is presented in light through the chiaroscuro technique. Her costume could be related to the model's possibly noble origins.

The Medusa's head presented on the shield as well as the goddess's helmet can be related to wisdom and wise war. The existence of the book is more indicative of the wisdom dimension or even of the protection towards the sciences. Moreover, in this painting, the balanced and decisive use of light is characteristic, differing from the usual mysterious suggestiveness in the form.[3]
At this point, we present on a Table some elements concerning the first image (see Table 2).

Table 2
Presentation of the First Image Elements

Image Elements	Analysis	Interpretation
Painter, origin	Rembrandt, Dutch	artist
Helmet, shield, wreath, book dress	goddess Minerva/Athena as noble lady	protection, honor, wisdom noble origin
Wooden table	red tablecloth	aesthetics, rest

Figure 2
Second image: Bol

Note; Ferdinand Bol. *Allegory of Education* (ca. 1656). London, Simon C. Dickinson Ltd.

Rembrandt's depiction of Minerva inspired his student's creation. Ferdinand Bol (1616-1684), a student of Rembrandt, represented the *Allegory of Education* (ca. 1656) a depiction of Minerva in the company of three children (Figure 2). In the picture, Minerva's attributes are familiar elements: her helmet, the armor, the spear, and the shield with the Medusa's head on it. Tamvaki (2000) advocated this point of view, mentioning that Minerva was not only the beloved daughter of Zeus, but also the goddess of wisdom, the patroness of art and science, or the goddess of wise war. Bol dealt with the depiction of the goddess from his youth. In this painting, a group portrait is presented in mythological disguise. The painting shows a mother of noble origin in nice clothes with her three children. Minerva-Tutor-Mother teaches the well-dressed children the courses of reading (at right), writing (lower left), and arithmetic (lower right). The pedagogical and teaching method of Athena-Tutor-Mother is inspired by the Erasmian ideals, according to Chamberlin (2022).[4] At this point, we present on a Table some elements concerning the second image (see Table 3).

Table 3
Presentation of the Second Image Elements

Image Elements	Analysis	Interpretation
Painter, origin	Bol, Dutch	artist
Armor, book, stylus, fingers	goddess Minerva/Athena as Tutor -Mother	wise war, reading , writing, arithmetic
Children	family status	noble origin

Figure 3
Third image: Maes

Note: Nicolaes Maes. *Group Portrait of four unknown children representing mythological figures* (1674). Dordrecht, Dordrechts Museum.

Nicolaes Maes (1634-1693) created another disguised group portrait like the previous one painted by Bol (Figure 3). In this case, there are no adults, but four children. They are not allegories, but representations of the gods or deities in their childhood. The children's characteristics on the hill are personalized. The naked little boy, who is riding an eagle, attracts the observer's attention. This is probably an indirect reference to Ganymede and his abduction by Zeus, who was transformed into an eagle. Maes used the context of religiosity as well as humanistic and neoplatonic thinking by accepting the view of a child's soul.[5] Among the other children in this dark landscape, the archer Diana or Artemis (goddess of hunting and wildlife) in her young version (at left) stands out. Pomona/Opora, a minor goddess of fruit harvest during the season of autumn, is presented next to the fruit (at right). In the center there is a child-brother, who is possibly trying to keep the soul of the other child far away from extinction.

At this point, we present on a Table some elements concerning the third image (see Table 4).

Table 4
Presentation of the Third Image Elements

Image Elements	Analysis	Interpretation
Painter, origin	Maes, Dutch	artist
Bow, bird,	goddess Diana/Artemis	hunting
trees, fruit	goddess Pomona/Opora protection	nature
children		freedom, soul

Description of the Teaching Intervention

During the courses in the sixth-grade of a Greek primary school there was the problem finding that the children had difficulties on understanding visual and historical elements when interpreting pictures or events/incidents, despite the student interest in art and history. Therefore, we sought out eight students as a research sample to participate voluntarily in a teaching intervention during two hours out of the official

teaching program. We used three images of the Rembrandt van Rijn, Ferdinand Bol, and Nicolaes Maes paintings in order to perform visual semiotic analysis and to research the acquisition of visual and historical knowledge through our connective way of seeing Flemish paintings in a cooperative learning environment.

