The impact of artificial intelligence methods on graphic design

Zülali Mine NAZ*[1]
Şükrü Mustafa KAYA[2]

Abstract

Artificial intelligence (AI) methods are creating revolutionary changes in the field of graphic design and significantly transforming design processes. Advanced AI techniques such as deep learning, generative adversarial networks (GANs), and neural networks are used in many areas, such as automatic visual generation, style transfer, typography optimization, and providing personalized design recommendations. While these technologies accelerate the creative processes of graphic designers, they also contribute to the emergence of new aesthetic understandings and design approaches. Among the effects of AI on graphic design, time and cost advantages, personalized content production and design automation stand out. Especially thanks to GANs, AI-supported tools can analyse user inputs and create new and original designs, thus supporting and improving manual design processes. In addition, AI-supported design tools contribute to the democratization of design by allowing users to participate in design processes with less technical knowledge. In this study, the effects, advantages and disadvantages of AI methods on graphic design are examined in detail. The role of AI in artistic production processes, the new opportunities it provides for designers and its ethical dimensions are discussed, and how the interaction between graphic design and AI will take shape in the future is evaluated.

Keywords: *Artificial Intelligence, AI-based Graphic Design, Graphic Design, Digital Design Age*

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[1]* Doğuş Üniversitesi, MYO, Bilgisayar Destekli Tasarım ve Animasyon Bölümü, mnaz@doğus.edu.tr, Orcid: 0000-0002-1729-6819.
[2] İstanbul Aydın Üniversitesi, ABMYO, Bilgisayar Teknolojileri Bölümü, mustafakaya@aydin.edu.tr, Orcid: 0000-0003-2710-0063.

Yapay zekâ yöntemlerinin grafik tasarımı üzerindeki etkisi

Öz

Yapay zekâ (YZ) yöntemleri, grafik tasarım alanında devrim niteliğinde değişiklikler yaratmakta ve tasarım süreçlerini önemli ölçüde dönüştürmektedir. Derin öğrenme, üretken çatışmacı ağlar (GAN'lar) ve sinir ağları gibi gelişmiş YZ teknikleri, otomatik görsel oluşturma, stil transferi, tipografi optimizasyonu ve kişiselleştirilmiş tasarım önerileri sağlama gibi birçok alanda kullanılmaktadır. Bu teknolojiler grafik tasarımcıların yaratıcı süreçlerini hızlandırırken, aynı zamanda yeni estetik anlayışların ve tasarım yaklaşımlarının ortaya çıkmasına da katkıda bulunmaktadır. YZ'nin grafik tasarım üzerindeki etkileri arasında zaman ve maliyet avantajları, kişiselleştirilmiş içerik üretimi ve tasarım otomasyonu öne çıkmaktadır. Özellikle GAN'lar sayesinde YZ destekli araçlar kullanıcı girdilerini analiz ederek yeni ve orijinal tasarımlar yaratabilmekte, böylece manuel tasarım süreçlerini desteklemekte ve iyileştirmektedir. Ayrıca YZ destekli tasarım araçları, kullanıcıların daha az teknik bilgiyle tasarım süreçlerine katılmalarına olanak tanıyarak tasarımın demokratikleşmesine katkıda bulunmaktadır. Bu çalışmada YZ yöntemlerinin grafik tasarım üzerindeki etkileri, avantajları ve dezavantajları ayrıntılı olarak incelenmektedir. Yapay zekanın sanatsal üretim süreçlerindeki rolü, tasarımcılara sağladığı yeni fırsatlar ve etik boyutları tartışılmakta ve grafik tasarım ile yapay zekâ arasındaki etkileşimin gelecekte nasıl şekilleneceği değerlendirilmektedir.

