Connecting & Sharing:

Envisioning the Futures of Visual Literacy

THE BOOK OF SELECTED READINGS 2023

Edited by

Jung Lee,

Wanju Huang, Xiaoning Chen,

Filipa Rodrigues, Lee Okan,

Stephanie Beene, Catalina Huilcapi-Collantes

Cover Art:

"Winter Sunset", created by Barbara Miner, was selected for the 1st place at the International Online Juried Art Exhibition at the 2022 IVLA Annual Conference.

The Land Outside My Door Series: The Midwest is flyover country according to most news organizations; nothing of note to be considered. Every day, no matter the weather, I walk and photograph the macro and the minutia. I use these images as touchstones for this series of prints, my sculptural interventions in the woods and for the small wooden artworks that I create from reclaimed ash wood. I am part of a web, connected and somehow separate from all other organisms. Intimately knowing the patterns of plants and animals in the rhythm of seasons brings me great, anchoring joy.

About the artist:

Barbara Miner holds the position of tenured Professor and Chair in the Department of Art, at the University of Toledo, in Toledo, OH. Her mixed media sculptures, installation works, and paintings, informed by the nexus of human/nature interaction, and the practice of meditative repetition, have been exhibited nationally (Maine to California) and internationally (Sweden and Poland) in over 107 exhibitions.

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. For the 2023 BSR, 11 articles and 5 art works came from 10 different countries: Pakistan, Belgium, Israel, Greece, Turkey, Ecuador, Spain, UK, and Japan as well as USA.

We are proud to present these multi-faceted works for your consideration.

International Visual Literacy Association
Publications Committee
First stated in 1998

Jung Lee, Editor-in-chief 2023

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 at least three different editors assigned by the editor-in-chief. The authors receive editors' comments and submit the revised papers for the final review. For the 2023 BSR, 11 papers were accepted for the book. The rejection rate for this year's publication was approximately 21% based on the number of papers submitted for publication. The rejection rate is considerably higher if you consider the review at the conference level.

Please request further information about the review process from:
Jung Lee, Editor in Chief of *Book of Selected Readings 2023*
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Editors' Choice Award

Each year the editors of the Selected Readings choose papers that they judge to be exemplary words 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 **Faizan Adil**. Adil's paper, Image Ambiguity in Contemporary Era, is instructional, informative, and visually engaging. Reviewers commended that this paper made a valuable contribution to current visual literacy by conveying how images were altered and the consequences of this alteration vis-a-vis misinformation and disinformation. By providing many specific visual examples in the paper, Adil demonstrates his thesis concretely and visually.

The author will receive a certificate of recognition at the next IVLA Annual Conference to be held on October 2 (online) and 5-8 (in-person), 2023 in University of Illinois Urbana-Champaign, USA. Congratulations for the excellent paper.

The Book of Selected Readings
EDITORS' CHOICE

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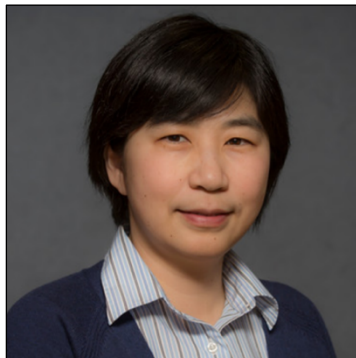
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International Online Juried Art Exhibition

Since 2020, during the annual conference, IVLA has held an international online juried art exhibition, VIEWS & VISIONS: CONNECTING & SHARING THE VISUAL. The exhibition is open to 2D works and videos (5 min max), including but not limited to painting, drawing, photography, prints, collage, screen art, and related digital media. The exhibition is publicly available on an online, virtual 3D exhibition platform. In 2022, art works from 13 different countries were submitted. Jurors selected art works to be displayed, and, of those, which works would be awarded or honored. You will see the 2022 awarded and honored art works in this Book of Selected Readings.

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Image Ambiguity in Contemporary Era

Faizan Adil

Independent Scholar, Pakistan

Abstract

This enquiry delves into an investigation of whether a photograph, due to its ambiguous nature, can be fabricated by removing or adding accompanying text, changing its placement, or editing, retouching, altering, or distorting it. This paper examines the art of photo-editing and manipulation both in the historical and contemporary context to assess the exploitative impact of photography in the form of spreading mistruths, distortion of facts, and propagating false narratives. I further investigate the ethics of contemporary photographs and photojournalism to see how the visual medium has evolved by not only becoming more accessible but also by providing easy access to several manipulation tools. Furthermore, to describe the application of ambiguous photographs in the contemporary era, this paper relies on Noam Chomsky and Edward Herman's "Propaganda Model" theory (Chomsky & Herman, 1988).

Keywords: Propaganda Model, Ethical Photojournalism, Photomanipulation, Doctored Images

Introduction

Photomanipulation is the practice of altering photographs using a variety of methods, tools, and techniques, including cropping, making composites, or retouching images. One of the earliest examples of photomanipulation is from the 1860s – just a few decades after the invention of the camera (Young, n.d). Today, photomanipulation has become a more accessible and acceptable practice with the help of various tools, making exploitation possible in the form of spreading mistruths, distortion of facts, and propagating false narratives.

This paper argues that a photograph is considered ambiguous in nature in the absence of clear context and altering an ambiguous photograph can consequently lead to deception. Several case studies have shown how people, organizations, and propagandists with harmful agendas have used photomanipulation to intentionally deceive and mislead their audiences. This enquiry proposes a model of photo archiving and metadata identification as a practical solution for tackling this issue.

Photographic Ambiguity

The book *Another Way of Telling* (Berger, Mohr & Philibert, 1982) uses the term "photographic ambiguity" to refer to the myriad possibilities of interpreting a single photograph. An example from this book (See Figure 1), at a first glance, depicts a man simply smiling at a horse. Nevertheless, this fact alone is not enough to establish the story the photograph aims to depict. Berger (1982) explains the "photographic ambiguity" concept by providing different plausible stories behind this image, which can all be true and false simultaneously, depending on the context in which the image is published. Some possible meanings of this image imagined by Berger are "The Man Who Set Fire to Farms (his smile becomes sinister)", "Before the Trek of Two Thousand Miles (his smile becomes little apprehensive)", and "After the Trek of Two Thousand Miles (his smile becomes modest)." With each interpretation, the context of a simple smile changes.

Figure 1
Image from the book 'Another Way of Telling' (Copyright by Knopf Doubleday Publishing Group)

The Impact of Framing

The frame of a photograph plays a part in influencing its context. A photographer may consciously or unconsciously add or remove elements from the frame of a photograph or may even use photo-editing tools to remove entire objects or people from the photograph. As harmless as it seems, cropping a picture can often drastically change its context.

In the contemporary era, framing pictures becomes more prominent on social media, particularly on platforms like Instagram. Projects such as "Broken India" (See Figure 2) by a Singapore-based tech company emphasize this phenomenon by showing what lies beyond the "beautiful" frames on Instagram (Borges, 2015).

Figure 2
Project Broken India shows what lies outside the frames (CC by SA 2.0)
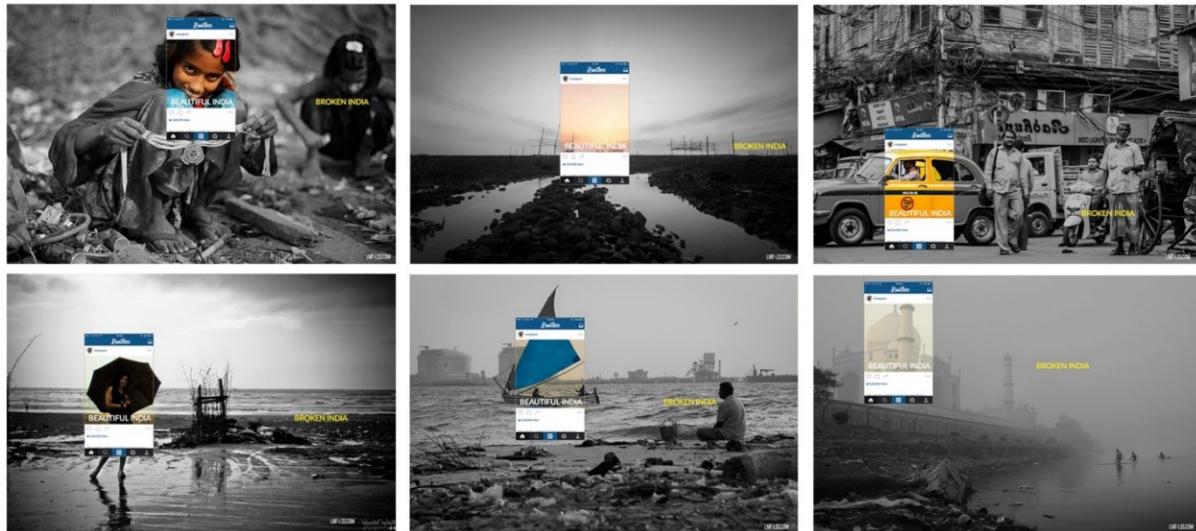
Cropping a photograph to remove "extraneous details" is considered acceptable by several photography organisations, such as the World Press Photo (World Press Photo, n.d); however, the conscious attempt to remove or add objects or people from a frame to intentionally alter the context and meaning of a photograph can lead to negative consequences. In 2010, British news agency Reuters came under criticism for cropping out a knife and blood from photographs (See Figure 3) released by a Turkish organisation called Human Rights and Freedoms and Humanitarian Relief (Barnes, 2017).

Figure 3
On the left, the uncropped photo. On the right, Reuters' released photo (CC by SA 2.0)

Media Theories

What happens when the context of an image changes from its original intent and is differently propagated by a distributor? The answer lies in several media theories that have been put across through the ages. One of the most prominent theories is Noam Chomsky and Edward Herman's "Propaganda Model" from their book "Manufacturing Consent" (Chomsky & Herman, 1988).

The Propaganda Model

The "Propaganda Model" theory lists five filters that make it impossible for the media to be impartial. Chomsky and Herman (1988) argue that the media does not merely inform us but rather "manufactures" our opinions. This paper applies the same theory to the medium of photography. The five filters are:

1. Media ownership: Global media is owned and run by powerful conglomerates whose main purpose is to earn profit through their venture.
2. Advertising: The media's primary source of revenue comes from advertisements. Advertisers pay the media, and the media, in turn, sells its audience. This gives advertisers an upper hand, enabling them to manipulate the media.
3. The media elite: Powerful institutes, including the government, the social and political elites, as well as private entities, know how to maintain control over the media by publishing stories or highlighting experts who speak in their favour.
4. Flak: If a person or entity attempts to report on the misdoings of the powerful, they face criticism and hostility.
5. The common enemy: The powerful media elite creates a bogeyman, a common enemy, or a target to divert public opinion.

These filters manufacture consent among the consumers of the media.

Other Theories

Several more psychology and media theories help in understanding the impact images have on human perception.

A study called "The Influence of Color on the Perception of Scene Gist" illustrates how the same photograph, if presented in different colour tones or with varied blurriness, is perceived differently (Castelhano & Henderson, 2008). Another popular media theory is the "Magic Bullet Theory," which states that the information the media publishes hits the audience like a bullet and implants ideas and opinions in

their minds. A study called "Rethinking the Bullet Theory in the Digital Age" establishes this theory's relevance in the digital age with users strongly influenced by social media (Nwabueze & Okonkwo, 2018).

Historical Examples of Image Manipulation for the sake of Propaganda

To understand how the Propaganda Model applies to the medium of photography, the following are some examples of images that were altered or edited to propagate a certain biased narrative.

Circa 1902

To present a heroic image (See Figure 4) of General Ulysses S. Grant during the American Civil War, a photograph was released showing him on a horse in front of a battlefield full of his troops. The doctored image continued to fool people for a century before an investigation in 2007 by researchers at the Library of Congress revealed that the image was a composite of three different images (Graham, 2015).

Figure 4
General Ulysses S. Grant during the American Civil War. Composite photo on the right. (CC by SA 2.0)

The year 1982

The renowned *National Geographic* magazine admitted to warping an image (See Figure 5) of the pyramids vertically to fit it on its cover (Goldberg, 2016).

Figure 5
The Pyramids of Giza, Egypt (CC by SA 2.0)

The year 1989
A US-based magazine featured Oprah Winfrey on its cover to promote its daytime show. In the picture (See Figure 6), Oprah's head was real, but the rest of the body was of an actress photographed ten years earlier. Neither had consented to the image manipulation (Fix the Photo. n.d.).

Figure 6
Oprah Winfrey on the Time magazine cover, on the left. Original image on the right. (CC by SA 2.0.)

The year 1994
The *Time* magazine published a mugshot of OJ Simpson (See Figure 7) on its cover when his murder trial was ongoing. The magazine darkened his portrait to make him look menacing and to perpetuate subliminal racial biases (Carmody, 1994).

Figure 7
Photo Illustration for Time by Matt Mahurin, on the left. Unaltered image on the right. (CC by SA 2.0.)

The year 1997
A Swiss tabloid edited an image (See Figure 8) from an attack on Hatshepsut's temple in Luxor, Egypt, turning a puddle of water into blood. The attack had left 58 people dead, and such edited imagery was a deliberate attempt to ignite anger and hatred among the people (Battiato & Messina, 2009).

Figure 8
Unaltered image of the Hatshepsut's temple on the left. Altered image on the right. (CC by SA 2.0)
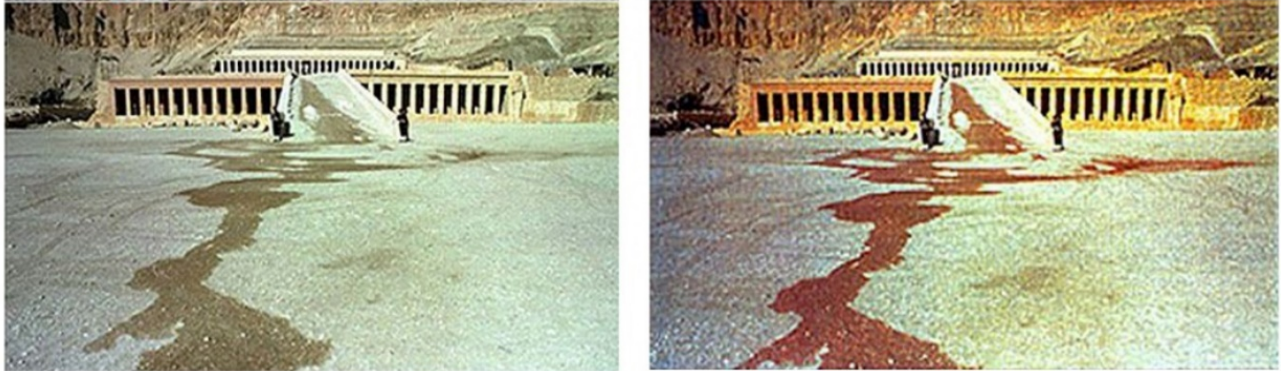
The year 2003
This photograph (See Figure 9) of a British soldier telling Iraqi civilians to take cover was a composite of two images from the same place and time to show more people in the background for impact (Riper, n.d.).

Figure 9
Brian Walski, a Los Angeles Times reporter, combined two photographs into one used on the newspaper's front page (CC by SA 2.0)

The year 2008
Iran claimed it had launched four missiles (See Figure 10). The U.S. later refuted the claim that the fourth missile was photoshopped (Lyons & Nizza, 2008).

Figure 10
In an Iranian Image, a Missile Too Many (CC by SA 2.0)

The year 2011
A doctored image (See Figure 11) of Osama bin Laden's corpse was all over the media after he was killed in a U.S. operation in Pakistan (Hill, 2011). To date, it is unclear what happened to his corpse.

Figure 11
Osama bin Laden's corpse published in The Guardian (CC by SA 2.0)

The year 2020
Former U.S. President Donald Trump's administration used an advertising campaign (See Figure 12) showing rival Joe Biden sitting alone in a basement (Kessler, 2020). In the original photograph, Biden was praying at a church after the murder of George Floyd (Parks, 2020). Although the edits to the picture were minor, the edits distorted the picture's context.

Figure 12
Trump campaign ad manipulates three images to put Biden in a 'basement.' (CC by SA 2.0.)

The Dangers of Presenting Photographs as Facts in Photojournalism

In the above-mentioned examples, Chomsky and Herman's (1988) five filters come into play in one way or another and show how powerful entities successfully propagate false images. This model becomes even more dangerous in photojournalism, where photographs are presented as facts by media houses and are published in newspapers, etched into history forever. A study called "A camera never told the truth: An exploration of objectivity in photojournalism" questions the ethical implications of altered photographs in journalism by exploring several published examples of doctored images, warning photographers of the consequences of spreading propaganda (Rehman, 2018).

Moreover, popular photo magazines have come under fire for featuring and awarding manipulated photographs, such as the "2013 World Press Photo of the Year" by Paul Hansen (Petapixel, 2013), which was altered. While photomanipulation techniques are generally looked down upon in the journalism world, Magnum Photos member Christopher Anderson says:

"It is beside the point to argue about the degree to which facts have been altered because all photography does that… I am more interested in the truth in what they have to say, even though I know it is subjective. When a suburban kid in [a] garage in New York is retouched to look like he is in a burned-out alley in Aleppo, I don't have to examine the raw file to know that the photographer has created something that has nothing at all to do with facts." (Laurent, 2013)

In Pakistan, editors often receive edited images by the government's Ministry of Information (See Figure 13). The newspapers are compelled to publish these doctored photographs despite the apparent and often hilarious obviousness of the edits (Tahir, 2017), as newspapers are often dependent on politicians and capitalists for advertisement revenue.

Figure 13
Photoshopped image of the chief minister on the left. Original image on the right. (CC by SA 2.0.)

In 2021, Pakistan's political party, Pakistan Tehreek e Insaf (PTI), uploaded a photograph (See Figure 14) on Twitter featuring a person with text reading: "*My name is Kashif Chaudhary. I am an employee at a workshop in Klotiya, Daska. I will vote for Pakistan Tehreek e Insaf NA - 75 Candidate Ali Asjad Malhi*" (PTI, 2021). The image showed the person as a resident of Punjab, Pakistan, but the photograph was of a model released as a stock image by an Indian creative agency called Triloks (See Figure 15).

Figure 14
Image posted by political party PTI on Twitter (CC by SA 2.0.)

Figure 15
Stock photo of an engineer, featuring a model (CC by SA 2.0.)

Similarly, a study conducted in Finland asked editors of several newspapers about the levels of photomanipulation and photo editing that are acceptable in the field of photojournalism (Mäenpää & Seppänen, 2010). Many editors were open to basic editing, such as cropping, brightening, and changing saturation, but disapproved of removing entire objects or people. They were also in consensus about having guidelines on photo editing.

Another dangerous impact of manipulated images occurs when courtrooms use photographs as evidence. A study "A new approach to photography forensics using 3d analysis for correcting perception errors" attempts to provide a solution to this by using three-dimensional (3d) modelling and Google satellite images to reconstruct a photograph of a location or a building and to ascertain its factual accuracy (Kim et al., 2010).

With all conventional journalists now also moving towards digital documentation and photography, it is essential that tools and platforms are put together to assess the veracity and accuracy of photographs and interrogate those who indulge in malpractices. There should also be an association of photo editors, especially in countries like Pakistan where there is a need for more skill-based education on journalism. The thesis project I undertook during my bachelor's degree investigated the role of press photography and photojournalism in Pakistan. During my analysis of image placements, I found it very easy to identify a newspaper's political, economic, and social inclinations just by comparing the placements of the published photographs (Adil, 2015).

Contemporary era

In today's world, cheap smartphones and easily accessible editing software have changed how images are produced, reproduced, distributed, and consumed. On Instagram, users share 1.3 billion images daily (Broz, 2023). Photo editing has become such a common tool that Instagram has hundreds of filters that change over time. The filters not only include colour palette changes but also changes to the face and eye shape, adding make-up, and even transforming faces into younger or older versions of a person. Moreover, the filters that change faces follow a stereotypical standard of beauty by lightening skin tones, colouring or enlarging the eyes, and slimming the face. A study published in the International Journal of Eating Disorders showed a link between the practice of editing selfies with body image issues and eating disorders (McLean et al., 2015), and another study links selfies to narcissism and self-esteem (Barry et al., 2017).

Oversharing images in the digital world also raises the question of what exactly an image is now. The 1.3 billion number from Instagram mentioned earlier not only consists of material shot through a camera lens but also contains graphics, memes, and gifs that fall into the same category of an image because of their similar impact.

In June 2020, when the *Black Lives Matter* movement was at its peak after the murder of George Floyd, activists commemorated a "Blackout Tuesday" urging people worldwide to post a plain black image on their social media profiles using the hashtag #BlackLivesMatter (Coscarelli, 2020). While this activity seemed to support the movement, it ended up "doing more harm than good" because all the black square images cluttered the hashtag page and consequently censored the actual images from the movement (Willingham, 2020).

The Propaganda Model theory also applies to visual content on social media channels. Photo editing tools and social media filters give power to the users to morph their image or identity online, often leading to scam, lies, and deception – a practice now commonly known as "catfishing". The term catfishing is used to describe the act of online deception, in which an individual creates a fake online persona and pretends to be someone else, usually for the purpose of tricking, manipulating, or misleading the audience, often with the help of fake photographs. In 2021, social media was a "gold mine" for scammers with 770 million U.S. dollars in losses to fraud, as it is "easy to manufacture a fake persona" online, according to the U.S. Federal Trade Commission (Fletcher, 2022).

Proposed Method: Image Upload Metadata

This paper proposes the following method as mandatory practice for photographers uploading an image onto any platform to ensure that the context of the image is truthfully communicated to the viewers. Photographers should be required to fill out a form while sharing their photographs to minimise misinterpretation of their work. The more details the photograph contains, the easier it will be for viewers to understand the context. Each photograph should have the following information:

1. Year

2. Location

3. Focal length

4. Genre
   - Photojournalism/ Documentary Photography
   - Press Photography
   - Fine art
   - Landscape
   - Portrait
   - Surreal
   - Still Life

- Editorial
- Fashion
- Architectural
- Street Photography
- Personal Collection

5. Medium
   - Analogue
   - Digital

6. Characteristics
   - Single Image
   - Photo-series
   - Screenshot

7. Attributes
   - Changed Perspective
   - Anything removed or cloned from the image.
   - True Colour
   - Modified Colour
   - Photo Montage (If another image is used from the external source, mention the source, title, and artist information)
   - Photo Collage
   - Endorsement

8. Consent
   - Subject Consent
   - Subject Consent is not required
   - Without Subject Consent
   - Public Event

9. Ownership
   - Sole
   - Partnership
   - Collaboration
   - Sponsorship

10. Image License TYPE
    - Public Domain/ Royalty Free
    - Copyrighted
    - Creative Commons share-alike license (CC by S.A.)
    - Creative Common no derivatives license (CC by N.D.)
    - Creative Common non-commercial license (CC by N.C.)
    - Creative Common non-commercial - share-alike license (CC by C.N.C. - S.A.)
    - Creative Common non-commercial - no derivatives license (CC by N.C. - N.D.)

The outcome of the proposed method is provided in Figure 16 (n.d, 2017).

Figure 16
Industry of Dissolving Portraits (CC by SA 2.0.)

Title: Industry of Dissolving portraits
Location: Lahore, Pakistan
Focal Length: 75mm
Medium: Digital
Ownership:
Collaboration with Pakistan Photo Festival
Image License Type: CC by S.A.
Characteristic: Image Series
Consent: Subject Consent Taken
Genre: Photojournalism, Portrait and Documentary Photography
Attributes:
- Background cloned from the image to remove dust particles.
- True Colour
- Used one flashlight.
-

Conclusion

"Seeing is believing" is an age-old notion, but the truth of an image will always remain open to interpretation even if its raw files and metadata information are closely examined. All images must always be viewed with scepticism as even their placements and framing can play a considerable role in changing their context. If a viewer is going through a magazine featuring images from a famine, spread over six pages, but on the third page in the middle is a full-page advertisement of a beer, the impact of the famine may be lessened as the viewer's attention is likely to get diverted.

The famous one-million-dollar photograph of a potato (Chalasani, 2016) also exposes the façade of the photography industry, which is primarily run by corporate conglomerates infamous for exploiting the medium and the masses. Photographer Steve McCurry came into the limelight for his edited photographs, but no amount of criticism affected his career, and he continues to be a member of the National Geographic claiming that he is a visual storyteller and not a photographer (Naga, 2016). Nikon, another giant in the industry, also once awarded a photographer for an image that was later proved to have been altered (DiyPhotography, 2016).

Today, we see a trickle-down effect as photography takes over the world by being more democratic. However, with power comes responsibility. Moreover, now the masses are indulging in the same practice of exploitation that was earlier done on a higher level by corporate entities. Digital media users have turned themselves, their lives, and their homes into a brand, with the help of images, photo-editing tools, and free excessive use of social media. Furthermore, they are also now propagating their biased messages, carrying out subliminal campaigns and advertisements, and actively changing public perception using their influence.

In conclusion, this enquiry was just the tip of the iceberg and opens space for further investigations as well as retrospection on the best and worst practices in the field of photography and what needs to be done to ensure that there are enough critical awareness around crucial issues.

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The Age of Allegory

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Abstract

This paper examines the uses of allegory in early modern and contemporary art. I discuss allegory as a poetic and visual means, creating a multiplicity of meanings, and positing the image as a ruin. Referencing previous discussions of allegory by Walter Benjamin (1963, 2010), Peter Burke (1997), Craige Owens (1980), among others, I discuss the reliance of allegory on iconographical precedents and its fragmentary nature. These points are exemplified through paintings from the 17th century, by Peter Paul Rubens and Diego Velazquez, and contemporary artworks by Joseph Beuys and Francis Alÿs.

Keywords: Allegory, Ambiguity, Rubens, Beuys, Alÿs, Fragmentation

Introduction

In the 17th century, allegory was a central visual device. Artists used it to synthesize realistic representations with abstract religious and social ideas. In the following paper, I will analyze the use of allegory in some significant examples from Early Modern painting and discuss the allegorical interpretation of these paintings. In addition, I will show the ways in which allegory is still used by contemporary artists. The term "Allegory" derives from the ancient Greek word *állaagoreúein*, meaning "to say something else" (Pontani, 2016). Allegory is a method of creating meanings through difference. Often, a work of art suggests a symbolic narrative implicitly (Britannica, 2019). Thus, it is not surprising that during the Middle Ages, allegory developed into a method of interpreting words and images called "allegoresis," and was usually applied to Holy Scripture (Büttner, 2018). Allegory builds a parallel meaning to a given text or image, one that is not outspoken and evident but must be revealed. Much of the New Testament is written as allegory, and many examples of Christian iconographies are allegories, such as the prototype of the Good Shepherd. Allegory is at the basis of the Christian tradition, in the fundamental understanding of the Old Testament as a prefiguration of the New Testament. When believers read the Old Testament, they are not reading it as is but rather reading it as a prefiguration to the New Testament. Allegory was prevalent in the early modern period in history paintings, which often contained a contemporary reading of an event from the past (Burke, 1997).

Walter Benjamin (2010) elucidated the meaning of allegory as a negation of the symbol: "It is not possible to conceive of a starker opposite to the artistic symbol, the plastic symbol, the image of organic totality, than this amorphous fragment which is seen in the form of allegorical script," or "In the field of allegorical intuition the image is a fragment" (p. 63). Whereas the symbol condenses the general into a particular, allegory expands the singular into the general (Benjamin, 2010, pp. 70-71). When we encounter an allegorical representation based on a textual source, we are asked to understand a more comprehensive concept through the representation given to us. A beautiful lady sitting on a throne and holding a pair of scales is an allegorical representation of Justice. However, she also alludes to the Last Judgement and other iconographies using scales. A beautiful young male draped with a lion's skin and holding a club is the mythological hero Hercules, but he is also an allegorical representation of courage. In this sense, allegory demands a second reading. One needs to understand meaning through a representation that does not explicitly show the intended meaning. In this sense, allegory is dialectical and open to new interpretations. It is fluid and even iconoclastic, not allowing meaning to rest in form but provoking an ever-expanding interpretation. It is ambiguous, containing a multiplicity of meanings allowing for the construction of new meanings in the same forms.

The basis for an allegorical image is the fragment or the ruin. Benjamin (2010) writes: "Allegories are, in the realm of thoughts, what ruins are in the realm of things" (p. 65). Baroque artists synthesized diverse sources and manipulated models of representation, such as fantasy and realism, to create a new whole. This new whole is constructed (Benjamin, 2010, p. 66). The building of meaning relies on an imaginary

content, that is alluded to but not explicitly stated, thus remaining always open to interpretation. A good example is Peter Paul Rubens' painting *The Allegory of Peace* (Figure 1), made as a speech-act towards the conclusion of peace between the Spanish and English crowns in 1630, which Rubens assisted as a diplomat (Heinen, 2004).

Figure 1
Peter Paul Rubens, Allegory of Peace, 1629-1630, oil on canvas, 203.5 X 298 cm, National Gallery, London (Public Domain)

Rubens' *Allegory* shows the personification of peace, Pax, in the center, feeding Pluto – God of wealth and abundance — with her breast milk while plenty and prosperity surround her (Martin, 1986, pp. 120-121). These are represented by an entourage of dancing women on the left, taken from the Bacchanal, and a host of children – modeled after the children of Sir Balthasar Gerbier — with whom Rubens was staying in England. In the background, the goddess of wisdom, Minerva, pushes Mars away. Rubens' painting is clearly allegorical, making the point that enduring peace is more important and beneficial than the fulfillment of fleeting pleasures.

This intricate allegory is based on a composition by Rubens' teacher Otto van Veen, *The Temptations of Youth* (Figure 2). In Van Veen's painting, it is Venus in the center pressing milk from her breast, and it is a male youth whose mouth is open to whom she caters. Above the youth, Minerva is trying to stop this display of lust by stopping the milk stream with her hand. On the left-hand side of the painting, the figure of Bacchus pours wine from a cup towards the youth's loins, while the figure of Poverty pulls at his shirt. These figures symbolize the temptations of youth and the dangers they bring. Minerva, acting as the symbol of reason, tries to rescue the youth from these temptations and lead him towards the right path, symbolized by the temple on the right-hand side of the painting. Including a temple on a high, rigid mountain references another allegory, known as *The Choice of Hercules,* educates readers and viewers about the importance of virtue and the consequences of temptation to pleasure (Panofsky, 1997). The meaning of Rubens' painting is in direct opposition to Van Veen's, though still alluding to it through the compositional similarity. While Van Veen emphasizes the dire outcomes of bodily temptations, symbolized by the figures of poverty and drinking (Bacchus) pulling at the youth's clothes, Rubens depicts the figures from the Bacchanal as a positive consequence of peace, and explicitly linking such prosperity to the reign of Charles I, to whom Rubens gave this painting. Alluding to the precedential composition by Van Veen while turning its meaning on its head, this is a good example of how allegory turns historical content into philosophic truth, to use

Benjamin's words (Benjamin, 2010, p. 69).
Figure 2
Otto van Veen and Workshop, Allegory of the Temptations of Youth, 1597, oil on canvas, 146x212 cm, Nationalmuseum, Stockholm (Public Domain)

Allegory is not only about the creation of meaning but of the tendency of such meanings to multiply and accumulate. Thus, the use of artistic precedent and homage can easily create an allegory. One of the most potent forms of allegory is found in a series of works made by Rubens for the French Queen Marie de Medici. Initially, there were to be two cycles of paintings, the first dedicated to Henri IV, the King of France and Marie's husband, who was assassinated in 1609, and the second dedicated to Marie de Medici. However, Rubens never completed Henri's cycle, and we are left with the Queen's cycle.

The cycle, an amalgam of allegory and political propaganda, was meant to justify the reign of Marie de Medici after the death of her husband, Henri IV, until the coming of age of Louis 13th (Saward, 1978). Using allegory, Rubens tackled the problem of subject matter, or lack thereof, and created meaning with little content available to him. The cycle divides into three parts. The first part consists of Marie's early years from birth to childhood and education. The second part depicts her marriage to Henri IV and her progeny. Finally, the third part shows the rise of the dauphin, Louis XIII. The series comprises an overall of 24 paintings.

We will look at several paintings to highlight the functions of allegory. From the first part of the series, we see *The Fates Spinning Marie's Destiny* (Figure 3). This painting shows the Parcae, allegories of fate, spinning the Queen's future, while Jupiter and Juno oversee their work. Jupiter and Juno feature widely in the series, not only as the head of the Olympian gods but as a symbol of the sacred marriage, the hieros gamos, an example Marie is to follow. From the onset, we see the work of Allegory, referencing a concrete event, the birth of a Tuscan princess, and reading it as a mythological working of the fates and Olympian gods.

Figure 3
Peter Paul Rubens, The Fates Spinning Marie's Destiny, Marie de Medici Cycle, 1622-25, oil on canvas, 394 x 153 cm, Louvre Museum, Paris (Public Domain)

The Fates, who appear as present in some accounts of the marriage of Jupiter and Juno, exemplify the idea that Marie is chosen, comparable to the Olympian gods. The thread is twisted and pulled up from the fate sitting at the bottom left, through the middle fate, and up to the fate closest to Jupiter and Juno. She is the one holding the spindle. The spindle bearing the spun thread of Marie's destiny is held in a diagonal towards Jupiter and Juno, signaling their influence and overseeing of Marie's fate. The three fates call for a visual comparison with the three graces, beauty, chastity, and joy, who aided Venus and were painted by Rubens on a different occasion. Thus, although Rubens does not paint an actual event in Marie's life, he alludes to her destiny as the future queen of France through mythology. As viewers, we are expected to understand the meaning of this scene through the example of Juno and Jupiter, and an application of the mythological story of the Fates to a current political narrative. This canvas represents an event that is only possible on the allegorical level, which cannot take place in reality, the spinning of fate. Therefore, it is alluded to through comparison and parallel, through the imaginary and the mythological.

The second example from the series shows *The Birth of the Princess* (Figure 4), in which baby Marie is held by the personification of the city of Florence. A putto holding a shield with the Fleur de Lis, the symbol of the French royal house, is seen in the left corner, while a river god sprawled in the right corner represents the Arno River, thus alluding to the origins of both baby Marie and her future home of the French Monarchy. A cornucopia and torch held by Hymen, the god of marriage, seen flying in the upper right corner, suggests the fate of this baby as the future Queen of France through marriage. Hymen's inclusion, along with that of the Fleur de Lis and the Arno river, shows that the historical event of Marie's birth is read considering future politically important events. Through this allegorical reading Marie's birth is given epic connotations and turned into a philosophical truth: Marie de Medici was destined from birth to greatness.

Figure 4
Peter Paul Rubens, The Birth of a Princess, Marie de Medici Cycle, 1622-25, oil on canvas, 394 x 295 cm, Louvre Museum, Paris (Public Domain)

Looking at these paintings, one is overtaken by allegory. The creation of meaning is created layer by layer through the influences and allusions to previous artworks, Greek and Roman mythology, and courtly symbolism. These varied sources are all combined to paint a picture of the current Marie de Medici. Rubens used similar visual allegory in his great allegories of the Christian Church, *The Eucharist* tapestries, as well as *The Constantine* series. In the Marie de Medici series Rubens creates content where there are not real political events to depict, and he does this through allegory. Allegory represents and portrays abstract concepts, such as destiny, and was a general form of visual communication in the 17th century.