In the sixth-grade history schoolbook written by Koliopoulos et al. (2012), there is a relevant unit about the Renaissance period (First unit-Chapter 1. The Renaissance and the Religious Reformation). The responses of the students were correlated with the development of historical and visual knowledge. For the data collection we used a semi-structured interview and a text synthesis written by the team leaders. The student sample formed three sub-teams of two students per sub-team. Each sub-team was asked to observe one of the three images and answer the interview questions. The first sub-team dealt with *Minerva in Her Study*, the second sub-team dealt with *Allegory of Education*, and the third sub-team dealt with *Group Portrait of Four Unknown Children Representing Mythological Figures*. They were also asked to read historical texts and compare them to the Flemish paintings, interpret the work of art and communicate the views to the other team members. They produced a text on each representative painting, containing the students' total review. They also optionally participated in activities of consolidation. The other two students dealt with all three paintings.[6]

At this point, we concentrated on the implementation of the teaching aims in relation to the specific aims. The students were asked to (a) simply observe the three Flemish paintings we suggested, (b) openly observe and describe these works from the Renaissance, (c) interpret the works of mythological disguise (Minerva/Athena, Diana/Artemis, Pomona/Opora), (d) read relevant historical texts and examine whether the Renaissance was influenced by Greco-Roman antiquity, and (e) work harmoniously in sub-teams during the interview and text production process.

Results: Data Analysis-Interpretation

The researcher conducted the student interview according the following questions. These questions were influenced by the Kokkos (2011) and Mega's (2011) assumptions on critical response:
1. What do you see? / What does interest you?
2. Look closely and describe the faces or things you see.
3. Are there any objects or situations that help you recognize some faces?
4. Who are the painters? Where are they from? Which historical period do they belong to? Have they been influenced by ancient Greece?

The sixth-grade students, who eagerly participated in the interview sub-teams, answered the questions orally. First, they successfully recognized the objects represented in the specific paintings because of the children's previous familiarization with some representative objects during their third-grade courses related with the transition from mythology to history. These objects (helmet, shield, spear, book, bow, fruit), as symbols, helped the interview participants to describe the paintings and recognize the faces of persons related with deities of Greco-Roman antiquity (Minerva/Athena, Diana/Artemis, but not Pomona/Opora). After the phases of observation (simple, open, and analytical), the students also successfully identified the name (Rembrandt, Bol, Maes) and origin (Dutch) of the painters as well as other pieces of information about the Renaissance period by reading not only the images, but also the relevant historical texts (phase of comparison). The researcher did not give any ready knowledge to these students. He gave them instructions of constructing their visual and historical knowledge. Finally, the students produced a text synthesis written by the team leader, including a total view on the specific three images through critical reflection and historical thinking, and searched for more relevant information (including the name of Pomona/Opora) in digital or traditional libraries (phases of review and consolidation). The author of this study has translated the student texts from Greek (see Figure 4) into English in order to quote some student comments as indications of the visual literacy development that in turn helped the historical literacy development.

Figure 4
A sample of the second image description by a 12-year-old student (in the Greek language)

Εικόνα 2

[handwritten text in Greek]

First image: Rembrandt

In the text created by the sixth-grade students there was a general presentation (subjects, location, time) as well as a description of the goddess *Minerva/Athena in Her Study* with aesthetic content. After the familiarization with the art, what followed was a reasoned interpretation of the painting. The response included the characteristic interpretation of the crown as a symbol of glory:

