THE EFFECT OF DIGITALIZATION ON ILLUSTRATION IN GRAPHIC DESIGN

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Abstract

Illustrations that support the visual aspect of the graphic arts are visual images used to interpret, depict, explain or embellish content in books, newspapers and online media. The communication process, which evolved from the drawings on the cave walls to writing, is insufficient on its own. Illustrations can express a feeling, a meaning or an essence more effectively than a wall text can. Illustrations can simplify a complex idea, complement the words or message expressed to the user, and can sometimes stand alone without any necessary explanation. Illustrations continue to take a permanent place in our lives by enabling us to give details that cannot be seen in photography or to express imaginary ideas or thoughts with digitalization. Today, with wider and more efficient distribution networks, illustrated newspapers, books and magazines find a suitable distribution area. Both graphic design and illustration have their own techniques and tools. With digitalization, these tools are developing and reaching a level that every user can achieve. With different types of software, illustrators develop their own artistic forms. The illustrations, which were previously made with computers, have now been replaced by graphic drawing tablets.

In this study, it is aimed to draw attention to the illustrations that help the sector trying to keep up with the digitalized world, to research the techniques used and new technology products. For this purpose, the types of illustration were researched, the traditional techniques still used today and the developing digital tools were examined. The developments experienced with digitalization in illustrations, the effects of produced software and applications on graphic design are discussed.

Keywords: *Illustration, Digitalization, Graphic design, Graphic tablet*

Introduction
Illustration and Graphic Design
In terminology, illustration is defined as a picture that is functional to explain something. Etymologically, the word "illustration" comes from the Latin word "Illustrate", which means explanation. It is also said that illustrations are derived from the word illusion. This occurs as a complement to a goal to help a person more easily understand the message in a picture. Illustration, which is a two-dimensional work of art, is used to clarify an understanding. Illustrative pictures are used to decorate books, magazines or newspapers in certain columns. Illustration is usually a form of visual text or sentence. For those who love illustration, besides being interesting with its unique and various messages, it is an educational opportunity for children who are more interested in painting as they cannot read well. Illustrations can also describe scenes in a story, so illustration usually describes the character or the entire story content (Zeegen 2009; Özcan et al. 2018).

Historically, book illustration and magazine/newspaper illustrations have been the dominant forms of such visual arts, but illustrators have also used their graphic skills in poster art, advertisements, comics, animation art, greeting cards, and cartoon strips. Most illustrative illustrations are made with pen and ink or metal nib, then reproduced using a variety of printing processes, including lithography, photography, and engraving (Liu 2021).

Graphic design is an art, professional and academic discipline that consists of reflecting visual communication that aims to convey specific messages to social groups with specific goals. Therefore, it is an interdisciplinary branch of design whose basis are defining problems and setting goals for decision making, creativity, innovation and lateral thinking, as well as digital tools that transform them for correct interpretation. This activity helps in optimizing graphic communication. The role of the graphic designer in the communication process is the encoder or interpreter of the message (Chu 2018). They work on the interpretation, organization and presentation of visual messages. Design work always starts from a client's request, a linguistically manifested request, verbally or in writing, that is, graphic design transforms a linguistic message into a graphic representation. Graphic design, as a field of application, has different fields of knowledge that focus on any visual communication system (Ambrose, Harris & Ball 2019).

Illustration Types
Illustrations make a deep and long-term impact on the human mind. When used appropriately, they become a powerful mechanism for rich storytelling and marketing. Illustration, one of the most widely used tools of visual com-

munication, has been developing over the years to gain a strong identity in the publishing, packaging, healthcare, education and production industries. Illustrations can be integrated into books, learning materials, animations, posters, flyers, magazines, movies and indeed all kinds of print and digital media. Any idea or concept can be presented in a more interesting way using illustration. With the developments in technology and the increasing importance of illustration for some different fields, it has brought brand new styles to illustration techniques. With the developing technology and the tools used, new products are emerging (Klimowski 2012).

With digitalization, illustrations have started to be used frequently in the film and advertising industry, and in a number of other areas. The expensiveness of advertising and film productions or the difficulty of movie shooting due to the pandemic we live in today have pushed artists to use illustrations. The fact that illustrations can be applied to both traditional methods and digital methods is an advantage for artists.