Anahtar Kelimeler: Yapay Zekâ, Yapay Zekâ Tabanlı Grafik Tasarım, Grafik Tasarım, Dijital Tasarım Çağı

Introduction

Today, rapidly developing technology continues to transform the daily lives of humanity. Especially in the last 20 years, rapidly developing technological opportunities play an important role in the differentiation and development of graphic design processes and the design responsibilities and design methods of graphic designers. With the emergence of new technological opportunities in the 21st century, a significant development and transformation era has occurred in all design fields, and the methods of designers to produce their designs, convey the desired message to professional media, and communicate with the target audience have rapidly changed and become digital. Technology, which continues to change and develop day by day, should show that; solving complex design problems that occur in the production process, designing the design process easier compared to the past, has greatly enabled real-time design and sharing in terms of the designer and the work. Throughout history, designers have strived to create innovative designs with the innovations brought by the period they live in, and have continued to create their works in line with the latest tool, technology, and the technological opportunities it brings.

The digital age has led to revolutionary transformations in the field of graphic design, redefining creativity and design processes. The transition from traditional design techniques to digital platforms has provided graphic designers with a faster, more flexible and innovative environment, while also increasing competition in the sector. Software tools such as Adobe Creative Cloud, cloud-based design platforms and artificial intelligence-supported creative applications are among the fundamental elements that have expanded both the scope and impact of graphic design. Digital design has not only increased creativity, but also provided a global interaction environment, allowing brands to reach their target audiences more effectively. User-friendly tools such as Canva allow even non-professionals to create visual content, which is described as the democratization of graphic design. However, these developments also bring new challenges for industry professionals; the need to keep up with innovations and master technology has become important. In order to understand the effects of the digital age on graphic design, it is necessary to examine not only technological developments, but also the reflections of these developments on creativity, design principles and elements, and the understanding of aesthetics. The ever-changing dynamics of technology

are shaping the future of graphic design and showing that innovations in this field offer unlimited possibilities.

The aim of this study is to identify and analyse in detail the effects, advantages and disadvantages of AI methods on graphic design. The role of artificial intelligence in artistic production processes, the new opportunities it provides to designers and its ethical dimensions are discussed and how the interaction between graphic design and artificial intelligence will be shaped in the future is evaluated.

Related works

In the studies of Kanmaz and his friends, rapidly developing technological opportunities in the last 20 years play an important role in the differentiation of graphic design processes. With the new formation of the 21st century, changes have occurred in the field of graphic design and the habits of graphic designers have become digital. The opportunities brought by technology and graphic design today show that; solving problems, creating design methods easier compared to traditional methods and real-time sharing and designing have been provided compared to past design methods. Designers have continued to create their works in every field of design and graphic design with the latest tools, technological methods and developing their designs thanks to technological opportunities (Kanmaz and Pehlivan, 2024).

Karaçeper states in his study that developing technology has entered every area of our lives today and has significantly affected the field of graphic design. Especially technology, which is present in every area of our lives, has made differences in many areas of graphic design as well as daily life and has reshaped the traditional methods in this field and enabled us to use them more efficiently (Kaya and Akcay., 2022). Although some traditional methods continue to exist in today's designs, technological and computer-aided design, which is a necessity of our age, has come to the fore and progress has been made (Karaçeper, 2018).

Uncu, in his study, has experienced significant changes in design with the rapid development of the digital age, and developing technological opportunities have changed the ongoing methods by exceeding the limits of traditional media. Changing traditional methods have offered new opportunities in creating a new design form. These new opportunities have also offered new opportunities in the business world and brought

with them some difficulties (Uncu, 2024). These difficulties experienced are constantly evolving and the adaptation process of designers to these developments should be in line with the innovations that emerge. Pala Öztürk's study on the adaptation process states that the digital developments experienced require acceleration and adaptation in direct proportion to the human lifestyle. In the period we live in, where technological methods have accelerated more than ever, human beings are trying to adapt to newly emerging technological methods (Pala Öztürk, 2023). Karaman is closely related to the adoption of digital methods in order to increase the value quality of design and to ensure productivity and social well-being. In this direction, many institutions have strengthened their long-term business policies focused on digital transformation and developed strategic foresight studies. Digital transformation has become an inevitable part of the design and business world (Karaman, 2024).

