

A research essay by Amy Shumaker
April 3, 2020

December 2, 2019; revised April 3, 2020

Abstract

Through the research gathered in this project, I examined how the methods, vision, and basic design fundamentals of the Bauhaus School have translated in twenty-first century photography. Further, these century old principles are applied in my own photography through the presentation to be shown as the second aspect. In my research, I focused on the means of communication that is photography as it was seen by the Bauhaus photography professor Laszlo Moholy-Nagy and the basics of universal communication transcribed by the foundering professors.

Universal communication followed along with the role of the artist to show the reach of Bauhaus design techniques. Furthermore, this research covered driving factors of the Bauhaus photography program such as Photograms, Typography, Objectivity, and Ready-Made or Autonomous influence. Each point showed both the influence on my own work, and others work created since 1980.

Lastly, the research pushed photography into the modern age as photographers found new ways to apply Artificial Intelligence to the Bauhaus model. The research addressed how the 21st century has surpassed even what Bauhaus thought possible, and how it has led to global communication.

Key Words: Photography, Communication, Bauhaus, Laszlo Moholy-Nagy, AI, Objectivity, Photogram

Over the past one-hundred years, the intertwined practices of photography and modern art have shifted to contemporary art. With the shift, the resurgence of former art styles has come back onto style. Thus, a pattern of art philosophy is applied to new methods and means of expression with modern advancements in cameras and computer technology. Debatably, the invention of the computer age has caused the dissemination of information to be more involved, quick, and accessible as never before. One advancement of the computer age is the formation of Artificial Intelligence (AI), which among other things, can be used to create and shape our ideas about fine art. One school of thought that has seen recent emergence in art and photography is from the Bauhaus School. With the 101st anniversary of the school's introduction into the educational fundamentals of art, it is still reshaping the framework for photography. An analysis of the modern age of AI generated art proves that it is an advancement of the photography fundamental basics taught at Bauhaus and furthermore the next evolution in Bauhaus philosophy.

To start, we must define one of the most important philosophical ideas of the Bauhaus era. While the term *gesamtkunstwerk* was not freshly coined, it does adopt a new methodology. Each school within the Bauhaus functioned to study the others in equal measure to gain a better understanding to satisfy the overall need for visual communication. For example, those in the school of architecture studied metal working and textiles. Together the new aesthetic forms a *gesamtkunstwerk*. A rough translation of *gesamtkunstwerk* derives "total work of art." It serves to piece together each form of art as a whole aesthetic, whether it is the Romantic poetry of Goethe with Caspar David Friedrich's landscapes, or the simple shapes and complimentary colors of Bauhaus basics with minimalistic tea sets. László Moholy-Nagy, the professor of photography at Bauhaus defines it as "the sum of all art forms" (Moholy-Nagy 13). He claims that *gesamtkunstwerk* can abolish all individual artistic endeavors out of universal necessity.

This idea aligns with the Bauhaus' mission of universal communication that is further addressed in this essay.

In the Twenty-First Century, we have all encountered the fundamentals of a square, a triangle, and a circle. Furthermore, we have all encountered a cardboard box, a folded flag, and an orange. It is within the reasonable assumption that the very basic ideas and variables within the space around our niche environments can be related geometrically and spatially. At its core, the Bauhaus School was taking elements of each item, whether it be a teapot, a chair, or an apartment complex, and breaking them into elements to form the essence of that object. Such elements included color, shape, comprehension, motion where applicable, tactile characteristics, and most importantly the space it occupies (Bauhaus Spirit).

To escape the world of theoretical art jargon, it is a safe conclusion that most people have unconsciously done this in their lifetime. Bauhaus School started with principles created by Swiss educational reformer Fredrich Froebel who was known for the formation of kindergarten (Lupton and Miller 11). Children were given blocks of various shapes to draw their own conclusions about objects functionality and assist in early cognition (11). A house could be represented as a square base with a triangle roof and the tree in the front yard as a rectangle with a spherical top. Bauhaus leaders Johannes Itten and Joseph Albers saw that by reteaching college age students to rediscover an object's basic functionalities, they would better understand the limitations on those materials and how to creatively push those limits. The idea of reteaching a basic drawing technique learned by children and applying it to primitive adult learning is a phenomenon known as the recapitulation theory (25). It is also seen in the Bauhaus predecessors and theoretical schools such as the Vienna Secession and the Blue Rider Expressionists (25).