> In the picture painted by the Dutch artist Rembrandt in 1635, it is presented the goddess Minerva/Athena. She wears a beautiful dress that was probably worn by the noble ladies of that time […]. She wears a wreath on her head […]. Next to her knees I can see the shield of the goddess as well as the helmet, which is quite close to her. Her hand rests on a book, which is on a wooden table with a red tablecloth […]. The wreath, which the goddess Athena wears on her head, manifests glory. In ancient Greece it was an honor for someone to be crowned with a wreath.
>
> (student, 12 years old)

The connection of the Renaissance with ancient Greece is documented by the relevant excerpt from the text production where the existence of a connection between art and history was presented:

> Greece shared its customs with Europe and other countries during the Renaissance. At that time people of different nations adopted customs and manners from other countries. The painter of the picture seems to have been pleased and he liked the Renaissance period as it helped his inspiration. It also seems that he had a special preference for the mentality of ancient Greece since he painted a great Greek goddess and not any other.
>
> (student, 12 years old)[7]

Second image: Bol

In the *Allegory of Education*, an extensive description of the aesthetic part of the painting emerged once again (sample of critical reflection). The description was accompanied by reasoned judgments (sample of historical thinking), through which the relation of the depicted persons with educational content (reading, arithmetic, writing) was interpreted. In addition, their social status was interpreted through references to clothing and hairstyle. This could be combined with the fact that the upper class used to teach children, and especially girls, at home. The description of the shield, where Medusa is depicted, was characteristic. Therefore, visual knowledge (artist, exhibition of the work, colors) was connected to historical knowledge (subjects, space, time, and causal relations):

> The picture was painted in 1656 by the Dutch artist Bol and there is in London. The painting presents the goddess Athena (Minerva), who teaches reading, writing and arithmetic to three children. The goddess Athena wears a blue dress and a silver armor. On her head she wears a majestic golden helmet. In her right hand she holds a spear and next to her feet there is her large silver shield that presents Medusa. The little girl that sets her book on the knees of Athena is taught how to read by her. This little girl wears a beautiful dress and has an impressive hairstyle, something that shows her noble

family origin, like the other children. The girl dressed in black is taught arithmetic by the goddess. I draw this conclusion because she counts her fingers […]. The boy seems to be taught how to write as he writes on a book. He wears noble clothes […].

(student, 12 years old)

The question of whether teaching Minerva/Athena could be the mother was answered positively. Specifically, it was related with the mother teaching ancient Greek history and Latin. In this way, the Renaissance was connected with Greco-Roman antiquity and given a universal meaning:

The artist shows that he took advantage of the Renaissance period in a positive way as he tries through his work to promote the education of children of that time in all regions of the world.

(student,12 years old)[8]

Third image: Maes
In the produced text on *Group Portrait of Four Unknown Children Representing Mythological Figures*, there was an analytical description of not only people but also of nature. A reference was made to *trees, fruit, sky,* and *clouds*, which were related with the chaotic, heavy atmosphere of the painting. Beyond the connection of the Maes work with Greek mythology, as the goddess Diana/Artemis is recognized by her bow, there was also a connection with philosophy, which focuses on human values (humanism). The opposite meanings of life and death were presented in the multiple interpretations of the painting, dealing with the most characteristic reference to the black huge wings of the bird, which may also be the wings of an angel, who takes the child's soul to heaven:

The painting by the Dutch artist Maes has four children who are in the countryside. One little girl is sitting on the edge, wearing a white dress. The boy next to her seems to be trying to save a child from a black bird […]. In this chaos another child on the left holds a bow (probably the goddess Diana/Artemis) and tries to hit the bird to free the child. Another explanation is that the little boy died. The wings belong to an angel who tries to take it away to heaven […]. The sky is cloudy. Near the children there are trees and fruit too. This artist promotes the Renaissance through his work as he depicts themes from ancient Greece and humanism.