In his work, Çeken uses algorithms so that artificial intelligence computers can easily perform tasks that they consider complex, make decisions, learn, and designers can produce design processes. Today, artificial intelligence is used in art, design, health, education, and many other areas, and this is also transforming graphic design (Kaya et.al., 2021). While traditional design processes were at the forefront in the past, with the increasing use of developing technology and artificial intelligence methods, designer creativity and human originality have begun to be replaced by instructions given to artificial intelligence, and in this direction, artificial intelligence can produce different design alternatives in seconds compared to traditional methods (Çeken and Terzi, 2024). On this subject, Sönmez has presented different methods than traditional methods in his study on artificial intelligence. Artificial intelligence has facilitated design processes by examining data and creating new and different designs. Artificial intelligence technology, which is a developing part of design, continues to be used rapidly in the field of graphic design and this use is increasing day by day. However, artificial intelligence can limit the responsibilities and roles that designers undertake in design. It also brings about important discussions and question marks among designers in terms of creativity (Sönmez, 2024). In addition to this subject, Deveci's work, the history of art is full of a series of experiences that show that the artist has always obtained works inspired by the great masters of the past. Today, similarly, artificial intelligence programs are developing starting from imitation in production pieces. These artificial intelligence systems, dialectical

applications between classical rules and visual aesthetics, learn the understanding of perfection and artistic beauty, and reshape the products or designs produced (Kaya et.al., 2022). This process can be questioned in different ways by combining or destroying existing ones. Production with artificial intelligence reveals itself in the production of these dialectical processes. In this context, files and reports automatically by artificial intelligence, we now need to re-evaluate the role of the artist or designer Deveci (2022).

Transformation and graphic design with digital methods
- *The formation of graphic design:* Graphic design can be defined as a visual tool that effectively, explanatorily, informatively and clearly presents a subject to the other party. We can say that the main purpose of graphic design is to convey a message in a clear, effective and aesthetic way. Graphic design, which proves that it is also a subject in plastic arts and painting, contains many visual expressions and these are applications such as pictures and typography studies aimed at expression (Naz, 2021).
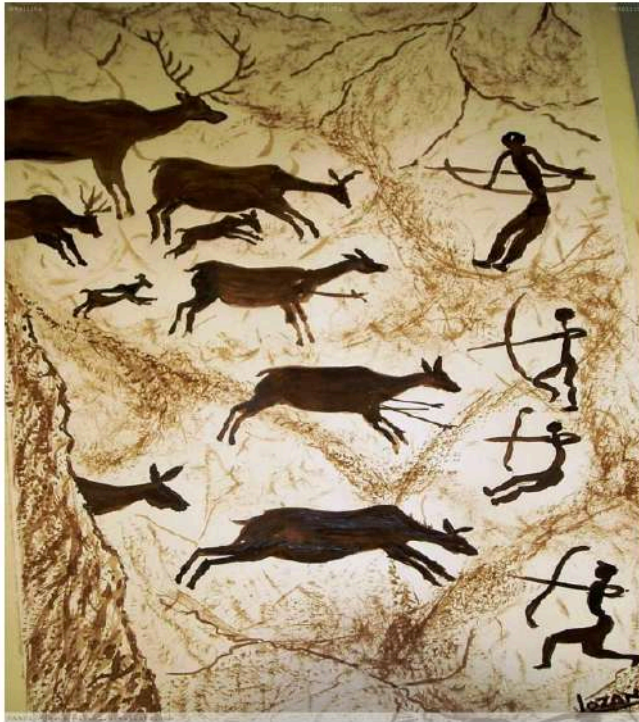