In many senses, this allegorical tendency points to speaking something through something else in an ever-growing cycle of parallels and displacements: Marie's destiny is represented through mythological figures, her birth is depicted through personifications of her future home, and so on. In his paintings, Rubens depicts contemporary political figures and events from their lives alongside mythological figures from a cultural past (i.e. Greek or Roman) and personifications of abstract ideas (such as the city of Florence). Under the umbrella of allegory, Rubens synthesizes the contemporary story of Marie de Medici with the ancient past. He renders the contemporary through mythology, making the latter relevant and the former distant. Benjamin noted that allegory is a mixture of convention and expression (Benjamin, 2010, p. 63). In the case of the Marie de Medici cycle, the conventional use of mythology is harnessed to express Marie de Medici's political role and stature.

One more example from the Marie de Medici cycle will demonstrate the function of allegory on a visual level. The painting shows her introduction by portrait to Henri the IV (Figure 5). This occurrence references methods in which elite European society was matched and married by presenting portraits of eligible others to the man preceding the official engagement and marriage. Here we see Henri IV with the personification of France at his side. She wears a cape covered in Fleur de Lis, whispering in his ear while he surveys a portrait of Marie de Medici. Holding it are Cupid, son of Venus and Mars, and Hymen, the marriage god, whom the viewer would have met already at the painting of Marie's birth. Above, Jupiter and Juno look on, blessing the match.

Figure 5
Peter Paul Rubens, The Presentation of Marie de'Medici to Henri IV, Marie de Medici Cycle, 1622-25, oil on canvas, 394 x 295 cm, Louvre Museum, Paris (Public Domain)

Henri IV, fashioned after the figure of Mars or the hero Hercules, wears armor, and France is shown as an allegorical representation of Rome (Vivanti, 1967). The diagonal between Juno and Jupiter and Henri and the personification of France shows Marie de Medici to be a stand-in for France herself. Rubens compares the holy marriage of the gods to the soon-to-be monarchical couple, and the message to the viewer is allegorical: it is in France's interest to have Marie as a Queen.

The need to recognize and read allegory caters to the discipline of art history, as, of course, to viewers, and speaks to how images were understood to function during the 17th century. Another great artist versed in allegory is the Spanish Baroque painter Diego Velazquez. In his painting *Los Borrachos* (The Drinkers), we see a young male in the role of Bacchus, the Roman god of wine (Figure 6). He wears a wreath of vine tendrils on his head while crowning another figure. The other figures around him divide into the mythological figures on the left and Spanish peasants on the right. The identification of the figures is based on their clothing, as seen in comparison between the standing figure with the brown cape, based on Velazquez's earlier painting of the Water Seller, made in Seville.

Figure 6
Diego Velazquez, Los Borrachos (The Drinkers), 1628-29, oil on canvas, 165 x 225 cm, Prado Museum, Madrid (Photo credit: ©Museo Nacional del Prado)

Velazquez fuses mythological and social realism in this painting, based on a composition by Hendrick Golzius known through an engraving by Jan Saenredam. In the print, peasants beg the wine god for his gift of wine, hoping it assuages their pains of life. Velazquez's *Drinkers* hung in the summer bedroom of King Philip the IV and should be understood also in relation to the King's own pleasure of drinking while looking at the benefits of such an action represented allegorically in the painting by Velazquez. Allegory contemporizes the mythological, forming a new, relevant depiction of drink as fitting for the painting's patron and viewer.

In this painting, as in the paintings in the Marie de Medici cycle, the painter synthesizes contemporary representations with mythological reference. On the one hand, the reference to Bacchus situates the painting within the mythological and iconographic traditions. On the other hand, the representation of common Spanish figures, such as the water seller, alludes to contemporary Spain. Velazques creates allegory by merging these two distinct traditions: mythology and realism. Thus, the painting does not depict pure mythological narrative, nor absolute realism. In this sense it remains fragmentary, situated in the gap between two traditions of representation. The allegorical image is always prone to ruin, as Benjamin (1963) says: "In the field of allegorical intuition the image is a fragment, a rune. Its beauty as a symbol evaporates when the light of divine learning falls upon it. The false appearance of totality is extinguished" (p. 176).

The allegorical in baroque imagery builds meaning and can be considered an early modern mode of visual discourse. The visual world mostly served elite patrons, which is true in general of the viewers and "art consumers" of the early modern period. However, the recurrence of allegory as a visual device in the modern period can attest to a search for meaning by artists and viewers alike. A case in point is Joseph Beuys' *How to Explain Pictures to a Dead Hare*, which uses allegory as its prime method. Beuys staged the work at the event of his first solo exhibition of drawings and watercolors at the Schmela Gallery in Dusseldorf, a commercial gallery. From the onset, the action was meant to infuriate Beuys' critics and can be read as an allegorical action. Kuspit referred to it as an act of symbolization (Kuspit, 1995, p. 47). However, I think allegory would be a more fruitful term. Following Benjamin's definition of allegory as the antithesis of the symbol, made of multiplicity and never reducible to coherency, Beuys brings together his varied public image as a social artist whose teachings have educational content and now as a commercial artist having a debut show in a gallery. He uses this multiplicity to critique and distance his own exhibition

in a commercial gallery from his public image as an educator. The result is an allegory about art and its role in contemporary life.

Beuys appears in his exhibition, his face covered with a mask of gold leaf and honey, the soles of his shoes covered in felt and iron rods. The covering of his head with gold leaf and honey is symbolic. He places the liquid substance of honey on the head as a locus of rationality and constancy. He mixes symbols of manly rationality and feminine "beauty." Using iron rods in one of his shoes and felt in the other Beuys also refers to the symbolic order. Iron is used to represent masculinity and is connected to the mythological god of war, Mars, who was the allegorical representative of war tools. This complex figure, an allegory, then proceeds to "explain" the painting to the dead hare. Beuys identifies with the dead hare and its actions during life: rubbing, pushing, digging, actions foregrounding material existence (Duncan, 1995, pp. 82-83). Thus, the work becomes an allegory of two kinds of artists: the commercial artist, or the rationalist, and the performance artist, a materialist whose body, and not a distant representation, is art.

This unique approach to the body, as a means of thinking in a non-rational way, departs from the Western dualism splitting mind and body and higher and lower realms of existence (Duncan, 1995). One of the results of allegory is its dialectical character, always oscillating between two elements, speaking of one thing through the other, mixing symbolically loaded elements into a new relationship. In this light, much of contemporary art can be seen as having an allegorical tendency, as Craige Owens has claimed in his article on allegory as the basis for postmodern art (Owens,1980).

Conclusion

To summarize, I will give an example of recent contemporary use of allegory, which refers to traditional allegories of the early modern time. In the Belgian pavilion at the Venice Biennale, Francis Alÿs explores the theme of children's games, through films of children playing and paintings made by the artist. (The work was first shown in 2019 at the Eye Filmuseum in Amsterdam during 2019-2020). Through Alÿs' videos of children's games around the world, he speaks to the internal logic and system of rules that control these games (The Nature of the Game).

Alÿs' work also speaks to the difference or gap between the naivety of the children's games and the harsh, war-stricken realities of these children. However, the subject of children's games is far from new. In 1560, Pieter Bruegel the Elder painted his known painting by this name. In it, Bruegel created an index of children's games, and framed the world of children as a mirror to adult life. While adults work, children play. Some of the games are naïve, while others are cruel or mischievous. The comparison between the children's world and that of the adults results in melancholy. Bruegel exposes "human nature" in the children's games, showing them to be prone to adult cruelty already in childhood. As Benjamin has shown, one of the characteristics of allegory is melancholy (Benjamin, 1963, pp. 132-133). In Bruegel's painting, the naïve games of children are compared to the brutal acts of adult violence and worldly interactions. Much in the same vein, Alÿs' choice to forefront playing of games speaks to difference and similarity with the grown-up world. Even if Alÿs did not have in mind the canonical work of Bruegel the Elder, his focus on a subject that has a rich iconography, lends an allegorical aspect to the work.

Alÿs' work stems from the artist's travels and looking. However, it cannot escape the allegorical tendency due to the subject matter, its universalizing aspects and the melancholic expression that ultimately pervades when watching the videos. Melancholy, according to Benjamin, grows from an understanding of relativity: understanding meaning as fluid, as relational, and tingent. Allegory, as always, is fragmentary. Allegory functions on several parallel levels. As we saw in the Marie de Medici cycle by Rubens, or *Los Borrachos* by Velazquez, allegory merges the imaginary and the realistic, the abstract and the concrete. Referring to subjects present beyond the representation, allegory ultimately leaves gaps in our interpretation, and evolves towards melancholy.

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Integrating STEM, Language, and Visual Literacy for Multilingual Learners

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Abstract

While multilingual students in K-12 classrooms are steadily increasing, they are significantly underrepresented in STEM (Science, Technology, Engineering, and Mathematics) at the post-secondary level and workforce (National Academies of Sciences, Engineering, and Medicine, 2018). This paper contributes to narrowing this gap by proposing an integrated STEM, language, and visual literacy approach. The first part of the paper explains the theoretical perspectives and their connections to each other. In part two, the authors share how the integrated approach works, using concrete classroom examples such as sense-making, deepening STEM learning, developing disciplinary language and discourse, and using multimodal communication. STEM educators will be inspired to implement appropriate multilingual student support strategies to create culturally responsive instructional activities that empower students and leverage multimodal communication, motivating them to pursue advanced study and add new perspectives traditionally excluded in STEM.

Keywords: visual literacy, inquiry, culturally responsive teaching, multilingual learners, STEM

Introduction

Classrooms in the United States have become more diverse, with students from different linguistic and cultural backgrounds. The National Center for Educational Statistics (2022) shows that the number of English Language Learners (ELLs) was 5.1 million in the fall of 2019, representing approximately 10.4% of the entire student body in K-12 settings. One out of four students is projected to be an ELL across the nation by 2025 (National Education Association, 2020).

Many different terms, such as ELL and emergent bilingual, are used to address this group of linguistically and culturally diverse students. In this paper, the authors use the term "multilingual students" to describe these students' linguistically rich profiles and shift the focus away from English.

With a growing population of multilingual students in schools, a top concern for educators is how to support their academic success. The authors center their discussion on engaging and supporting multilingual students in the interdisciplinary subject of STEM (Science, Technology, Engineering, and Mathematics). STEM education has traditionally been seen as an apolitical space in which students learn facts and theories and conduct hands-on experiments leading to politically neutral findings. However, studies show that multilingual students have a lower interest in STEM, lower persistence rates to pursue STEM at the higher education level, and a lower sense of belonging in STEM classes (National Academies of Sciences, Engineering, and Medicine (NASEM), 2018). Consequently, they are significantly underrepresented in STEM fields at the post-secondary level and workforce. This paper addresses the need in the field by promoting an innovative approach that integrates visual literacy, content, and language to engage multilingual students in culturally responsive STEM inquiry.

Theoretical Perspectives
This paper is based on a professional development project funded by the Library of Congress (LOC) Teaching with Primary Sources (TPS) Midwest Regional Grant. With the support of the grant, the authors,

who are the project team, developed professional learning experiences for both pre- and in-service STEM teachers focusing on selecting and using inclusive visuals to address the needs of multilingual students. "Inclusive visuals" is a term coined by the authors to integrate key features of three theoretical perspectives on which the project was grounded: culturally responsive teaching, visual literacy, and inquiry-based learning. Even though each theoretical perspective varies in its components and applications, the authors' discussion centers on the connection with multilingual students' STEM teaching and learning. A visual representation of how the three perspectives connect through inclusive visuals is shown in Figure 1.

Figure 1
Theoretical Perspectives
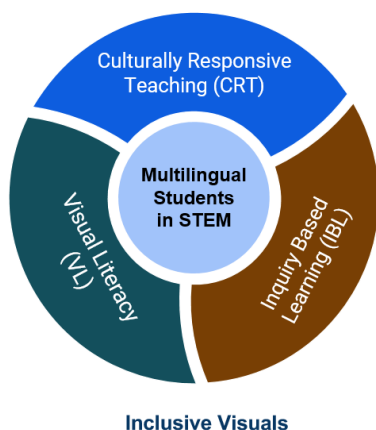
Culturally Responsive Teaching

The disappointing outcomes of marginalized populations in STEM problematize the perception that STEM is neutral and makes culturally responsive teaching (CRT) an essential theoretical perspective and approach to working with multilingual students (Ladson-Billings, 1995). CRT uses "the cultural characteristics, experiences, and perspectives of ethnically diverse students as conduits for teaching them more effectively" (Gay, 2002, p. 106). CRT is founded on the assumption that "when academic knowledge and skills are situated within the lived experiences and frames of reference of students, they are more personally meaningful, have higher interest appeal, and are learned more easily and thoroughly" (Gay, 2002, p. 106). That is, when STEM teaching and learning experiences are situated within students' funds of knowledge (González et al., 2005) and lived experiences, they are more likely to thrive academically.

CRT-enhanced STEM curricula increase student engagement with content (Hernandez et al., 2013; Lee et al., 2008; Nykiel-Herbert, 2010; Sanford et al., 2020), boost students' school attendance (Bernard, 2004), improve their grade point averages, and encourage the formation of positive racial self-images (Butler-Barnes et al., 2017). Therefore, CRT is critical to the educational success of multilingual students.

Visual Literacy

With abundant visual representations in daily life and, increasingly, in STEM education, a brief discussion of the unique features of visuals is necessary. First, visuals are neither objective nor complete. For instance, photos are confined by the frame, reflecting the photographers' perspectives (Sandweiss, 2007). Similarly, maps are limited in providing a comprehensive view of geographic areas as well as how humans interact with nature (Huffman, 1997). Further, visuals are created in specific sociocultural contexts. Visual elements such as line, color, shape, and symbol are interpreted differently depending on the cultural backgrounds of viewers (Knight et al., 2009).

Given the visuals' subjective, incomplete, and culturally specific nature (Chen, 2019), it is problematic to assume that multilingual students would have no problem making sense of the meaning if visuals were provided. All students must learn visual literacy skills to work effectively with visuals (Avgerinou, 2001). Along the same line, the WIDA (World-Class Instructional Design and Assessment) framework (2020), which designs language development standards for multilingual students, emphasizes the importance of

using a multimodal approach in the interpretive and expressive communication domains. Such an approach encourages teachers to expand beyond traditional print to include modes of communication such as visuals.

Like traditional literacy, visual literacy can be generally broken down into "reading" and "writing." When "reading" visuals, students view, analyze, interpret, and evaluate visual information. When "writing" visuals, students produce, design, and create information visually. Most importantly, visual thinking and learning skills are essential in constructing meaning from visuals and creating visuals.

Inquiry-Based Learning
Inquiry-based learning (IBL) shifts traditional teaching and learning in the classroom. As a student-centered approach, teachers take the role of facilitators to engage students in conceptual development and phenomenon exploration in STEM. When students engage in IBL, they connect exploration with the natural world to develop an understanding of STEM phenomena. IBL varies from more structured to open-ended, depending on students' experiences and teacher support (Smithenry, 2010; Spronker-Smith et al., 2012). The IBL cycle generally starts with posing questions, problems, or scenarios; through this method, students formulate hypotheses and test them through experiments and/or observations (Pedaste et al., 2012). Through IBL, students follow approaches and practices similar to what scientists do to produce new knowledge in their disciplinary fields (Keselman, 2003).

Recent studies have shown evidence of multilingual students' meaningful and active engagement in the context of authentic STEM activities and practices (Lee & Januszyk, 2021; NASEM, 2018). Multilingual students can learn not only STEM content but also self-reflect on their diverse experiences and cultural resources (MacDonald et al., 2017).

Putting it all Together
The three theoretical perspectives complement each other to frame an integrated approach to STEM teaching and learning with multilingual students. First, CRT foregrounds selecting inclusive visuals that highlight representations of people from marginalized groups. Multilingual students are more likely to continue pursuing future studies and careers in STEM if they see people who look like themselves participate in STEM professions (Bieri Buschor et al., 2014; Ijoma et al., 2022). Moreover, inclusive visuals should reflect diverse experiences to which multilingual students can connect. Priority should be given to visuals demonstrating a topic of student interest or local community concern.

Second, visual literacy expands traditional, text-based literacy to multiple literacies critical to global citizens' competence (Brown, 2022). Visuals help multilingual students break free of language barriers to access the core curriculum, make connections to their prior knowledge, and celebrate diverse perspectives. Visual literacy strategies provide explicit and purposeful support for multilingual students to develop visual literacy and language skills in meaningful STEM content.

Third, utilizing IBL as the primary approach to instruction is aligned with the components of CRT and visual literacy. Student-centered learning with cultural scaffolding sends the message that multilingual students are capable and have the knowledge and experiences to construct meaning (Gay, 2002). Holistic and integrated learning challenges educators and students to make connections across content areas and socio-historical, political, and cultural contexts. Informed by CRT, visual literacy, and IBL, STEM teachers are equipped with pedagogical practices to empower multilingual students to deconstruct visuals and develop visual narratives that communicate learning creatively and critically.

Finally, it is vital to consider the shift of contemporary views on science and language (Lee & Januszyk, 2021) as reflected in the Next Generation Science Standards (NGSS) (NRC, 2013) and the WIDA framework (2020). Specifically, the view on science has changed from *what knowledge is* to *what knowledge does*. Similarly, the view on language has shifted from *what language is* to *what language does*. The WIDA 2020 framework identifies essential language uses to communicate and negotiate ideas across disciplines. In STEM, the most relevant key language uses are the discourse patterns to explain, argue, and inform.

Implementing the Integrated Approach

The pedagogical implication from the theoretical and changing perspectives of STEM and language is integrating content, language, and visual literacy to support multilingual students' STEM inquiry. Inclusive visuals are viewed as texts that embed rich and culturally responsive STEM content. As students work on their visual literacy skills, there are ample opportunities for multilingual students to use academic language in meaningful contexts. Further, through instructional support such as TALKMOVES (TALKMOVES, 2022) and sentence frames, multilingual students can practice the discipline-specific discourses (i.e., talk, write, and think like STEM professionals) as they explore what they can do with STEM (Aguirre-Muñoz & Pando, 2021). The key multilingual student support strategies are summarized below in Table 1. This table is by no means an exhaustive list of multilingual student support strategies; rather, it is a list of those the authors found to be most appropriate for the context of the paper. These strategies will be elaborated on in detail in the examples below.

**Table 1**
Multilingual Student Support Strategies

Content/Visual Literacy Strategies	Academic Language and Discourse Strategies
A. Modeling and guided practice to work with visuals through visual thinking routines B. Visual aids C. Graphic organizers D. Multiple modalities (input) E. Translation	A. Repeated use of academic vocabulary in meaningful contexts B. Word banks C. Talk moves/Sentence frames D. Multiple modalities (output) E. Translanguaging

The authors share examples of the integrated approach from the instructional activities developed by participating pre- and in-service teachers in the LOC TPS project. Specifically, the examples fall into four categories. First, inclusive visuals help multilingual students make sense of STEM content and engage in a topic. Second, modified visual aids such as graphic organizers deepen multilingual students' understanding of how concepts are organized and related. Third, with language, visual literacy, and content support, multilingual learners can bridge everyday discourse to the specialized STEM discourse of CER (McNeill & Martin, 2011), namely by developing claims, locating evidence, and constructing reasoning from visually represented data sets. Fourth, with access to visuals and other modes, multilingual learners are empowered to communicate their learning and unleash their creativity to design and problem-solve.

Sense-Making to Engage Multilingual Students

One of the effective strategies for multilingual students is to use visuals to build content understanding and develop academic language (Bicen & Beheshti, 2022; Wright et al., 2015). The following instructional activity example is from a unit designed for a group of middle school students. The school community is in Chicago, and students are familiar with the mid-western urban environment. The teacher intentionally selects visuals that illustrate Chicago across different historical periods (see Figures 2, 3, and 4). Students explore these visual data of Chicago to answer the guiding question, "What changes occur in cities that have increased in population?"

Figure 2
Chicago 1857 (Palmatary et al., 1857)
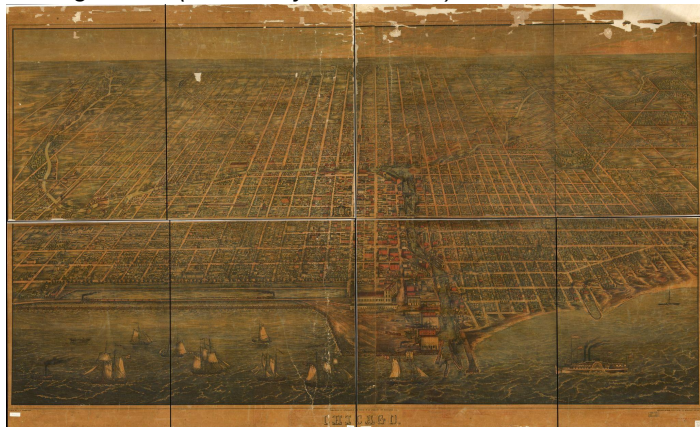
Figure 3
Chicago 1916 (Reincke, 1916)
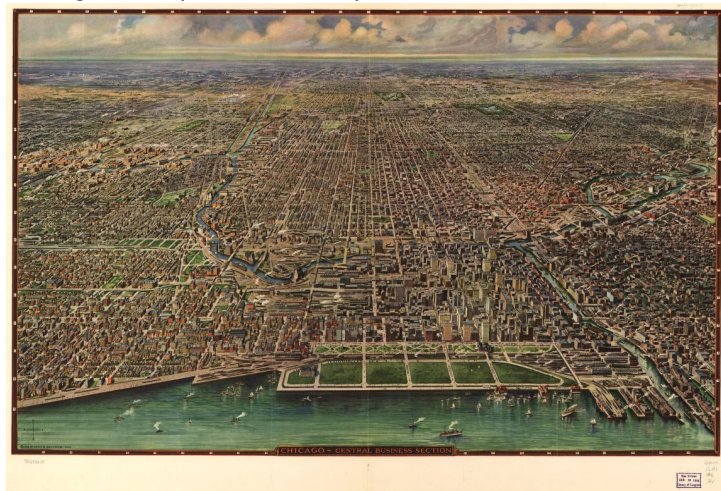
Figure 4
Chicago 1980-2006 (Highsmith, n.d.)

This visual literacy activity is guided by the inquiry-based *Notice and Wonder* thinking routine (National Council of Teachers of Mathematics, n.d.). First, students look at the images one by one and record their observations (i.e., what they notice). Multilingual students have access to a word bank where each content word is illustrated by a picture to cue the meaning. They then compare the photos across time, discussing what they think are the changes to Chicago (e.g., size/number of buildings, cars, trees/green space, population, etc.). To support multilingual students to communicate learning and develop academic discourse in English, the teacher prepares sentence frames for them to describe the changing patterns observed in the photos. For instance, one sentence frame is "Compared to …., there are less/more … in …."

The next step is for students to discuss things they might be wondering about in a group (e.g., uniqueness to Chicago, urban vs. rural, actual population changes per photo, etc.). Students have the opportunity to ask clarifying questions and conduct a follow-up investigation. For example, students who wonder if the changes are unique to Chicago or if the conclusions are more generalizable are provided with the option to choose another city of personal importance and explore its changes through the web-based Google timelapse, which provides an interactive visualization of how the Earth's surface has changed over the past few decades. Students conclude that their observations (e.g., buildings, cars, population, greenspace) are consistent across many areas, but changes vary depending on population growth and other factors. By integrating culturally relevant visual data into *the Notice and Wonder* thinking routine, multilingual students connect discipline-specific discourse to compare and explain community issues, informing their decisions as they expand learning beyond the classroom.

Deepening Understanding through Graphic Organizers
Graphic organizers (e.g., KWL charts which include three columns titled What we already **k**now, What we want to **k**now, and What we have **l**earned) are often used to connect students' prior knowledge and new learning. Using graphic organizers can build new learning on students' funds of knowledge and invite students to observe and think about the STEM phenomena they plan to explore. Graphic organizers (e.g., Venn diagrams) also facilitate students' processing of information organization by identifying key categories or providing guiding questions. Visual displays of information can promote students' cognitive processing when learning new information (McCrudden & Rapp, 2017). Teachers can use graphic organizers in one activity or throughout the inquiry cycle to help students deepen their learning. For multilingual students, the significance is that graphic organizers can mitigate students' cognitive load by breaking down the large chunks of information into manageable and organized formats. Moreover, graphic organizers can be adapted by adding students' primary languages to promote the transfer of knowledge across languages.

An example of the effective use of graphic organizers is from a group of pre-service teachers enrolled in the elementary math methods course. The primary source analysis tool, a graphic organizer from the LOC, was used to organize the observation and reasoning of STEM-related content (Library of Congress, n.d.). The top section of the graphic organizer consists of three columns: Observe, Reflect, and Question. As they explore the visual, these three columns guide learners through the See, Think, and Wonder thinking route (Project Zero, 2022). The bottom section of the organizer lists prompts for further investigation and additional notes to answer the questions.

The pre-service teachers were given a primary source–*Remembering the Weather that Day* (see Figure 5), in order to understand and interpret the daily weather conditions. The visual was the record of the weather conditions in New York City on 9/11, including the data on time, temperature, dewpoint, pressure, visibility, wind speed, and conditions. This primary source was a good example to demonstrate to the pre-service teachers how to relate STEM content to students' real life and connect the STEM content to critical cultural and social issues in communities.

Figure 5
Remember the Weather that Day (Chen, 2001)
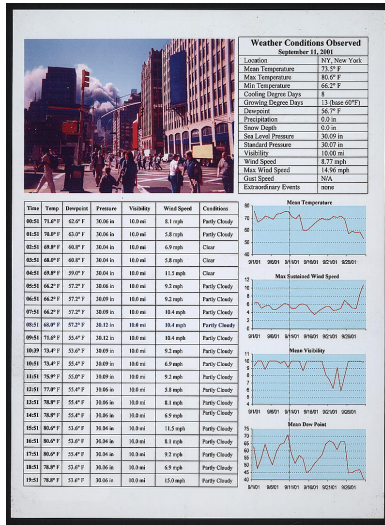
The pre-service teachers completed the graphic organizer to record their observations, reflected upon the primary source to generate and test hypotheses about the source, and raised critical questions for more observations and reflections (see Figure 6).

Figure 6
Completed Primary Source Analysis Tool Graphic Organizer

Teachers can adapt and use graphic organizers to facilitate multilingual students' visual thinking and learning in STEM. The adaptation of graphic organizers primarily focuses on two aspects. The first is to support multilingual students' comprehension of a task. For instance, if multilingual students do not understand the meaning of "Further Investigation," they will not be able to generate relevant information to complete the section. One approach teachers can adopt is to use the image of a magnifying glass as a visual aid to explain the meaning of "Further Investigation." The second aspect of the adaptation is to provide scaffolding for multilingual students to practice discipline-specific discourse. In this case, teachers can provide a list of content vocabulary and sentence frames focusing on the language features (e.g., words, phrases, clauses, and types of sentences) to achieve the key language function (e.g., explain, argue, inform) (WIDA Standards Framework, 2020).

The example below illustrates how the pre-service teachers in the project designed and adapted graphic organizers for multilingual students to explore, explain, elaborate, and evaluate their inquiry in STEM lessons. For example, when examining and constructing symmetrical snowflakes, students were given a graphic organizer at each inquiry phase that visually displayed what students were expected to do and how to accomplish the task. Using graphic organizers, students identified the problem, brainstormed a way to solve it, designed a plan, experimented and built their snowflakes, and reflected upon possible improvements. Figure 7 depicts a section of the graphic organizer used in the lesson to facilitate students' thinking while they designed their snowflakes.

Figure 7
Section of the Graphic Organizer for the Snowflake Lesson

The "imagine" task is further elaborated by three guiding questions and a visual of a thinking brain. To respond to these questions, multilingual students can employ the given sentence frames to collect and record thoughts. This creates an opportunity for multilingual students to practice key vocabulary words, summarize important ideas, and predict possible difficulties when constructing their symmetrical snowflakes.

Additional strategies to support multilingual students include providing a version of the graphic organizer in students' primary language and creating the space for translanguaging (Garcia et al., 2016). Translanguaging means that students can use all their linguistic repertoire while they engage in the

discussion of inclusive visuals.

Graphic organizers can be used to develop and enhance multilingual students' knowledge when students are invited to observe and think about STEM phenomena and connect lived experiences to STEM topics. Further, graphic organizers provide guiding questions and organized information for multilingual students, which deepens their understanding of STEM topics and implementation of STEM experiments.

Practicing STEM Disciplinary Discourse–CER
Claim, Evidence, and Reasoning (CER) are the major components that organize the discourse pattern of scientific explanations. Based on the NGSS (2013), K-12 students are expected to construct evidence-based explanations (Buxton & Lee, 2010; NASEM, 2018). The CER discourse pattern is challenging for all students, but for multilingual students, the pattern needs to be explicitly introduced and modeled. It is essential to integrate STEM content and language learning through scientific investigation in order to scaffold CER.

According to the WIDA 2020 Standard 4: Language for Science, multilingual students are expected to achieve a high level of disciplinary discourse. Use the WIDA 2020 Language for Science Standard for 4th and 5th grades as an example: One of the most critical languages uses is "Argue." For this crucial language use, multilingual students are expected to interpret scientific arguments by "comparing **reasoning** and **claims** based on **evidence**." Students are able to construct scientific arguments that "signal logical **relationships** among **reasoning**, relevant **evidence**, data, and/or a model when making a **claim**" (the authors' boldfaced keywords connected to CER). To achieve a high level of disciplinary discourse, multilingual students need continuous support for learning STEM content as well as opportunities to practice the discourse pattern of CER.

In the following example, the 4th and 5th graders work on a unit that explores how architects use shapes to adapt to the local environment. The class consists of multilingual students from different parts of the world -- several Muslim students and recent immigrants from India. The teacher selects photos of well-known buildings around the world. One of them is a photo of the Taj Mahal (see Figure 8), a masterpiece of Muslim art and a symbol of India's rich history. It is also rated as one of the world heritage sites by UNESCO, attracting millions of visitors worldwide each year.

Figure 8
Agra, Taj Mahal (Zürich, 1890-1900)

Students work in small heterogeneous groups to construct collaborative reasoning and problem-solving skills in STEM and real life (STEM discourse, 2017). Further, peers apply the revoicing strategy (Ferris, 2014) demonstrated by their teacher to model how language is used to achieve the purpose of the key language use: Inform. Working in groups, peers can also provide immediate feedback on language use and the CER discourse pattern. That is, they can discuss whether the language used by each other gets

the point across and serves as a strong piece of evidence or reasoning for the claim. The small group discussion gives multilingual students the opportunity to engage in the CER discourse orally. Such practice helps all students transition more confidently to the writing domain to construct their CER.

To guide thinking in the CER discourse pattern, multilingual students are provided with a *TALKMOVES* handout (Table 3). The left column of the handout provides a guiding question to help students understand what each of the C, E, and R means. The right-hand column includes sample discourse frames to organize the language for each component. Small group discussion allows multilingual students to develop the CER discourse pattern in the listening and speaking domain with appropriate support.

Table 3
Sample Multilingual Student TALKMOVES for CER

TALKMOVES	Discourse Frames
Making a **claim** (What is my conclusion based on the data?)	Architects use …. (shapes) in the building to … … are the shapes used in the building to …
Presenting the **evidence** (What do I notice from the data?)	Based on …, the local environment is … … are shapes I observed in the photo.
Explain the **reasoning** (How do I connect the evidence to the claim?)	… (shapes) are used to build … because …. … (features of shapes) are the best to address … (local environment conditions).

This example illustrates the opportunities multilingual students have to repeatedly use discipline-specific language and discourse through scaffolded visual literacy STEM content. In addition to English, the teacher encourages multilingual students to use their primary language and multimodalities, such as drawing, to contribute to the CER.

Multimodal Communication
Visual literacy is not just deconstructing visuals to learn the content and language. It also involves skills to reconstruct visuals to communicate meaning. While multilingual students may be limited by what they can communicate in English, they can demonstrate evidence of learning if they are supported with multiple modalities.

The example included here shows the initial and revised ecosystem models created by a pre-service teacher in the science methods course. In Figure 9, the teacher identifies the basic elements of the tall grass prairie with detailed drawings and labels. However, the model does not show what categories the elements belong to and how they interact with each other.

Figure 9
Initial Model of the Ecosystem in Tall Grass Prairie
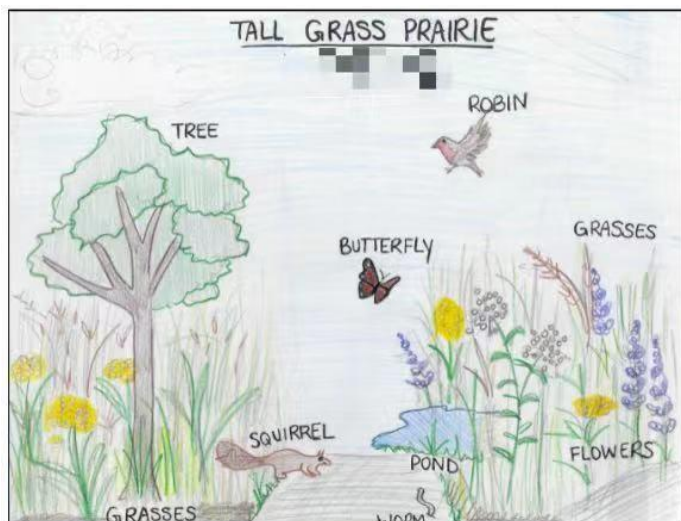
The initial model is completed as a pre-assessment to establish a baseline for learning. Upon finishing the learning segment, the teacher creates a revised model (see Figure 10). In this model, the teacher not only categorizes the abiotic (i.e., sun, air, and water) versus the biotic (e.g., squirrel and silver maple) elements but also uses arrows to show how energy moves from one to the other elements to form an ecosystem. The comparison of the two models shows strong evidence of content mastery.

Figure 10
Revised Model of the Ecosystem in Tall Grass Prairie
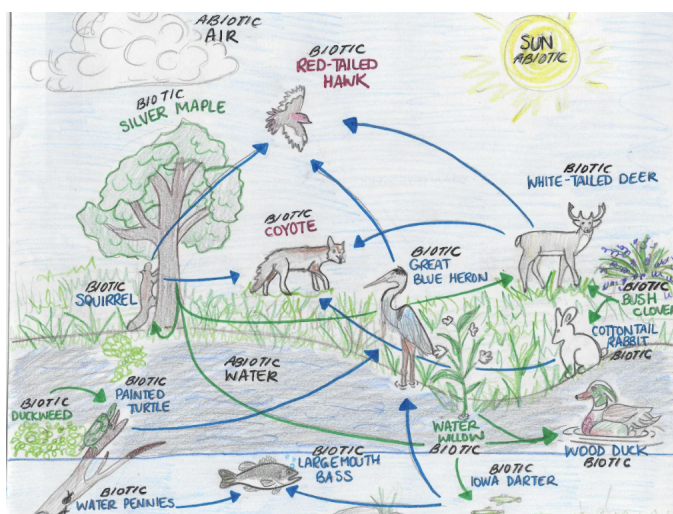
While multilingual students do not necessarily create these drawings, the implication of using visuals instead of print as the primary mode of communication sends a powerful message. Evidence of learning can be in different formats, and educators must shift away from collecting assessment evidence based on English or text only (Gottlieb, 2021). For younger multilingual students, teachers can provide students with classroom materials to create a 3-D model related to a STEM topic. Older multilingual students can leverage primary language, drawing, and/or technology to demonstrate their conceptual understanding of the content as well as critical thinking and problem-solving skills by creating something innovative (Brown, 2022).

