READING LIST

(The History of Visual Communication and Design in 10 Key Moments + Colour Theory)

The History of Visual Communication and Graphic Design in 10 Key Moments

Visual communication, or nonverbal communication, goes beyond body gestures and writing. Visual Communication expresses emotion, feelings, ideas, information and thoughts with a combination of words and pictures, art, typography, photography, symbols, movies and/ or sounds.

1. Cave Paintings: 15 000 - 10 000 BC

Cave and rock paintings were the first form of visual communication. They originated around 40,000 years ago, mainly in Asia and Europe. Researchers have not been able to determine the exact purpose of the Paleolithic cave paintings. However, probably they were not simply decorations of living areas since the caves do not have signs of continuing human stay and were not easily accessible.

Theories suggest that cave paintings may have been a way of communicating with others, or for a religious or ceremonial purpose. It is widely believed that the paintings are the work of respected elders or shamans.

The most common themes in cave paintings are large wild animals, tracings of human hands, and abstract patterns. Drawings of humans are rare compared to the more naturalistic animal subjects.

The Lascaux Cave is a complex of caves in southwestern France. Over 600 wall paintings cover the interior walls and ceilings of the cave. The paintings are the combined effort of many generations. The age of the paintings is now usually estimated at around 17,000 years.

The paintings were drawn with red and yellow ochre, hematite, manganese oxide and charcoal. Sometimes the silhouette of the animal was incised in the rock first. Scholars interpreted the paintings as being magic symbols, intended to increase the number of animals.

2. Pictograms, Ideograms and Logograms: 5000 BC

A pictogram is a symbol or an icon that represents various concepts, objects, places and events, or even various activities. This is achieved through illustration. Pictograms typically represent an idea by an image. Pictography is a form of writing whereby ideas are transmitted through drawing. It is the basis of cuneiform and hieroglyphs.

Early written symbols were based on pictograms (pictures which resemble what they signify) and ideograms (pictures which represent ideas). It is commonly believed that pictograms appeared before ideograms. They were used by various ancient cultures all over the world since around 9000 BC and began to develop into logographic writing systems around 5000 BC.

An ideogram or ideograph is a graphical symbol that represents an idea, rather than a group of letters arranged according to the phonemes of a spoken language, as is done in alphabetic languages. Examples of ideograms include wayfinding signage, such as in airports and other environments where many people may not be familiar with the language of the place they are in, as well as Arabic numerals and mathematical notation, which are used worldwide regardless of how they are pronounced in different languages.

Symbols in logographic systems generally represent *words or morphemes* rather than pure ideas. This contrasts to other writing systems, such as alphabets, where each symbol (letter) primarily represents a sound or a combination of sounds.

Chinese character is a logogram used in writing Chinese, Japanese and Korean. A complete writing system in Chinese characters was developed 3500 years ago in China, making it perhaps the oldest surviving writing system. Chinese characters are derived directly from individual pictograms. The number of Chinese characters contained in the Kangxi dictionary is over 47,000, although a large number of these are rarely-used variants.

3. The Alphabet: 2000 BC

The first known alphabet started in ancient Egypt. The first pure alphabets (properly, "abjads", mapping single symbols to single phonemes, but not necessarily each phoneme to a symbol) emerged around 2000 BC in Ancient Egypt, as a representation of language developed by Semitic workers in Egypt, but by then alphabetic principles had already been inculcated into Egyptian hieroglyphs for a millennium. Most other alphabets in the world today either descended from this one discovery, or were directly inspired by its design, including the Phoenician alphabet and the Greek alphabet.

The Proto-Canaanite alphabet, like its Egyptian prototype, only represented consonants, a system called an abjad. From it can be traced nearly all the alphabets ever used, most of which descend from the younger Phoenician version of the script. The Phoenician alphabet was based on the principle that one sign represents one spoken sound. The Aramaic alphabet, which evolved from the Phoenician in the 7th century BC as the official script of the Persian Empire, appears to be the ancestor of nearly all the modern alphabets of Asia. Besides Aramaic, the Phoenician alphabet gave rise to the Greek and Berber alphabets.

The Greek alphabet is the source for all the modern scripts of Europe. The History of the Greek alphabet starts with the adoption of Phoenician letterforms and continues to the present day. The Greek alphabet can be considered to be the world's first true alphabet. The alphabet of the early western Greek dialects, gave rise to the Old Italic and Roman alphabets.