Figure 1: Examples of the first cave paintings (2025)
*(URL-1)*

The formation of graphic design dates back to very old times, even before the era of writing, when communication and communication methods were not developed. The first examples of graphic design are cave paintings, as presented in Figure 1, which are drawings created without any aesthetic concern and without adhering to visual hierarchy and design principles in order to provide information about people's hunting methods, lifestyles, nature and daily lifestyles. These drawings are the first visual examples of the formation of graphic design as symbols. Another important example of communicating with visual symbols to give information is the hieroglyphs in Ancient Egypt. Hieroglyphs are also one of the first systems that laid the foundations of graphic design by combining the written and visual language of graphic design. In the Middle Ages, graphic design began to take shape with religious texts and manuscripts. Manuscripts were mostly used to write sacred texts (such as the Bible) in the Christian faith. These manuscripts were works equipped with detailed, finely ornamented and carefully drawn pictures. It is seen that these works have made significant contributions and developments in the aesthetic design hierarchy of graphic design history. Until the period before the invention of the printing press, all books were in the form of manuscripts, and in those times, the reproduction of books was not done by printers as it is today, but by specially trained slaves, especially in the Greeks, just like in the Romans. Since the designed books were in the minority in terms of variety and had religious content at that time, book writing began to be carried out more as a church duty. The influence of the church on the art of manuscripts continued throughout the Middle Ages. Towards the end of the Middle Ages, with the invention of paper, the use of paper in book production started a new era in the history of graphic design.

At the beginning of the twentieth century, radical changes occurred in people's lives due to the effects of world wars and technological developments and changes. Monarchy collapsed and was replaced by new forms of government such as democracy, socialism, and communism. In addition to these radical changes, many changes in technology and science took place in this period(Kaya et.al., 2023). Developments such as the invention of airplanes, Quantum Theory, and Freud's introduction of psychoanalytic thought occurred in this period. In all this confusion, movements such as Cubism, Surrealism, Dadaism, and Constructivism, which opposed social order and traditions, emerged. The effects of these movements, the Dadaists, Cubists, and other emerging movements, were

effective in graphic design and graphic art finding an identity (Naz, 2021). - *Evolution and turning points of graphic design:* When the historical process of graphic design is considered; as presented in Figure 2, the printing press invented by Gutenberg was a revolutionary development. Thanks to the printing press, designs were made accessible to a wide audience and became one of the basic elements and requirements of graphic design. This played a major role in the development of book designs, brochures, posters and all other designs under the title of graphic design. After the industrial revolution, it is seen that innovative approaches and searches in design, architecture and even literature changed rapidly. Especially in graphic design, there was an increase in innovative approaches, the desire to reach the target audience directly and the desire to convey the desired message to a much wider audience.
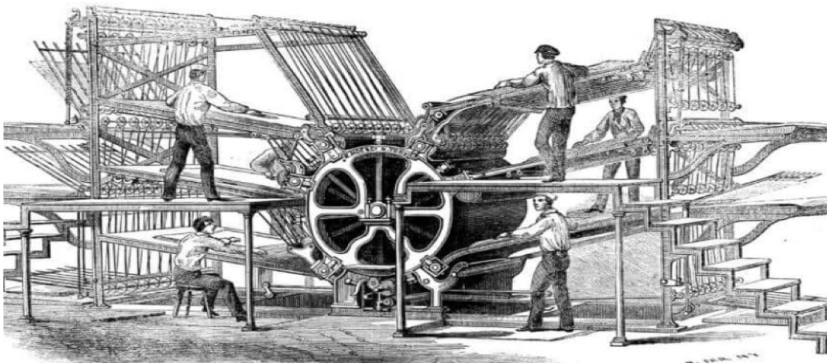
Figure 2: Gutenberg, the first printer (2025) - (URL-2).
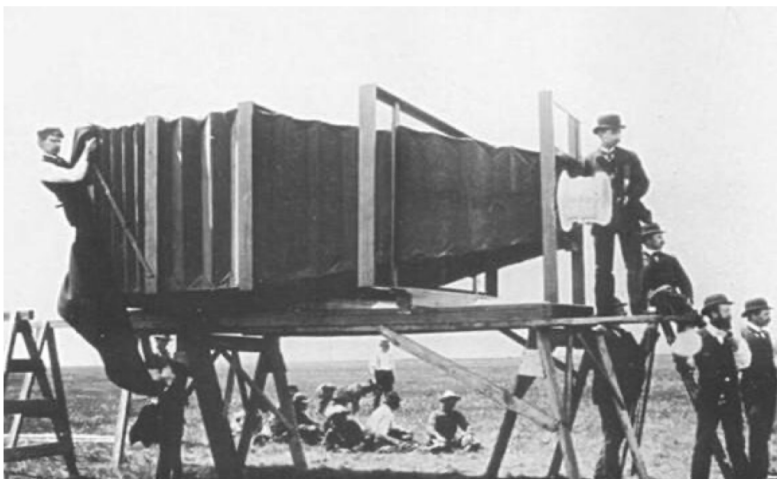
Figure 3: The first camera (2025) - (URL-3).