Albers employed the recapitulation theory in several ways. One method started in the basic fundamentals class for beginning students where he would ask them to break a drawing down into a series of squares. This is known as a Pedagogical drawing, which is a direct principle adapted from the research of Froebel (Lupton and Miller 14). Further, a drawing could be broken into squares and triangles drawn on a dot grid, known as the Stygmographie Method. The second form of Pedagogical drawing was a net drawing where the points were extended to form a “continuous grid,” referred to as the Netzzeichenen method (14). Another perspective of the function of a grid is its infinite expression of an object organized into frames or squares. A grid as a “prototype of linear expression” is a fundamental principle carried to Bauhaus from the DeStijl movement (32). Paul Klee and Wassily Kandinsky, founders of the Bauhaus method believed the line was a form of motion as a single point that was being extensively moved to a never-ending conclusion (29). Motion is essential to the essence of an object, even when transferred to a page. These drawing basics, still used in college level art fundamentals courses, are the building blocks to something greater.

Albers believed in the strong ability of a square to make the base of each objects’ ability for deconstruction. It was Kandinsky who wrote in his Bauhaus textbook that the translation of an object into geometric illustrations and color was a step towards global visual communication (Lupton and Miller 32). To Kandinsky, the symbols with the most impact are a yellow triangle, a red square, and a blue circle. If any object or phrase can be pictorially depicted, most cultures operate under the assumption that an object, such as an orange, possesses the same qualities. One only has to look at the logo design of social media websites to better understand this principle. The twitter logo is a series of curved triangles. Instagram is a warm colored gradient of rounded squares and circles. Most social media logos operate on the same understanding of basic colors

and shapes being universally acknowledged. Snapchat is yellow, and Facebook is blue. These logos and colors are known globally today.

The master of photography gleaned from Bauhaus was a Hungarian artist with a strong belief in the objectivity of photography. László Moholy-Nagy's essays in *Bauhaus Bücher: Malerei, Photographie, und Film* assert that a photograph is objective, while painting is meant to be subjective. Because photography is a mechanical vehicle for natural representations, painting can be dedicated to the existence of color and plane. Thus, photography fulfills the true form of representation (11). This theory is called fotokunst, where art becomes photographic and not photography as a form of art (Emerling 36). Fotokunst seeks to create and not replicate other forms of art. Instead, photography serves as a compliment in the concept of *gesamtkunstwerk*.

When defining objectivity here, it is the sense that photography is an art form because it accurately depicts reality as it exists. This can mean that it is documentary with artistic subjectivity. Moholy-Nagy does not imply that photography can only be objective in its interpretation, but representational in its accurate depiction of mechanical means. It frees the viewer from the need to see the world from another's sole perspective. (Meggs 349) Thus the passage of undiluted communication was achieved through photography with no former means of aesthetic forethought (349).

One means to which Moholy-Nagy achieved an artistic interpretation on an "objective budget" was a change in camera viewpoints. This meant aerial views, ground shots looking upwards, extreme close ups, and angled viewpoints (Meggs 349). His exploration with texture, contrast, chiaroscuro, repetition are pillars of his new vision for the objective world viewed from the camera (349).

What then can be said of photography's development into the next one hundred years as we see now know it? Moholy-Nagy says that one reason photography is so critical to *gesamtkunstwerk* is its special ability to create a conceptual image that enhances what we see (22). Moholy-Nagy's ideas were most likely inspired by the experiments of Eadweard Muybridge, published in *Animal Locomotion* in 1887 (Newhall, 121-121). Today, this principle is still a truthful possibility. |

In the physically objective sense, photography does enhance what the eye can see. One program used in photo-editing software was created by Pixelmator. The software feature, called "ML Super Resolution" uses an internal algorithm of 5MB to predict resolution patterns and recreate lost resolution from internet uploads or low-pixel cameras. It can recreate pixels up to 3 times the photos original dpi (Vincent). Pixelmator is not the only software to create AI generated resolutions. Google and Nvidia have been leading development in AI photography prediction. Pixelmator's main software competitor, Adobe, has commercially offered a similar AI feature in Lightroom with significantly lesser results. Online free platforms BigJPG.com and LetsEnhance.io are among many who offer similar algorithms, however with lesser results (Vincent).

With the help of AI programs, we can also learn more about the representational but internal ideas of others and the world around us. One AI artist, Trevor Paglen, conducted a performance using a "black box" of computer technology to create *Sight Machine* (Metz). The performance used digital motion capture and facial recognition, which was mapped by an open source software that runs neural systems based on AI engines from Google and other tech companies. It runs analysis on motion, emotions, and physical object mapping (Metz). In a sense,

it “thinks” about the actions and appearance of the Kronos Quartet as they played. Paglen explained:

“It's trying to look inside the software that is running an AI. It's trying to look into the architectures of different computer vision systems and trying to learn what it is that they are seeing. How are they looking at images? And what are the social, ethical, economic, and political consequences of these modes of seeing, which are becoming more and more ubiquitous?” (Trevor Paglen qtd. by Metz, 2017).