(student, 12 years old)[9]

It is worth noting that an unexpected justification was given to the presence of the goddess Diana/Artemis who comes to free the child from the bird by analogy with the struggles for freedom at times in history. In addition to visual knowledge, historical knowledge expanded, too, because in this phase, humanism was highlighted as an aspect of the Renaissance. The cross-reference of knowledge with the content of historical texts contributed to the cultivation of visual reflection and historical thinking. In this way students could selectively expand their knowledge through the multitude of information.

Conclusions

After conducting the research, in which there was participation of 12-year-old students in Greece, we derived conclusions from the students' responses to the Dutch *portraits historiques* by Rembrandt, Bol and Maes. Regarding our aim, the students succeeded in expanding their visual and historical knowledge by using Dutch paintings as an educational medium.

The teaching aims related to the specific aims were also achieved because, according to the data analysis:
- The students were familiarized with the works of art as historical sources.
- They interpreted and reasoned the portraits with mythological disguise of Minerva/Athena and Diana/Artemis but not of Pomona/Opora.
- They searched for elements of Greek mythology and humanism not only in portraits, but also in texts, and indicated the connection of the Renaissance historical period with Greco-Roman antiquity.
- There was some acquisition of visual and historical literacy through critical reflection and historical thinking.
- There was a cooperation of the children during both the interview and the text production.

Regarding our analysis related to the research questions:

1. Students can observe and interpret the Renaissance paintings in connection with the Greek antiquity on:
   subjects, spatiotemporal framework, causal relations (historical part),
   description, colors, symbolism, and aesthetic perception (visual part).
2. The art of painting can help students to strengthen the skills of visual literacy, which can help them also acquire historical literacy according to our method that included the five/six phases connected with the Perkins strategy.

This study is significant for the students of Greek primary schools because these students firstly approached the Greek mythology during their third-grade courses. Thus, during the sixth-grade courses, they get the opportunity to extend their visual and historical knowledge through paintings related to the Renaissance and Greco-Roman antiquity. In this case, future researchers and teachers can use the suggested method in the classroom by creating three teams of six persons per team, and three team leaders. Each team has to deal with one (not the same) of the selected paintings, and each team leader has to write a relevant text. The third-grade courses of mythology could not be considered as a limitation for teachers and students of other countries to adapt the method in their classroom, because during the phase of comparison they can find pieces of information in the historical texts and compare them to *portraits historiques*. A researcher could change *portraits historiques* with other pictures of historical content. This specific way of teaching history through the arts can be used from 11 to 14/15-year-old students, who belong in the same age category corresponding to middle school (Stamos, 2021). Teaching through Flemish paintings could offer a "window" into the field of visual and historical literacy in Europe and all over the world about the visual contribution to education by gaining bidirectional knowledge and entertainment.

Consequently, the Cartesian, Erasmian, and Spinozian ideals, by having a Platonic starting point, lead not only to the reputation of the artists, but also to the deification of their models through the mythological representations that draw their inspiration from Greco-Roman antiquity. The redefinition of standards of classical antiquity is transformed into the Renaissance humanism and, in this case, into portraits of mythological disguise. In this way, the Protagorian thought that a human being is the measure of all things (Plato, ca. 350 B.C.E./1995) is merged with concepts ideologically humanistic, artistically creative, and philosophically defined. Therefore, art through critical reflection can meet history, providing for the human eye to be properly trained in a connective way not only on observing, but also on comparing information.

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List of images

Figure 1: Rembrandt van Rijn *Minerva in Her Study* (1635). Japan, Private collection. https://artsandculture.google.com/asset/minerva-in-her-study/swFuWpGzPfJI7g?hl=en
Figure 2: Ferdinand Bol *Allegory of Education* (ca. 1656). London, Simon C. Dickinson Ltd. https://gallerix.org/storeroom/602737194/N/1448340127/
Figure 3: Nicolaes Maes *Group Portrait of four unknown children representing mythological figures* (1674). Dordrecht, Dortrechts Museum.https://rkd.nl/en/explore/images/7187

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Footnotes

[1]   During the 17th century in the North, the institution of patronage was weak. During the Thirty Years' War (1618-1648), the Netherlands was divided into the Protestant Netherlands, which resisted the Spanish Catholic rule, and the Catholic Flanders, having Antwerp as its capital, under the Spanish domination (Daskalothanasis, 2005; Fountoulaki, 2005).