Advertising Illustrations
Advertising illustrations are graphic images that clarify texts, direct the eyes of the target audience and create a lasting impression. Illustrations are included in ad layouts to convey one or two concepts to viewers. The purpose of advertising illustrations is to enhance the message of the accompanying text and to attract the consumer to read the text. Illustrations persuade potential customers to buy the product and maintain awareness (Figure 1).

Fig 1. J.C Leyendecker's 1915 Kellogg's advertising illustration

Advertising illustrations appear in almost every part of our lives. According to other application areas, there are many different uses such as billboards, television advertisements, flyers, posters, direct mail kits, web banners, bus stops.

Scientific Illustrations

Scientific illustrations are drawings that have a scientific subject or purpose aimed at conveying information. Today, sculpture, ink, watercolor, colored pencil, digital illustration and animation are widely used tools in science illustration (Wood 1994). Scientific illustrations are used in textbooks, brochures, magazines, user manuals, scientific publications, and botanical gardens (Figure 2).

Fig 2. A Magnolia species coloured etching by G. D. Ehret (https://www.botanicalartandartists.com/about-georg-ehret.html)

Technical Illustrations

Technical illustration is a field of drawing that uses static and dynamic images to explain the interconnectedness of technical operations. Technical illustrations detail a complex mechanism or product by making it visually simple. It aims to create effective images that effectively convey certain information to the observer through the visual channel. It generally continues its activities in broadcast media, medicine, engineering and scientific fields. Illustrators working in the technical field make technical and electronic manuals and assembly instructions available to people through this branch (Figure 3).

Fig 3. Technical illustration, Rescue Helicopter Section for United Technologies campaign – Hans Jenssen (https://www.hansjenssen.co.uk/cross-sections)
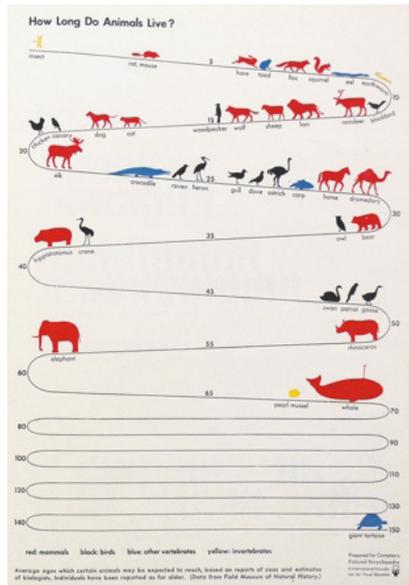
Children's Book Illustrations

Children's book illustrations include all kinds of pictures produced especially for books aimed at young audiences. In particular, illustrations are needed in stories to improve children's communication skills and expression potential. Illustrations in children's books draw attention visually and offer children a fun narrative structure. With these visual representations, their imagination gets rid of a limited expression (Figure 4).

Fig 4. İrem Ustaoğlu, "Monster Puh and Brave Suzi", Children's book Illustration work (https://www.behance.net/gallery/114928483/Monster-Puh-and-Brave-Suzi-%28thaki%29)

Infographics

Infographics are visual representations of information or data. It consists of an image, chart, and minimal text that provides an easy-to-understand overview of a topic. In infographics, striking and interesting visuals are used to convey information quickly and clearly. Therefore, they are valuable tools for visual communication. Marketers prefer infographics to create brand awareness and increase interaction. The purpose of infographics is not only to inform, but also to present entertaining and interesting content to the target audience (Figure 5).