Using inclusive visuals and multilingual student support strategies during the various inquiry phases, teachers can gather a plethora of formative and summative data to assess students' mastery of language features, including the use of vocabulary, phrases, and sentence structure in the context of STEM (NASEM, 2018). Moreover, the data analysis can inform teachers about the next steps in how to model specific language features and evaluate students' responses to the modeling.

Conclusion

This paper proposes an innovative approach to integrate content, language, and visual literacy to promote engagement and investment in multilingual students in STEM education. This integrated approach is built on three theoretical perspectives: Culturally responsive teaching, visual literacy, and inquiry-based learning. These theoretical perspectives guide teachers in several ways as they implement the integrated approach in STEM teaching and learning. First, it is important to select inclusive visuals that connect to multilingual students' lived experiences and funds of knowledge. Second, using inclusive visuals as texts in the inquiry cycle provides multilingual students opportunities to engage in authentic STEM practices, practice disciplinary language and discourse in meaningful contexts, and progressively enhance their visual literacy skills. Third and last, as they are scaffolded with a variety of adapted content, language, and visual literacy strategies, multilingual students, in collaboration with peers and teachers, move to the center stage in STEM reasoning and problem-solving.

As the education landscape becomes more multimodal, the demand for visual literacy is high for all students. Without visual literacy skills, it is challenging to view and process information with a critical mind. The authors present theoretical perspectives in this paper to guide teachers in selecting inclusive visuals and designing inquiry-based visual literacy activities, which promote multilingual students' disciplinary language, discourse, and content learning in STEM. Shared examples in the paper can inspire STEM educators to implement appropriate strategies to create culturally responsive teaching and learning opportunities. This approach will empower all students, especially multilingual students, to pursue advanced STEM research and add new perspectives that are traditionally excluded from STEM.

Acronyms Used in the Paper

Culturally Responsive Teaching–CRT
Library of Congress–LOC
Inquiry-based Learning–IBL
Next Generation Science Standards–NGSS
Science, Technology, Engineering, and Mathematics–STEM
Visual Literacy–VL
World-Class Instructional Design and Assessment–WIDA

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'Love Cannot be Framed.' A Visual Art Project during the Pandemic

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Abstract

Distance and communication during the Covid-19 pandemic have been one of the challenges of the last two years worldwide. While traveling was difficult, new technologies and visual stimuli provided opportunities to overcome those obstacles. This paper describes the art project titled Love cannot be framed *implemented by Wally De Doncker and Katerina Dermata. While "trapped" in their own countries, the two authors creatively challenged each other during the pandemic. Every week they proposed a theme to each other and took photos from their own living environment in Belgium and Greece. The authors created a synthesis by combining those photos, one Greek and one Belgian for each theme. As a writer, Wally De Doncker interpreted each synthesis with a literary and philosophical methodology and created an artistic album. This art project indicated that distance is only sometimes a barrier to creativity. It is an example of how love bridges a global epidemic.*

Keywords: photography, philosophical thinking, interpretation, visual arts

Introduction

In the last two years, humanity experienced a universal threat with enormous emotional, physical, and financial consequences. The COVID-19 pandemic dominated everyday life and practice, challenging people and creating intensive social distancing. However, art allowed people to experience new ways to express their emotions. People overcame this challenge of distance by implementing many visual projects, digital exhibitions, online art courses, and virtual art projects conducted by museums, art academies, and independent artists (Tor, 2021; Tunnikmah, 2021; Bakare, 2020; Hoffman, S.K., 2020).

In this international environment, two lovers creatively challenged each other by implementing a visual game, the starting point of the international visual art project titled "Love Cannot be Framed" (April 2020 - December 2021). The project's inspiration supports the idea that, especially in difficult periods, art can play a key role in bridging the distance imposed by external factors and in expressing love, affection, creativity, and emotions (https://www.youtube.com/watch?v=8O9OSwz2KVU).

Theoretical Approach

According to Roland Barthes (1979), photos incorporate different types and levels of messages. The first level -the denoted message- refers to what is represented in the photo or, in other words, the objective side of photography. The second level -the connoted message- concerns the meaning the photographer adds to the photo or the subjective side of the photo. Later, Barthes (1993) referred to another dimension of the photograph -the punctum- to describe an unexpected and surprising detail in a photo that affects the photographer on a deeper and personal level. In the photographic project "Love cannot be framed," the photographers incorporated all levels of messages as they tried to capture different themes they interpreted.

The starting point of taking photos for this project was always a theme expressed by a word. The photographers wanted to capture photos that represented a specific theme each time. That's why the primary function of the word towards the image in this specific project was the anchorage (Barthes,1979), which means the theme directed the authors towards a meaning selected in advance. Relay, according to Barthes (1979), is the function in which text and image enrich each other. When pictures were set together in pairs, they inspired Wally De Doncker to interpret them philosophically because the two pictures together

created a new meaning. The philosophical phrases, when added to the pictures, relayed and enriched their meaning on their turn.

The project also implemented the theory of social semiotics. The two creators set a goal to represent their theme via a photograph. To achieve this aim, they made choices about different conceptual levels of a photograph: the theme, the content (what to photograph), the selection (which one of the pictures of each other to choose), the connection and harmony between the photos and the suitable words to better express the meaning from a philosophical point of view. Sign creation is a process in which a signifier (the physical form of a sign) and a signified (the mental representation of a thing and the meaning associated) are set together and create an inseparable unit. Sign creation incorporates choices: what does a sign creator want to communicate, and which is the most appropriate form to use? This procedure for making choices in sign creation applies to the core of social Semiotics (Kress, 2000, Cope & Kalantzi, 2000).

Behind the philosophical interpretation

'I Miss Me'
When Wally De Doncker was a child, he would sometimes look in the mirror at length. Anyone who has tried this can say that gazing at one's reflection for an extended period of time can have a strangely hypnotic effect. One might see oneself as an outsider, as someone else, which allows for reflection upon certain questions: 'If I wasn't here, would I be able to see myself in the mirror?' 'If I hadn't been born, would my mum be here?' 'Would the house where I live be here?' 'Where would my cuddly toy be if I wasn't here?' 'How would my best friend feel without me?'

It was precisely this mirror that provided him with a turning point in his writing career. These questions formed the foundation of his book *Ik Mis Me* ('I Miss Me').

The power of a thought
During his book readings, both children and adults experienced strong reactions. On those occasions, he would ask children one of the questions from the book: 'If I wasn't here, would the walls miss me?' (De Doncker, 2019:25). This question evoked very different answers. Most audience members did not think it possible for walls to miss someone. But there were always a few who thought they could (e.g., 'In castle walls, I can sometimes feel the people who used to live there.') A young girl once said, very decidedly, 'I know for sure that they can!' De Doncker was amazed by how certain she was. 'What makes you so sure?' 'Well,' she said, 'Last year, my little brother was killed in an accident right here in front of the library. We can still feel him there every day, in every wall of our house!' All the children in the room fell silent.

Beyond this deep emotional response, 'I Miss Me' also inspired many artists. For example, it was also the inspiration for several French theatre plays: "La reine des neiges" (La compagnie du Balcon, 2011, F), "Non, mais t'as vu ma tête" (Compagnie Lucamoros, 2016, F), and "Toi et moi dix doigts" (Dusan Bogdanovic/Roland Dyens/Alberto Ginastera/Julien Malaussen Aurélio, Edler-Copes/Sanaé Ishida/Sophie Grelié, 2018…, F). In France, the book *Vivre sans moi, je ne peux pas* served as a theme for a number of large exhibitions as well as philosophical workshops for children and adults. Meanwhile, *Us Three* (*Nous Trois*), a film trilogy inspired by 'I Miss Me,' depicts the same three girls filmed every six years; their budding identities are given symbolic interpretation over a period of twelve years. The film tells the story of the quest and the preservation of the youthful imagination. Notably, the film 'Us Three / Nous Trois (2019), by Blauwhuis Productions (Ghent), was awarded' Best Film' at the 'Fic Autor Film Festival' in Mexico 2019 and the Bronze Award at the 'Queen Palm International Film Festival ' 2020 (second quarter) in Florida (USA) (https://www.youtube.com/watch?v=85ui9WiwAio).

In addition to these French adaptations, the Belgian dance company 'Cacao Bleu' based a performance on the book and the short film 'Zus zonder zus' ('Sis Without a Sis'). In this experimental film, audiences watch children dance and play within a safe cocoon of grass. The girls confront an adult dancer, anticipating and imitating her every move. Throughout the film, the children and the woman exchange roles, impacting their own lives and the lives of others, just like in 'I Miss Me.' A professional theater company created a stage adaptation of the 'I Miss Me' trilogy, which also included 'Clouds in the Sand' (Wolken in het zand) and

'Ahum.'

Starting with 'I Miss Me', De Doncker's philosophical nature began to play a more prominent role. To his surprise, this was appreciated by an ever-increasing number of readers, both in Belgium and abroad. It was a departure from his earlier realistic work, which was met with success. In the beginning, audiences misinterpreted his philosophical motivation. While audiences at first thought he was seeking out philosophical inspiration, he instead is an intrinsically motivated artist, prone to philosophical reflection.

His publisher wanted to make a film version of this book. Together with Jonas Baeckeland, the film's director chose stills from the last movie that could relate to the philosophical thoughts of 'I Miss Me.' This was an interesting process for both: How are stills interpreted as photos? How do we interpret philosophical thoughts? Sometimes they got different perspectives, and we were confronted with surprising angles. In one of the film's stills, the camera focused on a coat hanger without a dress. They started to improvise with the philosophical theme of the book. Would the coat hanger miss the dress? Would the dress miss the girl? He learned that connecting photos and philosophical thoughts could surprisingly enrich his thoughts.

The implementation of the project "Love Cannot be Framed"

The procedure
When COVID-19 overtook the world with quarantines, it sparked a creative response to the authors. They confronted each other with a visual game they could play remotely and online: Katerina Dermata from Athens in Greece and Wally De Doncker from rural Hamme in Belgium.

The authors challenged each other weekly with a theme around which they took pictures. The interpretation of the theme was completely free. The theme was interpreted subjectively. It came down to surprising each other with visual interpretations. The authors happened to stumble upon objects, people, and landscapes embodied by the theme.

At the end of the week, they selected three photos of 'themselves' they wanted to present to each other. They presented this selection to each other and then chose the best photo. The result was two final photos -creating a synthesis- per the theme. The following week a new project with another theme started. The authors maintained this project over several quarantine periods.

This is how a game evolved into a broader project. The authors noted that interpretation was the guideline of the project. Just like in the film version of the book 'I Miss Me,' the photos were interpreted on not one but several levels.

Through conversations, the authors reached a consensus of two images per theme, linking these photos to each other. From this moment grew a philosophical interpretation of Wally De Doncker as a person and author. This philosophical interpretation was then reassessed by others.

The themes
Themes were proposed by both authors alternatively. In total, 52 thematic words were proposed during the project (Figure 1). The themes were:

Balance	Composition	
		Decay
Blue	Connection	
		Direction
Borders	Contradiction	
		Exaggeration
Broken Change	Corners	
		Faces
	Creation	
Chaos		Flexibility
	Curiosity	

Flowers

Frame

Freedom

Glass

Green

Identity

Insecurity

Life

Light

Love

Mammals

Many

Mirroring

Motifs

New

Obstacle

Outside

Perspective

Prickles

Protection

Restrictions

Shadow

Sky

Smell

Sounds

Steam

Strange

Surprise

Tenderness

Together

Triangle

Two

Unexpected

Upside down

Wheels

Some themes were very specific, while others were more abstract. Analyzing the words above, the themes can be classified into different categories:

- *Nature:* words referring to natural elements or the landscape, such as sky, flowers.
- *Colors:* words connected to the chromatic palette, such as green, blue.
- *Numbers:* words representing single or plural numbers or order, such as one, many.
- *Orientation:* words connected to a location, place, shape, or movement, such as an upside-down corner, triangle.
- *Quality:* words describing a condition or change, such as new, broken.
- *Abstract themes:* words expressing ideas or concepts, such as freedom, love, curiosity.

Figure 1.
The panorama of the themes created in word clouds program © Wally De Doncker & Katerina Dermata

Photographing
There were many challenges during the project that arose at different stages. The first was choosing the theme. The second was deciding what to photograph, a choice each participant needed to make individually. New technologies, such as mobile phones, make photography easier, faster, and cheaper than analog cameras, and the participants used them for taking pictures.

The core of the project was a slow-looking process like that proposed by Shari Tishman (2017), connected with patient looking to create meaning and think critically, despite the speed of contemporary information. Thinking of a word, each participant had the opportunity to explore their environment -house, neighborhood, workplace, etc.- and look closer at visual stimuli that may not be noticeable in everyday life. Through this process, they could better picture their theme, literally or metaphorically. The credits for all photos are to the authors.

Choosing the photos
After photographing, each participant chose three photos to present to the other. Participants commented on each other's photos and their connection to the theme. After discussion, they chose two photos -one of each other- to create the final visual composition.

Interpreting the photos
The interpretation of the photos consisted of two levels, the interpretation of the visual elements and the philosophical thoughts. The first interpretation, visual elements, prompted participants to look for colors, lines, depicted objects, landscapes, and visual angles under the lens of each theme. In addition, participants interpreted each synthesis under a philosophical aspect that revealed not only the visible but implied levels of meaning, connecting the visual elements to another level. Characteristic examples are provided.

Motifs
A motif is a purely visual element that follows a repetitive structure. Patterns and motifs are everywhere: nature, mathematics, art, etc. The choices participants captured were many. Six photos captured the theme: lines, patterns on clothes, paths, and designs on different products (Figure 2).

Figure 2.
All the photos for the theme "motifs" before choosing the final two. © Wally De Doncker & Katerina Dermata
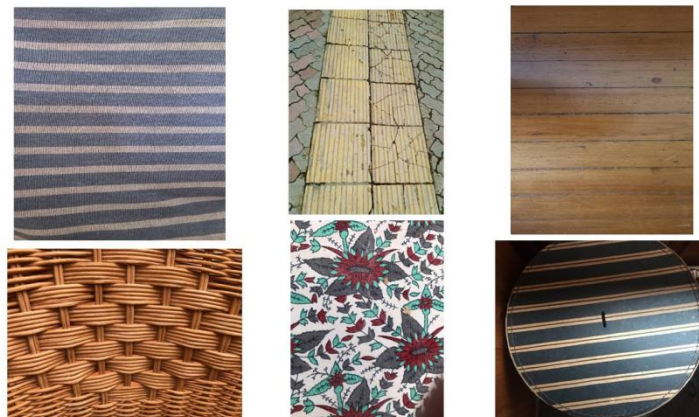
The photo with the path for people who are visually impaired (the middle photo in the first row) was chosen out of the three because the pattern of the yellow tiles is also functional. The photo with the storage box (the last photo in the second row) was also chosen because a clear linear pattern is interrupted by a small hole. It may also contain a secret: What's in it? So, the authors selected those two photos to create the synthesis (Figure 3) because they move beyond the theme to refer to the function of the path or the box.

The first photo of the synthesis of the theme motifs shows a storage box with horizontal motifs. The second

photo shows a footpath for people who are visually impaired located in Athens. The tiles on the right side of the path are broken. The path runs vertically in the photo. Visually the two photos are connected through the linear motif. Curiosity connects the two images. Where does the path lead? What does the box contain?

So: Even those who are blind will remain curious.

Figure 3.
Motifs © Wally De Doncker & Katerina Dermata

Curiosity
The first theme of the project was "curiosity," which represented the playful spirit of the visual game. As the photos were positioned together to form a visual composition, the authors discovered that various people interpreted and visualized the same theme differently. Curiosity, in one photo, was depicted as a long, distant glance through binoculars, while in the other, it was interpreted as a close and secret discovery (Figure 4).

Wally De Doncker connected the two photos philosophically. The function of binoculars is to search for objects, animals, and movements from afar. After its primary function as a cookie box, for example, a tin box may later be used to store all kinds of small items: needles, thumbtacks, photos, pictures, candies, even cash. The stranger who opens the box is often curious about what is inside. The connection between the two functions is searching for the core: for the binoculars that can see a far distance or for the box to find what is in it. Philosophically, it can be interpreted as searching for the core -- a core that is often symbolically not found.

De Doncker was inspired by the philosophical connection between the two photos, which led to reflections such as people searching for the core of their existence. Often, they don't find it, even though they try very hard and in every possible way. Even searching with binoculars in a box doesn't help. In far distances (in the universe), there is an infinity, an endlessness, and the further one goes, the more one discovers. The same phenomenon occurs with tiny things. For example, a microscope can discover molecules, atoms, protons, photons, etc. The endlessness does not help to find the ultimate nucleus—the core.

Figure 4.
Curiosity © Wally De Doncker & Katerina Dermata
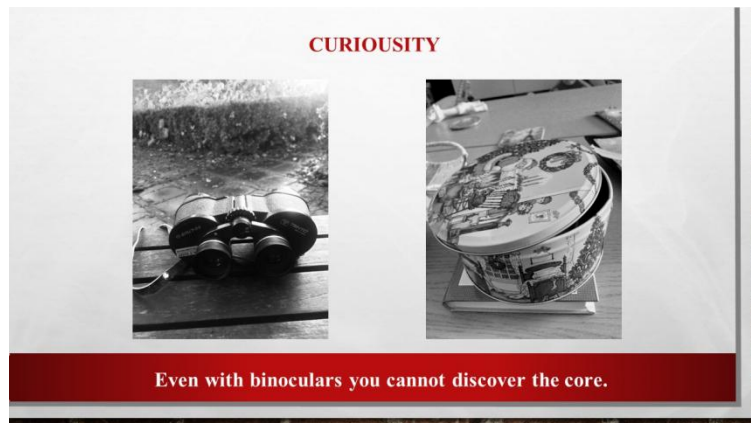
Change

The theme "change" was another example of how personal interpretation played a key role in how people viewed the world. The first photo shows broken reading glasses, while the second photo shows a bunch of green celery wilting (figure 5). The connection between the pictures leads to finite things. The broken reading glasses are not functional anymore. The wilted celery can no longer be served but is destined for the compost heap. The depravity of both objects is the leading theme of the change.

De Doncker linked broken reading glasses to the transience of nature. Because time is relative, a year feels like a long time. When something has been in one's life for several years, that person feels it will always be there. This inevitable process of time is often ignored. The insight that nothing lasts forever and nothing is permanent is communicated through the symbolism of the glasses. Often this insight is painful and hard to accept.

> So: 'Depravity sometimes leads to difficult insights.'

Figure 5.
Change © Wally De Doncker & Katerina Dermata

Corner

During the implementation of the project, participants noticed the effort it took to detect a suitable photo to capture the theme. This challenge, however, revealed unexpected visual details and contradictions. For example, "Corner" is a strong connecting edge between two lines crossing to a point. In the following composition (Figure 6), the first photo shows a footpath in Athens that turns into a curve instead of a corner.

The second photo depicts a male figure in the corner of a contemporary art museum. A street corner may be round and gentle in contrast to a wall's sharp and strict corner, which may restrict one's visual horizon.

In this synthesis, a black figure depicted in both photos -not intentionally- provides an extra visual connection between the two photos, as if the figure in the upper right corner of one photo stepped into the second one and stood at the corner. Visually, the two photos express different ideas: the "round corner" on the left provides an idea of movement when one turns into something new, walks away from something, or takes a new path in life, while the figure standing at the corner on the right photo has been "trapped" into a corner, facing an obstacle.

Both pictures can be interpreted philosophically. Whoever follows a path can avoid corners. A walker might be hindered by a tree in the path, but they will step to the side without colliding. Whoever avoids the curves and chooses the corners will be cornered and stuck at a particular moment. However, if one follows the curves, one can continue on their life path. Some people avoid corners and obstacles. They often fall into a routine. Others, on the other hand, are confronted with a life path with corners and obstacles. Sometimes they come out stronger; life experience makes them stronger. Sometimes they are forced into an awkward, embarrassing, or inescapable position. Viewers can interpret it differently: How do I interpret my life path? What do I prefer? Do I have choices?

So: The gentle way will never corner you.

Figure 6.
Corner © Wally De Doncker & Katerina Dermata

Mirroring
Some themes incorporated by default a visual character and referred directly to the sense of sight. A characteristic example was the theme "mirroring," which connects an image with its reflection, creating symmetrical elements in each photo. An image is seen through a mirror, creating playful photos, a visual game in the visual game, as the viewer takes a closer look to read the images.

In the photo on the right (figure 7), water works as the material in which the trees and natural environment are reflected. However, it is unclear which is the image, and which is the reflection. In reality, the photo illustrates the reflection of the inside of the room to the outside. The viewer must discover which part of the photo is real and which is the reflection.

Figure 7.

Mirroring © Wally De Doncker & Katerina Dermata

Plato's allegory of the cave (Eyer, 2009) closely observes this theme. What is the reality: the shadows of the prisoners on the cave's walls, or is it the prisoners themselves? What is the reality of the photos we have taken? Is this the image of the reflection in the water? Or is it the image of the trees next to the river? In the second picture, it is unclear what the reality is: Is it an open window that reflects the outside world in a mix with the reflection inside? If we are trying to indicate reality here, it would not be possible because a photo is only a picture of reality.

> Therefore: Imitation is close to reality, but it is not.

Smell
Some themes were connected to elements beyond the visual. For example, how can one capture something invisible, such as a smell (figure 8)? This theme was a challenge because how can you capture a scent in a photo? The first photo shows the front of a Dior perfume box. The second photo depicts cloves of garlic. Both photos refer to sharp-smelling products, but an underlying theme still remains. Like all perfumes, Dior is a seduction product, a mixture of various fragrances in a solvent. A brand name - a word in this case- implies the sense of smell in the viewer's mind. Garlic, with its characteristic smell - that not everybody likes- is also often used for good blood circulation and has been described as an aphrodisiac since ancient times. This philosophical link led to the following:

> Even hidden scents follow the path to passion.

Figure 8.
Smell © Wally De Doncker & Katerina Dermata

Freedom

Themes as abstract words were the most challenging and, at the same time, provided a variety of personal choices and interpretations. The first photo depicts a cityscape of Athens behind a locked gate. One cannot travel there freely without opening the gate or possibly climbing over it. Freedom is therefore blocked behind bars. Freedom in this photo is a state to be achieved once the obstacles are deleted or overcome. Visually, the bars going vertically through the photo and the choice of the visual angle - from the bottom up, contre plongée- provide an intense feeling of being trapped while the depth of the sky supports the lack of freedom. The photo conjures a prison from the outside: gigantic walls, bars, and sometimes even barbed wire, and the feeling of being deprived of physical freedom. Meanwhile, the second photo is of a cat that won't let anything get in the way. Freedom is understood as having the ability to act without constraint or possessing the power and resources to fulfill one's purposes unhindered. Suppose there were no obstacles, which is, of course, a utopia. Does freedom exist in a world without walls, barriers, and bars?

Hence this philosophical statement: "Without bars and obstacles, freedom is non-existent.

Figure 9.
Freedom © Wally De Doncker & Katerina Dermata

Life

At the core of this visual art project were pleasure and joy. These elements are at the core of life. In the first picture of the synthesis (Figure 10), one can see children playing, climbing a tree, and enjoying games. The age of children as the new generation and the activity -playing- imply that life continues. The second photo is a traditional Greek appetizer with wine and sweets. Life is implied via the depicted objects as a celebration: tasteful, sweet, and enjoyable situations where people come together.

Life is not always sunshine and rainbows. People must overcome obstacles during their lifetimes to move forward. When they have overcome them, they often come out stronger. Through play, children learn how to deal with and overcome obstacles. Life is most celebrated when obstacles like illness, accidents, and financial setbacks are overcome. Often with tasty food and drink.

Life is most celebrated after obstacles have been overcome.

Figure 10.
Life © Wally De Doncker & Katerina Dermata

Conclusions

The visual art project "Love Cannot be Framed" occurred during the Covid -19 pandemic (April 2020 - December 2021) as a game between two distant lovers living apart in Greece and Belgium. In a time of social isolation, this project became a way to span the distance between the participants, as art always finds a way to connect people.

The main characteristics of the project were personal choices and interpretation, which evolved into several areas:

- The themes were spontaneous choices of the participants, with no restrictions. Sometimes one theme inspired the next one, while other times, themes led in other directions. Every theme was a personal choice, which the other participants had to follow.

- Situations that eventually lead to taking different pictures. The different landscapes the participants lived in -urban environment and countryside- provided different photographic choices. Moreover, culturally determined elements of Belgian and Greek culture are represented in both photos, such as historical monuments, habits, and food elements.

- Subjective criteria to determine the final photograph. Each participant chose three photos to present, a matter of personal interpretation. "Which of my photos represents my theme better? Which choices do I make, and which do I choose to leave out of the selection?"

- Subjective criteria to determine the other photographer's final selection. The final choice was made based on personal criteria such as the photographic result (e.g., is it a good photo?) and the connection, apparent or implied, with the theme (e.g., does the photo represent the theme properly?). In some cases, we did not fully agree on the final two photos, which underlines that we have different subjective criteria.

- The link between both pictures leads to a philosophical interpretation. Each photo is a unit expressing the perspective of its photographer. When photos were compiled into pairs, they created a new unit, which embodies the individual meaning of each photo but also creates a new meaning as the two photos are seen in a composition. According to Kress and Van Leeuwen (1996), the composition is how a picture's representative and interactive elements interact, proposing a way to see them as joined or separate. The authors intentionally created pairs directing the eyes of the viewer to observe the photos in connection, inspiring philosophical reflection.

- Philosophical thought is interpreted by a wider audience. This thought first incorporates the personal interpretation of the creator. At the same time, everyone can interpret a stimulus on a

different level. Therefore, reflection is always multidimensional and open to personal interpretations. The authors tested this with an international audience of experts during the 54th IVLA Congress in Jyvaskyla, Finland.

In the future, this visual art project will be presented in exhibitions in Belgium and Greece (in progress). An idea would be the creation of a virtual gallery accessible online for photo education guided by a manual. This material could challenge students to experiment with themes, images, and philosophical interpretations as in the project.

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"The Photographer of the Day": Using a Digital Camera in Preschool Classroom

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Abstract

Children use digital cameras from very early age as the progress of technology provides accessible tools such as smartphones and tablets in everyday life. Children use the photographic medium to create their own photos, take photos to represent and explore their environment, to communicate with others, etc. By designing and implementing a visual literacy program focused on the impact of using the photographic medium from preschoolers, the researcher examines how children behave when they use the camera or are photographed in the class environment. The dimensions examined are the role of the child as a photographer and the role as the subject of the photograph and how the medium affects children's behavior. The results highlight the impact of the medium in preschoolers' behaviors when using a digital camera, and the importance of the observation in children's' reactions for the adults.

Keywords: digital photography, interactions, social development, preschool age

Theoretical Framework

The New School Curriculum for Early Childhood Education in Greece defines Information Communication Technology (ICT) as one of the eight learning areas for kindergarten. Using ICT, children are encouraged to develop skills such as critical thinking, cooperation, communication, and problem-solving, while ICT is closely linked to all the thematic units of the curriculum. Toddlers using ICT work in groups to gather information and photographs on their interests, develop autonomy and collaboration skills, share experiences, and interact (Pedagogical Institute, 2011). Digital camera is one of the tools of ICT used in the classroom for several reasons and used to promote visual literacy, as a tool of taking pictures with the children for educational activities and talk about them.

Scholars have recognized children as photographers in different circumstances. Children use digital cameras to support their learning in school (Abu Bakar et al., 2020) or take pictures of a particular learning area (Britsch, 2019). In Varvantakis and Nolas's 2020 study, children participated in photography competitions run by charities, newspapers, and educational institutions. Wong (2020) has studied the practical issues of using a digital camera in a preschool environment, investigating how children learn about photography through action.

Sociological studies of childhood, primarily of school-age children, have been used to study children's use of the photographic medium and/or participatory video (Lomax et al., 2011). These studies focus on aspects of children's lives from children's perspectives and recognize children as competent and active social subjects with knowledge of the social world (James et al., 1998; Mayall, 2002). For these researchers, photography is both a "text" through which children "read" social life and a "context" that illustrates childhood landscapes that may contrast those of the adult researcher (Orellana, 1999). Varvantakis, Nolas, and Aruldoss (2019) also focus on the politics of childhood, as well as how the social sciences use photography as a research method.

In addition, Rayna and Garnier (2017) have conducted very interesting research on the use of cameras by preschoolers, studying the range and diversity of children's methods of camera handling and the roles they adopt as photographers. Another small–scale qualitative study by Magnusson (2018) with three-year-olds and digital cameras illustrated that children changed power relations depending on who was looking at whom through the camera.

The Program "The Photographer of the Day"

This research focuses on the use of the digital camera by preschool children in the classroom. The focus is on the social aspect of the use of the camera, and especially on the reactions and behaviors children express as users of the medium and the effect of the camera on children's behavior. As children take over the role of the photographer of the day, they observe and explore their class environment and their peers. At the same time, they may be the theme of the photographer. How do children perform in those two roles and how does the presence of the camera affect their reactions? The research does not focus on the photographic result or on the content of the photos.

The idea for the program "The Photographer of the Day" came while observing children during free-play activities in the classroom. The researcher, also the teacher of the class, noticed that some children were imitating adults, pretending that they used imaginary mobile phones -toys and objects from the class environment - to "photograph" their classmates and their activities. This moment was the original stimulus to observe and study how children behave and interact with each other when they use a real photographic camera to capture moments of their daily activities in the class.

The research questions were the following:
- How do children behave when they use a digital camera to capture moments in their class environment?
- What are the main types of behavior they adopt as photographers?
- What are the children's main reactions when others try to photograph them?

The researcher decided on qualitative research for their methodology in light of two factors: first, due to the character of the research, which took place in the class environment, and second, by the dual role of the researcher as the preschool teacher of the group and at the same time as an active participant of the class. The methodological approach was dual: educational research in combination with participatory observation.

The researcher implemented the project in an Early Childhood Educational Center in Athens, Greece, where they also work as a preschool teacher. Seventeen preschool children aged 4 to 4.5 years from families of average socio-economic status participated. The project's duration was one month long. During the project, children engaged as photographers and used a digital camera to capture elements of the class environment. Children had previous experience using digital cameras, as they had been involved in other projects using cameras throughout the school year (Dermata, 2021). For the program's needs, "the photographer of the day" did not just pretend to play - like the original stimulus - but an experimental situation in which children used a real digital camera.

Before implementing the project, the researcher made some important decisions to guarantee that every child could participate equally. The major decisions were:

- *Who would be the photographer:* Every day, the teacher selected one child to be the photographer, following the alphabetical order of the class. At the end of the day, the researcher placed the selected child's name in a box, so the children that had already been photographers were excluded from the next day. If a child was absent on a particular day, their name remained available for another day. Every child took over the role of "the photographer" for one day during the project. This procedure was essential, as every child had the same possibility of becoming "the photographer of the day." By the end of the project, all the children participated equally.
- *Where would the photographer use the camera:* Since the project took place during the school's morning program, the researcher chose to proceed in the class environment. Places like toilets, music labs, and sleeping rooms were excluded.
- *When and for how long would the photographer use the camera*: each child could use the camera for 30 minutes per day during free-time activities. The researcher chose this allotment of time

because it gave the teacher adequate time to observe the photographer while the rest of the children played freely.

All the above decisions were taken from the researcher in order to achieve equal participation of every child and to make sure that the context of the program would be the same for every one concerning time, place, and duration of participation.

Another crucial decision concerned the tools used to observe and monitor children's attitudes and behavior toward other children. The researcher collected data through participatory observation. As camera recording procedures require a different approach (e.g., written consent of parents, technological equipment, more participants as researchers, etc.), the researchers decided to use a written observation protocol as the data collection tool. The researcher developed a simple observation protocol for better observation, where the researcher wrote down field notes about the interactions and behaviors of the photographer and the team.

While preschoolers were using the camera, the researcher observed and noted aspects of their behavior in practice. This follows what other researchers have found, for example, changes in the physical approach, physical posture, verbal interactions, frequency of interactions, duration of acting, etc. (Cohen et al., 1991). Observation of children's behavior, as depicted in the observation protocol (Figure 1), concerned two categories: a) observation of the children as users of the photographic medium and b) observation of children's reactions when "the photographer of the day" approached.

Before the project's implementation, a trial phase took place, during which children took the role of the photographer so the researcher could notice and make improvements to the observation protocol. During the pilot phase, the teacher had the assistance of the student Eleni Nikolaidou, whose contribution was invaluable to the implementation of the pilot phase of the project. The researchers developed the categories of behavior during the trial phase.

Practically, the implementation of the program took place in two parallel phases. Phase one included the preschoolers using the camera, while the second phase involved the researchers observing the children's behavior. The parents consented to the children's participation, as the project took place during the daily program. The researcher did not use any of children's personal data, such as names, faces, details, gender, family information, etc.

Figure 1
Observation Protocol

NAME:		DATE:	
PHOTOGRAPH ALONE	CONSTUCT SYNTHESIS AND THEN PHOTOGRAPH	AGREE TO BE PHOTIOGRAPHED	DENEY TO BE PHOTOGRAPHED
TALK TO ANOTHER CHILD	STOP THE USE OF THE CAMERA	TALK TO THE PHOTOGRAPHER	IGNORE THE PHOTOGRAPHER
SHOW THE RESULT TO OTHERS	GIVE THE CAMERA TO OTHER	FOLLOW THE PHOTHOGRAPHER	OBSERVE THE PHOTOGPAPHER
OTHER REACTIONS:			
OTHER REACTIONS:			

Preschoolers' camera use
Children were familiar with using a camera from participating in similar programs in the past. Thus, the researchers only provided a few instructions for using the camera to the children in advance. During the project, some children asked them to explain related issues again (e.g., using zoom) for better results.

During phase one (use of the camera by preschoolers), an experimental process followed specific parameters. Each child could use the camera for one day. The "photographers of the day" had the camera from 10.30 a.m.-11.00 a.m. The photographers could use the camera as many times as they wanted, continuously or in parts, during their day. The photographers could photograph whatever they wanted during free-play activities.

Additionally, children could leave the camera in a particular place (e.g., in a box) and use it again within their 30-minute allotment. The photos taken by each child were collected daily and transferred to a folder with the photographer's name on the computer. Researchers studied the photos afterward, alongside the data collected. In summary, the project aimed to construct a better overview of the children's behavior.

Results of observations - Children as users of the photographic medium
Children used the photographic medium to perform various roles and behaviors. Observation revealed several categories using the criterion of social interactions (or absence of social interaction) and verbal communication (Figure 2).

Figure 2
Types of Photographers
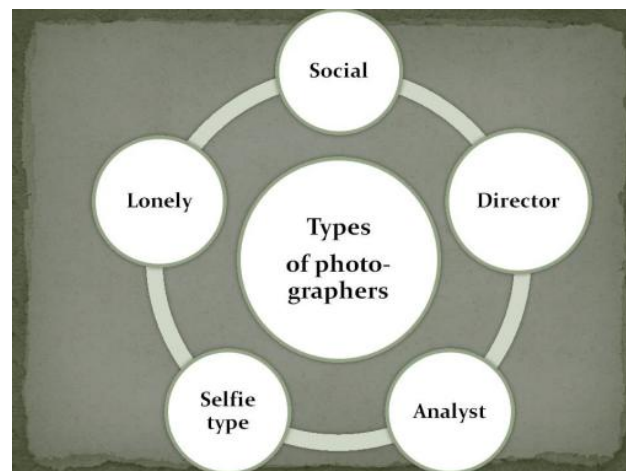
• *The lonely photographer*: The photographer moves alone around the classroom and photographs persons and objects without verbal interactions with the rest of the peer group. After photographing, the lonely photographer stops and observes the result. The researcher describes this type as "lonely" because the child's central concern is the photographic capture of the subjects they choose and observing the result (Figure 3) rather than communication and interchange with others. Very often, the theme of the photographic attempt is the other children from whom the photographer keeps distance and takes photos. In those photos, the children often capture a distant frame, which implies the distance of the lonely photographer from the group.