The AI system attempted to resolve the mystery behind the musician's actions and emotions, thus granting a layer of transparency that even standard photography cannot grasp. His AI generated video feed resembles that of a Stygmographie grid. With the assistance of AI, Moholy-Nagy's objective theory goes well beyond the limits that were initially perceived.

Another semi-objective format of photography that had Moholy-Nagy's interest was photograms. Photograms are described by him to be, paraphrased: a means by which to paint with light and make photographs without a camera (Moholy-Nagy 25). In summation, photograms are a photograph by mechanical means using only the enlarger, the light sensitivity of paper, and the mechanical action of placing and arranging objects with hands. He does say that photograms should be treated as a “new creative means, like color in a painting and sound in music... It offers the possibilities for composing in a newly conquered material” (Moholy-Nagy 25). He felt that one could not separate photography from photograms because of the necessary needs for balance between the mediums. In the modern age, photograms are a mostly bygone means of creative expression outside of darkroom artistry due to the invention of digital color photography, which instead creates a balance with black and white digital photography. While

color plate photography methods existed in Moholy-Nagy's era, they were not feasible as an everyday medium due to expense. Even so, it wasn't until 1937 when mainstream color film was introduced to the public; the first was Kodachrome by Kodak (Newhall 276).

Photograms followed his belief that while photography was meant to be purely objective, painting was for non-objective means due to its color abilities at the time and ability to depict abstract planes (Moholy-Nagy 9-10). He felt that photograms were photography's closest connection with the hands and the eyes. Like Albers and Kandinsky, Moholy-Nagy believes in universal communication by visual means, however he believes this language to be transferred via mechanical means as the hands to visual interpretation. The hands were the vehicle by which to transfer creative ideas (D'Alessandro 66). He certainly wasn't alone in the emotional significance of hands in Weimar visual arts. John Heartfield's *Fünf Finger hat die Hand* creates a similar and overwhelming sense of gravitational influence. It has a similar impact on Moholy-Nagy's commercial work for the Schocken Department store, which notes the sensuality and decadence in the hands. Likewise, a poster for Fritz Lang's *M* depicts the violent tension of the film's titular child murder through the hand alone (66-67). Moholy-Nagy understood that the hands were also a symbol of universal communication. Hands appear in numerous photograms by Moholy-Nagy from the years 1925-1926.

Another element to Moholy-Nagy's work was type, not just to convey information, but as another mechanical means of art. For the cover of *Bauhaus Bücher: Malerei, Photographie, und Film*, Moholy-Nagy uses an interaction between the space of photogram and type. He uses light refractions mixed with a bold red sans serif to balance the subtle with the forward. This was a component he used again for several projects. Light and type would become synonymous in the photographic cover for *Bauhaus Bücher: Von Material zu Architektur*. While not a photogram, it

blends the same ideas that photography is a representational medium and is made to serve as a liaison for communication. He uses shadows, light reflections on glass, limited but brazen color, geometric planes, and objective type to achieve the elements of what photography and typography is consistent with in true Bauhaus fashion.

For the 2019 MAK Vienna's Biennale, the museum hosted an exhibition called *Uncanny Values*, which examined the values between AI and art. For the exhibition, a design duo known as Process Studio, or Martin Grödl and Moritz Resl, trained a Generative Adversarial Network (GAN) to detect and recreate typography and a modern symbol of communication, the emoji. The architecture consists of two neural networks that, when played against each other, predict changes and patterns. This creates imitation data that is meant to pass as real image data, therefore creating or recreating certain image styles (Nicholson). A GAN draws from a preexisting bank of information, usually images, to predict new information. This form of unsupervised learning can form hyperrealistic images of people and things that do not exist, as well as manipulate audio, video, and reimagine communication as a whole (*Uncanny Values*). Process Studio's GAN formed new emojis from a bank of all of the emojis currently in existence. Emojis were selected for their universal understanding past cultural boundaries. The program *Almoji*, takes Moholy-Nagy's ideas of objectivity and the Bauhaus teaching of universal communication to the modern era. The interaction between this new level of typography, along with *Alfont*, the type equivalent of *Almoji*, generates new emotions and ideas. *Alfont* fluctuates between thin and slab text weights, and sans serif and serif font to create a photographic appearance of painterly light imagery that shifts and evolves as we read it.