One of the important points for the history of graphic design was the invention of the camera after the industrialization period as presented in Figure 3. Before the invention of photography, the design process was designed by drawing by hand or by applying certain engraving methods. With the invention of photography, posters, product shots and catalog designs came to the fore. Thanks to the trends that emerged with the invention of the camera, painters also started to work in the field of graphic design, examples were given where graphic design and art were intertwined. With the invention of photography, the need for communication in design was met. In this way, graphic design became an indispensable part of technological elements. The idea of "functional and visually compatible", which emerged after the revolution of "integration of art, craft and technology" in design with the Bauhaus school at the beginning of the 20th century, along with the printing press, camera and developing possibilities, began to be adopted more with the integration of new technologies into the production of visual communication designs with the radical transformation that began after the digital age was introduced in the 1990s. In this process, graphic designers played an important role in the transition between the two disciplines and pursued a technologically informed aesthetic (Eskilson, 2007:396). Now, design, aesthetics and technological possibilities have merged into a whole and are reflected in graphic design.

-Transformation with digital methods: Art is a phenomenon that has been going on since the existence of humanity and has evolved over time. Throughout history, people have used different branches of art to express the world, nature and themselves. Art has always benefited from today's technology. The acceleration observed in the speed of development of technology with the 21st century has also been reflected in the field of art; the meaning, content and function of art have changed as much as the production methods (Naz and Kaya., 2025).

The era we live in is a period in which digital art and digital artists are increasingly coming to the fore with the developments in technology. Although art and technology have interacted at every stage of history, today, with the innovations and opportunities observed in the digital field, the popularity of interaction has increased as well as the speed of its spread. Art has gained a new form and has begun to be applied with new techniques (Eke and Yücel, 2023).

The rapid rise of digital media has caused significant transformations in the field of visual design and fundamentally changed design processes. The process of digitalization has gone beyond the boundaries of traditional media and offered designers new opportunities, allowing for the creation of a new aesthetic language. This transformation has not only affected design processes but also created new opportunities and some challenges in the business world. Adaptation of design to digital platforms refers to the process of adapting traditional design principles to digital environments. This adaptation has been realized with the aim of improving user experience, ensuring brand consistency and making the most of the features of digital platforms (Uncu, 2024).

Art and technology are concepts that affect each other and art changes with technology. The concept of digital art has emerged as a phenomenon that has increased its effectiveness in the 2000s. In general, the re-formation of art with computer techniques has given birth to digital art. Digital art has caused interdisciplinary rapprochement, and art, design and technology have begun to find the power of expression together (Atan, 2015).

There is a direct relationship between art history and technological transformation. Over time, artists have begun to produce works of art using new techniques and materials as technology has advanced. In particular, with the development of computer technology, artists have had the opportunity to produce works of art that could not be produced with computer support (Kızılaslan and İsmailoğlu, 2021).

Digital methods are the most important effects of graphic design, thanks to the innovations brought by the age, design has evolved and graphic designers have moved away from the position of designers who only design with pencil, paper and paint as in the periods when traditional methods were used, and with the opportunities brought by digital transformation, there have been changes in design methods. Today, graphic designers use almost no traditional design methods. With the influence of digital methods, the term Graphic Design has changed and developed in terminology with the development of the digital age, with the works designed being called Digital Product and the Designer being called Digital Product Designer, Social Media Manager, Visual Designer, Digital Artist etc.