Figure 3
The Lonely Type of Photographer Observing the Result
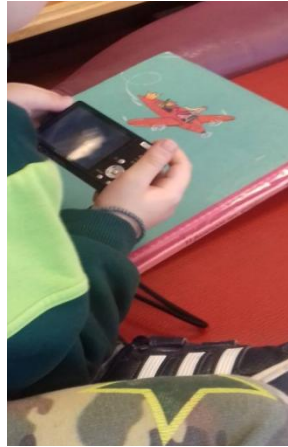
• *The social photographer*: the social type is the photographer who photographs objects or people while interacting intensely with peers verbally. The social photographer is constantly talking to their friends while photographing – asking or notifying them to photograph, laughing, talking, showing the result of their action to others, or allowing the group to influence them through suggestions to photograph a subject (Figure 4). On a smaller scale, the social photographer invited friends in advance to show them what they would photograph (e.g., "Come, let me show you what I will take"), showing their intention to communicate their activities to the group. The social photographer was the center of the attention of the class.

Figure 4
The Social Type of Photographer

- *The director photographer*: the director can be either the lonely or the social type.
  - ○ As a lonely photographer, the director does not capture with the photographic lens the objects as they are or as they saw them the moment they chose to photograph. Intentionally, the director photographer places, adds, and removes elements of the composition to create a new personal composition (Figure 5). Often, this action of directing proceeds gradually and evolves, following a pattern: creating a composition → photographic capture → recreating a composition (adding, subtracting, moving) → new photographic capture → reconstructing a composition, etc., into an action that can be

rendered with three or more consecutive photos.

o As a social photographer, the director communicates with the group they wish to photograph and instructs the participating peers. These verbal interactions involve prompting (e.g., "Look at me!", "Smile!") as well as compositional advice (e.g., "You come here", "sit down", "go next to Kostas"). The director actively shapes the composition of the faces they capture, erasing the event's spontaneity in front of the photographic lens.

Figure 5
The Director Type of Photographer

- *The analyst photographer*: in this type, the researcher classified the social photographer who, after capturing a photograph, shows the team the result while explaining what is depicted in the photo. In this category, the dominant pattern of behavior was the dual photographer-interlocutor relationship. For a long time, the photographer and a friend photograph and observe the photos together, talk about them, laugh or experiment while they discuss about the photos. To a lesser extent, the analyst photographer tried to discuss their efforts with the researcher, showing and explaining the visual material (Figure 6).

Figure 6
The Analyst Type of Photographer

- *The photographer as the subject of photography*: in fewer cases, the photographer used the camera, posing alone or with their friends (selfie or group selfie), imitating the typical practices and behaviors of adults today.

Results of observations – Children's reactions to the presence of the camera
The primary types of children's reactions when "the photographer of the day" approached them and tried to photograph them were the following (Figure 7).

Figure 7
Children's Reactions
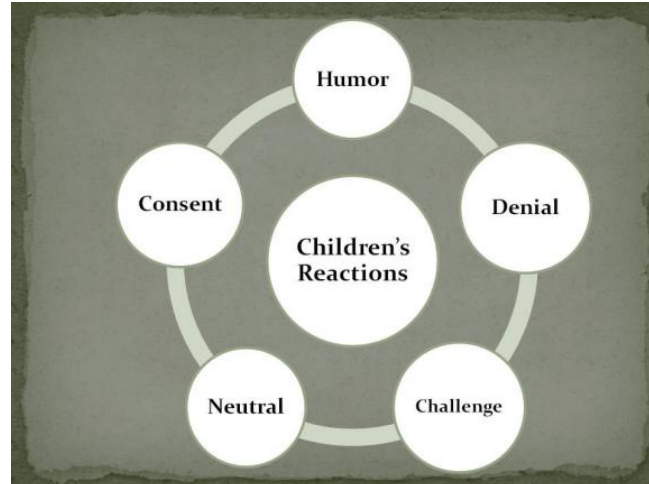
- *Consent*: many of the children were very happy to be photographed. Consent was expressed in practice, with children spontaneously posing and smiling to the lens when "the photographer of the day" approached them. Some children first agreed verbally when the photographer asked permission to photograph an element of their appearance (e.g., "Shall I take a photo of your shoes?") or themselves. Children often approached "the photographer of the day" first, inviting them to photograph them (Figure 8).

    Figure 8
    Consent to be Photographed

- *Neutral reaction*: a small number of children did not seem to be affected by the photographer's presence but continued to work even when the photographer tried to photograph them. The photographer's presence seemed to affect the children less and less every day as the team became accustomed to the active presence of the photographer in the classroom.

- *Denial*: a significant issue highlighted by the project was the free will of persons who wished to be, or refused to be, the object of the photography. This issue arose when some children reacted to the photographer's intention to photograph them or asked the teacher/researcher to solve the issue. This reaction led to the debate about the right of every person to say no and the need to ask for people's

consent when one takes photos of them, especially at this sensitive age.

- *Humor*: the camera's presence stimulated the team to express themselves by making funny faces, inviting the photographer to capture them, and sharing the result with the team. Children reacted daily with funny faces and spontaneously posed when the photographer urged them to look at the camera or when the photographer asked to immortalize them. Funny faces gave rise to artistic interventions in photography, combining the two arts and visual arts.

- *Challenge*: a unique challenge, however, was the photographer's invitation to photograph parts of the body that usually are covered under clothes, such as the area of the underwear. Although for preschoolers, this reaction was a game that mainly caused laughter, as evoked by using words that caught the adult's attention (e.g., ash and kaka), the researcher intervened, provoking a need to discuss the issue of capturing body parts "off limits" to the photographer.

Limitations

The researchers conducted this study in a preschool education context. This condition evoked limitations, like the freedom the children had, limited by the degree of their autonomy, the limitations of space, and the time they had to use the camera. The researchers captured their observations using a simple written protocol. They limited their use of digital media for ethical reasons and practical issues (e.g., signed video license, etc.); therefore, they may have missed some limited-scale interactions that digital media may have captured.

Discussion of the results

As photographers, some children focused on working alone, experimenting with the medium, and exploring the environment through photography. In those cases, children practiced observation skills as they slowly observed their environment, acted, and afterward examined their photos. From a general observation of the photos taken by the children, the main categories of themes were objects, especially toys, or small details of the environment, such as icons on their cupboards or logos on their t-shirts, etc. Another notification was the very close frames on objects children chose in their photos, which may express their mood to experiment with the medium and explore their environment. The analyses of the content of the photos could be the subject of another research in the future.

Other children shared their ideas, efforts, and results with one or more classmates and the teacher. The photographers of that category performed social interactions before taking pictures (inviting a friend to take pictures together) or after taking their photos, as they showed their results to their peers. It is not entirely clear if the children's main interest transferred from the photo shooting action to the social interaction, but sharing the experience or the results was present in their behavior. Those observations on the use of the photographic medium as a lonely or social activity in the class are interesting because they portray two aspects of a learning process: learning alone through individual activity person and learning in a social environment.

Children, as the theme of the photographic medium, also performed a variety of behaviors. From denial to challenge, the peer group showed different degrees of interest in the photo-shoot activity. More children were interested in following the photographer of the day, observing, making fun of the situation, or actively participating. From observing the children's reactions, the stimulus of a digital camera seems to attract the other preschoolers to talk and interact more. This study can serve as a foundation for a broader study to investigate how the use of the camera affects the way children interact with each other in a class environment, if the camera works as a tool to support more shy children to connect with the group, and whether interactions during the use of the medium are in some degree associated with the general social interactions of the children in a group.

Conclusions

Photography, as experimentation, documentation, and presentation of activity, is an integral part of modern pedagogical curricula at all levels of education and part of the daily life of children today. This paper attempts to document the behavior and reactions of children in a classroom, as expressed when a camera is present. As photographers, children displayed attitudes and behaviors based on group work and moved to the level of individual action, binary action, or action in larger groups. Depending on the type of interaction, the photographers acted essentially as directors and analysts, playing a dominant role in the interaction. Often, the team or some of its members took the initiative to invite the photographer to act as the subject of a photograph. As the subject of photographic capture, children's behaviors ranged from neutrality and denial to consent, humor, and provocation.

Suppose visual literacy is something we do as active participants (Stafford, 2011). These observations highlight the need for effective audiovisual education from an early age and the emergence of ethical issues related to using the medium by children and photographing children among themselves. Such research could partially answer questions about the extent to which the medium influences the development of new social relationships, the expansion of existing relationships, or the degree of detachment/isolation of children from the social life of the classroom.

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The Datatext at the Knowledge Exhibition

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Abstract

Public understanding of many aspects of modern life is routinely, and sometimes wildly out of step with reality. Given the increasingly visual nature of modern life, the question arises whether visual communication may address this problem. There are historical precedents in this field from which to learn – such as Isotype. This theoretical study sets out the groundwork for an alternative approach to Isotype. The datatext (after W. J. T. Mitchell) is a multilevel discourse comprising visual arguments mutually reinforced by combinations of words, numbers, and images. This concept draws upon John Dewey's philosophy of education (and localism); Martha Nussbaum's ideas about capability; Iris Murdoch's metaphysics; representational and embodied metaphor; and good practice in infographic design. The author provides recommendations for an experiment to test the effective visual display of key civic facts to improve a local public's civic awareness.

Keywords: data visualization, civic information, visual communication

Introduction

Since 2012, U.K. market research company Ipsos Mori has run an annual Perils of Perception survey that seeks to make sense of the relationship between public perceptions and reality. Over 200,000 interviews have been conducted in an international undertaking across over 40 countries (Ipsos Mori, 2022). The survey has cast light on significant disparities between public understanding of civic facts and the reality "out there". A significant proportion of countries' citizenry surveyed routinely:

- Misjudge issues such as the proportion of Muslims in society
- Assume the wider public is less happy than is the case
- Assume the public is less tolerant of homosexuality, abortion, and pre-marital sex than is the case, and
- Assume that wealth is distributed more equitably than it is (Ipsos Mori, 2016).

These findings seem to speak to a problem in many guises today. Disinformation, misinformation, "fake news," and other related concepts seem to be a growing concern. In the U.K., up to 10% of survey respondents were found, during the COVID-19 pandemic, to be consistently receptive to conspiratorial claims about vaccines (Freeman et al., 2021). In another study, such people were found to be less likely to comply with official guidance and vaccination programs (Roozenbeck et al., 2021). The issue is taken seriously at the highest level. For example, in 2019, online disinformation was the subject of a parliamentary inquiry in the U.K. (DCMSC, 2019), while more recently, in July 2021, UK Minister for Digital Culture, Caroline Dinenage, launched a new initiative involving teachers, library workers, youth workers, and carers, to improve British citizen's media literacy, following a spate of surveys that indicate high rates of information illiteracy amongst the public (DCMSC, 2021).

How serious, then, is this problem? Some suggest that because "fake news" comprises so small a component of the average adult's media diet, that it represents less of a genuine threat to democracy, than it does a modern day "moral panic" (Jungherr & Schroeder, 2021). On the other hand, if "fake news" is defined in too restrictive a way (by for example, associating it only with a small number of disreputable websites) the true breadth and depth of the problem may be missed. Certain groups in society may be more vulnerable to "fake news" than others (Tandoc Jr., 2019). Indeed, the role played by disinformation in politically significant events, such as the 2021 U.S. Capitol riot, suggests the risks of "fake news" are significant, even if they only reach or influence a small number of individuals (Jeppesen et al., 2022). Little wonder then, that some suggest "fake news" should be addressed as a top scientific priority (Bergstrom & West, 2021). In seeking a way past this seeming impasse, it would be sensible to improve the effectiveness

of reliable sources of information while acknowledging the asymmetrical nature of potential harms misinformation may cause in public life.

We live in a world mediated by screens – in this sense, an increasingly visual world, and information and data are presented to us using visual methods. In news and current affairs, data journalists hold increasingly influential roles in the networked newsroom, helping to decide what news coverage we receive (Dick, 2014). Over the past decade, infographics have increasingly been used in politics to reach and engage voters (Amit-Danhi & Shifman, 2018; Towner, 2017). In healthcare, highly embellished infographics are an effective way to communicate, whether concerning antimicrobial resistance (Walker, 2019) or health policy goals and initiatives more broadly (Reynolds et al., 2008), particularly concerning low-numerate social groups (Nelson et al., 2008). Can infographics play some part in addressing the broader malaise of a (partly) misinformed citizenry and the concomitant problems arising from this? That is the question this paper seeks to address.

Fortunately, there are historical precedents to learn from in information design. Almost a century ago, Otto Neurath and an interdisciplinary team of experts, set about creating Isotype, a visual method for communicating statistics. Used at first to inform the Viennese public about the city's governance and its demographic composition, these pictographic forms were displayed in interactive museum exhibitions. Figure 1 shows a typical Isotype pictogram, concerned with car manufacture. This paper outlines the philosophical context that coincided with the rise of Isotype to explore the 'cross-connections' between thought and practice at its origins (Burke in Burke et al., 2013b, p. 89). The author presents an alternative philosophical perspective for conveying civic information in a form called the datatext, before setting out a hypothetical methodology to explore some of the key ideas in this alternative approach.

Figure 1
"Automobiles produced in 1929," Isotype illustration (Neurath, 1936, p. 93)
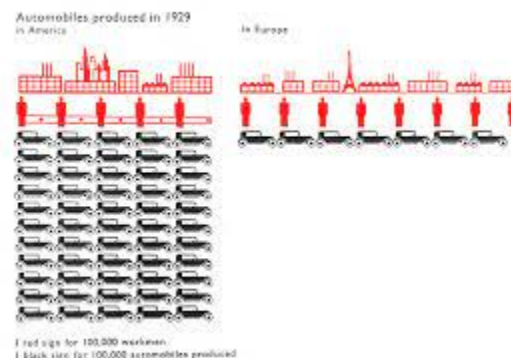
Otto Neurath's Epistemology and Educational Philosophy

Language, for Otto Neurath, was the medium of all knowledge. But in its spoken form he believed, it can mislead, due to internal inconsistencies. Ever the empiricist, Neurath thought of vision as a more reliable mode of connection between words and reality (Burke in Burke et al., 2013b, p. 88). Neurath sought a unified theory of empirical knowledge, expressed in predicate logic, based on an encyclopaedic rather than a systemic model; an approach to knowledge that was heterarchical in nature, rather than hierarchical (Cat, 2019).

Neurath's formative years were spent in Vienna, the capital of a constitutionally stable economic superpower, comprising peoples who spoke many languages across a wide geographical expanse (Janik & Toulmin, 1996[1973], p. 16). Fin de siècle Vienna was a fertile environment for new visual modes of communication, which may be found for example, in a series of popular almanacs published by J. Steinbrener (Dalbello & Spoerri, 2006). Figure 2 shows an embellished pictogram typical of those published in the Steinbrener almanacs.

The infographics in these books were embellished with realist depictions; countries were represented by national dress, professions by identifiable uniforms, and so on – they embraced the idea that statistical thinking could be both embodied and contextual (Dalbello, 2011, p. 167). Neurath was familiar enough with such illustrations (Burke in Burke et al., 2013a, p. 12); and indeed, both Isotype and these almanac designs seem to continue a long-established discursive tradition established by the Tables of Nations (Dalbello, 2011, p. 172). However, where the almanacs' infographics embody reasoning in detailed symbols of the particular, Isotype embodied reasoning in simplified, abstract forms. The rejection of ornamentation and the embrace of utility were organizing principles in Isotype, just as they were in many other intellectual fields in Neurath's Vienna, including architecture (e.g., Adolf Loos) and language (e.g., Karl Krause) (Janik & Toulmin, 1996[1973], pp. 93-97).

Figure 2
"What Different Nations Eat and Drink," pictographic illustration (*Šareni svjetski koledar: za godinu*, published by J. Steinbrener, 1900–1908).

Neuraths' approach to knowledge followed the Epicurean tradition of satisfying a means to an end in the present moment. This tradition represents a philosophy of "good living," involving the pursuit of a simple life of tranquillity and contentment, free from pain and fear. Neurath's emphasis on the collaborative process, rather than a hierarchical "program," speaks to the perceived importance of democratic cooperation in science and internationalization, a common theme among the Logical Positivists leading lights (Cat, 2019; Edmonds, 2020, p. 6). For Neurath, as for all Logical Positivists, an optimistic belief in the potential of human rationality was also important. By simply giving people the correct information, they would more likely than not make the right choices (Edmonds, 2020, p. 60). But Neurath was no naïve empiricist – for him, decision-making was informed by what he called "auxiliary motives" (not reasons), whether in the form of tradition, instinct, superstition, authority, or populism. Indeed, Neurath dismissed the idea of pure, unaided rationality as "pseudorationalism" (Howard, 2019, p. 53). His approach to science, therefore, did not necessitate the exclusive use of value-free methods (Cat, 2019). Neither did his approach to education,

which was distinctly pragmatic, drawing as it did upon the two dominant educational philosophies in Vienna -- popular (bourgeois) education and socialist education (Groß, 2019, p. 181). Education, for Neurath, required argumentation that might allow one to separate essentials from incidentals in each subject matter, which in turn meant that it was unavoidably (and unapologetically) ideological (Cat, 2019).

Words Divide, Pictures Unite
Neurath conceived of Isotype as a method for explaining the connections between social and economic realities, for an audience that was often poorly educated. Clear and easy-to-follow rules were needed to communicate clearly with this audience. These rules (called the Vienna method before 1934 and International Picture Language after 1935), concern the repeated use of identical figures to represent increasing scale in the numbers displayed, as opposed to the use of re-scaled figures commonly found in other pictographic styles (Neurath, & Cohen, 2012 [1973], p. 215). Neurath believed that increased suffrage required the efficient diffusion of knowledge through education (Vossoughian, 2011, p. 58). A universal language he hoped may help achieve this goal (Cat, 2019), an idea long-established in utopian socialist thought, owing debts to Descartes, Comenius, Leibniz and others (Lins, 2016, p. 238). Neurath described Isotype variously as a 'helping language' (Hartmann 2008, pp. 279-282), a 'universal slang,' a 'universal jargon' (Burke in Burke et al., 2013b, p. 90), and a 'language-like technique' (Burke, 2011, p. 37). Such a means of communication would empower the modern citizenry, forging 'a new world outlook' spreading just as the old authorities of state and church were declining (Neurath & Cohen, 2012 [1973], p. 252). Statistics were, for Neurath, an organizational precondition for modern governmental planning (Hartmann, 2008, p. 280). In visual form, they were a resource, he hoped, that may be used to foment political change amongst the Viennese public (Vossoughian, 2011, p. 58). And yet, the process of transmission in Isotype was intended to reflect the nature of scientific knowledge as neutral and lacking in association (Groß, 2019, p. 184), and so Isotype symbols were intended to be value-neutral (Cat, 2019).

The *Gesellschafts- und Wirtschaftsmuseum* in central Vienna, run by Neurath from 1925 until 1934 (Edmonds, 2020, pp. 132-133), housed Isotype displays that provided an alternative way of thinking about social issues to conventional museums (Nemeth, 2019, p. 126). The displays included multimedia learning materials intended to spur group discussion, including "lantern slides, charts, photographs, and models" (Vossoughian, 2011, p. 52). The interior of the building (designed by co-founder of the Vienna School of Architecture, Josef Frank) was, in terms of its lighting, fixtures, and even frames, intended to focus attention on the visual arguments on display (Neurath & Cohen, 2012 [1973], p. 215). Neurath recognized the importance of screens and modern media in modern life and accommodated what he saw as the conditioning effects of cinema and illustration within Isotype displays (Cat, 2019). Visual learning served both as a direct means of conveying introductory subject matter and as a way of optimizing engagement in learning (Neurath & Cohen, 2012 [1973], p. 236). Neurath thought that Isotype leaned towards internationalization in a way that word-based education could not (Neurath & Cohen, 2012 [1973], p. 247).

Neurath's displays concern his philosophical belief in reasoning about truths that could only be elicited through logic and scientific language. This reasoning required basic building blocks, or observational techniques, corresponding to medium-sized physical objects in the real world. Isotype was therefore used to express relationships between real things in the world as opposed to abstractions, such as money, value, or interest (Leonard, 1999, pp. 468-9). This approach had a practical advantage; it provided a means to focus discussion on public objects that could be objectively assessed, rather than on subjective, private opinions, thoughts, and feelings (Howard, 2019, p. 58).

Metaphysics and the Rise of Nationalism
Neurath had embraced Marxism by the close of World War I while fighting, and 'Red Vienna' provided a fertile environment for the spread of his ideas, on his return to the city after the war (Edmonds, 2020, p. 59). However, the Wall Street Crash of 1929 had a catastrophic effect on the Austrian economy, creating large-scale unemployment that led to a polarization between a largely progressive Vienna and the country's conservative provinces (Edmonds, 2020, p. 127). The Austro-fascists that would sweep away Neurath's social museum in 1934 were steeped in the metaphysics of Völkisch ideology, romanticism, and the veneration of tradition (Edmonds, 2020, 2020, p. 142). The rise of this movement coincided with rising anti-Semitism, which directly affected many Jewish members of the Vienna Circle, including Neurath (Edmonds, 2020, p. 127).

Just as reason was revered amongst the Logical Positivists, so to was metaphysics repudiated as being essentially meaningless to them. In his 1931 essay *The Elimination of Metaphysics through Logical Analysis of Language*, Neurath's friend Rudolph Carnap explored how regressive political organizations had invoked metaphysical abstractions (e.g., the National Socialist use of 'Das Volk'). (Howard, 2019, pp. 54-55). Neurath stood out within the Circle as being particularly vehement in his antipathy towards metaphysics, even arguing for the use of an *Index Verborum Prohibitorum*, a list of banned metaphysical words and phrases, to be used in discussions (Howard, 2019, p. 55). For Neurath, as for all Logical Positivists schooled in the Austro-Marxist tradition, opposition to metaphysics was no mere philosophical talking point; it was a foundational political commitment (Howard, 2019, p. 57). In Neurath's view, the religious zealot and the nationalist were united in their exceptionalist beliefs, against which the Marxist viewed all human life across the same 'earthly plane' (Neurath & Cohen, 2012 [1973], p. 295). For Neurath, "The community of the state is nothing but a kind of large association, whose statutes do not possess special holiness" (Neurath & Cohen, 2012 [1973], p. 295). Logical empiricism, continuing the tradition of Anglo-utilitarian empiricism skepticism, therefore represented the antithesis of authoritarianism, and hence of fascism (Edmonds, 2020, p. 4).

Pictures Unite, Pictures Divide
Isotype has been subjected to much criticism over the years because of its perceived reductionism at the expense of accuracy (Burke in Burke et al., 2013c, p. 197) and because of its essentialism (Hartmann, 2006). Indeed, the 'signs for the five groups of men' (1936) have been discredited by recent discoveries in the field of genetics after The Human Genome Project, which shows that there is more genetic variation within some traditional racial typologies than there is between them (Rutherford, 2020). Others have criticized Isotype because of Neurath's work with the Izostat Institute in Soviet Russia, which was later concerned with publicizing Stalin's *five-year plan*. In turn, Isotype was described by a contemporaneous scholar of data design as having "the drive of vigorous propaganda behind it" (Funkhouser, 1937, p. 350). These criticisms clearly present a challenge to Isotype's legacy.

Some other problems with Isotype seem rather less ideologically fraught, however. For example, though Isotype was designed according to a physicalist philosophy, this need did not preclude the design of embellished visual data concerning abstract ideas like money or interest rates. Neurath's antipathy to metaphysics and expressions of national identity need not preclude embodied realities from being presented in such displays. Political theorists have noted the centrality of feeling to public notions of nationalism (Smith, 2003), and indeed, not all notions of national (or local) attachment are necessarily authoritarian. The rise of civic nationalism challenges the idea that national identities are mere 'imagined communities', as does the concept of 'ecstatic nationalism', concerning embodied and materialized identities (Skey, 2006).

A central problem seems to be that Isotype was designed to convey social relations abstracted from the lived environment in which they took place. This was seen as essential to its design. According to Neurath, verbal languages bind speakers to their immediate community, whereas the "language of vision" allows for the shedding of national traits and hence for a widening of, indeed for the globalization of an imagined audience (Hartmann, 2008, p. 283). But in shedding these associations, the bond between people and the lived environment is broken too. Neurath thought that the representative iconology of Isotype's symbolism was superior to abstract lines and curves, not only because they may semantically anchor meanings within representations but also because they incorporate affect due to their "friendliness" (Jansen, 1996, p. 152). But what if this friendliness inspires an emotion more like polite curiosity, rather than an authentic, affective attachment to, or sympathy with the graphical characters displayed? Indeed, Isotypes' human figures may be interpreted as being mere representations of Adolphe Quetelet's "l'homme moyen"; a statistical concept of the average man, that played a significant role in the emergence of eugenics (Grue, 2006). Devoid of personality and authenticity, these figures are, it may be argued, as abstract as lines, bars, or circles. Such figures may offer distraction, but are they capable of providing audiences with a meaningful sense of emotional connection and attachment? The author will now address this question with recourse to alternative ways of thinking about representation, cosmopolitanism, and metaphysics, to those espoused by Neurath.

John Dewey's Localism and Governance

In *The Public and its Problems* (1927), John Dewey sought to establish a clear link between democracy in governmental systems, in terms of accountability, and democracy as a way of life for a nation's citizens. Dewey believed that a democracy must play a significant role in educating its citizens, as well as involving them in its processes (Dewey, 1927). Local associative behavior must be constituted as communities of action, sharing common interests, concerns, and symbols (Dewey, 1927). This ideal, according to Dewey, has three essential requirements; universal education in how civic society works; transparency in the circulation of facts and statistics about the functioning of the state, and localism (Dewey, 1927). Foregrounding the local as a critical influence on how larger scale political organizations should be run, Dewey considered that any attempt to develop the capacities and capabilities of the public must therefore begin at the local level, which he believed, could lead Americans from being an atomized "Great Society" to a connected "Great Community" (Dewey, 1927).

In 1916, in *Democracy and Education*, Dewey devised an approach to pedagogy whereby learning is not conceived of as a simple mode of transmission from the teacher to the learner but is instead mediated according to the environment in which it takes place. Dewey defined environment in a broad sense, to include the space of learning, as well as the psychological disposition of the learner, which would include, as Jayanandhan puts it: "… the things that are noticeable to or important to a person" (2009, p. 106). For Dewey, the importance of affect in shaping the learning experience is profound; it is a "moving force" towards new ideas or, indeed, towards a sense of place (Jayanandhan, 2009, p. 107). In terms of how this approach may best be understood at the policy level, Dewey's wider philosophical legacy can be used to conceive of an exhibition of locally meaningful civic data as a form of pragmatic localism, a way of operationalizing local government policy while acknowledging the tensions that may arise as a consequence, in terms of central government (Coaffee & Headlam, 2008).

Martha Nussbaum's Cosmopolitanism and the Capability Approach

In its design, Isotype conveys a certain cosmopolitanism while eschewing the notion of local attachment. The question arises, might it be possible to unite the two? Here it is important to distinguish between different manifestations of cosmopolitanism. So, for example, the Kantian notion of the *Weltburger* (world citizen), and its association with the public use of reason, would seem to be compatible with any civic display of public information. But it is necessary to challenge an older conception of cosmopolitanism, one reaching back to the Stoics and their wish to center the cosmos in ancient thought as an alternative to the *polis (the city state structure of community commonly found in ancient Greece)*. This was an approach that sought allegiance with a higher moral order encompassing all of humanity, rather than an allegiance with the local (Held, 2005, pp. 10-11). Martha Nussbaum has critiqued the seemingly internal incoherence of this ancient philosophy in terms of the modern field of human development, observing that it seems to involve an uncoupling of the relationship between material wealth and human flourishing, a process that results in an ethical bifurcation, whereby "duties of material aid" are treated differently from "duties of justice" (Nussbaum, 2019, p. 7). A potential solution to this problem, Nussbaum suggests, may be found in the works of Cicero. To Cicero, the local comprises a "special salience" pertaining to the ethics of action and compassion that allows for the balancing of "… the near and the distant, pointing the way to a reasonable moral psychology for today's world" (Nussbaum, 2019, p. 10). Nussbaum provides a list of Central Human Capabilities, the fourth of which is concerned with 'Senses, Imagination, and Thought' that may contribute to a broader educational infrastructure, benefitting local publics and providing them with "… an adequate education, including but by no means limited to, literacy and basic mathematical and scientific training" (Nussbaum, 2011, pp. 33-4). In Nussbaum's approach, then, it may be possible to develop a universal "language-like" medium, using locally resonant imagery, towards more effective exhibitions that might improve people's understanding of their local environment.

Iris Murdoch's Unselfing and the Metaphysical Animal

Logical Positivism was the dominant force in British analytical philosophy from the 1930s (MacCumhaill & Wiseman, 2022). The leading thinker in this movement in the U.K., A.J. Ayer, espoused a radically anti-metaphysical approach, primarily influenced by his reading of key figures in the Vienna Circle (MacCumhaill & Wiseman, 2022, p. x). But not all British philosophers of the post-War period were quite as anti-metaphysical as Ayer and Neurath.

After World War II, as a post-graduate at Newnham College, Cambridge, Iris Murdoch, along with a small, close-knit group of peers, began to dissent from what, by then, were seen as increasingly old-fashioned ideas about the supposed tension between logic and metaphysics. Murdoch was inspired by idealistic ideas about morality and metaphysics, conceiving of people not as rational animals but instead as metaphysical animals, who create stories, art, music, and signs, to make sense of what is important, while just as importantly, pointing towards what might become important (MacCumhaill & Wiseman, 2022, pp. xiii-xiv). Murdoch developed a moral theory of 'unselfing,' rooted in the idea of an attentive gaze directed toward individual reality. In *Sovereignty of the Good* (1970 [2001]), she explained how the act of 'unselfing' can lift the individual out of their immediate (and often relatively narrow) cares and concerns, allowing them to see the wider good in the world. This process permits a certain softening of views based on established relationships and bonds (Driver, 2020, p. 169). 'Unselfing' is, in turn, contingent upon humility, attentiveness, and, crucially, upon a conception of love, not in terms of an individual's feelings but instead defined as a quality of trust and care that legitimizes and so maintains and repairs the authority required of any source of reliable, public information (Murdoch, 1969 [1997]). This disposition shifts the conception of education away from a mere accumulation of information and towards the relationships that make education possible toward a better understanding of others and an embrace of the idea of incomplete knowledge (MacCumhaill & Wiseman, 2020, p. 169). This approach is very different from Neurath's, which was concerned with establishing a universal theory of knowledge. Rather than driving out metaphysics, as Neurath sought to do in his philosophy, Murdoch instead intended to bring metaphysics and aesthetics into alignment in the context of art critique, a process that made unselfing possible, as she explains:

> A contemplative observation of contingent 'trivial' detail (insects, leaves, shapes of screwed-up paper, looks and shadows of anything, expressions of faces) is a prevalent and usually, at least in a minimal sense, 'unselfing' activity of consciousness. This might also be called an argument from perception. It 'proves', as against generalizing and reductionist philosophical or psychological theories, that individual consciousness or awareness can be spoken of in theoretical discussions of morality. It is where the moral and the aesthetic join. (Murdoch, 1994, p. 245)

As a Platonist, Murdoch's attitude to learning represented moral progress, allowing a de-emphasis on oneself, one's place in the broader world of knowledge, and what it is to be known (Murdoch, 1994, p. 179).

Combining Dewey's philosophy of education (in particular his emphasis on localism as key to bridging democratic systems and democracy as a way of life), Nussbaum's capability approach (with its recognition of the special importance of the local in the ethics of action), and Murdoch's ethical conception of 'unselfing,' (with its encouragement to turn away from the self, with a regard to those relationships and bonds that connect us to others), it is possible to conceive of an alternative to Isotype that may be an effective medium for communicating important civic information to a local public, in local exhibitions. The following section will set out some methodological bounds of such a hypothetical experiment.

Hypothetical Methodology

A dry-run experiment involving the material proposed would ideally be situated in an exhibition space. The author would commission various multimedia infographic designs comprising key demographic and social information about the local environment. The local district may define the locality. These designs should be datatexts. The datatext may be defined as:

> …a visual argument that takes the form of images and words, that combine to express numerical data with the aims of optimizing memorability, and affective connectivity, while at the same time adhering to standards of best practice in terms of accuracy… Datatext design considers the social identity and group dynamics within the publics they are designed for. The datatext should be clear and vivid and [should] contain reliable information, displayed accurately. (Dick, 2022, p. 140)

The datatexts produced may concern any of the following topics:

• Proportions of the local population by age, gender, race, disability, and religious affiliation
• Proportions of immigrants living locally (first and second generation)
• Proportions of unemployed, under-employed, retired people etc.

- Comparative rates for various types of crime
- Index of life expectancy (by electoral ward, for comparison)
- Proportion of the population who vote
- Index of local earnings, including mean, median, key outliers, and comparative data
- Details on local media consumption

The exhibition design should consider vital empirical findings from past studies of memorability in museums. These designs should adhere to established best practices in data visualization design in media and mass communications (Cairo, 2019), incorporating up-to-date empirical findings in optimal design (Vanderplas et al., 2020). Because some studies show tactile and kinaesthetic engagement can improve memorability (Sweetman et al., 2020), the authors may commission multisensory, interactive multimedia datatext objects. Similarly, since an increasing scale of materials in exhibitions has also been found to positively affect memorability (Sweetman et al., 2020), the authors may likewise commission large-scale wall chart datatexts.

Datatexts, like all forms of infographics, are essentially visual metaphors (Wainer, 2006, p. 30), so their design will involve thinking deeply about metaphors. A metaphor may be defined broadly, – as the application of figurative language in any form. Three basic assumptions about the nature of metaphors in datatexts may help in the design phase, namely:

- Some metaphors are abstract and implicit (for example, line graphs, where up is more and down is less, according to *cognitive metaphor theory*),
- Some metaphors are representational and explicit (for example, pictograms), and;
- Some visual displays of data contain both of these kinds of metaphor

Given the embodied nature of the first of these types of metaphor (Lakoff & Johnson, 1980), some gestalt-like image schemas based on Lakoff's *Spatialization of Form* hypothesis (Risch, 2008) may be incorporated into the design. Statistics concerned with the theme of fixedness (within space) may feature recognizable local icons and landmarks (such as statues, buildings, stadia, and natural landmarks) within their design, whether in color, greyscale, or outline. Figures 3, 4 and 5 incorporate key landmarks from, respectively, the Heaton, Byker and Jesmond areas of Newcastle, in their design. Alternatively, statistics concerned with movement may feature landmarks associated with the local transport network, bridges, roads, and other locally recognizable infrastructure. Some initial research will be required to identify those icons and landmarks with net positive associations amongst the local population.