With the end of Bauhaus, there was a rise in the belief of objectivity in photography as a direct result. After World War II took its toll on Germany, the Kunstakademie Düsseldorf, in

English known as the Düsseldorf School of Art, was formed. For the photography department, the future was sought in the new professor Bernd Becher. Inspired by the ideas of László Moholy-Nagy and a handful of others, Bernd and his wife Hilla photographed buildings of a dying European culture, including water towers and framework houses (Eklund). The shot was composed the same way every time: straight from the front, eye level, cloudless, and evenly lit. It was a rebellion against the ideas of Otto Steinert, a popular German photographer who attempted to revive the subjective pictorialism movement (Stimson). The Bechers saw this endeavor as a stagnant art revival in a culture that was only rebuilding.

Instead, they traced back to a movement that was formed before the war and had a significant impact on the work of Moholy-Nagy and other contemporaries like Alexander Rodchenko and El Lissitzky. The movement known as New Objectivity traces through painting, graphic design, photography, etc. It starts at the forefront of the 1920s with post World War I industrialism that was so well cherished by Moholy-Nagy (Stimson). German photographer Albert Renger-Patzsch photographed tight shots of factories to show the curves, angles, contrast, and chiaroscuro that made the steel buildings abstract works of art (Newhall 292). Similarly, Charles Sheeler framed American Ford Motor Co. factories (Newhall 178). This form of photography celebrated the machine, the industrial age, and documented the new geometric square buildings that had arrived in Germany.

The New Objectivist movement as a whole categorizes design as a straightforward means. Poster designer Lucian Bernhard designs product posters with the reduction of elements to pictorially depict only what was being advertised (Meggs 292). His vision came from predecessor Peter Behrens, who was a transition character from Jugendstil (German Art Nouveau) to modern pictorialism. Behrens believed that all elements of a company's design

should be branded for cohesive similarity and recognition. His work for *Allgemeine Elektrizitäts-Gesellschaft* led to the creation of similar aesthetics teapots, lamps, and pamphlets (259).

Together, these principles of the New Objectivist movement were an inspiration for the Bauhaus translation of *gesamtkunstwerk* and elemental construction.

Partially inspired by Bauhaus principles, the documentary heavy Düsseldorf School would produce a new straightforward photography with simple clean color and unbiased intent. The Bechers would teach a student named Thomas Ruff, who would take these ideas to the next stage of development. Ruff advanced cameraless photogram techniques from the teachings of Man Ray and Moholy-Nagy, and added color for the modern age. He elaborated on Moholy-Nagy's ideas by reversing the negative as the means to an end result (Gagosian). In line with Bauhaus *Gesamtkunstwerk*, Ruff also did a photo series based on the designs of the Bauhaus architecture professor Ludwig Mies van de Rohe and other early 20th century modern architects (Tate). He digitally removed all obstructions of the modern toll on constructed modernist buildings to look as they were when they were first constructed. This series, *Häuser* combines both Bauhaus principles of architecture and the objective fabrication of the photography program (Tate).

Thomas Ruff's first large scale series was called *Anderes Porträt*. The series consists of large, wall sized photographs of people that do not exist. Ruff called friends, family, and models to his studio to take the same, representational "passport" photograph of each of them. He then imported them into the Minolta Montage Unit, a machine used by German police in the 1970s to create composite images (Anatomy Films). Instead, Ruff turns the composite process into art by providing the 4x5 negative from his Linhof for quality and portrait style that subtly allude to The Bechers' planned and precise style with water towers. In this way, the series is the mixture of

Düsseldorf School and Bauhaus principle is both objective documentary and impartial enhancement of the human eye. In a similar vein, it satisfies the Bauhaus philosophy of deconstructing an object to the essence. By creating fake people, Ruff has taken the essence of gender, ethnicity, age, and class. He mixes them to create a new concept of a fully neutral person by mixing traits that are stereotyped to a trait, such as gender.

Similarly, this is how a GAN operates. The true impartiality of a GAN is fueled by the images it sources from. Thus, it is easy to create a genderless individual. By using a GAN, anyone can easily accomplish the same composite basics without the darkroom. In 2017, artist Heather Dewey-Hagborg created *Probably Chelsea* using a GAN. She contacted Chelsea E. Manning, the famous American whistleblower, who is also transgender. While in prison, Manning sent DNA samples to Dewey-Hagborg. After mapping Manning's genetic phenotype, she plugged the variables into a GAN to determine her "gender, skin color, eye color, height, and bone structure" (Uncanny Values). Based on Manning's genetic ancestry and DNA, 30 virtual "mugshots" were created that fluctuate between gender, ethnicity, and physical traits. The description of *Probably Chelsea* considers them "objective, neutral, and safe" in pending Police investigations, which proves that identity is not an exact code, and like photography GAN composites are truly objective to a fault (Uncanny Values).