Several hundred years later, the Romans used the Greek alphabet as the basis for the uppercase alphabet that we know today. They refined the art of handwriting, developing several distinctive styles of lettering which they used for different purposes. They created a rigid, formal script for important manuscripts and official documents and a quicker, more informal style for letters and routine types of writing. However, the Romans made further important contributions to type design: in the Roman alphabet, serif originated with the carving of words into stone in ancient Italy. Roman stonemasons started adding little hooks to the tips of letters to prevent the chisel from slipping, which turned out to be the very aesthetic as well as legibility increasing addition to type that we use to this day. The alphabet used by the Romans consisted only of capital (upper case or majuscule) letters. The lower case (minuscule) letters developed in the Middle Ages from cursive writing, first as the uncial script, and later as minuscule script. Yet another Roman innovation is the institution of the baseline: In typography and penmanship, the baseline is the line upon which most letters "sit" and under which descenders extend. By these additions Romans ensured that type was perfectly aligned in rows, thus greatly contributing to type aesthetics.
By A.D. 100, the Romans had developed a flourishing book industry and, as Roman handwriting continued to evolve, lower case letters and rough forms of punctuation were gradually added.

Yet another Roman innovation was the invention of the Codex: A codex (Latin for block of wood, book) is a handwritten book, in general, one produced from Late Antiquity through the Middle Ages. The codex was a vast improvement upon the scroll, which it gradually replaced as the written medium, in several ways. It could be opened flat at any page, allowing easier reading; the pages could be written on both recto and verso; and the codex, protected within its durable covers, was more compact and easier to transport. The codex also made it easier to organize documents in a library because it had a stable spine on which the title of the book could be written. The spine could be used for the incipit, before the concept of a proper title was developed, during medieval times. Although most early codices were made of papyrus, papyrus was fragile and supplied only from Egypt. The more durable parchment and vellum gained favor, despite the cost. From the point of view of Graphic Design the codex completely revolutionised the field in that codices brought about the gridded page layout system, which we still use today.

4. The Art of the Book: Medieval Europe

Medieval Europe brought the introduction of books, which were named "Illuminated Manuscripts". In an illuminated manuscript the text is supplemented by the addition of decoration or illustration, such as decorated initials, borders and miniatures. In the strictest definition of the term, an illuminated manuscript only refers to manuscripts decorated with gold or silver. However, the term is now used to refer to any decorated manuscript.

Most medieval manuscripts were written on parchment (most commonly *calf*, *sheep*, or *goat* skin) or vellum (*lamb*, *baby goat*, or *calf* skin). From the late Middle Ages manuscripts began to be produced on paper.

Illuminated manuscripts are also the best surviving examples of medieval painting. The earliest surviving illuminated manuscripts are from the period AD 400 to 600, primarily produced in Ireland, Italy and other European locations. The meaning of these works lies not only in their art history value, but in the promotion of literacy. The majority of surviving manuscripts are from the Middle Ages, although many illuminated manuscripts survive from the 15th century Renaissance.

Most of these manuscripts are of a religious nature. However, especially from 13th century onward, an increasing number of secular texts were illuminated. Most illuminated manuscripts were created as codices, although many illuminated manuscripts were *rolls* (scrolls) or single sheets. Only a few illuminated manuscript fragments survive on papyrus.

4.1. European Heraldry (1100)

Technically, the world's first logo is the coat of arms, used as a symbol to represent family houses or territories. Like logos, a house's coat of arms aimed to represent the values, characteristics and styles of the people. Later, these emblems took on more practical purposes such as wax seals to reflect authenticity.

4.2. Storefront Signage – 1389 (*Old-fashioned Bar Sign*)

In the 14th century, beer and ale were preferable alternatives for drinking water at a time when most water sources were polluted. King Richard II of England made a law that ale houses must have signs out front so the public could find them easier.

These were the first signage that actually represented companies and they are also the origin of a beautiful tradition that survives to this day.

5. 1440: The Printing Press

The year 1440 brought the invention of "The Printing Press" by Johannes Gutenberg. The printing press revolutionised the world of visual communication by giving humans the ability to reproduce text and graphics much faster and easier - instead of having to manually reproduce things.

Johannes Gutenberg (1398 – 1468) was a German goldsmith and inventor who became famous for his invention of the technology of printing with movable types during 1447. Gutenberg has often been considered the most influential and important person of all times.