Fig 5. Gerd Arntz, Infographic Showing the Habitat of Animals (https://datavizblog. com/2013/08/06/dataviz-history-isotype-charts-the-vintage-visual-language-that-gave-rise-to-modern-infographics/)

Archaeological Illustration

Archaeologists use illustrations to describe artifacts from the remains. Today, archaeologists prefer computer and graphic software to produce illustrations. The purpose of archaeological illustrations is to provide more information in a format that the audience can read (Figure 6). They figure works for interpretation on websites, books, and research papers. By displaying an archaeological illustration of a finding, an accurately sized draw-

ing is obtained showing the details of the object's decoration, type, form, and even construction method. Archaeological illustrations are usually black and white. The main purpose is to reveal the decoration and show the depth of the object. Colors are rarely added to academic pictures. It is only added to highlight details such as glazes or colors in painted glass.
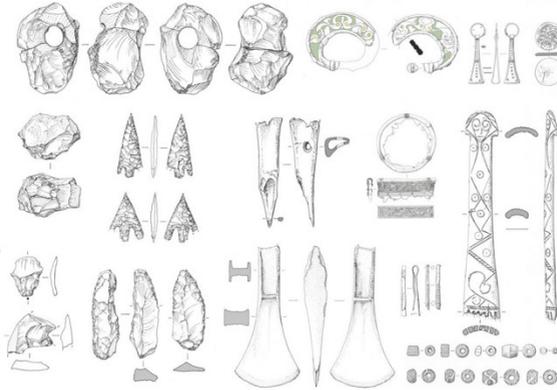

Fig 6. Illustration sample from Artifacts from Archaeological Studies (https://www. wessexarch.co.uk/archaeological-services/artefact-publication-illustration)

Illustration in the Digital World and Digital Methods Used in Illustration

The illustrations were used by upper-class nobility before the 1500s, representing the cultural identity of the church. In the Renaissance period, the art of illustration became a desirable and valued art and spread to the world as a visual culture. Digital illustration, on the other hand, took its first steps for development shortly after World War II. In the 1960s, when scientific research on computation and algorithms was carried out, it gained great momentum. Creative experiences created with the help of computers in the period between 1950 and 1970 have been a period of innovation for today's illustration art and animation industry. After studies, the ability to program computers to perform specific tasks and the improvement of imaging systems allowed illustrators or artists to input directly. In this way, it is possible to manipulate the images pixel by pixel in order to achieve the desired goal. Thus, the foundations of digital painting and drawing were laid. Between the 1970s and 1990s, illustrators and artists began to see how technology could be used to transform existing images into new works with the available possibilities. Most of these artworks are basically created from

vector images different from pixel images. Unlike pixel images, vector images can be dimensioned endlessly without losing resolution. Developments between 1980 and 1990 began to encompass both the viewer and the artist, interactive environments placed at the interface between the real and virtual worlds. Illustrators are focused on manipulating images with the help of computer software tools. In this way, in the digitalized world, art has become easy to reach and visible for every class and every person. Illustrators can make their works visible to millions of people from all over the world at great speed by uploading them online thanks to the internet (Husarik 2007).

The major developments in the 21st century we live in are changing the way we communicate, our lifestyle and the way we watch movies, which have evolved into the digital world, at the same speed. As the world digitizes, the data obtained through concrete and natural means is reset. Despite this, the illustrations continue on their way by transforming. An area is emerging where technology and illustration combine to create a new natural identity. With the use of computer aided design in the new digital world created, concepts such as new media art have become more audible today. New media art is a term that covers art forms that are produced, modified and transmitted through digital technologies. It is a branch that can be used generally connected to the internet and provides interaction with users. With the social and cultural changes in the society, it has created a space for new contemporary art practices. In new media art, artists often collaborate because of the need for a wide variety of artistic skills to be executed. The use of various graphic tablets and social media has also increased the number of illustrators. Artists and illustrators who want to increase their followers on social media have been in search of new ideas (Meyer, Schaupp & Seibt 2019).

Digital Methods Used in Illustration
There are many forms of digital approaches found in different infrastructures used in illustrations or artistic drawings. Today, as the materials and digital illustration tools used change and develop, different techniques and approaches emerge. Different tools can be used according to the wishes of the artists in order to obtain the desired image quality or to manipulate the images easily.

Vector Based Illustration
Vector illustration is an art formed of vector graphics. It is created using vector drawing software programs such as Adobe Illustrator. These charts are based on mathematical formulas. Illustrations are usually composed of points, lines and curves as the main structure. When vector illustrations are

rescaled according to the variety of work, their resolution and image quality are not lost.