Figure 3

A (draft) datatext depicting the population of Heaton (a district in Newcastle upon Tyne, England) by religion (drawing upon the Office for National Statistics' 2011 census). The (untitled) background image is of the W.D. & H.O. Wills Building, a listed Art Deco-style building in Heaton. CC License: Ken Brown / W.D. & H.O. Wills Building / CC BY-SA 2.0.
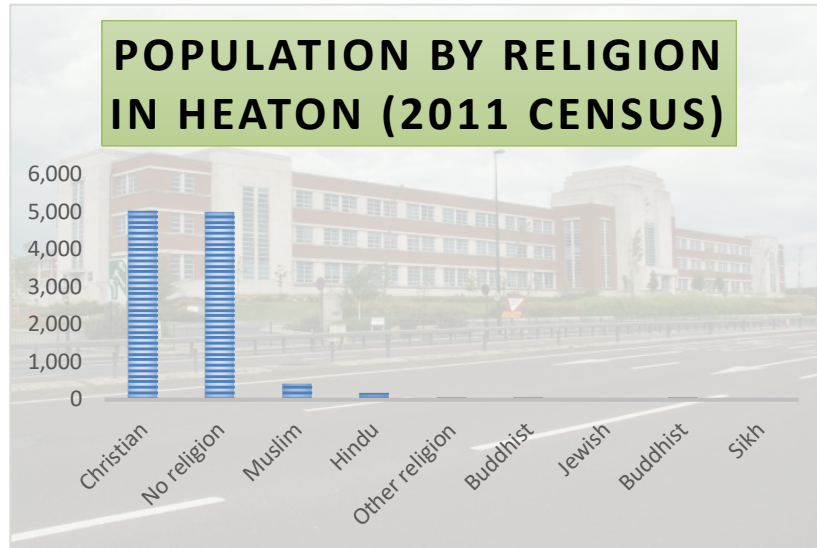
Figure 4

A (draft) datatext depicts Byker's population (a district ward in Newcastle upon Tyne, England) by religion (drawing upon the Office for National Statistics' 2011 census). The background image in this design is titled: "Tom Collins House, Byker, Newcastle upon Tyne - This building forms the western end of the Byker Wall." CC License: User:Lawsonrob
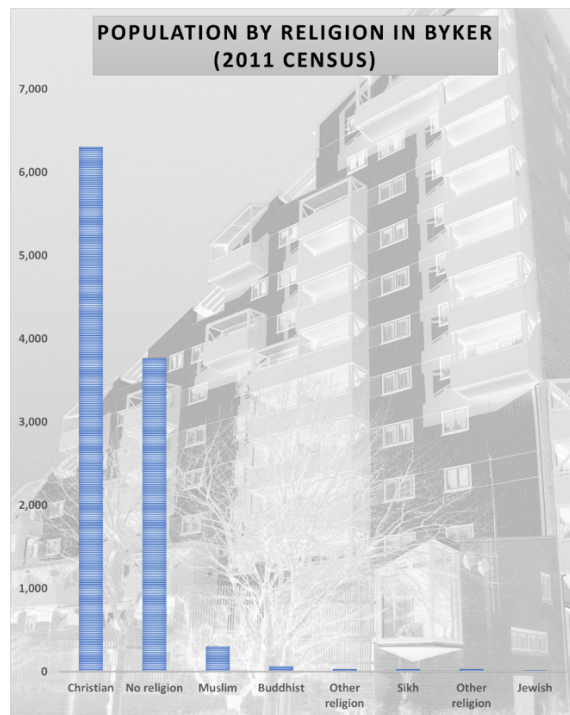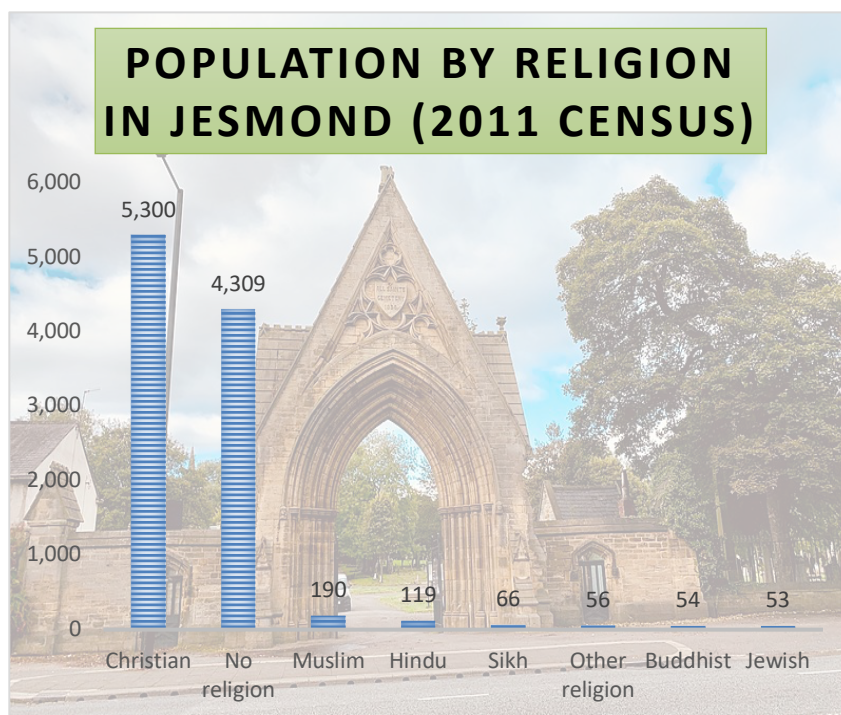
Figure 5
A (draft) datatext depicting the population of Jesmond (a district ward in Newcastle upon Tyne, England) by religion (drawing upon the Office for National Statistics' 2011 census). The (untitled) background image in this design is of an 1835, Greek-Revival-style arched entrance to Jesmond Old Cemetery Catacombs. CC License: AlixChaytor.

The author will recruit a diverse range of participants living locally in the exhibition space in advance. Informed consent will be required, and participants will complete a demographic declaration. A single study phase, asking participants to estimate the various metrics displayed in the exhibition, will be administered before participants are given access to the exhibition. Participants will then engage with the exhibition on their terms. Some graphics that do not adhere to datatext principles may also be included as a form of experimental control. Participants will be administered a short exit survey upon completing their exhibition visit. Participants would then be surveyed at subsequent intervals (one month, six months) to test their memory of the exhibition's contents over the longer term.

Conclusion

To conclude, it seems that there are some aspects of Isotype in its conception and design, from which we can learn to pursue an engaging and effective visual display method for data. Neurath's pragmatism, and his pursuit of democratic ends, are values in keeping with the improvement of public engagement in politics through processes of transparency. Designing educational materials around an audience's media habits, as Neurath did, is also a potentially useful approach.

Some of Neurath's ideas may be improved upon. For example, his conception of people as social (and rational) beings necessitated an analysis of the environment in which people learn. But Neurath defined the concept of environment very tightly – failing to consider the wider lived environment within which people receive, refine, and share knowledge of the world. We may agree with Neurath that certain visual symbols have a comprehensive (if not necessarily universal) appeal. Still, we should not ignore the fact that some symbols have important meanings, and associations at the local level, too. Indeed, we can see that the seeming paradox of a quasi-language or visual method for communicating statistical facts need not necessarily adhere to the scientific notion of neutrality. We can surely also agree that visual methods

should adhere to generally agreed standards of best practice in design (particularly those established in journalism, media, and communication –literature that centers the reader) without unduly fetishizing them.

But Neurath's thinking was unduly dogmatic on some critical matters, too. This is particularly true of his opposition to ornamentation, considering what we now know about the memorability of embellished visualizations (Borkin et al., 2013). His opposition to metaphysics, particularly those that connect people to places (which must be considered in the context of rising fascism in interwar Vienna) blinded him to the importance of the wider environment (on Dewey's terms), not least in terms of how ritual and habit inform the communication and circulation of new knowledge within communities. And whether "friendly" or not, Isotype figures lack authenticity; they are by degrees no more or less abstract than lines, circles, and bars. People may like them, but that does not mean they have an affective connection with them.

By accommodating elements of Neurath's philosophy of visualization and by adopting ideas from Dewey (on localism), Nussbaum (on capability), and Murdoch (on "unselfing"), it is possible to conceive of a theoretical alternative to Isotype that may prove to be an effective medium for communicating important civic information to local publics, in local exhibitions. This approach involves designing datatexts, visual arguments mutually reinforced by combinations of words, numbers, and images conceived of as comprising a multilevel discourse. These datatexts may be used to communicate key social indicators and facts, using locally resonant images and other metaphors while adhering to standards of best practice in the journalism and communications literature. The effectiveness of these displays for the productive communication of civic facts to the local public may then be tested experimentally.

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Visual Literacy for Education Professionals

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Abstract
Visual literacy (VL) is essential for improving the visual communication skills of graduate students who desire to develop *instructional material or manage Information and Communication Technology (ICT)-mediated learning. However, in the current challenging and highly visual digital world, the Ecuadorian context needs a well-structured graduate program of VL. Indeed, promoting visually literate professionals in Education and other fields has yet to be understood as a complement to their digital competence development. This educational intervention was conducted with graduates from different areas of study who were in an ICT in an Education program. The specific content was integrated into one of the subjects. The VL training module described focuses on the themes, subtopics, and teaching methodology. The professor identified the most difficult topics for students to understand. This experience aims to help scholars, teachers, or researchers who want to perform an intervention in a similar context to make learning design and content decisions.*

Keywords: visual literacy, higher education, graduate students, digital competence

Introduction

In the digital and post-pandemic educational age, people have had to learn to encode and decode linguistic and non-linguistic signs to communicate in various learning scenarios and contexts (Bodén et al., 2023; Reddy et al., 2020). The need for visually literate learners and educators is now more challenging and essential for enhancing learning and sharing academic and scientific information. However, the Ecuadorian undergraduate educational background indicated that some learners and junior professionals in the Education field needed more training to be visually competent (Huilcapi-Collantes et al., 2021).

Scholars insist that developing visual literacy skills is essential for learners in twenty-first-century higher education (Bleed, 2005; Brumberger, 2011; Hattwig et al., 2013; Kędra & Žakevičiūtė, 2019; Statton Thompson et al., 2022). Thus, this research suggests that Ecuadorian graduate programs need to integrate the content of visual literacy in knowledge areas external to Visual Communication, Graphic Design, Visual Arts, or related. In fact, visual literacy is needed to complement learners' digital competence development (Association of Research and College Libraries, 2011) because a large amount of information takes the form of images that substitute the text and "become the predominant form of communication" (Lundy & Stephens, 2015, p. 1057). Pre-service and in-service teachers and professionals in the educational field must learn to encode and decode visual information (Gómez Díaz, 2010) and picture-text messages for building, analyzing, or selecting instructional material and educational resources, managing ICT-mediated learning environments and improving visual communication skills for teaching.

This educational intervention was conducted in a public university in Ecuador in a graduate program, "Information and Communication Technologies in Education" (ICT). The professor proposed integrating the specific content into one of the subjects titled "Read and Write in Digital Environments" to understand visual literacy and its relevance in the field. Throughout this research, the visual literacy (VL) training module will focus on the content and the teaching methodology. The intervention assessment includes crucial moments of systematic observation and an analysis and evaluation of students' production. Furthermore, this research identifies the topics that became complex for students since they struggled to understand and apply that content in their assignments and tasks throughout the

module.

This experience could help teachers who want to implement a similar intervention to make decisions to help students successfully achieve a better level of VL. Moreover, it ratifies that visual literacy is a complementary and transversal process to develop the educational field's much-needed and well-known digital competence. Finally, the VL intervention's general evaluation helped the authors restructure the program outside formal education to manage the time and the themes according to their research-specific needs. This intervention was the pilot of the 5-year doctoral research: "Visual literacy for in-service teachers through Graphic Design to improve the planning and development of the learning process" (Huilcapi-Collantes, 2021).

Visual literacy as a complement of Digital Competence Development

The European Parliament recognizes digital competence as one of the eight key competencies for lifelong learning throughout life (Diario Oficial, L394, 2006), so its development has undoubtedly been the educational system's permanent occupation in recent years. In this respect, to educate the new millennium's students and help them develop the necessary competencies for the twenty-first century, it is essential to have teachers capable of guiding them on their educational journey through new media (INTEF, 2017). Therefore, it has been crucial to focus on graduates who work in the educational field and support them in developing and enhancing their digital competence for their professional purposes and teaching tasks.

On the other hand, Kárpáti & Paál states that "being visually competent means the combined use of knowledge, skills, and attitudes manifested in specific situations that require the use of visual language" (2022, p. 4). Hence, visual literacy competence is transversal in almost the entire development of digital competence because digital information is not shown or disseminated through only oral and textual language but mostly through visual language. Accessing, communicating, collaborating, or elaborating digital content with the information presented only through text or audio is almost impossible. In digital media, there is a dependence on the image, so much so that the images have taken the place of the word (Cordón, 2010) and "often function as information" (Association of Research and College Libraries, 2011, para. 6). Thus, a person required to handle visual information to achieve digital competence. Therefore, visual literacy competence is complementary to this process.

Visual literacy is not a previous or subsequent stage of digital competence development because both are paired processes. Indeed, to develop digital competence, the skills to handle visual information must also be acquired, so both competencies need to be taught and learned simultaneously.

The visual literacy educational intervention

The intervention was piloted with a group of graduate students from different fields enrolled in the   "Read and Write in Digital Environments   " subject. The course's general objective was: *Develop the ability to communicate effectively through textual and visual communication codes in virtual environments to improve the planning and development of the learning process.*

The course was scheduled for ten face-to-face sessions, as the institution determined. Each session is equivalent to two classes of two hours each, so the participants had four hours of face-to-face training for ten days, meaning forty hours of classes. Class sessions ran three days a week.

Participants

Participants included twenty-four students who were in the Education graduate program. The students' age was between 26 and 56 years. They were fifteen women and nine men. The participants' undergraduate degrees were diverse. See Figure 1.

Figure 1
Participants' undergraduate degrees.

Participants' undergraduate degrees		n		
Education	67%	16	11	In-service teachers
			5	Other jobs than teaching
Pedagogy	4%	1	1	In-service teacher
Comunication/Marketing	8%	2	2	Other jobs than teaching
Others	21%	5	2	In-service teachers
			3	Other jobs than teaching
Total	100%	**24**	**14**	**In-service teachers**

The sixteen participants who had completed undergraduate studies in Education had different majors: Social Science Education, Early Childhood Education, Foreign Language, and Computer Science Education, among others. However, five performed jobs   besides teaching due to their work relationship with governmental and non-governmental organizations. For example, one was a supervisor of community projects, two were instructors of training programs, one developed educational resources at the Ministry of Education, and another worked as an operator in a customer service center. Consequently, only eleven participants with a Bachelor's Degree in Education work as teachers.

On the other hand, the person with a degree in Pedagogy worked as a foreign language teacher. The participant, who had a degree in Electronics Engineering, worked as a Mathematics and Computer Science teacher. The one with a degree in Pastoral Theology worked as a Religious Education teacher. The rest of the people who participated in the course worked in non-teaching activities. Thus, of the twenty-four students enrolled in this graduate program, only fourteen were in-service teachers, equivalent to 58%.

The participants' profile diversity was a factor that set the course's development from the beginning because not all were familiar with the development of educational resources and the teaching practice in face-to-face classes or virtual environments. Indeed, we learned that the student's profile in this graduate program would always be diverse because they do not exclude any applicant according to the undergraduate studies he has completed. Hence, the graduate program is not exclusive to teachers.

All participants worked and had work experience in some areas, such as Education, Communication, Computer Science, and ICT. This fact is usual in the context where the course was developed because graduate programs are expensive, so the students are expected to pay themselves for their studies while working. All participants attended classes after their usual workday, which is generally eight hours a day.

Infrastructure and equipment
The equipment is the set of necessary items for this intervention. The university's classroom had enough equipment for the course. It has a computer for the professor, a projector, and a screen. Additionally, the room is equipped with switches near the students' desks to facilitate the laptops' connection to AC power. Students could also connect with their user accounts to the university's wireless network. This intervention only required the equipment and infrastructure that the university offers.

Course content
Most of the course content was related to visual literacy. However, the curriculum`s subject is "   Read and Write in Digital Environments   ." The themes were taught to students sequentially, as shown in Table 1.

Table 1

Course themes and subtopics of the subject: Read and Write in Digital Environments.

No. Class	Themes	Sub-themes
1	The literacy concept in the 21st century	● Digital illiteracy ● Social and Digital Exclusion ● New literacies and new forms of reading
2	Multiliteracies	● New literacy in reading and writing ● Visual literacy ● Information literacy ● Digital literacy
3	New literacy in reading and writing	● Reading and writing the textual content in virtual environments ● Multimodal text: linguistic and non-linguistic signs ● The role of images in electronic text
4	Visual literacy	● Visual images perception ● Meaning, analysis, and interpretation of visual messages ● The cognitive impact of the visual message
5	Communication through visual language (I)	● Principles of design for the composition of visual messages
6	Communication through visual language (II)	● Rhetorical strategies to communicate with visual language ● Persuasion through visual images
7	Communication by picture-text integration	● Characteristics of textual elements in virtual environments (typography) for readability ● Construction of the picture-text message ● Transmedia narrative
8	Construction of digital educational resources with visual and textual elements (I)	● Context ● The users ● Aesthetic quality
9	Construction of digital educational resources with visual and textual elements (II)	● Notions of usability. ● Tools for developing educational resources ● Project: an educational website
10	Construction of digital educational resources with visual and textual elements (III)	● Usability evaluation of educational websites

Teaching methodology

This visual literacy educational intervention was developed following a student-centered approach, prioritizing methodologies for active learning. The core methodology was project-based learning (PBL). In this methodology, "the student interacts actively with his co-workers in small teams, and with his teacher, exchanging ideas and discussing progress in the solution or proposed solution to a specific scenario" (Noguez & Neri, 2019, p. 1283). Thus, the students become involved in their learning process and actively participate alone and with their peers in each activity.

The professor conducted each class session in two parts. The first introduces the topic to the students through the resources prepared for this purpose, such as articles, slides, real-time teaching, or web content such as videos. Figure 2 shows students reading from a resource.

Figure 2
Students in the class read from a digital resource on their own devices.

The second part of the class carries out learning activities, such as:
- Role-playing
- Real-time reactions on social networks
- Kahoot games
- Case studies
- Pictionary
- Discussions on the recommended literature list.
- Individual and group expositions about the projects or case studies
- Drawing
- Analysis of photos, posters, and paintings on the university's walls

The active students' participation was permanently promoted, while the professor played the tutor and guide role (see Figures 3 and 4). The professor supported the autonomous learning activities after the face-to-face class in the virtual classroom in Moodle, a learning management system (LMS) by messaging service, and email were used for this purpose. Social networks were not used for communication outside the classroom with students because the learning platform and email proved sufficient. In addition, some tutoring of students took place at the end of each class session when requested.

Figure 3
Students played Pictionary in two groups.

Figure 4
Students drew by hand and explained their drawings to others.

Students' assessment
All students' production elaborated during the learning activities was evaluated with rubrics and checklists from the virtual platform Moodle. The students knew how they would be evaluated since the instruments were presented when requesting the assignments to guide their elaboration. In addition, self-evaluation and co-evaluation were favored using the proposed instruments. Hence, students were involved in their learning process and their classmates. The self-and-peer evaluation provided feedback on the students' learning and facilitated the professor to set partial grades. The sum of the student's grades determined the approval of the course.

General evaluation of the visual literacy intervention
The professor systematically observed a class diary to evaluate the intervention. In this document, the professor wrote several moments of the process that could not be documented in a tangible way (Pérez Pueyo et al., 2017).

On the other hand, the educator analyzed the students' production and the evaluation results. The observations about the crucial aspects of this intervention are presented below:

About the participants

The participants' profile was heterogeneous because of their undergraduate degree, so the diversity in knowledge and experience enriched the discussions. All showed a high motivation for the active learning activities conducted in the second part of the sessions. This strategy helps energize and engage students in class because they attend classes after their full-time work journey. For instance, one student traveled three hours from their hometown to the university to participate in the study.

More than half of the participants were linked to teaching, others were related in some way to the educational field, and a small number were not associated with this field but wanted.

The students chose the topic of their final project. Thus, most of them build a website that could serve them in the immediate future for their professional practice. However, the students who did not work as teachers nor had a job in this field needed help finding an ideal topic. In these cases, the final project was an assignment to pass the course and finish the program.

Infrastructure and equipment evaluation

From a broader perspective, the university infrastructure and equipment were appropriate for this intervention. The students had access to the network from their computers or mobile devices. The professor had a computer with Internet access via cable, from where she could project to the classroom screen.

The virtual learning environment and available resources evaluation

Resources such as scientific articles, videos, websites, multimedia material, and Kahoot learning games were uploaded to the Moodle platform and helped address the different topics. However, during the course planning, the professor confirmed a need for more educational resources to promote visual literacy. There was information on the web, but to support educators, there needed to be a concrete and well-structured resource for online or mobile training.

On the other hand, in the mobile application store, the professor found applications related to visual literacy, such as a visual acuity game for children, a visual attention therapy, and a visual inspection test. However, there were no applications to promote or support visual literacy. Hence, the professor confirmed and promoted the creation of a specific educational resource to integrate into this training process.

After this intervention, the professor designed and developed the *Visual* mobile application (Huilcapi-Collantes et al., 2019) and conducted a pedagogical and user interface usability evaluation (Huilcapi-Collantes et al., 2020a) of this resource. This mobile application is expected to become a helpful resource in further similar interventions and adaptations of this course. "The *Visual* app presents its content in six short units related to the VL course content. […] Each unit has ten activities […]. Each activity shows immediate feedback to users by evaluating if the response was correct or incorrect" (Huilcapi-Collantes et al., 2019, p. 642). Thus, the students will understand the topics exposed by doing some activities in the mobile application.

Teaching methodology evaluation

The methodology encouraged students' active participation, which was appropriate for this intervention. Indeed, the professor promoted collaborative learning and self-learning by diversifying the previously described learning activities.

The students perceived these classroom-based activities positively because they could share with their peers some ludic moments that made them de-stress, feel comfortable and enjoy. See Figure 5.

Figure 5

Students made sketches for one of their group projects and dramatizations in teams.

Content evaluation

The course ran in a purely academic environment, and the subject was compulsory. This module took approximately four weeks to complete, and it was the last subject   students took before completing the graduate program. The subject articulates with the graduate program curriculum, so the professor integrated the content about visual literacy following the academic coordinator's requirements. The professor added some themes to the course because the coordinator asked her to do that. These themes were: transmedia narrative, usability, and usability evaluation.

The content introduced topics explicitly related to visual literacy in the first three classes. The course needed additional time for students to learn some themes in-depth. They elaborated on the production requested in a short time, and inevitably, some topics were challenging to understand. These were the following:
- Meaning, analysis, and interpretation of visual messages.
- Principles of design for the composition of visual messages.
- Rhetorical strategies to communicate with visual language. (See Figure 6)
- Characteristics of textual elements in virtual environments (typography) for readability.
- Construction of the picture-text message.

Figure 6
Students exposed their group investigations about rhetorical strategies to communicate with visual language.

On the other hand, the university's syllabus format only establishes the course's general objective and specific objectives, and the competencies and learning outcomes are not specified. Kennedy (2007) mentions that the objectives are explicit statements about what is to be taught, but they need to be more precise about what the student is expected to learn and how he will demonstrate it. Thus, a learning process to develop visual literacy should support students in achieving specific learning outcomes related to visual

literacy competence.

After this intervention, the authors proposed a new course structure based on the ACRL Visual Literacy Competency Standards for Higher Education (2011), which describes visual literacy performance indicators and learning outcomes. The ACRL standards are the most exhaustive guide and "tangible set of visual literacy abilities" (Brumberger, 2019, p. 12) to design an intervention, and it is the pioneer in providing a comprehensive framework for teaching visual literacy and its subsequent assessment (Hattwig et al., 2013). This restructuring does not change the themes but reorganizes them following a new structure to align each topic with the intended learning outcomes. The article: "The effect of a blended learning course of visual literacy for in-service teachers" (Huilcapi-Collantes et al., 2020b, p. 1) compiles the new course structure where authors set learning competencies for each standard.

Evaluation of the production requested from students.
The evaluation carried out in the course was linked to the students' production. The evaluation instruments guided students and set the requirements they had to fulfill. However, this evaluation did not reveal the level of visual literacy achieved after the course. The production made by the students was only evidence of performance. Evaluating the degree of visual literacy at a theoretical level was necessary.

Therefore, in the context of the expected doctoral research, the authors proposed two evaluation instruments to assess the development of visual literacy competence after the new course: a test to evaluate the level of visual literacy (Huilcapi-Collantes et al., 2020b) and a rubric to assess the students' project (Huilcapi-Collantes et al., 2022), both instruments align to visual literacy competencies set in the new structure.

<div align="center">

Conclusion
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This intervention was conducted in the digital era, using emerging technology and current media and considering visual literacy as a fundamental competence in twenty-first-century Education. Indeed, visual literacy influences people's ability to understand the world, learn and communicate. Therefore, this experience confirmed that visual literacy is a complementary and transversal process to developing digital competence.

The graduate students, who participated in the course, needed to develop their visual literacy level because it complements their digital competence development. Some were teachers, and others worked building educational resources and instructional material or manage ICT- mediated learning. Thus, this intervention allowed them to develop the abilities "to effectively find, interpret, evaluate, use and create images and visual media" (Association of Research and College Libraries, 2011, para. 2), helpful for their specific area of work. Indeed, although "fluency in visual communication requires relevant training" (Kędra, 2018, p. 71), the participants acquired some skills that allowed them to communicate better through "picture-text integration" (Lamour Sansone, 2015, p. 4) within the challenging and highly visual educational digital environments.

Analogical in-class activities linked with the student-centered approach helped to activate the knowledge and connect with the themes and sub-themes, helping the students to understand some new concepts and present their projects. By performing these activities, the professor sought the student's active learning to use and apply the knowledge to construct digital educational resources. To illustrate, Pictionary was the first game they played in the opening class, whose theme was: " The literacy concept in the 21st century ." The students performed this activity to connect with the concept of literacy and understand that people read linguistic and non-linguistic signs permanently. Pictionary revealed that the images have a meaning for the people who drew them but also for people who read them. Here is the crucial fact of choosing images for educational resources. Some of the draws the students had to sketch were a driver reading the traffic signs, a tourist reading a map, or a man reading a newspaper.

In addition, drawing each other helped students to realize and remember that visual language is the first language they use as toddlers, and each doodle represents what we look at and has a meaning. This activity associated the sub-themes: " Visual images perception ," " Meaning, analysis, and

interpretation of visual messages," and " The cognitive impact of the visual message." Throughout this exercise, the professor exposed Díaz Jiménez's investigation (1993) that adults can not represent themselves because they have not mastered the visual language and have not learned to perceive reality as their eyes see it. Therefore, someone who has not learned visual language cannot produce visual products, read them, or understand their meaning.

Last, the final theme: "Construction of digital educational resources with visual and textual elements," was challenging for the students. Professor asked students to sketch by hand what was the final group project for this theme, an educational website. This exercise helped them face a blank sheet and put their ideas on it by outlining the site's pages. The sketch was the idea organizer and memory aid to construct this digital educational resource planned in groups. Also, it helped to organize the visual and textual elements by applying concepts learned in class.

The authors conclude by describing these few activities to emphasize that visual literacy training for professionals in Education or other fields can also incorporate many analogical activities. In this context, it is essential to highlight that although visual literacy has been strongly linked to the techno-cultural phenomenon (Ausburn & Ausburn, 1978), a person may be visually literate without solely using digital resources and electronic devices for his training or having high-skilled digital competence. Indeed, taking into account one of the earliest definitions —considered by researchers such as Pettersson (2020) to be future-proof—. "visual literacy is the learned ability to interpret visual messages accurately and to create such messages" (Heinich et al., 1982, p. 62). Therefore, a person could demonstrate a visual literacy level in non-digital modes. Visual literacy complements, enhances, and supports the development of digital competence. However, some visual literacy skills, such as interpreting images, creating visual messages, or evaluating images and visual messages, could also be acquired without digital technology dependence. Here the professors' creativity to innovate visual literacy training and adapt the content, such as the one presented in this manuscript, for professionals with any level of digital competence.

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Paradigm Shift, Expansion, and Inclusion: Visual Literacy Research for the Field of Information

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Abstract

In addition to the continuing call for the inclusion of visual literacy into the curriculum for library and information science education, a paradigm expansion in research to develop and lead an interdisciplinary research advancement is a pressing task. The proposed paradigm shift in research results from the shift in the nature of information from text-based to visual information. Such a paradigm shift requires expanding research methodologies and theoretical frameworks. At the same time, paradigm inclusion is needed to invite and embrace interdisciplinary research and diverse research methodologies and theoretical frameworks to study visual information. This paradigm shift, expansion, and inclusion empathize with the social construction of knowledge/meaning in the studies of visual information by communities of users/viewers/readers.

Keywords: visual literacy, paradigm shift, information research, social construction of knowledge, ACRL Visual Literacy Competency Standards, Framework of Visual Literacy for High Education

Introduction

The field of information is an interdisciplinary study with theories and practices focusing on "the origination, collection, organization, storage, retrieval, interpretation, transmission, transformation, and utilization of information" (Borko, 1968, p. 3). "The field of information went through its first significant paradigm shift in the 1980s, changing from a system orientation focus to a user-centered focus (Dervin & Ninan, 1986). Following this shift, a new paradigm emerged as Nardi and O'Day (2000) called for computer scientists and software engineers to design systems as information ecologies that connect people, information, technology, and their practices in context. In 2008, Marchionini (2008) indicated that information scientists should adopt an ecological framework. Fidel (2012) also advocated an ecological framework to conceptualize the engagement between information behavior and information practice.

Nevertheless, at present, it remains questionable whether the transition to an ecological perspective of human information interaction has successfully taken place." (Tang, 2020,2019a-b). Researchers in the information field have been applying various research methods to study information-related issues. Successful research methods include experimental design, content analysis, citation analysis, surveys, interviews, action research, observational research methods, visual research methods, and others. Researchers use these methods in quantitative and qualitative approaches to examine the information-related concerns or problems by applying theoretical frameworks in cognition, behavior sciences, constructivism, interpretivism, poststructuralism, postmodernism, and other theoretical dimensions. Meaningful theoretical frameworks have been applied to support these research methods.

The proposed paradigm shift focuses on the information nature shifted from textual information to visual information. The paradigm expansion focuses on expanding existing research methodologies and theoretical frameworks to support this paradigm shift. The paradigm inclusion invites interdisciplinary research and embraces diverse research methodologies and theoretical frameworks to study visual information. This paradigm shift, expansion, and inclusion empathize with the social construction of knowledge/meaning in the studies of visual information by communities of users.

The information field is in the midst of advances in technology, internet access, and the rise of the pervasive visual information world. Visual information flows freely in this flat world without boundaries or structures or in various/different shapes and formats (Ma, 2015). When text-based or textual information is visualized, the meaning of the information becomes the center of research. When meaning becomes elusive or a shared process/activity in working with visual information, the social construction of knowledge/meaning has become essential to a new research paradigm. Research methodologies need to focus on the encoding

and decoding processes to allow the social construction of knowledge/meaning for visual information by communities of users, which is a key concept of this article and research endeavor. This social construction of meaning/knowledge is based on communities of readers/viewers/users/patrons who create meaning. When meaning is created and constructed/deconstructed by readers/viewers/users/patrons in a shared community, research methodologies and theoretical frameworks to study meaning construction are critical and essential to the success of such a research process.

Significance of the Social Construction of Meaning

Although some research in the information field has focused on visual information, little research has paid attention to the meaning construction of visual information by communities of users. For this article, the focus is on the social construction of the meaning of visual information research. Such a research endeavor invites and addresses some of the following research concerns.

--What happens when data and text-based or textual information is visualized? The social construction of knowledge/meaning will become the center of visual information research.

--When data/information is visualized, data/information becomes a visual text. A visual text invites communities of readers/viewers/users to interact with the visual text to construct meaning. A visual text is the result of a behavior with intent, and it is not neutral. Meanings are socially constructed.

--When text-based or textual information is visualized, research methodologies must be developed to study the social construction of knowledge/meaning.

--When text-based or textual information is visualized,

- research methods of visual information-seeking behavior have to be developed for the social construction of knowledge/meaning.
- research methods of organizing information, indexing, and information retrieval have to be developed for the social construction of knowledge/meaning.
- research methods, information representation, or information visualization have to be developed for the social construction of knowledge/meaning.
- research methods of information instruction have to be developed for the social construction of knowledge/meaning.
- research methods of collection management and policies have to change for the social construction of knowledge/meaning.
- research methods of interface design for information systems have to be developed for the social construction of knowledge/meaning.
- the research methods of information visualization have to be developed for the social construction of meaning.

--When visual information may not be quantifiable, quantitative research methods may or may not be sufficient or applicable for most of the research on visual information, new and different research methods, and direction need to develop and lead.

--How do communities of the readers/viewers/users extract meaning from visual texts encoded by the authors/designers/libraries?

--How do the communities of readers/viewers/users create meaning while interacting with the visual texts?

--How will researchers approach the above sample of concerns of visual information research?

--What theoretical framework(s) and research methods will be appropriate to carry out visual literacy research for the field of information?

The information field has dramatically embraced the world of visual information. Historically, visual literacy research started in the mid 1960s. The author started to introduce visual literacy to the information field in 1993. A review of some definitions is necessary for the readers.

What is Visual Literacy?

John Debes' offered the following definition of the term:

"Visual Literacy refers to a group of vision-competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret the visible actions, objects, symbols, natural or man-made, that he encounters in

his environment. Through the creative use of these competencies, he is able to communicate with others. Through the appreciative use of these competencies, he is able to comprehend and enjoy the masterworks of visual communication." (1969)

Definitions of Social Construction of Meaning in Visual Literacy Research for the Field of Information Research

Research in meaning construction in this visual information world is a paradigm expansion that requires particular research methodologies and theoretical frameworks to support such research undertakings. In the publication in 2015 (Ma, 2015, p. 2-6), Ma provided the following definitions in the research model to study meaning construction to facilitate reading and understanding of the key concepts.

The author/designer/librarian/information professional is defined as the creator of a text. Text or visual text has two meanings. The first meaning is the physical or visual text one works with. Such a text is a communication created by the author/designer, carrying socially and culturally encoded messages that readers/users of different communities may understand and interpret in various ways. The encoded messages can be decoded or interpreted by the members who share the same membership in the same community. The second meaning is consideration of the socially constructed meanings by the reader/user and the community of readers/users as a text or discourse.

In the field of library and information science, the text refers to documents, monographs, or journals that are in print or digital formats. Text is in contrast to a visual image/object, digital visual surrogate, or visualization in other forms.

A reader is someone who interacts with the visual text. In library and information science, it refers to the library user or patron.

Reading In library and information science, reading is understood as user information-seeking, searching, and information query formation processes. In visual literacy research for information studies, reading is also the process of creating meaning while interacting with a text/visual text. Visual texts contain socially and culturally encoded symbols and signs, which remain dormant until they are received by the reader/user/viewer. It is the reader/user/viewer who creates their meaning.

A community of readers/users/patrons could be a group of people who share similar cultural, social, economic, professional, geographic, and other positions. For example, communities of readers/users familiar with the same culture can read the text and share ideas with members from the same community.

In library and information science, the community of readers/users/patrons refers to the community concerned with service and/or the community of users that share similar cultural, social, economic, professional, geographic, and other positions.