Block printing, whereby individual sheets of paper were pressed into wooden blocks with the text and illustrations carved into them, was first recorded in Chinese history, and was in use in East Asia long before Gutenberg. By the 12th and 13th, the Chinese and Koreans knew about moveable metal type at the time, but because of the complexity of the movable type printing it was not as widely used as in Renaissance Europe.

It is not clear whether Gutenberg knew of these existing techniques, or invented them independently, although the first option is considered unlikely because of the substantial differences in technique. He certainly introduced efficient methods into book production in Europe — in large part, thanks to the popularity of the Gutenberg Bibles, the first mass-produced work, starting on 1455. Even so, Gutenberg was a poor businessman, and made little money from his printing system.

Gutenberg began experimenting with metal typography after he had moved from his native town of Mainz to Strasbourg (then in Germany, now France) around 1430. Knowing that wood-block type involved a great deal of time and expense to reproduce, because it had to be hand-carved, Gutenberg concluded that metal type could be reproduced much more quickly once a single mould (US *mold*) had been created.

In 1455, Gutenberg demonstrated the power of the printing press by selling copies of a two-volume Bible (*Biblia Sacra*) for 300 florins each. This was the equivalent of approximately three-year wages for a clerk, but it was significantly cheaper than a handwritten Bible that could take a single monk 20 years to transcribe. The Gutenberg Bibles surviving today are sometimes called the oldest surviving books printed with movable type — although actually, the oldest such surviving book is the Jikji, published in Korea in 1377.

However, it is notable that the print technology that produced the Gutenberg Bible marks the beginning of a cultural revolution unlike any that followed the development of print culture in Asia. The Gutenberg Bible lacks many print features that modern readers are accustomed to, such as pagination, word spacing, indentations, and paragraph breaks.

Raúl Rosarivo, in his Typographical Divine Proportion, first published in 1947, was the first to analyze Renaissance books with the help of compass and ruler and concluded that Gutenberg applied the golden canon of page construction to his work, based on the "golden number" or "secret number" to establish the harmonic relationships between the diverse parts of a work.

5.1 Incunabula

The word 'incunabula' usually refers to the earliest printed books, completed at a time when some books were still being hand-copied. An incunabulum is a book, single sheet, or image that was printed — not handwritten — between the years 1455 and 1500 in Europe (italiano: *quattrocentina*). The origin of the word is the Latin incunabula for "cradle", used by extension for the early stages of something.

There are two types of incunabula in printing: *the block book*, printed from a single carved or sculpted wooden block for each page, employing the same process as the woodcut; and *the typographic book*, made with individual pieces of cast-metal movable type on a printing press.

Many early typefaces were modeled on local forms of writing or derived from the various European forms of Gothic script, but, particularly in Italy, there were also types modeled on humanistic hands. These humanistic typefaces are often used today, barely modified, in digital form.

Standard works in Latin inherited from the medieval tradition formed the main part of the earliest printing, but as books became cheaper, works in the various vernaculars began to appear. The design of the books shows all the characteristics of a transitional period. They still resemble their medieval counterparts where ornamentation, initials and bordering are very important but they are certainly no longer as dark and dense as the medieval illuminated manuscripts. Already we see a move towards whiter, lighter pages. The grid was technologically necessary to set type and this caused the books to follow to a grid system, another novelty in design.

5.2 Albrecht Dürer

Dürer (1471–1528) was a painter, printmaker, and theorist of the German Renaissance. Dürer established his reputation and influence in Europe when he was still in his twenties, due to his high-quality woodcut prints.

His vast body of work includes engravings, portraits and self-portraits, watercolours and books. The woodcuts show a more Gothic flavour than the rest of his work. His watercolours also mark him as one of the first European landscape artists, while his ambitious woodcuts revolutionized the potential of that medium.

Dürer's introduction of classical motifs into Northern art, through his knowledge of Italian artists and German humanists, has secured his reputation as one of the most important figures of the Northern Renaissance. This is reinforced by his theoretical treatises, which involve principles of mathematics, perspective, and ideal proportions.

An important part of Dürer's output were prints, both as woodcuts and as engravings. Printmaking techniques are, of course, at the core of incunabula books, and therefore Dürer's work had considerable influence over the book industry of the 15th century.