Due to its ability to integrate with Adobe Photoshop, it is an ideal method for processing poster-style works by exchanging photos. Works made using vector software such as Adobe Illustrator are considered vector illustrations. The use of vectors has become widespread due to the laboriousness of creating raster images and the expensive computational power required. All of the text vectors used today are made in vector-based programs.

Pixel Based Illustration

Pixel-based0 illustrations consist of small colored or colorless squares that can be seen when zoomed in and form the whole image. Their image quality is lower compared to vector-based illustrations. Pixel-based illustrations may experience problems with rescaling. Especially when the image is zoomed in, breaks occur in the edge lines. In illustrations created using this method, it is possible to make smoother transitions between colors by increasing or decreasing the color of pixels or shadows. Thus, smoother color mixtures can be obtained. It is possible to animate illustrations with various brushes and effects included in software such as Adobe Photoshop or Procreate. Unlike vector-based illustrations, smooth color transitions can be achieved with the help of brushes instead of clear and sharp transitions.

Pixel art is a form of digital art in which images or photographs are created or edited at the pixel level using graphics editing software. Pixel Art is created from large visible pixels that make up the constituent elements of the entire image.

Today, vector graphics have taken the usage areas of Pixel Art. Illustrators and artists use Pixel Art as an artistic choice. While a simple program such as Microsoft Paint can be used, a more comprehensive program such as Adobe Photoshop can also be used. In the game industry, although 3D software dominates the market, pixel art still exists.

Photo Manipulation

Photo manipulation is the process of transforming the image by using various methods and techniques to achieve the desired results in photography. Photo manipulation may also be used in science fiction elements. However, in the images created, surreal scenes should still have realistic perspective, lighting and shading (Wilson 2016). In order to achieve the required level of realism, photographs that are independent of each other, but also complement each other, should be combined. Generally, Adobe Photoshop software is used, where the image can be processed best.

Animated Illustration

GIF is a commonly used image file format for images on websites and motion graphics in software programs. Illustrations saved in this format offer lossless compression without reducing the quality of the image. GIF images can contain a maximum of 256 colors. They are also loops where the first and last frames are exactly the same. With such illustrations, it is possible to achieve the desired results in storytelling or explaining the subject. Animated illustrations are gaining popularity today as they convey jokes, emotions and ideas. The use of animated illustrations in integration with applications such as Twitter, Facebook and Instagram have become widespread.

Illustration Tools Emerged with Digitization

Digital illustration is the process of creating images and works using digital tools. It is made with Adobe Illustrator, Photoshop and similar applications. In addition, it is used in tools such as computers, mouse, stylus pen, drawing tablets. Many of these tools are inspired by the materials used in traditional illustration. With these tools that have become widespread, a more flexible and comfortable working area has been created in illustration. Therefore, the demand for these vehicles is increasing rapidly today. Likewise, with the increasing demand, the vehicles used are renewing themselves and new types of vehicles are emerging.

Computer

Illustrators and artists first experimented with computers in the 1950s. By the 1970s, the light pen or stylus pen was introduced to the market. In this way, users started to move items freely on the computer monitor. Today, stylus type pens are still in the foreground compared to the mouse. The advent of the inkjet printer in 1976 facilitated the printability of works of art.

After the 1990s, illustrators focused on manipulating images with the help of computer software. Thus, companies such as Adobe have produced vector or pixel-based software programs that appeal to users. The digital manipulation of photographs has created the contemporary generation of artists. The widespread use of social media today has led illustrators to work in this field.

Computers and software have allowed designers to quickly and easily bypass the design processes that used to take hours and focus on other important areas such as creativity and innovation. With digital methods becoming more common, money and time have also been saved. Computer technology has made it easy to review and edit errors quickly. For this reason, it allowed designers to pay more attention to details. Computers put typesetting tools in the hands of individual designers, giving them a trial period in the design

of new and unusual typefaces and page layouts. The rapid development of technology has also significantly affected the way illustrations are created and distributed to audiences.