Intertextuality suggests that certain meanings of one text are created only by the existence of related texts (De Vaney, 1987). Brenda Marshall (1992) notes that "intertextuality is precisely a momentary compendium of everything that has come before and is now. Intertextuality calls attention to prior texts in the sense that it acknowledges that no text can have meaning without those prior texts, it is space where 'meanings' intersect" (p. 128).

In the library and information science field, intertexuality refers to particular meanings or interpretations of one information search strategy or metadata construction or subject analysis created only by the existence of other documents or texts.

Visual intertexuality suggests that the availability or accessibility of related visual texts constructs particular meanings of one visual text. Meanings are constructed from a visual text in conjunction with the socially situated viewers. Viewers create meanings when they interact with the visual texts through visual intertextuality. (Ma, 2013)

In the field of library and information science, visual intertexuality refers to certain meanings or

interpretations of one information search strategy or metadata construction or subject analysis, which are created only by the existence of other visual documents, objects, surrogates, or visual materials.

Encoding means precisely that --selecting the codes which assign meanings to events, placing events in a referential context that attribute meaning to them (fictional codes perform this work too; it is not limited to the codes of "actuality" and naturalism). (Hall, 1973).

In the field of library and information science, encoding refers to the information storage process where meanings are assigned. Encoding means assigning codes and meanings to metadata in the organization of information, subject analysis, data structure, database design, interface design, information systems, and information storage.

Decoding is defined as meaning which is decoded by the receiver. For a visual text, one needs to be taught and guided to decode visuals correctly. One aspect of visual literacy is interpreting and creating meaning from the stimuli surrounding them.
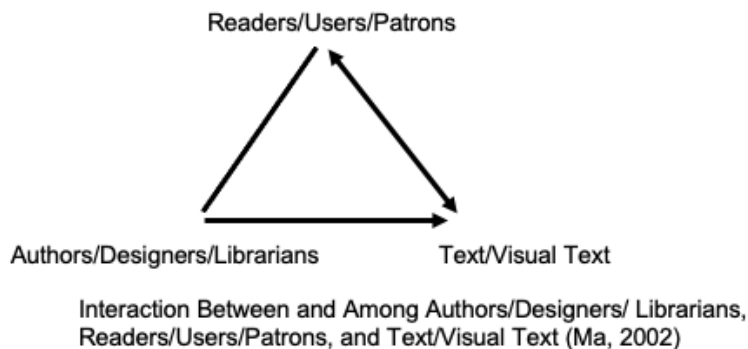
In library and information science, decoding is defined as the process of information retrieval. The user/patron formulates information retrieval strategies to search for information either by him/herself or with the assistance of an intermediary information professional. For example, the reference information professional usually assists with the decoding process, and it happens with a reference interview.

Codes are syntax patterns created by the conventions of production that are repeated daily. The syntax patterns or codes are culturally constructed. They need to be examined for paradigmatic meanings.

In the field of library and information science, such codes frequently appear in metadata schemas, codes for the organization of information, data structures, search structures/options, interface designs, and other related areas.

Figure 1
Research Design Model

Interaction Between and Among Authors/Designers/ Librarians,
Readers/Users/Patrons, and Text/Visual Text (Ma, 2002)

The model shown in Figure 1 explores the relationships between and among the authors/designers/librarians, text/visual text, and communities of readers/users/patrons in the interaction of a visual text. In this model, the critical and social construction of meaning/knowledge by users/patrons/readers/viewers are based on communities of users/patrons/readers/viewers rather than an individual's cognition or constructive or social constructive knowledge. That is the essence of research methodology and theoretical framework to study the social construction of knowledge/meaning in the visual information world by communities of users. For the paradigm expansion in research of information fields, a research model like this allows for ascertaining the social construction of meaning created by authors/designers/librarians, communities of users/patrons/readers, and visual texts. The following research examples illustrate how this research model works.

The Expansion of Theoretical Framework(s) for the Social Construction of Meaning/Knowledge

1. **Paradigm Expansion: The Library is a Semiotic Construct**

Semiotics is one of the theoretical frameworks that are appropriate for visual literacy research of the information field. The library is a semiotic construct. Library operations are semiotically defined; for example, reference services, access services, archival services, technical services, main entries, added entries, access points, description, tagging, manifestations, expressions, attributes, AACR2, RDA, ISBD, MARC tags, fixed field, variables, and many other library terms/signs/images and concepts. The author applies semiotics to study icons on library websites in 1996 and 2006. Ma used the semiotics theoretical framework to support the research design of icon studies on the World Wide Web. The research stated that "Semiotics is the theory of signs. As Eco explains, semiotics' studies all cultural processes as processes of communication' (Eco, 1979, p. 8). Ann DeVaney's semiotic model for analyzing social and cultural issues in educational television is used for the study. This model was based on the theories of Ferdinand de Saussure, Roland Barthes, and Christian Metz, who emphasize that knowledge is socially constructed through language and communication systems. In other words, meaning is socially and culturally built. The concept of the sign contains two aspects: signifier, which is the soundimage, and signified, which is the concept. For example, the relationship between the concept of a 'book' (the signified) and the soundimage made by the word 'book' (the signifier) forms a sign.

'Signs are further organized into systems of meanings or codes' (Muffoletto, 1994, p. 302). Semiotics, like structuralism, studies the relationship between form and meaning. 'Signs are assigned meaning based on historical patterns of use that are recognized within social/cultural groups. These patterns of use are called codes.' (Pomper, 1988, p. 18). A sign comprises two types of meanings: syntagmatic and paradigmatic. Syntagmatic meaning refers to the meaning that is assigned based on syntax or based on the relationships among signs. Paradigmatic meaning is derived from other systems or codes. The icons on the homepages of the WWW carry meaning dependent on the syntax of their use. They also carry paradigmatic meanings derived from other systems or domains." (Ma, 1999, p. 235). This research is an example of using a semiotic theoretical framework to study visual information. A follow-up study was published in 2006.

Another research published in 1999 by Ma and Diodato presented how semiotics can be used as a theoretical framework to study traditional indexing principles for icons indexing the library websites for retrieval. Icons are both indexing devices and signs. They are visual forms of knowledge representation. The researchers "examine icons as visual form of knowledge representation (the structure and features of the icons) to determine how icons are representative of the information to which they are linked. The investigators assessed how each icon on the selected library website satisfied the chosen indexing principle" (Ma, 1999, p. 181).

Does semiotics allow the social construction of knowledge? It has its limitation of structuralist view to limit knowledge representation on form in its visual text.

2. **Paradigm Expansion: Theoretical Framework for the Concept of Library Users: Communities of Library Users**

In 2015, through a series of talks and presentations, Lorcan Dempsey popularized the views of Douglas Zweizig who had urged library staff to think about the library in a new way: think of the library in the life of the user, not the user in the life of the library (Zweizig, 1973) (Bedi and Webb, 2020, p. 127).

Libraries have been evolving in this visual information world in the user's life. Visual literacy has been playing an increasingly important role in enriching libraries in the life of the user. In the visual information world, the expanded theoretical framework to support Dr. Zweizig's views of "the library in the life of the user" will be the expanded concept of "the library in the lives of communities of users." This expanded view is especially meaningful in the visual information dynamics and the changing diverse world to focus on the library in the lives of diverse communities of users. When the library shifts its services to the communities of users in the visual information world, the encoding and decoding processes of visual information are also expanded and shifted. At the same time, communities of library users create meaning and construct meaning in the decoding process of library operations and services.

This powerful theoretical framework allows researchers to study the relationships between and among communities of users, authors/designers/librarians/information professionals, and the visual texts in the

meaning construction process.

The following publications provide examples of research to study the relationship between and among authors/designers/information professionals, users/viewers/readers, and visual texts. Based on the author's research on analyzing postmodern art by applying the theoretical framework of reader-response criticism (Ma, 1995), the research was conducted to examine the relationship between and among designers, text, and users of the Galter Health Sciences Library Web site. It asks such questions as "How do Web site designers construct their subject?" or, "Whom do the web designers think their users are?" The study ascertains the intentions of the designers of the GHSL Web site; examines the meanings made by the users through interviews; compares the similarities and differences of designers' intentions with their organization of knowledge represented in the GHSL Web site; and compares the similarities and differences between the designers' intentions and views of the users. A similar research design was used to study postmodern art, film, and data visualization (Ma, 1995, 2004, 2006, 2019).

The reader response theorists emphasize the relationship between the reader, the text, and the author. Unlike structuralist theorists, "all reader-response critics focus on readers during the process of reading" (Mailloux, 1982, p. 20). American reader-response theorist Stanley Fish departed from the phenomenological model of reader-response theory developed by Jauss to a social model. Conceptualizing that meaning is created by the reader in the reading process Fish extended his theory by examining the social construction of knowledge, which influences the reader's subjectivity. His concept of "interpretive communities" provides a basis for analysis of readers of different communities who share a community of interests (Ma, 2002, p. 531-532). "Communities of users are those who share membership in a social, economic, or another natural group, such as age, gender, race, and so forth, and whose interpretations are generally similar because of their membership. Agreement on interpretations may not be visible to group members. Still, the meanings of group signs and symbols have already been negotiated and renegotiated in its members' daily practices. (DeVaney, 1993, p.183) The library in the lives of communities of users in the visual information world remains an important part of information services and research. With the successful research effort to bridge visual literacy with information fields in these examples, the author has examined and developed a mapping of areas of information fields with visual literacy research areas in the hope that more research will be carried out. A list of definitions for the context of this article appears earlier in the article.

A Research Guide of Visual Literacy Research for the Field of Information

For researchers, the author created and designed with revision of the Rubric and Mapping of Library and Information Science Curriculum with Visual Literacy Studies published by Ma in 2015 (Ma, 2015, p. 12-14). This Guide appears in a similar table format but differs in providing a research focus road map to hopefully facilitate or guide researchers to carry out and engage in the paradigm shift, expansion, and inclusion in research methodologies and theoretical frameworks to conduct research in visual literacy for visual information. The Research Guide is the original scholarship and research by the author based on her teaching and research in the visual literacy for information field since 1993. The categories of information studies (LIS Areas) are based on the current information field areas, though it is not an inclusive list of areas of information studies. The categories of Visual Literacy areas and Research Methods/Theories are based on author's many years of research and scholarly communication on visual literacy by the leading scholars in visual literacy. The author has done research since 1993 to examine library and information issues with theories and interdisciplinary research methodologies to carry out visual literacy and information studies. Pioneering research in visual literacy to address issues in the library and information science field using critical and cultural analysis, textual analysis, semiotics, postmodern theories, reader-response criticism, poststructuralism, the social construction of knowledge/meaning, and other social science research methodologies have shown successful research results by the scholars in the following Research Guide. Many research areas in visual literacy for the information field need further research in the areas listed in the Research Guide below. The inclusion of interdisciplinary and new research methodologies will then advance research in visual literacy and the field of information. Traditional and current research methods and theoretical frameworks will continue to support the expansion of other research methods and theoretical frameworks to further research in visual literacy for information fields. These research methodologies and theories embrace and support the research of the social construction of meaning in the visual information world.

Table 1
A Research Guide of Visual Literacy Research for the Field of Information Research--Visual Literacy Research Methodologies, Theoretical Frameworks, Suggested Scholars, and Publications.
(This list of publications are not inclusive, but they serve as the foundations of visual literacy. There is no 2nd edition of Moore's book of *Visual Literacy: a Spectrum of Visual Learning*, but scholars in the book and listed in this Guide are recommended for the readers to follow from then to the present for their continuing research in visual literacy)

Information areas	VL Area	Research Method/Theoretical Framework	Scholars/Publications
Information Nature of Visual Information	Visual Literacy	1. Interdisciplinary studies 2. Foundations of visual literacy and theoretical framework.	Hortin, John. (1994, p. 5-29) Seals, B. (1994, p. 97-112) Moriarty, Sandra, E. and Kanney, Keith (Retrieved on May 18, 2023)
Nature of Visual Information Science	Visual Literacy	1. Interdisciplinary studies 2. Foundations of visual literacy and theoretical framework.	Barry, A.S.(1994, p. 113-132) Branden, R. (1994, p. 193-208) Burton, J.K. (1994, p. 65-83) Metallinos, N. (1994, p. 53-64) Miller, H.B. and Sewell, E. Jr. (1994, p. 135-161) Moriarty, Sandra, E. and Kanney, Keith (Retrieved on May 18, 2023) Stern, R.C. and Robinson, R. (1994, p. 31-51) Thompson, M. (1994, p.165-182)
Visual Information Theory Communication-Models	Visual Literacy	1. Interdisciplinary studies 2. Foundations of information studies and communication models 3. Theories and research methods in visual literacy and visual communication	Moriarty, Sandra, E. and Kanney,Keith (Retrieved on May 18, 2023) Wisely, F. (1994, p. 85-93)
Visual Information Literacy/Equity	Visual Information Rich/poor	1. Interdisciplinary studies 2. Foundations of information studies on information policies on visual information 3. Critical theories	DeVaney, A. (1994, p. 355-379). Dervin, B., & Nilan, M. (1986). Moriarty, Sandra, E. and Kanney, Keith (Retrieved on May 18, 2023)
Visual Information Policies	Encoding process	1. Interdisciplinary studies 2. Foundations of visual literacy and theoretical framework.	Moore, D.M and Dwyer, F.M. (1994) Moriarty, Sandra, E. and Kanney, Keith

	Visual Information Policies		(Retrieved on May 18, 2023)
Visual Information Collection Management	Encoding process	Critical theories in evaluating, identifying, collecting, and acquiring visual materials	Ma, Y. (1995) Moriarty, Sandra, E. and Kanney, Keith (Retrieved on May 18, 2023)
Visual Information Storage: Cataloging Classification Metadata Indexing Abstracting	Encoding process	1. Critical theories` 2. Perception research 3. Visual cognition 4. Visual design 5. Evaluation of visuals 6. Cultural, political, social, and aspects of visuals 7. Ethical considerations of visuals 8. Technological aspects of visuals	Ma, Y. (1996, 1999). Moriarty, Sandra, E. and Kanney, Keith (Retrieved on May 18, 2023)
Visual Information Retrieval	Decoding process	1. Decoding Process 2. Social construction of meaning 3. Semiotics 4. Cultural, political, social, and technological use of visuals 5. Information design 6. Critical theories for analysis/use of visuals	DeVaney, A. (1987,1993) Ma, Y. (1995, 1996) Moriarty, Sandra, E. and Kanney, Keith (Retrieved on May 18, 2023) Muffoletto, R. (1994, p. 295-310)
Visual Information Needs and Information Seeking Behavior	Decoding process	1. Decoding Process 2. Social construction of meaning 3. Semiotics 4. Cultural, political, social, and technological use of visuals 5. Information design 6. Critical theories for analysis/use of visuals	DeVaney, A. (1991, 2001) Fredette, B. (1994, p. 235-256) Griffin, R. (1994, p. 257-275) Ma, Y. (2002, 2006) Moore, D.M. (1994, p. 145-161) Moriarty, Sandra, E. and Kanney, Keith (Retrieved on May 18, 2023)
Interface Design System design	Visual Literacy: Encoding process	1. Interdisciplinary studies 2. Foundations of visual literacy and theoretical framework.	DeVaney, A. (1990, 1993, 1991, 2000, 2001) Ma, Y. (1995) Moriarty, Sandra, E. and Kanney, Keith (Retrieved on May 18, 2023) Knupfer, N. (1994, p. 209-231) Petersson, R. (2002, 2006) Saunders, A. (1994, p. 183-192)
Evaluation of Visual	Decoding process	1. Critical theories 2. Critical use of visuals 3. Perception research	Bisplinghoff, G. (1994, p. 337-351)

Information Systems		4. Visual design 5. Evaluate visuals 6. Information design 7. Cultural, political, social, and aspects of visuals 8. Ethical considerations of visuals 9. Technological aspects of visuals	Couch, R. A., Caropreso, E.J., Miller, H. (1994, p. 277-294) Muffoletto, R. (1994, p. 295-310) Yeaman, A.R. (1994, p. 311-336) Moriarty, Sandra, E. and Kanney, Keith(Retrieved on May 18, 2023). Pettersson, R. (1993, 1997). Ma, Y. (2015)
Research Methods	Research Methods	1. Interdisciplinary studies 2. Social construction of knowledge/meaning 3. Critical theories	DeVaney, A. (1994, p. 355-379) DeVaney (2001) Dwyer, F.M.(1994, p. 383-401) Ma,Y. (2015) Moriarty, Sandra, E. and Kanney, Keith(Retrieved on May 18, 2023) Nichols, R. (1994, p. 369-379

Conclusions

Seeing a visual or a visual text does not automatically ensure that one will learn from it or become visually literate. Research in visual information has confronted and challenged the information profession with the constant creation of meaning via metadata, presentations/representations of knowledge, visual navigation, visual interconnectivity, visual intertextuality, and a spectrum of visual information seeking behavior and services as a postmodern enterprise instead of a traditional static enterprise. Researchers are urged to embrace critical theories toward decoding the meaning of visuals while carefully encoding record knowledge for diversified dimensions. Visual literacy prepares information researchers to study and lead in research of the social construction of knowledge/meaning in this visual information world.

The proposed paradigm shift, expansion, and inclusion do not exclude but expand the traditional research methods and theoretical frameworks. It introduces new research methods and theoretical frameworks of visual literacy research to the information field. We not only can continue to use the social science research methods and other interdisciplinary research methods of quantitative and qualitative approaches but also innovate, expand, and include new and different research methods and theoretical frameworks to conduct and support the research of visual literacy and information. Such advancement of research will enhance information field research, education, and professional services in this visual information world. This research paradigm shift focuses on expanding from text-based information research and its services to a paradigm expansion and inclusion of visual information research methodologies, theoretical frameworks, advancements, and embracement of an interdisciplinary spectrum for research opportunities to establish a critical and social construction of knowledge by examining the encoding and decoding of the meaning construction process in the visual information world.

When esoteric theories used in visual literacy research are introduced to an applied field like information and library science, it takes time and effort for new or different research methodologies to be developed, evolve, and mature. When a paradigm shift and expansion are introduced, it will take time to establish itself. There will be little literature to form a body of scholarly communication to begin or establish the new

research base. Citation analysis at that point or for a while will not be meaningful or applicable, or noteworthy until intellectual communities become sizable and establish themselves for consistent research foundations and communities. For scholars pioneering in this paradigm expansion and shift, there may be little citation analysis to indicate their leading scholarship to be cited or measured by citation analysis until such pioneering research has formed a big enough intellectual community or established standards in these new research areas. In fact, actual research goes beyond citation analysis. Authentic researchers conduct research to advance knowledge, enrich education, solve problems, and share scholarship. Visual literacy for information research is an example of a paradigm expansion and inclusion of different research perspectives and methodologies.

In 2015, the author responded to the ACRL Visual Literacy Competency Standards for Higher Education in the special edition of *the Journal of Visual Literacy.* This article further supports its implementation for its research realm of the 2011 ACRL Visual Literacy Competency Standards for Higher Education and the *2022 Framework of Visual Literacy for High Education.* The current and future publications resulting from these standards/framework have started to create a body of literature to add to the existing literature of visual literacy and/or ACRL Visual Literacy Competency Standards for an expanded understanding of visual literacy and interdisciplinary research, support, and appreciations of visual literacy and the ACRL Visual Literacy Competency Standards for Higher Education and the *2022 Framework of Visual Literacy for High Education.*

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A Liquid Syllabus: A Visual Starting Point

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Abstract

A syllabus is the first introduction to a course. It can either provide a warm welcome to a course or be seen as an overwhelming list of rules and requirements, leaving students feeling that they cannot be successful. To use the syllabus to promote equity and inclusion in an online course, the author developed a web-based syllabus. This visual approach can welcome students. This interactive approach can provide transparency and support. It can also offer relatedness, accessibility, and social and teacher presence, which helps promote a positive learning community. An example of how this syllabus was developed and used in an online course is included. There is also an alternate way to create a visual, accessible syllabus. Students responded positively to using a liquid syllabus. Other course design professionals, as well, evaluated the syllabus as a beneficial strategy for inclusion.

Keywords: equity*,* inclusion*,* liquid syllabus, transparency, visual interaction

Introduction

What if a new method could allow instructors to start an online course in a way that was welcoming and transparent? What if this start allowed visual interaction and firmly established the instructor as a supportive and approachable presence? What if this approach was not only a way to gain student buy-in for the class norms but also an opportunity to provide visual guidance on course content rather than dense text-based directions? To try a new syllabus approach as a basis for an inclusive learning community, would educators give up a traditional syllabus?

When I began developing an online general studies course for undergraduates, I was interested in implementing course design strategies that promote diversity of thought, fair treatment, and inclusion of all individuals. From the perspective of an instructional designer, my reasoning was that diversity, equity, and inclusion can be advanced by how a course is designed rather than just by the content of the course. Since the syllabus is the starting point of a course, that is where I started. The syllabus needed to be easy to access, visually engaging, and interactive. How could I do this in a way that would establish the importance of equity and inclusion in this learning community? What could I do to engage these students who may ordinarily skip reading the syllabus?

In this paper, I will examine how traditional syllabi may not support equity and inclusion. I will define the idea of a liquid syllabus, and then review the theoretical basis for using this new kind of syllabus. Subsequent topics include how I designed and used a liquid syllabus in an asynchronous online course, student reactions to the liquid syllabus, and the strategy review by professional course designers.

Objective

To use a syllabus to establish equity and inclusion in an online class, it is essential to consider what equity and inclusion mean.

Equity means a standard of fair treatment for all in a learning community. It ensures that all participants have equal access (Rucci, 2021). It is easy to think about equity in the question: "Does every participant have a chance for success in our learning community?" (Garcia et al., 2021, p. 139).

Inclusion in a learning environment ensures that everyone can be authentic and respected (Rucci, 2021). Inclusion concerns belonging, making connections, and having the safety to learn. According to Garcia et al. (2021), the inclusion test asks: "Are we hearing the ideas from all?"

Now consider a traditional syllabus. Many such syllabi include aggressive language, compulsory words such as *must*, negative words such as *never*, or highlighted and bold text such as **"*Don't be late to class*"** (Taylor et al., 2019). They may also focus on a lengthy set of rules rather than student success (Taylor et al., 2019).

Understandably, instructors may need to be clear with expectations and close all the possible loopholes. Does a traditional syllabus, however, provide an opportunity for success and promote connection and safety? When I surveyed fifty-nine students at a comprehensive state university, twenty-nine reported feeling that there have been times that a syllabus has made them feel they could not succeed in a class.

The objective of this paper is to demonstrate how a syllabus can be reimagined to support equity and inclusion in a course. This new syllabus is a web-based, interactive, visual form of a syllabus designed to reach diverse students.

A liquid syllabus

When researching ways to prepare a welcoming syllabus, I was introduced to the work of Dr. Michelle Pacansky-Brock, a noted leader in higher education with expertise in online teaching (Pacansky-Brock, 2020). Pacansky-Brock (2020) proposed a liquid syllabus. She defines a liquid syllabus as a website-based tool devoid of aggressive language, easily accessible, and fluid so it can be adjusted when it meets the needs of the learning community (Pacansky-Brock, 2017).

This syllabus can be reached from outside the learning management system (LMS), making it more accessible to all students, including those who rely on a phone more than a computer. It consists of multiple formats for sharing information, including video and visuals, rather than just text. Moreover, it is interactive. Students can contribute to this kind of syllabus rather than having it handed to them. It can also be adjusted and updated throughout a semester to add new items as needed (Pacansky-Brock, 2020).

Theoretical Framework

To understand how a liquid syllabus can promote equity and inclusion in a learning community, I will explore two educational theories and how they support using a liquid syllabus. These theories are Self Determination Theory and the Universal Design of Learning.

Self Determination Theory

The Self Determination Theory (SDT) identifies three learner motivation and engagement requirements. They are autonomy, competence, and relatedness (American Psychological Association, 2021). Figure 1 shows how to apply the requirements of SDT. SDT maintains that when students have options in a learning situation (autonomy), feel supported and able to succeed (competence), and are connected in a learning community (relatedness), there are positive learning outcomes. (Hsu et al., 2019)

This theory, developed by Richard Ryan and Edward Deci in 1977, challenged the widespread belief that motivating students can only be accomplished by offering rewards (American Psychological Association, 2021). Even today, this is still relevant.

The component of SDT to consider when thinking about the syllabus is relatedness. Relatedness can be fostered by instructors working to be approachable, striving to ensure the learning community is open and safe (Bunce et al., 2019). Bunce et al. (2019) showed that black and minority ethnic (BME) students have many barriers to achieving autonomy, competence, and relatedness in higher education. This inability to meet the three basic needs of SDT erodes the student's goals for academic success (Bunce et al., 2019). According to Ramos and Wright-Mair (2021), imposter syndrome, or feeling inadequate in an academic setting, is a common issue among students with multiple minority identities.

Figure 1
Application of SDT (Zacrosser, 2020)
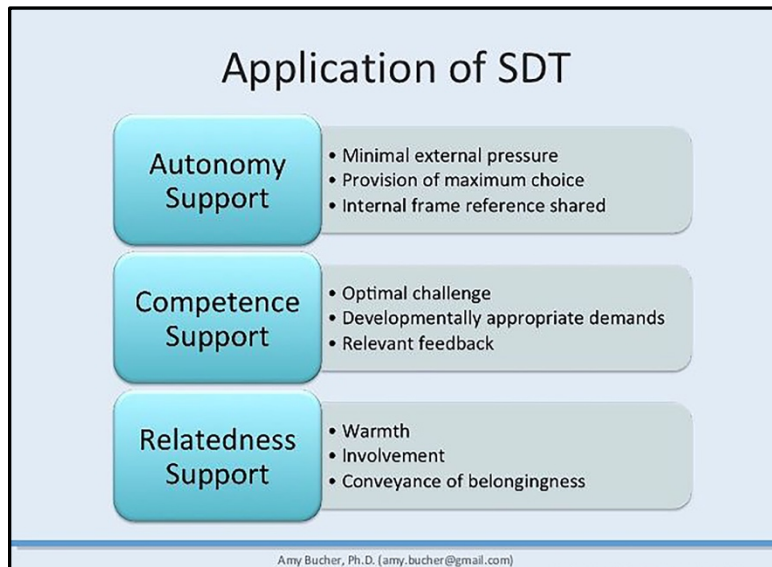
If a liquid syllabus can support the SDT requirement for relatedness, it can help promote learner motivation and engagement.

Universal Design of Learning

Universal Design (UD) was initially developed in 1997 by architects, engineers, and product designers, including Ronald Mace, but now the principles can be applied to education. They are referred to as the Universal Design of Learning (UDL) (Centre for Excellence in Universal Design, 2020). For education, the principals of UDL require three components. They are engagement, representation, and expression; the why of learning, the what of learning, and the how of learning (CAST, 2022). Although many think of UDL in course design as making sure that aspects of the course are accessible to students with physical disabilities, it is also about creating a variety of learning experiences that engage students in different ways to meet the needs of a diverse learning community (Dalton et al., 2019).

A liquid syllabus can help meet the goals of UDL by providing different ways for students to access information about course materials, including visual multimedia explanations rather than just text (CAST, 2022). This definitely changes the "how of learning."

It is important to know that more U.S. 4-year college students own a cell phone than a computer (Brooks & Grajek, 2020). The fact that a liquid syllabus can be reached from a mobile device makes it more accessible than a traditional syllabus posted in an online course, which needs to be accessed from a computer through an LMS. Even if students access course materials consistently through the LMS, it is a nice option to be able to reach the course syllabus from a mobile device if necessary for a quick check.

Example in an Online Course

Now that I have established the theoretical basis for using a liquid syllabus to improve equity and inclusion in an online course, I will provide an overview of how I apply it in an example course.

Description of the Course

The course where I used the liquids syllabus in Spring 2022 was GIS 4466, Sustainable Fashion: What and Why. Figure 2 shows the landing page for this course. This course is an asynchronous fifteen-week online course. It is a general study elective with the goals of helping students critically examine the fashion industry's environmental impact, analyze opposing points of view related to sustainability, and consider

Figure 2
GIS 4466 Landing Page and Menu
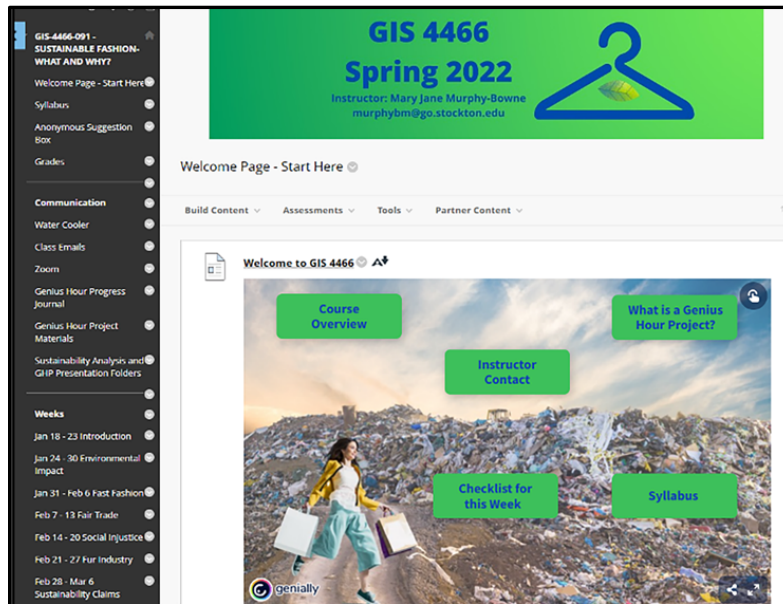
personal consumer choices and their impact. The liquid syllabus was included as a link in the course menu, and the link was emailed to students a week before the start of class.

Twenty-five juniors and seniors were enrolled in this course and represented various majors. Spring 2022 was the first time this course ran.

Syllabus Content
This syllabus was created using Google Sites and comprised seven pages. I selected this tool because it is a free website creation tool. The pages included a home page, the learning alliance, the course schedule, assessment and expectations, resources, a Genius Hour Project (GHP) overview, and major class project pages.

Home Page
The home page included a welcome video. This provided an opportunity to establish an instructor presence in a welcoming way. It also included a video showing students how to navigate the course using the course menu to find all the materials. Figure 3 shows the home page.
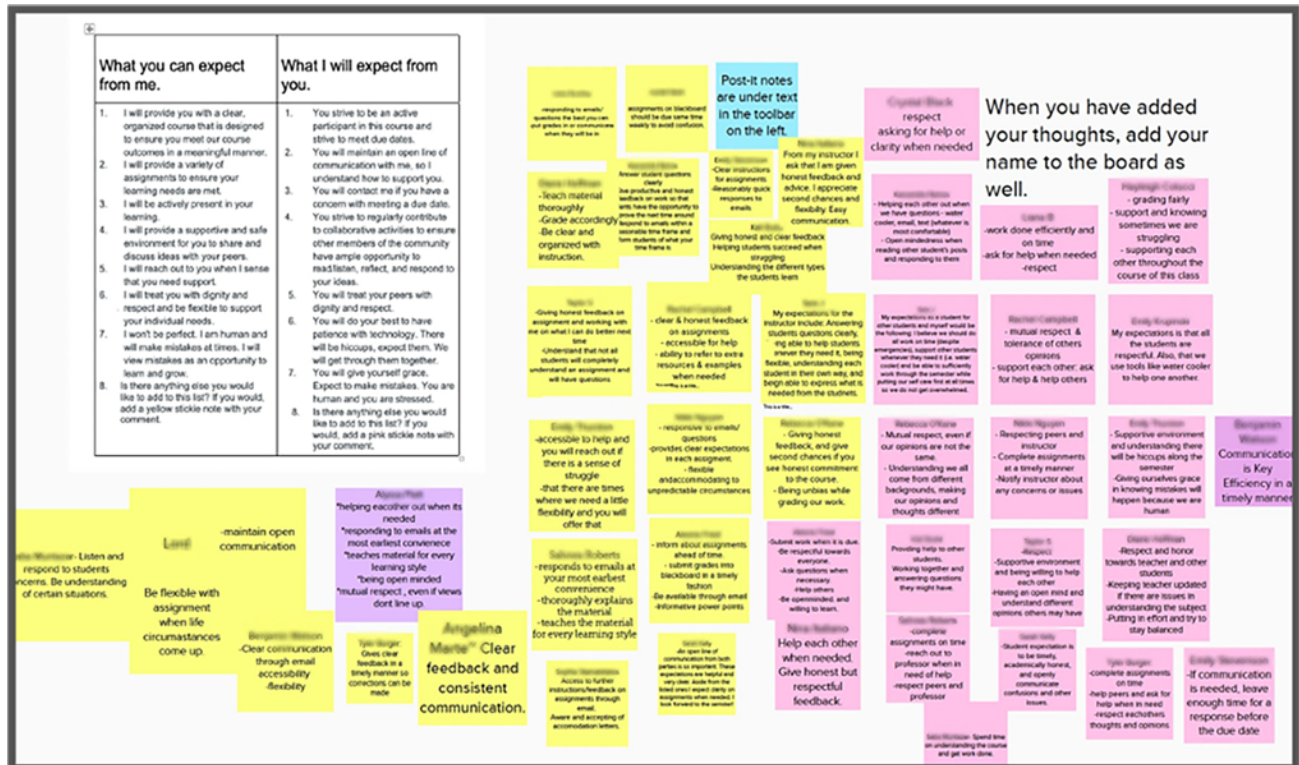
Learning Alliance
The Learning Alliance provided the opportunity for students to contribute to the norms of the learning environment. It was inclusive in that all students contributed to the norms. During the first week of the course, students participated in a class activity using an interactive whiteboard tool called Mural. A set of expectations for the instructor and students in the class were included on the board as a starting point. These were the suggested points from Pacansky-Brock, (2020). Students added yellow sticky notes to suggest additions or edits for expectations for the instructor and pink sticky notes to add suggestions for the students in the learning community. Student suggestions are in Figure 4. Student names have been deliberately blurred for privacy.
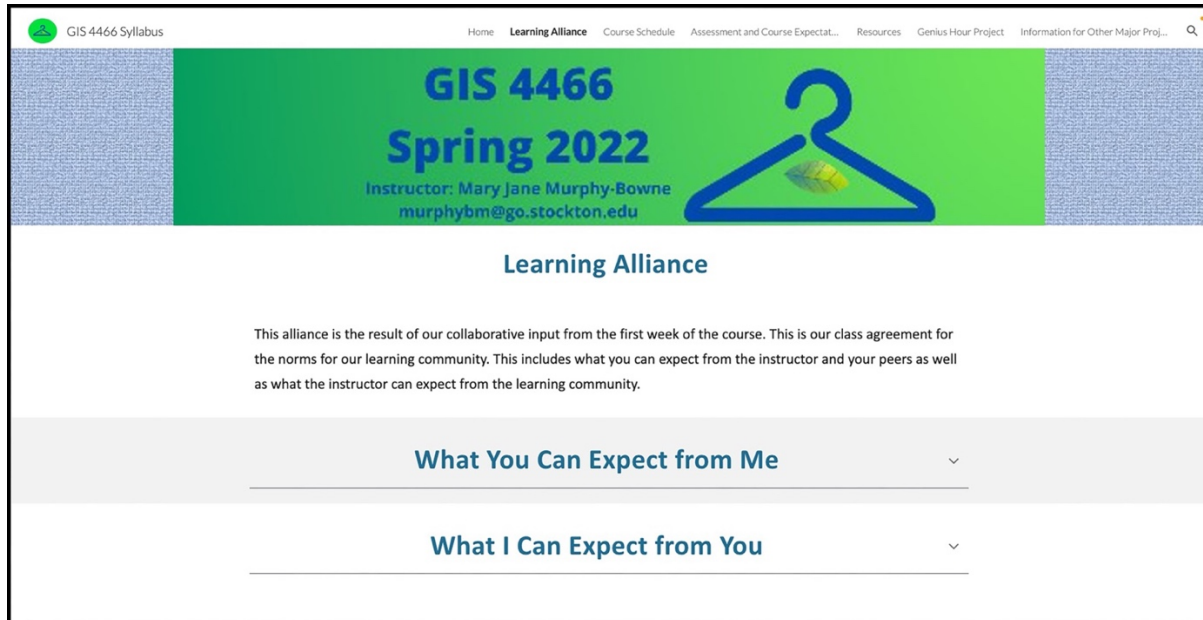
Figure 3
Home Page
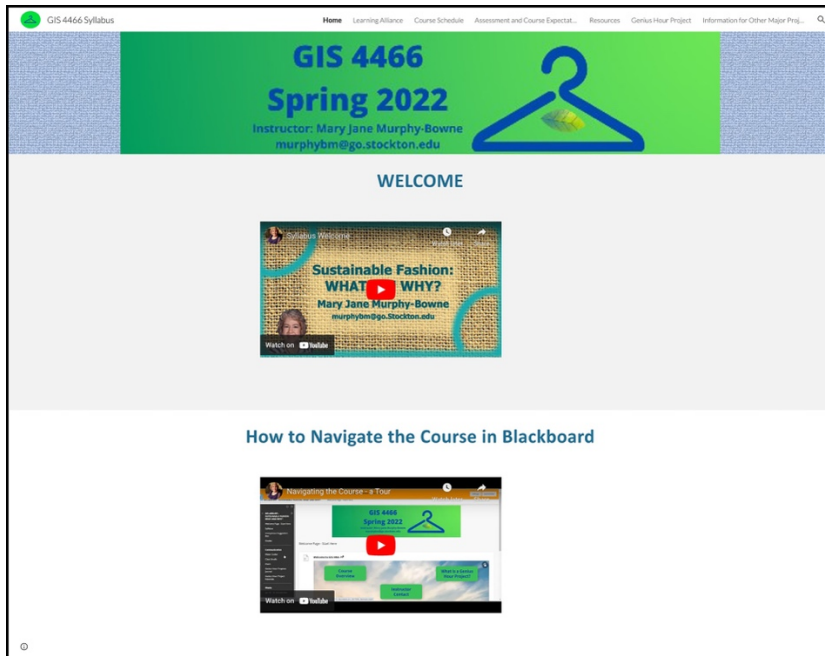
Figure 4
Learning Alliance Creation Activity

The suggestions were added to the original norms to create the norms for the learning community. These were then added as the learning alliance page in the liquid syllabus. You can see this page in Figure 5.