His most widely sold works were his woodcut prints, mostly of a religious nature, but secular as well - as is the case in the rhinoceros print. Dürer either drew his design directly onto the woodblock itself, or glued a paper drawing to the block. Either way, his drawings were destroyed during the cutting of the block.

Engraving, the other main technique, worked on the reverse principle to woodcuts in that it was not elevated areas of the printing surface that were inked but the grooves. The lines removed from the copper plate with a cutter would appear black in the prints. The plate was engraved by the artist himself, a technique which would have been familiar to Dürer from his time spent as a goldsmith in his father's workshop. The engraved plate was then inked and wiped, leaving the ink in the grooves, and it was ready for printing.

Later the three main specialities of Dürer's workshop were paintings, prints, and to a lesser extent designs for stained glass. Dürer also experimented with other printmaking techniques, including drypoint as well as etching on iron plates.

6. The Masters of Type: The Renaissance

The Renaissance was a period in European history dating from the 14th to the 17th century, regarded as the cultural bridge between the Middle Ages and modern history. It started as a cultural movement in Florence, and later spread to the rest of Europe, marking the beginning of the Early Modern Age. The intellectual basis of the Renaissance was humanism, derived from the rediscovery of classical Greek philosophy and represented in the quote "Man is the measure of all things."

This new thinking became manifest in art, architecture, politics, science and literature. In addition, the invention of metal movable type helped the dissemination of ideas from the later 15th century. As a cultural movement, the Renaissance promoted Latin and vernacular literatures, learning based on classical sources, and the development of linear perspective and other techniques of rendering a more natural reality in oil painting by artists such as Leonardo da Vinci and Michelangelo.

One of the major benefits of this new learning value was the spreading of literacy, i.e. the ability of not only to be able to read but also to write. Keeping diaries and notebooks became a widespread practice. As a consequence, the art of calligraphy as well as of page layout and lettering acquired special importance.

Calligraphy masters travelled teaching the new educated elite these new fine crafts. Leonardo Da Vinci's notebooks are of particular interest to historians, not only due to the beautiful illustrations and technical drawings but also through their extraordinary page layouts. New writings required creating a new type of fonts that were more legible and more elegant. Page designs were rapidly becoming lighter, while white space was making more and more its appearance.

The problem was, however, that ancient Romans had only uppercase, capital letters. Renaissance typographers had to spend more time working on lowercase letter shapes. As a basis, they took Carolingian scripts that were common in early Middle age (before the blackletter had become dominant style across the Western Europe), but changed them significantly to match the Roman uppercase letters and to better adopt to Gutenberg's printing technology that had just appeared.

6.1 Aldus Manutius

Aldus Manutius (1450–1515) was educated as a humanistic scholar and established a printery in Venice. Aldus devoted himself to publishing the Greek and Roman classics, in editions noted for their scrupulous accuracy. A five-volume set of the works of Aristotle, completed in 1498, is the most famous of his editions.

He was especially interested in producing books of small format for scholars at low cost. To this end, he designed and cut the first complete font of the Greek alphabet, adding a series of ligatures or *tied letters*, similar to the conventional signs used by scribes, which represented two to five letters in the width of one character.

To save space in Latin texts he had a type designed after the Italian cursive script, which was the first italic type used in books (1501). Books produced by him are called Aldine and bear his mark, which was a dolphin and an anchor. Aldus employed competent scholars as editors, compositors, and proofreaders to insure accuracy in his books.

7. Photography and Printing: The Industrial Revolution

The Industrial Revolution was the major technological, socioeconomic and cultural change in the late 18th and early 19th century. Printing techniques using movable type had restricted graphic design to an inflexible grid. Anything that was to be mass printed in great volume needed to adhere to a system in which type was set in consecutive rows of parallel lines.

Lithography dates back to the end of the 18th century, when Alois Senefelder invented the technique of printing with stone plates. This novel method – originally intended for the reproduction of music notation - quickly spread throughout the art world.

As a means of visual communication and expression, photography has distinct aesthetic capabilities. In order to understand them, one must first understand the characteristics of the process itself. One of the most important characteristics is immediacy. The image that is recorded is formed by a lens in a camera. Upon exposure to the light forming the image, the sensitive material undergoes changes in its structure, a latent (but reversed) image usually called a negative is formed, and the image becomes visible by development.

Photography involves light patterns being reflected or emitted from objects that are then recorded onto a sensitive medium or storage chip through a timed exposure. The first photograph was an image produced in 1826 by the French inventor Nicéphore Niépce.