[2]   Peter Paul Rubens (1577-1640) did not paint any *portraits historiques* for his patrons but only for members of his family environment. Rembrandt dealt a little with Greek antiquity. However, he was enchanted by the beauty of divinities. His characteristic works are *The Rape of Europa*, *Minerva/Athena, Diana/Artemis and Actaeon*, *The Rape of Proserpina/Persephone*, *Ganymede*, and *Andromeda* (Tamvaki, 2000).

[3]   This particular portrait is similar to the portrait in Amalia Van Solms's gallery, at the Stadholder's apartments in the Binnenhof, and depicts a cousin of Elector Palatine Frederick (Tamvaki, 2000).

[4]   The classical ideal of morality and the virtuous life, as virtu, is identified with both wisdom and teaching by Minerva/Athena to children (Chamberlin, 2022).

[5]   *The Abduction of Ganymede* (ca. 1636-1638) by Rubens is a typical painting. According to Tamvaki (2000), in the myth related to Ganymede, the erotic dimension (Plato's view), the beauty of the soul (Xenophon's view), the transition of the child's soul to heaven (religious view), and the identification with the sign of Aquarius (constellation) were interpreted.

[6]   The same procedure was conducted by the researcher with a small team of third-grade students in order to observe the evolution of the learning process from myth to history through image.

[7]   In the text produced by the third-grade students, at the beginning, the representation of a woman wearing a crown probably as a queen or princess, was mentioned. Then, by focusing on the objects (shield, spear) the interpretation was redefined and the depicted person was connected to Greek mythology (Minerva/Athena, goddess of wisdom). In addition, the helmet was recognized full of light in the painting. In terms of historical thinking and knowledge, the painter of this work (Rembrandt) and the depiction of the goddess (Minerva/Athena) were recognized, as well as the location (Netherlands). Therefore, it seems there is a transition from imagination to visual and historical literacy:

> I see a woman wearing a dress, earrings and a crown on her head. Behind her there is a shield and in front of the shield there is a helmet as well as a book in her left hand. This picture was painted by Rembrandt from the Netherlands. This woman is the goddess Athena (Minerva). At first I thought that she was a princess or a queen and that the helmet was some kind of light.
>
> (student, 9 years old)

[8]   In the case of the third-grade students, three children were described and that they learned how to write, count, and read from the goddess Minerva/Athena. This time, the identification of Minerva/Athena was easy because the recognition of her was preceded through the connection with Rembrandt's painting, in which Rembrandt had depicted the same symbols (helmet, spear, shield). Thus, it seems that visual perception turns into knowledge in terms of both the visual and historical approaches:

I see three children who learn different things. The first child writes, the second child counts using the fingers and the other child reads. The goddess Athena (Minerva) teaches them all these. The goddess Athena (Minerva) wears a helmet. She holds a spear and next to her there is a shield. This painting was painted by Bol, Rembrandt's student.

(student, 9 years old)

9   In the case of the third-grade students, a simple and clear description of the image was made with the addition of emotional dimensions (fear, embrace, protection). There was a particular reference not only to the underworld (Hades), but also to death in a philosophical dimension, as well as to the goddess Diana/Artemis provoking death through her bow. Therefore, it seems that art gives to students the opportunity of reading pictures and understanding visual and historical elements, without the use of memorization:

I see four children each of whom has something. The first child holds a bow and is the goddess of hunting, the goddess Artemis (Diana). The second child is picking fruit. The third child embraces the fourth one who may belong to the same family. The fourth child is afraid of these because he might be taken by the wings to go to Hades. This picture was drawn by Maes.

(student, 9 years old)