Figure 5
Learning Alliance Page

Other Sections
Other sections included a course schedule, an area that explained how the course would be assessed, and a section for resources. Here students could find information about major assignments outside of the LMS. The directions were not just text-based but included multimedia presentations to support the learners visually. New resources could be added when deemed necessary to support the students. The other sections can be seen in Figure 6.

Now that I described the liquid syllabus created for GIS 4466, I would like to discuss how I evaluated this strategy's effectiveness. I evaluated it from the student's point of view as well as the course designer's point of view.

Student Evaluation
I used an anonymous Google form to allow students to evaluate the design strategies, including the liquid syllabus I used in the course. Participation in the survey was anonymous, so the participants´ demographics were not collected. Out of the class of 25, 16 students consented to complete the survey. Of those 16, 14 submitted it. Open-ended questions provided qualitative data, and Likert scale questions provided quantitative data. Table 1 shows the results of the Likert question provided about the syllabus. Students showed strong agreement on a scale of 1 to 5, from strongly disagree to strongly agree.

Figure 6
Other Syllabus Pages

Table 1
Syllabus Likert Question Results

Question	Mean	SD
The syllabus helped me feel welcome in the class community.	4.571	0.646

Students also discussed the syllabus in their comments in the open-ended questions. Notable student comments included: "very different than what I am used to," "helped me to get to know the professor," "organized and easy to follow," "interactive," and "would have liked a printable version also." As a result of the request for a printable version, that is an adjustment that I have made for future students.

Professional Review
I also asked professionals with course design responsibilities to evaluate several aspects of the course, including the liquid syllabus. For the professional evaluation, 20 professionals were invited to participate, and eight submitted evaluations. Volunteers were recruited from the university where I taught the course, from the community college where I was employed as an instructional designer, and from the cohort and alumni in the university's instructional technology master's program. The professionals included instructional designers, instructional technology specialists, and higher education faculty members. Their experience ranged from one year to 20 years. These professionals evaluated the course strategies for contributions to diversity, equity, and inclusion using a 4-point rubric, with four being the highest score.

The rubric was developed inspired by the Quality Matters Higher Education Rubrics for Online & Blended Learning (Quality Matters, 2021). Figure 7 shows the rubric categories and goals. Participants scored each goal on a four-point scale, with four showing strong evidence to one for limited evidence.

Figure 7
Professional Rubric Categories and Goals

Category	Goals				
Introduction	1.1 Instructions are clear on where to start and how to navigate the course in the Welcome section of the course.	1.2 Ways to communicate with the instructor and peers are clear.	1.3 The instructor provides an introduction that is welcoming.	1.4 Learners have an opportunity to introduce themselves to the instructor and each other	
Assessment	2.1 The ways that students are assessed are varied to support the strengths of diverse learners.	2.2 The course provides a variety of ways for learners to track their progress and receive supportive feedback	2.3 How work will be evaluated is clear to the learners.		
Course Materials	3.1 A variety of course materials are used to reach diverse learners.	3.2 There are ways for students to ask questions and get support if they need help with course materials.			
Learning Activities	4.1 Learning activities support interaction and active learning.	4.2 The instructor is actively present in the course activities.	4.3 The course activities support student autonomy.	4.4 The course activities are relevant to a wide range of students.	4.5 The learning activities provide opportunities for student collaboration.
Course Technology	5.1 Tools used to promote student engagement	5.2 A variety of tools are used.			
Usability	6.1 Instructions are clear and provided in a variety of ways to support diverse learners.	6.2 The course is accessible to a variety of learners.	6.3 The course is easy to navigate and consistent in how it can be navigated.		
Diversity, Equity, Inclusion	7.1 This course meets the needs of a diverse group of students.	7.2 This course provides a fair experience for all learners.	7.3 This course provides an open welcoming learning community.		

Based on a 4-point rubric, the average score for diversity questions was 3.86. The average score for equity questions was 3.83. The average score for inclusion questions was 3.87. Figure 8 shows how the professional rubric goals were grouped into diversity, equity, or inclusion categories.

Figure 8
Professional Rubric Goal Categories

	Diversity	**Equity**	**Inclusion**
Item Number	2.1, 3.1, 4.4, 5.2, 6.2, 6.3, 7.1	2.2, 2.3, 3.2, 6.1, 7.2	1.1, 1.2, 1.3, 1.4, 4.1, 4.2, 4.3, 4.5, 5.1, 7.3

The professionals also had the opportunity to respond to open-ended questions. The question about the syllabus was, "How does using a liquid syllabus as a strategy support diversity, equity, and inclusion in this online course?" Notable responses from the professionals about the syllabus are displayed in Figure 9.

Figure 9
Professional Feedback – Notable Responses about the Liquid Syllabus

> **Notable Responses**
>
> I believe having the liquid syllabus allows the students to have access to course information in multiple ways (e.g. Blackboard and Google Sites) and intern gives the students the ability to access it anywhere. Also, adding the videos and actually seeing you can give the students the opportunity to be comfortable with you and see how you all could be relatable.
>
> You invite students on a journey of learning something new. And you as an instructor invite learners to be your partners throughout the course.
>
> Liquid syllabi allow course expectations to be explained in a variety of formats. It isn't as overwhelming as the "wall of text" of a traditional syllabus. It breaks down the syllabi more, easier to read, and easier to understand
>
> The use of a liquid syllabus is a creative way to support diversity, equity, and inclusion in an online course. In this course, the instructor used a liquid syllabus to provide her students with a welcoming introduction video. Throughout the video, the instructor does a great job of fostering a connection with her online students.
>
> Students can easily access and navigate the liquid syllabus on their cell phones using a link provided by the instructor. Overall, the liquid syllabus encourages students to engage in their learning experience.
>
> Adding visual and auditory communication to the syllabus is a way of reaching diverse learners and helps clarify information and direction beyond simple text.
>
> Additionally, tis syllabus was nicely broken down by separate taps, which made for easy searching and points of reference, and also supports DEI.
>
> A Google site for a syllabus has changed my perception of the way it should look. It's so naturally designed. How could it be any other way!? Wow!

The reviewers found the liquid syllabus to be a good way to foster a connection with students and found it less overwhelming than a wall of text in a typical syllabus. Although one reviewer commented, "I prefer an old fashion syllabus," most of the reviewers thought that the liquid syllabus "allows course expectations to be explained in a variety of formats. It isn't as overwhelming as the wall of text of a traditional syllabus." One reviewer even noted that "A Google site for a syllabus has changed my perception of the way it should look." This is a strategy that could be shared as a new approach for supporting DEI for course design professionals, as many were excited by this new approach.

Alternate Formats

While the results from students and professionals were very positive about using a liquid syllabus to support equity and inclusion in an online course, is this a realistic undertaking? As an instructional designer, do I suggest this strategy to the instructors I support?

To be honest, I do hesitate. There is a significant time commitment to implement a liquid syllabus. It also requires access to a Google Suite account or another website creation tool. Some instructors do not have the time or the resources to implement this strategy.

There is still a way to provide an interactive, visual syllabus that can be accessed outside the LMS. I have worked with some faculty members who wanted to create a more visual and interactive syllabus using ThingLink. ThinkLink is an educational media tool that can be used to create interactive images. This can be the basis for a visual syllabus that is easier to prepare. Using ThingLink, instructors can include multimedia, break up long text passages, and welcome students in a visual manner. ThingLink can be easily embedded in an LMS and can include a link for a fully accessible version. A ThingLink syllabus can also be linked in the course menu of an LMS, and access could be provided as a link in a welcome email before the class begins. The benefit of using ThingLink is that it takes less time to create an interactive syllabus than to create a Google Site syllabus. Figure 10 shows an example of a ThingLink syllabus.

Figure 10
ThingLink Syllabus Example
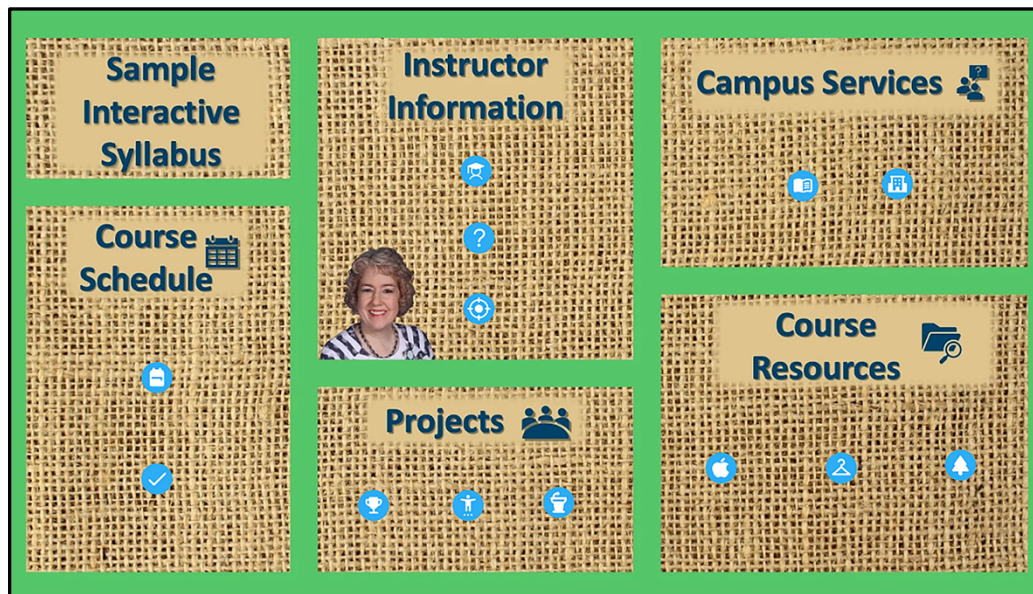
Summary and Conclusions

This paper focused on using a web-based visual syllabus to promote equity and inclusion in an online course. I discussed the definition of a liquid syllabus and the theoretical basis for using a liquid syllabus. I provided an example of how I developed and used a liquid syllabus in a course and outlined student and professional reactions to the liquid syllabus. I found the use of a liquid syllabus to be well-received. I understand that using a web-based syllabus can be time-consuming and may require resources not available to all faculty members. However, an interactive image tool like ThingLink provides an easier alternative for providing an interactive, visual syllabus. This new kind of visual syllabus can certainly be the starting point for a welcoming learning community and an equitable and inclusive course.

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Audiovisual Literacy and the Anthropology of Music

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Abstract

The paper presents three examples of ethnomusicological documentaries, all dealing with music cultures but deriving from diverse methodological viewpoints and techniques, to analyze how music, sound, and other aural dimensions of ethnographic films could enhance audiovisual literacy practices. The main focus of this review is on the cinematic representation of the nonrepresentational art of music to establish awareness of image-sound literacy and seek a balance between visual and audio channels in contemporary multimedia contexts. The purpose of this interpretation is to investigate how the visual matches with the aural aspects in these ethnographic documentaries and to inaugurate alternative approaches to handle the relationship between sonic and optical film narration. In this respect, our study attempts to critically expand the idea of "visual literacy" to a more comprehensive concept of "audiovisual literacy," offering a more holistic approach to understand and communicate multimodal phenomena.

Keywords: audiovisual literacy, music anthropology, ethnomusicological film, ethnographic documentary

Introduction

The role of media has changed over the years, and, today, they operate not only as documentation tools but also as independent channels for the analysis and interpretation of various phenomena for the humanities and sociocultural studies. However, the conjunction of images and sounds through audiovisual representation as a significant research and literacy means has not been widely established. According to the Western taxonomy, vision is the noblest of the five senses (Jütte, 2005, p. 64-65); thus, the perception of audio expressions has been scarcely investigated in the context of modern audiovisual channels. Despite the benefits of illustrating human lives and behaviors, scholarly and educational environments do not largely implement audiovisual practices. However, there are specific films — the ethnomusicological/anthropological films on music cultures — that focus on sound and music as key components of the audiovisual continuum. This paper highlights how visual and acoustic representation can document sight and sound phenomena and reveal them in profound and innovative ways. What can we learn about specific cultures, practices, performances, and their interaction through the film lens and cinematic soundscapes? What is the role of an ethnographic film's acoustic narration? How can we train ourselves to decode audiovisual elements featured in this kind of film? How does the audiovisual context of musical practices contribute to creating and sharing knowledge? Could we critically expand the idea of "visual literacy" to a more comprehensive concept of "audiovisual literacy"?

To shed light on these questions, the paper presents three selective examples of relevant documentaries, all dealing with music cultures but deriving from diverse methodological viewpoints and techniques. Our study focuses on the cinematic representation of music as a nonrepresentational art to establish awareness of audiovisual literacy and seek a balance between the visual and the audio channels in contemporary multimedia contexts. Arranged in chronological order by their year of release, the films involve faraway communities and their music practices, using the anthropological approach of ethnographic fieldwork (Pink, 2001). One of our main interests is to investigate the way the visual matches the aural aspect of these films. The analysis is selectively aimed at these three documentaries that establish an alternative way to handle the relationship between sonic and optical film narration; namely, *Siaka, an African Musician* (Zemp, 2005), *Roaring Abyss* (Piñero, 2016), and *Voices of the Rainforest: A Day in the Life of Bosavi* (Feld & Richards, 2019).

Theoretical and Methodological Conceptualization

We could define the anthropology of music as the study of music concerning culture, that is, music perceived within its social context and not as an absolute, mechanical, and self-referral process (Merriam, 1964). Furthermore, ethnomusicology is the scientific research of music as a sociocultural performance to understand not only what music and music-making are but also what they mean to their practitioners and audiences (Rice, 2014, pp. 9-10). On the other side, media literacy is a selective conception of literacy that involves the ability to access, analyze, evaluate, and create media in various forms (Thoman & Jolls, 2005). Contemporary audiovisual media have been largely used for this scope, although there is an emphasis on their visual features against their aural qualities. The use of audiovisual media in ethnomusicology and anthropology of music is not recent in terms of meeting new needs or modes of expression. The theoretical and methodological foundations of the advent of film and video in music anthropology were introduced many years ago as tools for academic exploration based on ethnographic fieldwork. It is not easy to determine the exact origins of the history of ethnomusicological films; we could instead look for its roots within the initial steps of ethnographic filmmaking. Films of ethnomusicological interest are linked to anthropological films and ethnographic documentaries that investigate music as cultural performance (D'Amico, 2020, p. 23-24).

As early as the 1930s, German and English ethnomusicologists encompassed film within their field research procedures. At the same time, anthropologists recognized the innovative assets of moving images and used film to record and analyze either body movement or nonverbal communication related to music. For example, as a pioneer of visual anthropology, Franz Boas paid special attention to music and dance, as he considered performing arts to be an integral part of human culture (Ruby, 1983, p. 27-29). After the end of World War II, various styles of ethnographic, anthropological, and ethnomusicological films were created in Europe. The most important of these were the "concept film" style of the Institute for Scientific Film in Germany, the "participatory camera" style of Jean Rouch and his descendants at the National Center for Scientific Research in France, as well as the "portrait film" style of John Baily and the National Film and Television School in England (D'Amico, 2020, p. 24-25). During the 1960s, most ethnomusicologists adopted audiovisual recording as an essential tool for fieldwork in music (Rice, 2014, p. 39-40). As soon as the late 1970s, video documentation with small, light, cheaper, and easy-to-use cameras made it easier to shoot with direct sound throughout on-site research and motivated ethnomusicologists to create more films (Simon, 1989, p. 40).

Over the past decades, a subfield of ethnomusicology and music anthropology, which could be defined as "audiovisual ethnomusicology," has emerged and begun to develop. This domain underlines the combination of the cultural study of music and visual anthropology. The subject matter of this new discipline is the "ethnomusicological film." Although the term is under construction, ethnomusicological films are recognized as effective ways to audiovisually explore and represent music within its natural and cultural environment. In particular, these films depict the lives of musicians, highlight musical and social structures, and introduce a holistic ethnographic approach to peoples' musical and sound practices (D'Amico, 2020, p. 22-23). There is no universally accepted norm for what exactly an ethnomusicological film is, how it is made, and how — ultimately — it should be interpreted. Ethnomusicologists and music anthropologists produce films using diverse methods and techniques. Each adopts different strategies, such as ideas and criteria for filming and editing, methods of collecting and analyzing data, ways of applying novel research tools, and channels of communicating their work to the broader public. Their distinctive goals, intentions, and approaches result in a compilation of means aiming to visually inscribe musical realities during their research fieldwork (Killick, 2013, p. 82).

There is a need to connect ethnographic films and documentaries, which intend to represent particular facets of music cultures, with audiovisual literacy and pay equal attention to both visual and auditory stimuli. This process requires sticking with Michel Chion's concept of "audiovisual contract" — ideal for all audiovisual media — as "a kind of symbolic contract that the audio-viewer enters into, consenting to think of sound and image as forming a single entity" (Chion, 1994, p. 216). As seen in Figure 1, the audience tends to forget that sound and pictures are coming from different sources and considers these two components to be parts of one the same world.

Figure 1
The illustration of Michel Chion's "audiovisual contract"
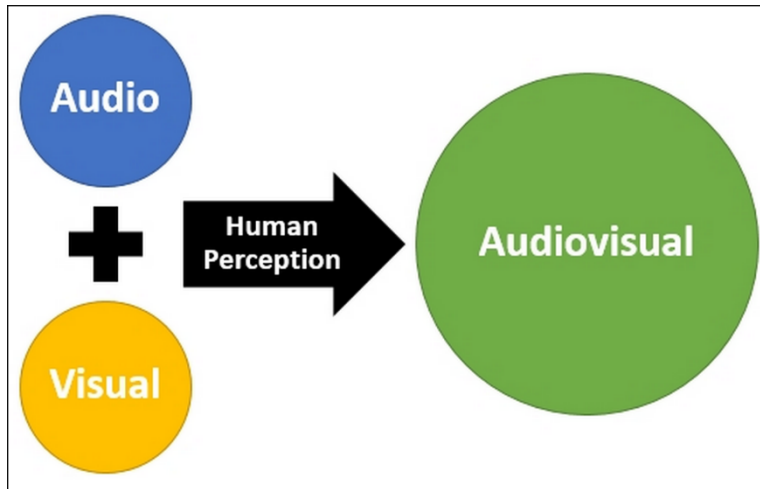
Films' Outlines and Contextualization

The first film analyzed is *Siaka, an African Musician.* It is a 2005 film directed by Hugo Zemp, presenting Siaka Diabate, a musician from Côte d'Ivoire. Having a mixed ancestry, Siaka is not a pure griot (troubadour), although he considers himself one. He has the musical talent to be recognized as an accomplished musician. The film documents Siaka performing with the Soungalo Group while practicing his instruments (Figure 2). Zemp's film includes five chapters, each dedicated to one of the instruments played by Siaka. It also includes interviews with him and master drummer Soungalo Coulibaly about Siaka's music life story. Ethnomusicologist and filmmaker Hugo Zemp is a prolific folk music researcher and has created several films on music from Africa, Oceania, and Switzerland. Besides his recorded discs and ethnomusicological analyses, Zemp has also written several articles on filming ethnic music.

Figure 2
Still image from the website of the film "Siaka, an African Musician"

The second film is Quino Pinero's *Roaring Abyss* — a sound journey across the mountains, deserts, and forests of Ethiopia and its vivid cultural universe. Produced in 2016, *Roaring Abyss* takes the viewer through the miscellaneous music scenes spread all over the country and, thus, manages to keep a record of this dynamic tradition of unreleased music recordings regarded as important for the transmission and preservation of African musical heritage. It constitutes the outcome of the director's two-year fieldwork in rural Ethiopia that revealed and documented rich music practices of these places — a material afterward transmuted in this audiovisual survey (Figure 3). Piñero is a sound engineer, music/sound producer, and documentary filmmaker working in Africa and Europe.

Figure 3
Still image from the website of the film "Roaring Abyss"

Finally, *Voices of the Rainforest: A Day in the Life of Bosavi*, created by Steven Feld and Jeremiah Ra Richards in collaboration with the Bona community of Bosavi people in Papua New Guinea, is a 70-minute "eco-rockumentary" a cinema concert of the rainforest's daily life and the music it inspires for the locals. The film presents numerous activities of work, leisure, and ritual in the full ambient visual and aural setting of the rainforest throughout the day and night. Steven Feld is an ethnomusicologist, anthropologist, and linguist who worked in Bosavi from 1975 to 2000 and recorded the original CD also titled *Voices of the Rainforest*. Together with acclaimed sound editor Dennis Leonard, Feld recomposed the CD's 25th-anniversary surround soundtrack. A 2018 return to Bosavi, with filmmaker Jeremiah Ra Richards, and research into the archival photographic material, led to the creation of this fascinating film (Figure 4). Feld is a pioneer in audiovisual ethnomusicology. Since the mid-1970s, he strongly supported audiovisual means in ethnomusicological fieldwork as a crucial tool for representing cultural life, human behavior, and social relations via texts and images and music and sound.

Figure 4
Still images from the website of the film "Voices of the Rainforest: A Day in the Life of Bosavi"

Films' Analyses and Critical Interpretation

In *Siaka, an African Musician*, Zemp's shooting and editing reveal his general artistic approach. His style is subtle but never dull, as he rarely allows shots to linger too long — a common challenge for ethnographic films that seek to develop full shots of whole bodies and actions. This axiom towards a wholeness of visual representation often applies at the expense of the audience, who grows uncomfortable with such slowly-paced editing, so Zemp avoids this trap. According to D'Amico (2020, p. 169), Zemp — following Jean Rouch's "cinéma vérité" — suggests a specific method of filming music performances that underlies his intention to respect both the music and the musicians. Although filming music requires sound-synchronized shots and cinematographers have been using new equipment since the 1960s, Zemp (1988, p. 394) affirms that several filmmakers and editors often decide to use out-of-sync images of musicians while playing other music. For Zemp, a film ethnomusicologist should try:

> to film a music piece, and to edit it, in its entirety; to keep music performance free from voice-over narration, and to translate song texts with subtitles; to film the musician as a human being and not like a thing or an insect, and to show the relationship between filmmaker and musician in the film, rather than hiding it; [and] to allow expression of the musician's point of view, respecting his voice and his language through translations in subtitles" (Zemp, 1988, p. 393-394).

Zemp (1988) examines the various ways of shooting a musical piece synchronously and in its integrity, such as stationary framing, panning, zooming, long sequence shooting with a moving handheld camera and several cameras, or multiple shooting with one camera. Each decision should match with the special circumstances of the music performed. In the fourth part of the film in question, Siaka performs the kora harp, a large string instrument. First, Siaka plays a cassette tape he has just purchased and, with his eyes closed, tries to reproduce the kora harp music he hears. In this sequence, we can identify another important

— though rarely documented — aspect of a musician's trade: practicing. Siaka listens to the tape for a while and then stops and tries to play the music in his way. He comments on the complexity in adapting another musician's performance to one's style and how he started playing the kora. In this long shot, the viewers watch (without interruption) Siaka performing, practicing, and informing them about his instrument and his relation to it. Zemp (1988) prefers capturing the moment as he experiences it in the field and lets Siaka express himself the way he wants. This direct approach reflects also the methodology he employs to document and edit this scene, having as few as possible different shots and camera angles and using the recording audio from (probably) one microphone, which is not visible on screen.

Concerning the particular ethnomusicological film, D'Amico acknowledges that "using long continuous shots that give priority to the music and to what Siaka and Soungalo have to say, this documentary is an example of an ethnomusicological film that serves a double purpose" (D'Amico, 2020, p. 178), as "a video with both high entertainment and high educational value" (Knight, 2009, p. 261). Zemp (1988) prefers sequences showing, in real-time, the relationship between the musicians themselves and between the musicians and the local people attending an event. Accordingly, the film's audience feels present on site, along with the camera, in the heart of the action.

Meanwhile, for Quino Piñero, the director of *Roaring Abyss*, sound and music are fundamental elements of filmmaking. In his website (https://quinopinero.com), he explains:

> Sound plays a main role in the story, it gives a meaning to that character in your film, makes you jump from your seat or take a deep breath after those powerful words. [...] Recording on location; editing the sound; adding foleys, extra dialogs, sound effects, atmospheres; mixing the music; [...] putting all these elements around you through surround mixes; designing the sound from the very first stages to the last re-recording moment.

Music is the main subject of his documentary creation, portraying lands and cultures through field recordings. In particular, *Roaring Abyss* is a virtuous combination of different elements that had appeared in his prior films. The film contains many uninterrupted live music performances with transparent images and sound documentation. For this occasion, all musicians are placed on site to perform for the shooting. In addition, audio equipment is usually visible to remind the audience that they are not watching a spontaneous music performance.

Apart from the abovementioned performances, the documentary contains bridging shots that transfer — visually and aurally — the cultural identity of the places presented. Villagers walking in the forest and talking, impressive landscapes, people working, and animals wandering around — all these offer an experimental combination of the images with the sound recordings, reorganized according to the creator's prior experiences and his overall conceptualization of the project. In one of his interviews, Piñero (personal communication, February 5, 2019) reveals:

> One of my main goals is to deal equally with image and sound. Most of the time, the sounds we hear in films do not belong to the correlated images; they do not match the actual context. In Ethiopia, I collected a large number of recordings, [and] started composing various soundscapes, mixing the sounds together and adding many layers of sound [...] [thus, creating] a "hyper-reality". [...] Then, I asked myself and my teammates what images could fit into these soundscapes. It's the reverse process of a director wanting to add sound to the moving images. [...] Showing not only the music in a film, but also the other "sound" life that is part of it, is a necessity for me. [...] Ethiopian traditional music is a "repetition" of the elements people hear in their daily life.

Most of Piñero's points of view appear in *Roaring Abyss* — an experimental piece of cinema that stimulates the senses by immersing the audience into a new world of sights and sounds not often encountered in the West. From the first scenes of the documentary, we recognize the filmmaker's intention to include both direct music performances and the cultural milieu surrounding them in the film's audiovisual spectrum. As a characteristic example of this approach, the film begins depicting a man weaving on a loom and creating rhythmic motives from the machinery's noises. As the filmmaker admitted, these sounds have been recorded in a different context and recomposed for the needs of the specific documentary. This cultural

soundscape is incorporated gradually into the next scene, where we can watch a realistic music performance with an aural reference to the previous section. The sounds of weaving "penetrate" into the performance of the second scene, in which we observe a long sequence of moving images switching according to the rhythm of the music. The musicians' gestures follow a musical rhythm, and the rhythm of music attends the realm of the loom that produces sounds as continuous circles in our ears and eyes.

Voices of the Rainforest is based on a 24-hour timeline without a verbal narrative structure, as a "compressed soundscaped day." Musicologist Kirsten Paige describes the film as "the litany of ongoing connections between the environment, its birds, and the Kaluli people who sing with it" (Paige, 2021, p. 130). The documentary could be divided into ten sections, interrupted by some bridging shots of the drones that seize the impressive immensity of the forest. In these units, there is a constant visual and sonic alteration, slowly and captivatingly transferring us from one part of the day to the next. The documentary's temporal "emplacement and displacement" (Paige, 2021, p. 130), as the community of Bosavi has changed in the last decades, is further complicated by the directors' decision to pair historical images with novel sounds and newer video footage with old recordings. The film has an experimental character with artistic dimensions in the way that Feld has combined archival material with high-resolution drone shots. For example, there are some scenes where the Kaluli people are scything trees, but it is not clear whether the sound of their singing is either a "live" recording or a pre-existing track.

The film's sequence titled "Relaxing at the Creek" recounts the story from the viewpoint of birds moving through and around waterways, as well as the perspective of Ulahi Gonogo's musical and poetic imagination. Ulahi is an artist whose singing words and phrases are flashed on the screen through manifold dissolves, jump cuts, repeats, splits, and overlaps. The recording of Ulahi singing at the creek was multifaceted. At the top of the mix is a stereo track of her voice. Then, there are additional tracks above and behind her. We can also hear the sound of the moving water from the tracks recorded by microphones facing her and at her left and right. Furthermore, there are three sets of tracks down the stream in each direction and behind her. And, finally, a close-up recording at the creek bank edge in front of her. Feld wonders but answers, "So why record and mix twelve tracks to present this sound space? Because the sound is already an image. [...] Those multiple tracks are [...] indexes of 'audio-vision' (Chion, 1994). [...] That 'far greater textural density' [...] is the way the new technologies of cinema surround sound make possible [...] a deeper 'audio-vision'" (Feld, 2021, p. 225).

Feld proposes a holistic approach that is also applied in this film, while he tries to experience and feel the world depending on his multi-sensorial instincts (Apley, 2020). For Feld, "to say that sound is a way of knowing is to acknowledge the importance of feeling the vibrational subtleties of a world, whether or not they are ever visible or touchable, and whether or not they are ever verbalized" (Feld, 2021, p. 222). He describes the forest of Bosavi as a locale interlinked with histories of listening, a place where water flows through the land as voice flows through the body.

> The presence of a film aesthetic is more a matter of the ways the sound and image interact multiply, and comes from the many visual and sonic economies employed to tell different kinds of ethno-dialogic stories. [...] I want the image-sound to be a total universe of exploration. This means doing anthropology of sound in sound together with doing anthropology of the image in images. Sound and image are primary material, the media and method of discovery of course. (Feld & Ricci, 2015, p. 50-51)

This comment conceptualizes the multimodal utterance of contemporary ethnomusicological films as audiovisual paradigms created for capturing and diffusing — where possible — an all-inclusive representation of the perceived reality that surround us, underlining not only its visible but also its sound qualities.

Conclusions

The three films offer a different perspective on how a researcher and filmmaker can act in the field and make specific decisions concerning film shooting and editing. They also depict new, unconventional cases of analyzing and interpreting music rituals and cultures, thus contributing to approaching and strengthening audiovisual literacy a more balanced handling of the correlation between cinematic sounds and images. Despite its hegemonic tendency, the visual dimensions of cinema could be interpreted and perceived in various ways, according to the organization of its sounds and silences. Starting from a simple approach and successively proceeding towards an experimental one, as seen in the three film examples of this paper, we can discover that these two dimensions — the acoustic and the visual — could balance to be perceived as an audiovisual nexus and could, in advance, frame the film's overall creation.

The first film under consideration (*Siaka, an African Musician*) has a typically structured form by applying simple techniques in filmmaking. For Zemp, the integrity and the entirety of the musical event has been of high priority. Therefore, there are no radical approaches, like complex audio recording sets or several cameras and different angles. His methodology of capturing the whole ritual without many interruptions creates a feeling of immersion into what is happening in that single moment and place. As opposed to the next two works, this film's aural facet is not something separated from all other film elements.

On the other hand, Feld's film (*Voices of the Rainforest*) relies a priori on the idea that sound and music can create a novel and unique film universe when being in dialogue with the image. This film employs a more artistic and experimental style, being a mosaic of different elements (old photographs, new recordings, old recordings, and new compositions), offering a ground-breaking way of dealing with audiovisuals in modern ethnomusicological documentaries. Finally, the second film presented in this paper (*Roaring Abyss*), stays somewhere between the other two. Its filmmaker — Quino Piñero — is interested in capturing the cultural milieu surrounding the rural locality's musical life. He prefers to create distinctive film soundscapes reflecting his personal experiences. At the same time, he innovatively incorporates live recordings of entire music performances, interviews with the musicians, as well as rehearsals of musical events or other rituals. His main objective is to contribute to the documentation and safeguarding of regional music culture, while paying attention to its optical and aural elements. All three films provide an ideal context for representing, analyzing, and interpreting sounds and images in conjunction with a view to an anthropologically-driven audiovisual literacy (Poulakis, 2016).

John Debes, the founder of the International Visual Literacy Association, delineates visual literacy as an ocularcentric branch of learning:

> Visual literacy refers to a group of vision-competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret the visible actions, objects, symbols, natural or man-made that he encounters in his environment. Through the creative use of these competencies, he is able to communicate with others. (Debes, 1969, p. 27)

Although more than fifty years of Debes's definition have passed, the main motivation of exploring, learning, and communicating through mediated representations has not changed. Nevertheless, current intermingled milieu demands for a stronger connection with humans' audiovisual sensors. As seen from the foregoing case-studies, ethnomusicological documentaries and anthropological films on music provide notable examples of moving from visual literacy to a more comprehensive concept of "audiovisual literacy." These films incorporate extended fieldwork research with critical analysis and interpretation through a multimodal representation that involves optical as well as auditory stimuli. Beyond the films' pictorial construction, the emphasis on sound and music could aid targeted — but also general — audiences to better understand the visuals. According to Larry Sider (2003, p. 10), "'[s]ound changes the image' — in fact, some would say it multiplies it." This resembles Michel Chion's (1994, p. 5) notion of "added value," which considers audiovisuality as an enhanced quality of present-day multichannel production and perception.