By 1837, Daguerre was able to fix the image permanently by using a solution of table salt to dissolve the unexposed silver iodide. That year he produced a photograph of his studio on a silvered copper plate, "the daguerreotype." Daguerre wrote a booklet describing the process, which became immediately a best seller.

Daguerre's process rapidly spread throughout the world. Exposures were at first of excessive length, sometimes up to an hour. At such lengthy exposures, moving objects could not be recorded, and portraiture was impractical.

7.1 The Arts & Crafts Movement

The industrial revolution had its critics. Book design and typography declined in quality, and many mass-produced goods were cheap and of poor quality. The Arts & Crafts Movement began in reaction to the poor aesthetic quality of the Industrial Revolution in Great Britain.

It was also a socialist reform movement. Followers of the Arts & Crafts movement intended to destroy the commercial system, believing that industrialization created a dehumanizing distance between the designer and manufacturer. The movement advocated attention to design and a return to hand-craftsmanship.

The movement's figurehead was William Morris (1834–1896), designer, typographer, printer, and publisher. Morris called for truth in the use and nature of materials and individual expression by designers. William Morris's small printing company, Kelmcott Press, produced 53 books of superb quality and refinement. Morris inspired book and type designers to work with private presses, which were more receptive to experimentation.

The Arts and Crafts movement did not promote a particular style, but the common aesthetic emphasized nature and simplicity of form. Architecture, furniture, pottery, jewelry, patterns, books, stained glass from the 1860s to 1910 reflect this aesthetic. The Movement is now recognized as the bridge between traditional

Victorian values and the modern movement. An important development in this movement was the formation of workshops that trained artists in many crafts – from pottery to furniture.

8. Vanguard - Experimentation: 1914+

Graphic design as we know it today really started developing in the modern era, roughly in the late 1800s up until the end of World War II. While the 19th century was more about technological advancements and new capabilities, the modern era was about learning how to exploit these advancements for more artistic aims.

With printing, artists and designers were pushed to explore new styles and techniques, which quickly brought to advertising and branding.

8.1 The Wiener Werkstätte (First Graphic Design Agency, 1903)

With more and more companies recognizing the benefit of graphic design, it was just a matter of time before the first graphic design agency emerged. Meaning simply "Vienna workshop," the Wiener Werkstätte was the first such organization of visual artists, including painters, architects, and early graphic designers. Organizationally, it set the precedent for all other collaborative agencies to follow.

Perhaps its greatest legacy was stylistic innovation, such as cubism. The work done at the Wiener Werkstätte set the stage for the popular Bauhaus and Art Deco styles that soon followed.

8.2 Staatliches Bauhaus (1919)

The "Bauhaus," first opened its doors in Weimar, Germany in 1919. One of the main objectives of the Bauhaus was to unify art, craft, and technology. The machine was considered a positive element, and therefore industrial and product design were important components.

In addition, this is the modern day Basic Design course that has become one of the key foundational courses offered in architectural schools across the globe.

8.3 Constructivism

An artistic and architectural movement in Russia from 1914 onward, and a term often used in modern art today, which dismissed "real" art in favour of art used as an instrument for social purposes.

Alexander Rodchenko (1891 - 1956), was one of the most versatile Constructivist artist/designers to emerge after the Russian Revolution. He worked as a painter and graphic designer before turning to photomontage and photography. His photography was socially engaged, formally innovative, and opposed to a painterly aesthetic.

8.4 Futurism

One of the most important avant-garde art movements of the 20th century, Futurism developed in Italy between 1909 and the early 1920s. Its members wished to destroy older forms of culture and to demonstrate

the beauty of modern life - the beauty of the machine, speed, advanced technology and urban modernity, violence and change.

The car, the plane, the industrial town were all legendary for the Futurists, because they represented the technological triumph of man over nature. The Futurists were fascinated by the problems of representing modern experience, and through this interest they explored every medium of art, including painting, sculpture, poetry, theatre, music, architecture and even gastronomy.

The Italian poet Filippo Tommaso Marinetti was the first among them to produce a manifesto of their artistic philosophy in his Manifesto of Futurism (1909). Marinetti summed up the major principles of the Futurists, including a passionate hate of ideas from the past, especially political and artistic traditions. As a poet, Marinetti's interests were especially concentrated on typography, which makes the Futurist movement highly relevant to Graphic Design history.