Composite photography as a forebear of the AI age is the modern equivalent of early modern movements culminating at Bauhaus. One idea ushered in from the Dada movement of the 1910s is Marcel Duchamp's "readymade" concept. The notion follows the appropriation of ordinary man-made objects with little to no modifications by the artist. They are displayed as art because they are unique to man's manufacturing process, and because they are not normally viewed as fine art (Lippard 139). Duchamp inscribes in his essay *The Bride Stripped Bare by*

Her Bachelors that readymades are a product of the moment, as well as an appropriation of said objects to rewrite how they are viewed in order to question how we see art. His example is as follows:

Readymade

Reciprocal = Use a

Rembrandt as an

Ironing board—

(Duchamp qtd. in Lippard 152)

If a priceless object is revised to become an everyday object, it proposes the question of value in art. Therefore, it proposes that art should be valued in the form of an ironing board as it is in a Rembrandt, because it is no less a human design, nor is it less engineered and planned. While not a pure Bauhaus principle, readymade art is an inspiration for an object's value that does appear in Bauhaus philosophy. The attitude of Bauhaus reconstructed design seen everyday as an equivalent value to high art to achieve *gesamtkunstwerk*. In other words, a school building is no less important than the design of the letter "A" or a baby cradle. Likewise, Bauhaus teachings pay significant attention to the construction of objects and the materials used to do so. In these ways, a readymade artwork is similar to Bauhaus theory.

In the same ways, AI is a form of readymade art. It comes from sensory imagery and information fed into a GAN's database. Paglen, whose work I mentioned earlier, uses GAN to create fine art. In his series *Adversarially Evolved Hallucinations*, he created photo composites using GAN and preexisting photographs to reflect the icons that culture holds in high regard. His "Venus Flytrap" was forged by an AI taught to see "American Predators"—drones, stealth bombers, carnivorous plants and animals, and Mark Zuckerberg (Hu). In "Highway of Death,"

Paglen trained another AI to generate a composite of photojournalism documented in the Gulf War, which creates a perfectly composed backdrop of a surreal landscape (Hu). He again holds the torch to what is fully critical of our culture and our personal use of computer technology, achieving *gesamtkunstwerk*. It goes beyond what our eyes can see to examine the personal and cultural biases of what we find important, dangerous, and beautiful. If “Venus Flytrap” is attractive and ascribed value, how high do we place Mark Zuckerberg or war on a scale of beauty? Paglen, like every Bauhaus artist, is careful what is placed into his GAN. Therefore, there is still a level of direct human interaction.

One artist seeks to completely eliminate the direct human interaction. Siebren Versteeg is an artist based out of New York City who uses GANs that are connected to the internet. He has created a changing landscape generated inside of a digital frame. The software generates albums of Instagram posts, clocks, album covers, and more. They update in real time as generated slide shows based on google image searches or external feedback presented in the piece (Siebren Versteeg). Versteeg also creates paintings from algorithm generated paint pathways and found images (Siebren Versteeg). Not only is Versteeg relying on readymade or found images on the internet, the GAN is manipulated by the stimulus it receives by millions of strangers. Thus, the artist is so removed that it pacifies the idea of Bauhaus objectivity.

Similarly, Mario Klingemann explores a custom GAN he calls “Neural Glitches.” He chains GANs together to form a system that not only produces new data, but checks itself. By using a series of facial markers, one GAN fixes or “heals” the series of discrepancies generated by the first GAN to create what the artist calls “neorealism” (Quasimondo). He even uses his system to map facial recognition on images to manipulate emotions and speech, as seen in his work “Alternative Face” (Quasimondo). Through generation and self-correction, it follows the

Bauhaus principles of photography's abilities to improve the eye's function by detecting pinpoints not visible to the eye.

In his essay *Bauhaus Bücher: Malerei, Photographie, und Film*, Moholy-Nagy predicts the future of world communication. He hypothesizes that man will be able to wirelessly transmit film articles (Moholy-Nagy 29). Now, digitally transmitted articles are a reality through AI, social media, websites, ebooks, and more. In one-hundred years, we have fully surpassed Moholy-Nagy's expectations. This is not to say that we can accurately predict the technological advancements in 2100. However, there is an underlying idea that surmises the most essential need for Bauhaus philosophy, which is global communication. Bauhaus recreated the fundamentals and set precedents that are just as groundbreaking today in order to standardize the way we communicate. Moholy-Nagy's portion of the *gesamtkunstwerk* of communication was photography for which the methods, it is safe to say, will remain for the next one-hundred years.

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