To conclude, contemporary media could open up numerous possibilities for audiovisual literacy drawn on sound and image ethnography. Film, in particular, has the potential to contribute to music research as a more technical apparatus to analyze music performance (for example, the synchronization of music and movement) or the study of musical instruments and genres as an interpretive agent. At the same time, it can highlight the relationships between the musicians and their audiences or approach the sociocultural contexts of musical phenomena. Since the beginning of the 21st century, new digital technologies and multimedia practices, combining texts, sounds, and moving images have encouraged several ethnomusicologists and anthropologists of music to create fresh audiovisual representations of music cultures and disseminate them all over the world. By overcoming the obstacles posed by the Western dogma of the domination of visuals over sounds, ethnographic documentaries on music could aid current work in audiovisual literacy by broadening its objectives, structures, methodologies, and outcomes.

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Rediscover Needs in Teaching Visual Literacy Skills in University Classrooms

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Abstract

Visual literacy instruction is an emerging topic in higher education, yet a gap exists in how those concepts and skills are taught in classrooms. The Visual Literacy Librarian at the University of Delaware created a mixed-method needs assessment that surveyed faculty and instructors on their current awareness and experiences in teaching visual literacy skills in classrooms across disciplines. Data was collected from a campus-wide online survey and voluntary interviews. A thematic analysis demonstrated that faculty and instructors across fields had similar interests and values toward visual literacy as a critical component in teaching and learning. The variation in experiences and different levels of expertise indicated challenges in implementing visual literacy in instructions. This chapter introduces new opportunities for the library and museums to support faculty by proposing new partnerships and unique institutional supports that aim to expand the interdisciplinary effort in teaching visual literacy in faculty's educational practices and beyond.

Keywords: assessment, academic libraries, visual literacy study and teaching, opportunities, higher education

Introduction

What are the reactions of faculty members when a librarian mentions the importance of teaching visual literacy ("VL") skills in their disciplines? Whether they were already implementing VL skills in instructions, confused, or not interested in the idea, librarians are always trying to find new ways to support faculty's needs in incorporating VL concepts and skills in teaching and learning. Three barriers exist in connecting university faculty and instructors to the concept and practice of enhancing students' VL skills in classrooms. The first barrier is that all academic disciplines have no universal visual literacy definition. The conversation on visual communication started when "visual literacy" was first introduced in the 1960s (Felten, 2008). In the pre-digital era, the definition of VL emphasized the application of language for textual analysis to "reading" images, mostly from literature studies (Messaris, 2012). While Messaris defined the competencies of VL are, much like phonetic literacy, decoding, comprehension, and interpretation (1994), other research explained that there was not a unified definition for either the concept or the practices (Blummer, 2015).

The second barrier comes from academic disciplines experiencing different levels of awareness when emphasizing the VL concept in teaching and learning. When VL began to enter college classrooms, Charles Hill (2003) noted that VL has long been a part of the instruction in fields like art history and cultural studies. However, literature on visual rhetoric and VL concept in other disciplines, especially in higher education, only started emerging at the beginning of the 21st century (Felten, 2008). While the VL concept was rooted in humanities, the STEM (science, technology, engineering, and mathematics) field shows an increasing need for VL learning. In a series of articles examining various cognitive skills necessary for conceptual understanding among biochemistry students, Schönborn and Anderson (2020) stressed the need for cognitive skills that "visualiz[e] and [interpret] the myriad of external representations that communicate our science" (p. 347). They voiced for formatively developing students' VL skills and including VL development in all courses across the biochemistry curriculum. Similarly, Rybarczyk (2011) pointed out that science instructors must explore creative ways to teach VL in Biology. These directions include integrating various approaches in scientific visual representation communications and exposing students to critically engage with scientific processes that are novel to traditional science fields.

The third barrier is that faculty believe that students, as the natural inhabitant of digital and visual media, are competent in interacting with visual materials. Faculty members often assume that students born in the digital age naturally carry the ability to engage in visual culture critically, while in reality, those "digital

natives" are not adapt to visual communication (Brumberger, 2011; Williams & Barnum, 2019). Researchers found that nowadays, students are constantly immersed in visual media, but "this does not necessarily mean that students know how to find appropriate images, understand their meaning and cultural context, or integrate them into academic work" (Matsuiak et al., 2019, p. 124). Felten (2008) highlighted this problem by writing: "living in an image-rich world, however, does not mean students (or faculty and administrators) naturally possess sophisticated visual literacy skills, just as continually listening to an iPod does not teach a person to critically analyze or created music" (p. 60).

To combat the three barriers, academic librarians are exploring new strategies for promoting VL in teaching and learning, such as through one-shot sessions or embedding librarians in courses. The author was hired as the Visual Literacy Librarian at the University of Delaware ("UD") to connect VL with more on-campus learning. UD is a public land-grant research university with more than 150 majors and minors and a total enrollment of 23,613 in 2022 ("Facts & figures: University of Delaware," n.d.). At UD, the library and museum galleries reside under one organization. The Visual Literacy Librarian is a dual-supervision position that works cross-departmentally in the library's Student Success and Curriculum Partnerships department and as museum staff. This unique role supports the Visual Literacy Librarian as an interdisciplinary educator and an agent between VL and the diverse faculty across departments. As Marcum (2002) argued, such role ensures "the active role in higher education's changing landscape by mastering the tools necessary for visual knowledge, communication, and presentation, and then sharing their mastery with students and faculty" (as cited in Milbourn, 2013, p. 275). As the foundation for this role, the author aims to determine what teaching and learning support faculty and instructors at a public state-supported research institution strive for.

The field of VL research lacks needs assessment data from university faculty and instructors. The research project led to this chapter intended to identify gaps in teaching with VL at the university and develop corresponding instruction support. It also aimed to contribute qualitative data to the dynamic conversation on VL, informing the expansion of VL instructional needs from traditional fields and all disciplines on campus. The questions that the author was hoping to answer with the assessment results are.
1. What gaps may exist related to visual literacy skills taught in the University of Delaware classrooms?
2. What crucial disciplinary areas of convergence do the different levels of University of Delaware faculty and instructors' awareness of visual literacy reveal?
3. What support is needed for faculty and instructors to teach visual literacy skills more effectively, in the context of their course and discipline?

Design

The author started planning the mixed-method needs assessment project in April 2021. To identify gaps related to teaching VL skills on campus, the author decided to reach the teaching faculty and instructors with an anonymous online survey. The assessment also aimed to identify challenges and explore more ways to support the needs of faculty and instructors in teaching visual literacy skills in the context of their course and discipline. The author designed a follow-up one-on-one Zoom interview for survey participants to sign up voluntarily.

Since the goal of the assessment was to survey the entire university, the author identified the sample population as faculty and instructors from all departments (including the English Language Institute, the program that offers intensive English programs for degree-seeking students, business and legal professionals, English language teachers, and general English language learners, and the Osher Lifelong Learning Institute, a program designed for adults aged 50+ to take and teach classes together, with no grades, exams or educational prerequisites) and campus. The assessment focused on courses currently being taught. Therefore, the target sample was limited to those who taught in either Spring or Fall of 2021. With the help of the Office of Institutional Research and Effectiveness, the author obtained a randomized sample of 1037 potential participants.

The author used Qualtrics Core XM (Experience Management) platform to conduct the online survey. The reason for choosing Qualtrics was that all faculty, staff, and students are licensed to use Qualtrics as the

UD's web-based tool for safe data collection and analysis for academic, research, and administrative activities. The online survey contains three sections. The first section of the survey asked participants about their backgrounds and views on VL skills in their classrooms. Questions in this section helped us identify the characteristics of faculty and instructors who had more incentives to involve in conversations about VL concepts and skills they valued in their teaching. This section included questions such as:

- Which academic unit are you primarily affiliated (e.g., History Department, School of Education)?
- How many years have you been teaching at the University of Delaware?
- Think about classes you are currently or will be teaching this year. How important is the role of visual information in your class?
- In order to be successful in my class, students must be able to…

The last question asked participants to choose all skills they valued in their classrooms. The options for this question were based on the seven standards in *ACRL Visual Literacy Competency Standards for Higher Education* (2011) and an option for participants to write other skills with examples from their teaching experiences.

The second section contributed to survey participants' prior knowledge of VL, including experiences applying VL skills in teaching and learning and past professional development or research opportunities. The author started this section by defining VL. Based on *ACRL Visual Literacy Competency Standards for Higher Education*,

> "Visual literacy is a set of abilities that enables an individual to effectively find, interpret, evaluate, use, and create images and visual media.
> Visual literacy skills equip a learner to understand and analyze the contextual, cultural, ethical, aesthetic, intellectual, and technical components involved in the production and use of visual materials" (2011, para. 2).

After seeing the definition, the participants identified if they had "encountered the idea of 'visual literacy' in [their] career as a professional or scholar." Participants who selected "no" or "not sure" skipped this section. Those who selected "yes" would proceed to the following short answer questions in this section:

- What does visual literacy mean or "look like" to you, from the perspective of your own discipline?
- Please provide an example of how you have helped your students practice skills related to visual literacy in your classroom, i.e., assessments, projects, or activities.

The author created norms to process responses in this section.

The final section collected information about faculty and instructors' interest in expanding knowledge in VL, such as:

- Which of the following learning opportunities do you think would be most beneficial to your teaching / your students' learning?
- Which type(s) of professional development are you interested in attending?
- How do you learn about professional development opportunities on campus?

The data from this section aimed to support the Library, Museums and Press to develop visual literacy-related workshops and programs and was considered out-of-scope for this article. Therefore, the author will not focus on discussing those results in this chapter.

Finally, all participants, whether they were involved in VL teaching or not, were invited to participate in one-on-one follow-up interviews. The author reached out to the volunteering participants and conducted a 30-minutes Zoom interview with each participant. The interviews were semi-structured, and questions directed the interviews focused on but were not limited to

- Participants' confident level of engaging visual literacy skills in teaching and learning. If confident, what experiences or support helped them to feel confident? If not, what do they think would be good support from the Library, Museums and Press?
- How did participants go about creating visual lending materials?
- Have they used or considered an interdisciplinary approach to teaching the kinds of VL skills typically included in their classes?

- Would participants consult a librarian or curator or look to the library/museums for teaching materials or expertise that could help?
- What were the participants' concerns when asking students to create a visual project?
- Using data visualization in teaching: What data were students using? What did the data visualization assignments look like? What support did students need the most?

Results

Among the 55 faculty and instructors who participated in the online survey, 13 volunteered for the interview, and the author interviewed eight due to participants' availability. The author gathered valuable information from the responses and performed a statistical and contextual analysis of the data.

Figure 1 shows the academic departments or fields of study participants are affiliated with. Since the goal was to understand which field participants were affiliated with, the short-answer question prompted participants to answer either their academic departments or areas of study (as shown in "Academic Department or Field as Participant Named"). Twenty-seven participants were affiliated with a STEM field or a science-heavy subject (as highlighted in yellow), and 28 participants self-identified as affiliated with an art or humanities field (as highlighted in green).

VL prevails in humanities, with more significant influence in subjects directly working with or relying on visual materials (Felten, 2008). It is reasonably unexpected to see that faculty and instructors from science and engineering fields had a similar level of interest and incentives with those from humanities about teaching visual literacy skills. On the other hand, the result represented a good number of academic departments. It resembled the teaching population at the university, which emphasized the impact of this survey as an environmental scan of the UD community.

VL is a relatively new concept in many academic fields. One of the goals of library instruction is to introduce pedagogical practices and teaching tools to faculty and instructors. New faculty are often targeted for teaching and learning outreach because they are perceived as new to instruction, agree that instructional practices are worth learning, and are constantly searching for new teaching skills and tools apart from how they learned as students (Jones, 2008). Hence, the author expected the online survey to reach a higher number of newer faculty and instructors. However, among all participants, only 7.3% self-identified as teaching at UD for less than two years. 21.8% of participants taught at UD for two to five years, and 10.9% for 5-10 years. Surprisingly, 60% of participants who filled out the survey had been at UD for more than ten years. The unexpected result revealed that faculty and instructors teaching at the university are probably more comfortable with their positions and instruction experience, therefore, looking for more authentic ways to engage students in learning. The other possibility is that newer faculty and instructors might have more exposure to visual learning as students or pedagogical training versus faculty who have been in instruction longer and might have fewer opportunities to interact with new pedagogical practices, either as instructors or as students. This result reminded the author that new faculty and instructors should not be the only focus for prompting library instruction and tools, especially regarding teaching VL.

In the following question about the importance of visual information in classes, 36.4% of participants said visual information is "extremely important" in classes they are currently or will be teaching. While another 29.1% stated "very important," 21.8% "moderately important," and "5.5%" slightly important, only 7.3% said "not at all important." While a high percentage of participants found visual information important, there was a discrepancy with participants recognizing and applying the concept of VL in teaching and learning, which will be discussed later.

Figure 1

Table of Survey Participants' Academic Affiliations

Academic Department or Field as Participant Named	School/College	Number of Participants
Kinesiology & Applied Physiology	College of Health Sciences	2
Biological Science	College of Arts and Sciences	2
Department of Physics and Astronomy	College of Arts and Sciences	2
School of Marine Science and Policy	College of Earth, Ocean and Environment	2
Chemistry	College of Arts and Sciences	1
Physical Therapy	College of Health Sciences	1
Department of Animal and Food Sciences	College of Agriculture and Natural Resources	1
Plant and Soil Sciences	College of Agriculture and Natural Resources	2
Medical and Molecular Sciences	College of Health Sciences	1
Computer and Information Sciences	College of Engineering	2
Civil & Environmental Engineering	College of Engineering	3
Department of Human Development & Family Sciences	College of Education and Human Development	2
Communication Science	College of Health Sciences	1
Management Information Science	Lerner College of Business & Economics	1
Department of Accounting and Management Information Science	Lerner College of Business & Economics	1
Biomedical Engineering	College of Engineering	1
Materials Science and Engineering	College of Engineering	1
School of Nursing	College of Health Sciences	1
Theater	College of Arts and Sciences	1
Department of Communication	College of Arts and Sciences	2
Anthropology	College of Arts and Sciences	1
Economics	Lerner College of Business & Economics	3
English	College of Arts and Sciences	4
Business Administration (BUAD)	Lerner College of Business & Economics	3
Education	College of Education and Human Development	3
Languages Literatures and Cultures	College of Arts and Sciences	3
Women and Gender Studies	College of Arts and Sciences	1
Music	College of Arts and Sciences	1
Art History	College of Arts and Sciences	1
Sociology & Criminal Justice	College of Arts and Sciences	1
Public Policy	Biden School of Public Policy and Administration	1
Art and Design	College of Arts and Sciences	2
English Language Institute (ELI)	English Language Institute (ELI)	1
		55

Figure 2

Importance of VL Skills for Students to Succeed in College Classes

In order to be successful in my class, students must be able to (select all that apply)
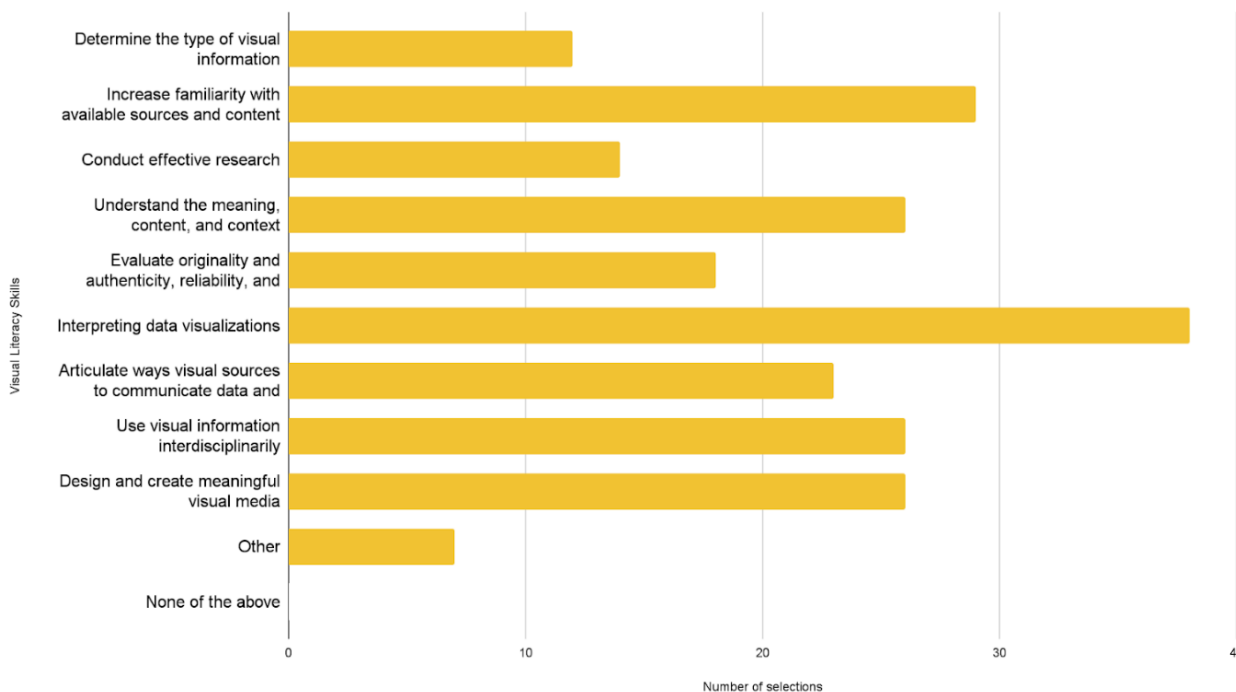

Figure 2 reflects the results (abbreviated from options in the survey) of what visual literacy skills would help students succeed in participants' courses. This multiple-choice question aimed to survey the importance of skills presented in *ACRL Visual Literacy Competency Standards for Higher Education Standards*. It is also crucial to note that the author rephrased standards for non-library professionals and incorporated learning outcomes from *ACRL Visual Literacy Competency Standards for Higher Education,* such as "interpreting data presented within data visualizations." Providing options for data visualization was a response to the high number of requests in data visualization workshops at UD. The result nevertheless shows the trend of VL in multidisciplinary instruction: The critical VL skills for students to succeed are moving away from the foundational "interprets and analyzes the meanings of images and visual media" ("ACRL Visual Literacy Competency Standards for Higher Education," 2011) to interpret data visualizations and use visual materials as communication tools. This surprising result might be due to the high population of participants from the science and engineering fields, as they were not the typical target of VL instructions and research.

The author spotted the discrepancy when showing participants the definition of VL and learned that only 47.3% encountered the concept in their careers as professionals or scholars. While 12.7% of participants were unsure, 40% had never heard of visual literacy. This knowledge gap prompted the author to question participants later in one-on-one interviews about professional development opportunities and confidence levels in teaching using VL concepts.

In the following question, participants shared, from the perspective of their discipline, what VL "look like" to them. The author was hoping to see examples such as in-class activities and assignments. A set of norms was created based on the answers, while a participant's answer could match multiple norms. Fifteen participants mentioned "image analysis," which is when a participant mentioned the evaluation, analysis, or understanding of both the conceptual and the aesthetic information conveyed by visual materials that are not data visualization. This also includes evaluating the material to identify biases, social and historical

developments, and the importance of media or format. Contrary to what faculty and instructors believed "interpreting data visualization" to be the most effective VL skill, analyzing images still lays the foundation of VL, especially among scholars who have encountered or implemented VL concepts in instructions. "Data interpretation," or interpreting data visualization or scientific models in any form, including extracting data, was mentioned nine times. Six noted "communication," which pointed to participants who highlighted the use of visual materials in forming some communication with audiences in mind, either among peers or in the form of teaching and presentation. "Creation" was also mentioned in six answers, as participants stated that creating visual materials in any form, including infographics, artworks, and multimedia creations. This also includes synthesizing or constructing visual materials. Unlike "communication," the activity of "creation" does not require audiences in mind. It is crucial to point out that the author engaged faculty members in interviews in this topic further. Many participants said they had enough support for using design tools, either from students' pre-requirement classes or partners such as preceptors. Faculty from the STEM fields did not want students' works to be penalized for aesthetic reasons. They mainly considered how design impacts the delivery of information. VL being "part of curriculum or field" has been mentioned four times. Participants stated that visual literacy is relevant to their curriculum or fields of study, such that some or all visual literacy skills are a part of thief fields' common practice or lesson plan and tied into cultural studies and literary studies. Finally, two participants related visual literacy to "critical thinking," as VL is part of or represented by critical thinking skills. This fits into the recent definition of VL as how those skills go beyond academic disciplines boundaries and firmly link to information literacy and critical thinking (Milbourn, 2013). The result encompassed voices across disciplines, but faculty and instructors did not discuss the content, context, or assignments they referred to but only the skills. Hence, the result of this open-ended question had missing content that the author was interested in analyzing.

Overall, the survey results responded well to the questions about who the faculty and instructors are interested in learning about VL, what gaps may exist in teaching VL skills, and what the different levels of awareness of VL reveal. As the author identified knowledge and needs gaps from some unexpected results, questions targeting those gaps were implemented in one-on-one interviews, and the responses will be discussed in the following section.

Discussion

The author reflected on the survey results to create interview questions, hoping to clarify findings from the results, and unravel the reason behind discrepancies in the survey. Combining the responses from interviews with data from the survey, the author identified four major challenges librarians faced in promoting VL skills in multidisciplinary university classrooms. The results also suggested four takeaways for institutions to implement as the starting point for engaging more campus teaching communities to enrich students' VL skills.

Challenges

"Visual Literacy" Means Different Things in Different Fields
The first challenge came from the discrepancy between most participants perceiving visual materials as somewhat crucial in their classrooms, but less than half had heard of the VL concept before. There was a high demand for data visualization to be a critical skill for students to succeed in classes. But when asked what VL looks like in classrooms to participants who encountered the concept before, the number of participants valuing data visualization dwindled. This issue could be a sign that most faculty who valued data visualization were from the STEM field, and they were not exposed to the term "visual literacy" in their field of studies. Instead, they addressed each skill under the umbrella term as independent skill sets.
As the author raised this gap in interviews, participants from the STEM field pointed out that they say "make a graph" or "create a table" rather than "data visualization" and make the connection with "visual literacy," a phrase unfamiliar to their field: "Even if they are the same thing, we say it differently." There are differences between librarians teaching visual literacy skills in a workshop, museum staff curating an exhibition to promote visual analyzing skills, and a science professor asking students to create a chart.
Regarding the different languages academic fields use to communicate the same idea, another participant noted that it was because of how faculty learn when they were students: "For science faculty, we feel pressure from trying to build the courage to provide the richest content, and often that's the tradition of how we learned. Where bridging the museum experience, or any other non-science experience was not really

part of the learning process, the science learning process...and we forget how some of these more humanity types of spaces can actually be very powerful."

Limited Time

For students to be successful in classes, participants were interested in support from the library and museums to help students "explore visual information sources to increase familiarity with available sources and subject-related content" and "understand the meaning, content, and context of a given visual source, including bias and perspectives." In interviews, six out of eight participants said they would welcome incorporating materials or visits to museum galleries and special collections to enhance students' skills in interacting with visual materials. However, they all mentioned that there is never enough time in a course or a semester, and VL as a skill set was never their priority in teaching. Not only do students not have enough time to digest what they learn, but faculty and instructors also struggle to create new activities and assignments in their courses. One participant said,

> "I would love to have beyond STEM type of interdisciplinary engagement. When I was brand new to UD, an idea that I sort of put on the back burner was that I want students to study [with primary sources from the special collections]…I always feel like the day-to-day operation of this catch up to me, and the dreams sort of fade out."

Another faculty member commented on bringing students to museum exhibitions, saying they could not do so because "I think it's tricky because time is not on our side."

Student Learning Barriers

The goal of instruction is always tied to students' learning outcomes. More often, faculty and instructors can identify students' learning barriers but worry about their learning outcomes. For example, a faculty member from the Department of Art and Design said that they introduced the concept of VL and integrated lessons such as "close-looking" a work of art or a writing assignment reflecting a museum visit. The faculty stressed helping students make the most out of VL activities, but students were often confused, struggled, or bored because "[students] don't like to dig very hard and very deep, and they don't like to go beyond some of the initial ideas."

A few participants recognized that museums and special collections staff could lead visits to exhibitions and materials to deepen students' understanding of class content in a visual approach but were hesitant to seek those learning opportunities. One faculty member raised the concern, saying:

> "The first time I heard about the particular approach, I am not 100% sure how I can do that because … most of the courses I teach are the first-year courses that do have large enrollment. My experience is that if I were to take a group of 70 students to the museum, maybe 2 or 3 would get something, the rest will not. And the time does become an issue of how to do it."

Similarly, another faculty concerned about students' learning outcomes and interest levels said,

> "I find that students are [thinking that they are] going on field trips because I would think you want to go out and see how things exist in the real world. But there are a lot of hesitations: Students just don't really want to. So it kinda doesn't use my time well to set time up and go do something like that."

Disconnection Between Interest and Services

The disconnections are twofold. Firstly, faculty and instructors might be interested in incorporating VL skills in their classrooms, but they need help to connect to the service. Half of the participants mentioned in interviews said they "heard of" visual literacy workshops in the library or saw their colleagues taking students to museums and special collections, but they did not know how to get involved. In the library, the Digital Initiatives and Preservation Department held workshops every semester on data visualization and welcomed the opportunity to get involved in courses with data process and visualization needs. However, participants with great interest in supporting students' data visualization skills either have yet to work with or hear of the department. What stopped those faculty to seek more help from on-campus partners? One participant explained,

> "I think maybe I was trained in how to interpret graphs in graduate school, despite reading so many research papers and going over them in lab meetings. But in terms of how to teach them or who could teach them, no, I don't think I've received support on that."

The second disconnection came from faculty and instructors already seeking help from the library and museums. They were comfortable seeking support from their liaison librarians but did not know that the Visual Literacy Librarian could tailor activities to support related skills. They also were not exposed to other library resources and services, such as museum exhibitions, special collections materials, and film and video collections. These could introduce authentic ways to help students develop VL skills in unique approaches.

Takeaways
The variety of experiences and different levels of expertise among faculty indicate challenges in applying multidisciplinary VL instruction and key opportunities for the library and museums to review and introduce programs and resources that enhance visual literacy teaching and learning.

Speak the Languages of Other Fields
One of the participants said,
> "Data visualization sounds like something that liberal art students do, and like 'graphical interpretation' or something literally like 'get your students to make graph[s],' you will get lots more interest from STEM professors because they understand those words and usually sounds very straight to the point. Even if it's the same presentation, call it different things, depending on who your audience is."

While many science fields include VL as part of the curriculum and as a component of scientific literacy (Rybarczyk, 2011), faculty are not a monolithic, featureless group.

Brophy (2007) stressed that the conversations between librarians and their patrons are the key to building relationships. He underlines that librarians need to be part of dialogues in the research and communications of their protons' fields because "the issue is not just about terminology but more critically about concepts and interpretation" (p. 517). The institution should facilitate conversations about teaching VL skills among librarians, especially subject librarians. Only when the Visual Literacy Librarian knows the language that other academic disciplines are speaking and subject librarians have exposure to the current discussion and teaching in VL, the library can provide approachable VL support to all faculty and instructors in need.

"Train the Trainers" and Take Bite-Size Approaches
Almost all interview participants mentioned that they welcome "collected resources" as professional development or teaching resources. "Training the Trainers" can be small yet effective steps: If librarians train faculty and instructors across higher education with skills teaching VL, different academic fields can scaffold those instructions and resources by adding discipline-specific knowledge and applications (Huber et al., 2021).

Understand that faculty and instructors have limited time to implement new lesson plans, librarians can curate resources for faculty to grow their knowledge in teaching visual literacy and provide bite-size materials, such as in-class activities or homework assignments. To name a few, librarians can refresh and popularize research guides with new bite-size resources, create video tutorials, or work with subject librarians to add VL materials in newsletters or blogs based on the academic department's teaching and learning needs.

Share the Expertise of Colleagues and Teams in Authentic Ways
In response to faculty and institutes who disconnected from library and museum services, the author suggests that it is crucial for colleagues in the library and museums to reduce the invisibility among departments. The organization should hold events internally to help librarians and staff learn about each other's fields and expertise. During an outreach event or a consultation, it is important for library staff to provide information to their patrons about related resources and services from other departments.

Opportunities in New Forms of Collaboration
Faculty have amazing ideas for connecting VL skills to their disciplines. Since they have limited time, they need incentives for collaboration and connection with the right services. Through professional connections or word-of-mouth, librarians should find ways to keep in the loop of possible collaboration projects involving

VL in unique ways. As an excited participant stated, "I feel if I were going alone solo at it, it would be much more challenging…I am very confident that we can do this because I am a part of a team, together we are doing it."

Future Research and Application

Increasingly, VL skills are more critical than ever as an element to help students succeed in their academic life. The approach of surveying faculty and instructors on how they were teaching visual literacy skills and what support would benefit their student learning was only the starting point of this conversation. The survey results and interview responses shed light on challenges in promoting visual literacy to academic disciplines across the campus. To debunk those challenges, takeaways provided practices that guide the author's home institution and other passionate academic libraries to popularize support in VL instructions. In the future, the author would like to focus on assessing teaching VL as an interdisciplinary skill set in nontraditional academic disciplines, such as the STEM field. Hopefully, this needs assessment will contribute to filling the gap in relevant discussions, engage more practitioners to support VL instructions across campuses, and demonstrate the greater value of VL in higher education.

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1st Art Exhibit Award

Winter Sunset (2022)

Barbara WF Miner

University of Toledo, USA

15"x26"
repurposed matte photo paper

The Land Outside My Door Series: The Midwest is flyover country according to most news organizations; nothing of note to be considered. Every day, no matter the weather, I walk and photograph the macro and the minutia. I use these images as touchstones for this series of prints, my sculptural interventions in the woods and for the small wooden artworks that I create from reclaimed ash wood. I am part of a web, connected and somehow separate from all other organisms. Intimately knowing the patterns of plants and animals in the rhythm of seasons brings me great, anchoring joy.

2nd Art Exhibit Award

Grotta (2022)

Dan Hernandez

University of Toledo, USA

45"x28"
inkjet transfer, acrylic and varnish on paper on panel

Grotta imagines a descent into the underworld loosely inspired by mythology, and video games. Much of the source material for this image is drawn from illuminated manuscripts. For instance, the main character is a depiction of Virgil appropriated from the Yates Thompson Divine Comedy (YTDC) (1444-1450, Italy). In Grotta, the figure is not Virgil, but rather an avatar of the viewer. One experiences the journey through this figure. Similarly to the YTDC, the narrative in this work plays out in a series of vignettes, but here the scenes compose a larger image - a map. Additionally, while there is a starting point and end point, Grotta has no predefined path. Instead, the viewer can explore the world autonomously. This approach to storytelling is influenced by the open world genre of video games. Grotta pays homage to one of the early masterpieces in this genre - Metroid (1986, Nintendo)

3rd Art Exhibit Award

Tides' End (2022)

N. Toros Mutlu
Izmir University of Economics, Turkey

60 x 90 cm
digital print on matte photo paper

60 x 90 cm
digital print on matte photo paper

60 x 90 cm
digital print on matte photo paper

Just like dreams may seem to be about anything and everything, but really are about nothing; these photographs, too, are about as anything and everything as dreams can be.

A dream is distilled from your everything; it is fed from a network of memories that stretches from what you had in your breakfast today to your high school history grades, and sometimes even these two can be elemental in the same narrative. Similar to a dream structure, the images in Tides' End were not made to be about anything in particular; and even if they once were, their meanings should be sought in artist's past and in their own individual merit. Imposing a pseudo-bond between these images would be a betrayal to viewer's own narrative. Once again, they are about whatever and anything you see now. If anything; I want these photographs to be the memories you never had.

Honorable Mention

呼吸●共生: we breathe and live, together (2022)

Hyungjoo A. Kim

Purdue University, USA

Poster, 700 mm x 1000 mm,
digital print

This poster reflects the problem of the ecosystem with the current Covid issues. Visually, ecology is a gestalt (configuration) made of many parts and is greater than or different from the combination of its parts. The poster illustrates that humans are a part of the ecological system. Also, the poster visualizes each species as a unique organism that represents the whole system simultaneously.

Biodiversity is key to sustaining life on Earth, and human existence would be impossible without its harmonizing effects. This poster intends to raise awareness about the issues of the environment and encourage an appreciation and respect for other species essential for achieving ecological vitality.

Honorable Mention

Mending Landscapes: Mirroring Joso (2022)

Marita Ibañez Sandoval

University of Tsukuba, Japan
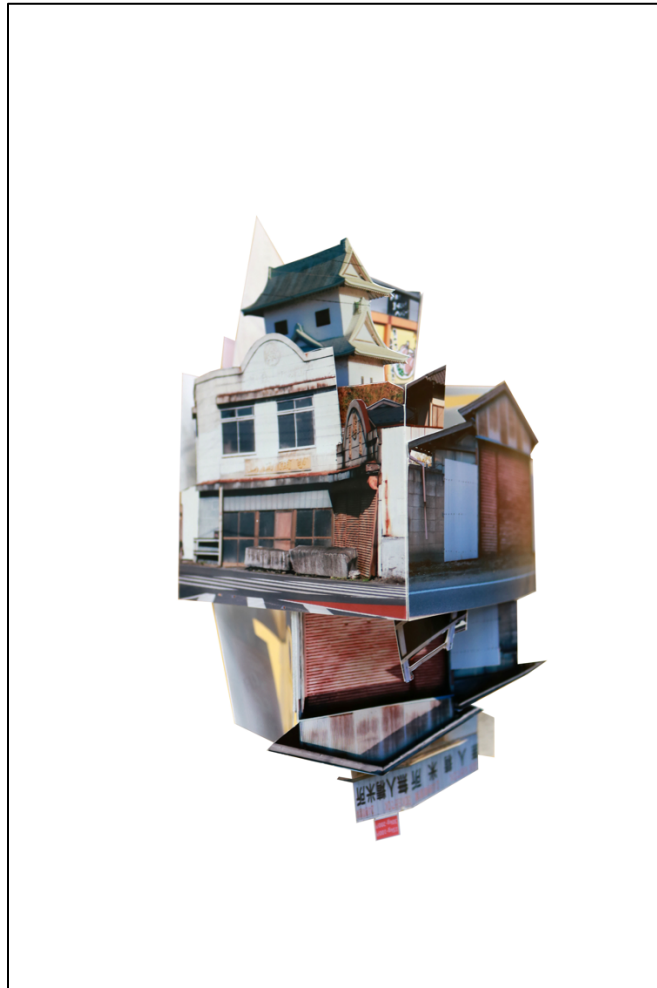
11000mm x 11000mm x 26000
3D Photomontage of Printed Photomedia

Joso in Ibaraki Prefecture is home to a significant Latin American population. In this context, three photographic visits were conducted in search of the migratory footprint of Brazilian and Peruvian communities and its effects on the urban-rural Japanese landscape. A work methodology was built using photomedia tools, photowalks, rephotography, and photomontage. Flusserian ideas of migrants as mirrors and windows are essential in (re)observing the city through their (our) eyes and experiences, always attentive to the city's migrational footprint and my traces when making an image or constructing a scale model. These models contained photographs and re-photographs of the city, taken on different days and times, an intermediate point between the printed photograph's two-dimensionality and the visited landscape's three-dimensionality.