8.5 Dada

Dadaism, or Dadaism, is a cultural movement that began in neutral Zürich, Switzerland, during World War I and operated from 1916 to 1920. The movement primarily involved visual arts, literature, theater, and graphic design, which concentrated its antiwar politic through a rejection of the prevailing standards in art through anti-art cultural works.

The Dadaists were very interested in the power and influence of the written word. To this end, they produced a series of magazines, which were also influenced by Marinetti's thoughts on the usage of typography as a tool for mixing text and image, which can be said to be precursors of the poetry school called "concrete poetry".

According to its proponents, Dada was not art — it was "anti-art". Dada sought to fight art with art. For everything that art stood for, Dada was to represent the opposite. Through this rejection of traditional culture and aesthetics, they hoped to destroy traditional culture and aesthetics.

Over time, avant-garde became associated with movements concerned with art for art's sake, focusing primarily on expanding the frontiers of aesthetic experience over aims for social reform. The avant-gardist movements of the early 20th century specifically focused on visual communication design and/or implemented it as a modus operandi such as The Constructivists, Futurism, Dada, Bauhaus and De Stijl.

9. Modernism: Late 19th Century to Early 20th

The term *graphic design* appears for the first time in 1922. In his article "New Kind of Printing Calls for New Design" (1922), book designer William Addison Dwiggins first used the term "graphic design" to describe exactly what his role was in structuring and managing the visuals in book design. From day one, designers were struggling to explain to non-designers what, exactly, they did.

Modernism is a trend of thought which affirms the power of human beings to make, improve and reshape their environment, with the aid of scientific knowledge, technology and practical experimentation. By 1930, Modernism had entered popular culture. Modern ideas in art appeared in commercials and logos, the famous London Underground logo is an early example of the need for clear and easily recognizable visual symbols.

Broadly, modernism describes a series of progressive cultural movements in art and architecture, music, literature and the applied arts that emerged in the decades before 1914. Modernism refers to the works of artists, thinkers, writers and designers who rebelled against late 19th century academic traditions, and confronted the new economic, social and political aspects of the emerging modern world.

9.1 Art Deco

Also known as *Style Moderne* or *1925 Style*, it was a movement in the decorative arts that grew to influence architecture, design, fashion and the visual arts. The name Art Deco derived from the *Exposition Internationale* held in Paris in 1925. Art Deco was influenced by many different cultures, particularly pre-World War I Europe. The movement occurred at the same time as, and as a response to, the rapid social and technological advances of the early 20th century.

9.2 The Posters of the WPA

In contrast to the opulence of Art Deco was the poverty generated by the Great Depression in the United States. Interestingly enough, some of the most beautiful graphic design work comes from the WPA, which was a work relief program that provided jobs and income to the unemployed during the Great Depression in the United States. It built many public buildings and roads, and as well operated a large arts project.

9.3 Postmodernity

This is a term used to refer to a style resulting from late 20th century and early 21st century life based on globalization, consumerism and the fragmentation of authority, and the commercialization of knowledge. "Post-modernity" is also used to demark a period in art, design and architecture beginning in the 1950s characterized by the rejection of strong divisions of genre, "high" and "low" art, and the emergence of the global village.

Postmodernity is marked by the re-emergence of surface ornament, reference to surrounding buildings in urban architecture, historical reference in decorative forms, non-orthogonal angles such as the buildings of Frank Gehry (1929—).

9.4 Deconstruction

Deconstruction is a term used to denote the application of post-modern theory, to a "text". Jacques Derrida (1930-2004), who coined the term, said that one consequence of deconstruction is that the text may be defined so broadly as to include not just written words, but the entire range of symbols and phenomena within Western thought.

In graphic design, deconstructivism gave its name to one of the major typographic movements, starting in the early 1980s and continuing into the late 1990s: Deconstructive Typography that shifted the typographic practice towards a spatial, non-linear process. The page is no longer to be just "read" but also *perceived*, beyond the pure textual content, into all of its associative conjunctions: We are meant to "feel" rather than "read" a page.

9.5 Paul Rand

Paul Rand published *Thoughts on Design* in 1947. With one foot in modernism and the other in post-modernism, he helped lead graphic design into its current form. He posted his theories and ideologies in the work *Thoughts on Design*, which largely shaped the future of the entire graphic design industry.