Graphics Tablet

Graphic tablets are devices that have a stylus-controlled interface and also have a computer input. Graphic tablets vary according to the technology used. But in general, all graphics tablets use received signals to determine the horizontal-vertical position of the stylus, its distance from the tablet surface, and its inclination. Graphic tablets are widely used among digital illustrators today. It is especially preferred for creating two-dimensional drawings. The pens of graphic tablets can also be used as a mouse. It has a drawing surface that makes up the majority of the surface area of the top of the tablets. This surface is pressure sensitive and records every line and curve the designer draws. Graphic tablets are also used to capture handwritten signatures. The image drawn on the tablet is transferred directly to the computer environment. It is preferred by illustrators because of the flexible movements of digital pens. Drawn images usually do not appear on the tablet itself. Instead, it appears on the computer monitor. After the tablets are connected to the computer, drawing continues by looking at the computer while drawing. Graphics tablets can be used with many different types of software, including graphics, animation, and drawing software. Due to its versatility, it is preferred by engineers and architects as well as designers.

Drawing Tablet

Drawing tablets are an essential tool for artists dealing with digital illustration. It captures drawings accurately and transfers them to digital files to increase work efficiency. Drawing tablets allow users to draw without the need for a computer connection like graphics tablets. It is possible to make precise drawings thanks to the pressure sensitivity with the drawing pen called stylus. The hardness and softness of the lines can be easily adjusted with the pressure to be applied on the drawing with a pencil. With different software and applications, it is possible to give illustrations with digital effects that are done manually in traditional methods. While working with a brush on drawing tablets, the page can be tilted and rotated in all directions in order to achieve a certain stroke.

Drawing Robots

Drawing robots recreate everything drawn on paper on a touchscreen device, using a pen or paintbrush. With drawing robots, it is possible to apply ma-

terials such as watercolor, which are used in traditional methods, on paper. While drawing a real-time watercolor drawing on a computer accompanying application, the robot follows the drawing, dips its brush in water, and then picks up the correct paint color and completes the painting process. According to the drawing robot brand users prefer, it can hold a pencil or paint brush while allowing it to sit securely on a metal plate or piece of paper.

In general, drawing robots capture the same drawing by following the movements of the human hand using software. Due to its ease of use and practicality, its use is rapidly spreading today.

Results and Conclusions

Considering the digitalized world today, the advertising industry also benefits from this area. Advertising is very effective in selling the same type of products that users or consumers can choose from. Advertisements made with effective illustrations, on the other hand, are catchy and attract attention to the product. In addition to advertisements, illustrations are frequently used in children's books. Considering the developmental processes of individuals, such books play important roles in mental development in childhood.

With digitalization, various applications and tools have emerged to transfer illustrations used in graphic design to users. These applications are followed by amateur or professional designers. The process that started with desktop computers has moved to devices small enough to fit in our pockets. The digitalized process is revising itself in a way that changes every day. Especially the current pandemic has led to the advancement of even daily life through digital platforms. The graphic design industry did not remain indifferent to this situation. The fact that the process of shooting the photographs used in the designs was costly and then the processing of the photographs took a long time led the artists to use illustration. The fact that the illustrations are designed and applied to different platforms regardless of time and place has been an indicator of keeping up with the digital world. The fact that illustrations made with vector programs do not have any problems in scaling and can be applied to any surface has been a great advantage for artists. Today, thanks to advanced technology, illustrators also create works that are difficult to distinguish from photographs. In this period when the use of social media is quite common, illustrators compete their arts with interesting projects. In addition, although digital methods are used, traditional methods that have survived from the past to the present are continued. In fact, both species are used together and new species emerge. Traditional methods were abandoned by some artists because they were found to be tedious. When we look at the digital side of the business, the users are too

many to be underestimated. They produce interesting works with the tools provided by technological opportunities.

Illustrations are considered an integral subset of graphic design. Nowadays, it makes a name for itself independently of graphic design. Illustrations, which once competed with photographs and lost this race, occupy a valuable part of our lives today. Although it is not known how the future of illustrations will be shaped by technological developments such as developing software and robotic drawing, it is no doubt that it will continue to exist in the future as it has come from the Paleolithic ages.

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