One of the top designers in history, Paul Rand left his mark on the logos of many everyday brands. His book highlights the importance of a "functional-aesthetic perfection," an ideal balance between a logo looking good and communicating its points effectively, seen in his popular logo designs for brands like Ford, Westinghouse, Yale, ABC, UPS, and IBM.

10. The Computer: Early 21st Century - Present

The modern day computer has revolutionised the entire world. From the 1950s onward, the world began its slow approach to the digital era we are currently living. The mass-adoption of home computers is a technological advancement comparable to the invention of the printing press, leading to a new age for mass communication based on digital software for new methods of creating art.

In 1950, the British mathematician and computer pioneer Alan Turing published a paper describing what would come to be called the *Turing Test*, a test of a machine's ability to exhibit intelligent behaviour equivalent to, or indistinguishable from, that of a human.

The earliest electronic digital computers were in operation around the 1940s. Computerised graphic technology was developed in the early 1950s, but it was not really artwork but mostly computer aided design and manufacture used in such situations as flight simulators and scans of the internal anatomy of human bodies. The first artistic experiments with computers took place in early 1960s. Most of these creations were the work of scientists, not artists, which led to a more technical than artistic style.

During the 1960s, computers began to have an impact on graphic design by offering systems programmed to assist with justification of setting, and using memories that can summon up an image on a cathode ray tube (screen) as reference. But reliance on this early system brought problems. The operators were unable to control spacing and word breaks that a good compositor in hot-metal could have supplied earlier. Nevertheless, hot metal was ousted by the effects of lower costs and the convenience of cold type.

In the mid-1980s, arrival of desktop publishing and the introduction of software applications introduced a generation of designers to computer image manipulation and 3D image creation. Computer graphic design enabled designers to instantly see the effects of layout or typography changes without using any ink in the process. Not only did computers greatly speed up and facilitate the traditional design process, they also gave a completely new outlook to sketching and idea formation.

However, possibly one of the greatest additions of the new technology to graphic design were the unprecedented things that could now be done with typographic elements, such as *negative trackings* and *leadings*.

In 1987, a new player arrived on the scene. Quark launched QuarkXpress 1.0 while Adobe launched Illustrator and Aldus released Freehand 1.0 the next year. Even though PageMaker was the first professional DTP (desktop publishing) application, QuarkXpress soon became the new standard.

10.1 Web Design

Tim Berners-Lee, the inventor of the World Wide Web, published a website in August 1991, making him also the first web designer. His first aim was to use hypertext with an existing email link. Early on, websites were written in basic HTML, a markup language giving websites basic structure (headings and paragraphs), and the

ability to link using hypertext. This was new and different to existing forms of communication - users could easily open other pages using browsers.

Programmers were the original web page designers in the early 1990s. Currently most web designers come from a graphic artist background in print, where the artist has absolute control over the size and dimensions of all aspects of the design. The Web Designer has only limited control over several factors, including the size of the browser window or the different devices that the site is viewed with - ranging from smart phones to HD computer screens.

Website design crosses multiple disciplines of information systems, information technology and communication design. The website is an information system. The observable content (e.g *page layout, user interface, graphics, text, audio*) is known as the front-end. The back-end is the functional design and programming or software engineering.

10.2 Mobile UI (*User Interface*)

Mobile UI design constraints include limited attention and form factors, such as a mobile device's screen size for a user's hand.

Data Visualization involves the creation and study of the visual representation of data, meaning "information that has been abstracted in some schematic form."

It is at this juncture that Infographics which are graphic visual representations of information, data or knowledge intended to present information quickly and clearly, start to play an important role. They can improve cognition by utilizing graphics to enhance the human visual system's ability to see patterns and trends.

The evolution of visual communication from cave paintings to digital software can serve as great inspiration. The history of graphic design is ongoing. That pretty much brings us up to date with graphic design, but one area still remains a mystery: *what is the future of graphic design?*

10.3 Ai-DA

Is Ai-DA the future of graphic design? Ai-DA is the custom-made life-size humanoid robot artist. It does not aim at the mere imitation of a human artist. Ai-Da includes an ethical arts project. Intended to highlight the beneficial and creative uses of Artificial Intelligence (AI) in contemporary art, the was described by its creator, Aidan Meller, as the "world's first ultra-realistic artist robot". Which is of course also a work of art in itself.

Ai-Da, whose name is a combination of the acronym for artificial intelligence (AI) and a reference to Ada Lovelace (1815-1852)– the English mathematician and writer well known for her advances in computing– hosted her first ever exhibition in Oxford in 2019.

How does a robot paint? Ai-Da has an inbuilt camera installed behind her eyes to "see" people and things. The AI processes what the eye is seeing and interprets this to create a piece of art, using a robotic hand to physically draw the work. Using this technological expertise, Ai-Da can make complex works in under two hours.

What does it mean to have a robot creating art for the real world? As Lucy Seal, researcher and curator for the project, told: "We are looking forward to the conversation Ai-Da sparks in audiences. A measure of her artistic potential and success will be the discussion she inspires.

It also feels particularly pertinent that Ai-Da is a female-presenting robot. Women artists are sadly underrepresented in the art world: according to a report by the Freelands Foundation, only 22 per cent of solo exhibitions at non-commercial London galleries in 2017 were by women artists.

And now the question is: Will there be more robotic artists and what kind of impact could that have on the art scene, and future (human) artists?

Colour Theory Overview

Isaac Newton created the colour wheel in 1666. The three primary colours, *red, yellow, and blue*, cannot be created from mixing other colours. The secondary colours, purple, green, and orange, are created by mixing the primary colours.

Tertiary colours are created by mixing the primary and secondary colours. The warm colours are red, yellow, and orange. The cool colours are blue, green, and purple. The neutral colours, black, white, and gray, while not on the colour wheel, are used to tint and shade the colours of the colour wheel. Tinting means to add white to a colour, while shading means to add black to a colour.

Basic Colour Theory

There are three basic categories of colour theory that are logical and useful: The *colour wheel*, *colour harmony*, and *the context* of how colours are used.

Colour theories create a logical structure for colour. For example, if we have an assortment of fruits and vegetables, we can organize them by colour and place them on a circle that shows the colours in relation to each other.

The Colour Wheel

A colour circle, based on red, yellow and blue, is traditional in the field of art. Sir Isaac Newton developed the first circular diagram of colours in 1666. Since then, scientists and artists have studied and designed numerous variations of this concept. In reality, any colour circle or colour wheel which presents a logically arranged sequence of pure hues has merit.

There are also Definitions (or *Categories*) of Colours based on the colour wheel:

Primary Colours: Red, yellow and blue. In traditional colour theory (used in paint and pigments), primary colours are the 3 pigment colours that cannot be mixed or formed by any combination of other colours. All other colours are derived from these 3 hues.

Secondary Colours: Green, orange and purple, formed by mixing the primary colours.

Tertiary Colours: Yellow-orange, red-orange, red-purple, blue-purple, blue-green & yellow-green formed by mixing a primary and a secondary colour.

Colour Harmony

Harmony can be defined as a pleasing arrangement of parts, whether it be music, poetry, colour, or even an ice cream sundae. In visual experiences, harmony is something that is pleasing to the eye. It engages the viewer and it creates an inner sense of order, a balance in the visual experience. Colour harmony delivers visual interest and a sense of order.

There are many theories for harmony. The following illustrations and descriptions present some basic formulas.

1. A colour scheme based on analogous colours:
Analogous colours are any three colours which are side by side on a 12-part colour wheel, such as yellow-green, yellow, and yellow-orange. Usually one of the three colours predominates.

2. A colour scheme based on complementary colours:
Complementary colours are any two colours which are directly opposite each other, such as red and green and red-purple and yellow-green. These opposing colours create maximum contrast and maximum stability.

3. A colour scheme based on nature:
Nature provides a perfect departure point for colour harmony. In the illustration above, red yellow and green create a harmonious design, regardless of whether this combination fits into a technical formula for colour harmony.

Colour Context

How colour behaves in relation to other colours and shapes is a complex area of colour theory. Compare the contrast effects of different colour backgrounds[1] for the same red square.

Red appears more brilliant against a black background and somewhat duller against the white background. In contrast with orange, the red appears lifeless; in contrast with blue-green, it exhibits brilliance. Notice that the red square appears larger on black than on other background colours[2].

If your computer has sufficient colour stability and gamma correction, you will see that the small purple rectangle on the left appears to have a red-purple tinge when compared to the small purple rectangle on the right. They are both the same colour as seen in the illustration below. This demonstrates how three colours can be perceived as four colours.