Graphic design has left traditional methods to technological methods with the development of digital transformation. Thanks to the computer technology

that developed after the industrial revolution, the most important design element of graphic design has become the computer, and thus revolutionary changes have occurred in art design, visual design, communication, graphic design and all other design fields. Graphic designers and artists who started to use computers as a design production method have been able to produce their designs, which they had designed with difficulty for long periods of time with traditional methods, in a much shorter time with the opportunities brought by digital transformation, saving time and creating more efficient designs without physical strength. Therefore, this convenience that digitality brings to design has pushed designers to digitalization and the demand for this field has increased even more. These developments, which have developed, grown and become more efficient than traditional methods, have rapidly changed new art trends and design methods. In addition to all these developments, the barrier to reaching the masses has been eliminated thanks to the widespread use of the internet. The internet network that came with the digital transformation has opened the doors to a new era in graphic design by allowing designs designed with computers to be disseminated and presented in digital environments and to reach a much larger audience than targeted, and this era has gained a unifying, conscious and informative function for people.

Digital artists and designers; While making use of the emerging digital platforms while creating their works, they are also tasked with pushing the boundaries of technology in order to create today's art. While these artists and designers explore the effects of developing technologies and the understanding of digital art and design, they also take into account the technological, artistic and social developments triggered in different digital media formats (Ryan, 2011). With the development of devices (computers, tablets) produced in line with the development of technology and the spread of their usage rates, smart devices and programs used in design (Adobe Photoshop, Adobe Illustrator, Adobe InDesign) have reduced the design production times of designers in the field of graphic design to a minimum level and provided the opportunity to present the message intended to be conveyed in the design to the target audience more successfully visually and technically. Nowadays, graphic designers and artists can reach the whole world in a second on any day and time period they want by publishing their designs over the internet (via various social media applications) without being bound by space and area limitations, and can transfer information and art with many users.

The impact of artificial intelligence on graphic design

Artificial intelligence is an operating system that analyzes the algorithms given to it and creates various visual outputs. It provides an interdisciplinary and versatile field of study. A multidisciplinary approach based on mathematics, computer science, linguistics is used in psychology, art, design and other fields (Rezk, 2023).

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The graphic design process includes creativity, knowledge, and aesthetics. The graphic designer uses this knowledge and experience when creating his designs. The difference between artificial intelligence design applications and graphic designers emerges at this point. Since the grid system is used in publications such as magazines and newspapers with daily, weekly, and monthly publication periods, it may be important to create fast and accurate data input on the specified design template. At this point, supporting with artificial intelligence applications can contribute to the rapid progress of the work (Karaata, 2018).

When the advantages and disadvantages of artificial intelligence in the context of graphic design are examined, it is seen that the advantages are endless. Among the advantages: errors are reduced, it can efficiently automate human tasks in routine tasks, it saves time. The disadvantages: there are not many resources for experienced designers, the best resources are expensive, it can negatively affect our creative thinking skills, it makes us lazier, etc. (Rezk, 2023).

Technology has played an important role in the evolution of visual arts and graphic design since the early days of civilization, and artists have always used the technology available at that time to express their feelings and thoughts. Today, artificial intelligence has the power and potential to create a major revolutionary change in the fields of art and graphic design. The development of artificial intelligence is making great progress, especially in terms of accelerating, diversifying and automating creative processes. Artificial intelligence software and systems offer graphic designers

significant advantages in visualizing complex data and developing new ideas, allowing the design to be created more quickly. In this way, graphic designers can leave routine work behind and focus entirely on creative processes. However, the role of artificial intelligence in the design process has not yet developed enough to replace human creativity. Artificial intelligence has difficulty in fully creating the emotional depth and meaning of graphic design. The value of a design is often shaped by the personal interpretation and meaning that the designer adds to the work. Artificial intelligence cannot imitate this human-specific creative understanding; however, it provides graphic designers with new ideas and perspectives thanks to the multiple alternatives it offers. This capacity indicates the possibility of producing more creative and effective designs in the future. The combination of human intelligence and artificial intelligence carries significant innovative potential in the field of visual arts and graphic design. However, this process needs to be managed responsibly. Artificial intelligence should not harm the essence of the design idea; on the contrary, it should be used as a tool that enriches and develops the designer's creative process. Ethical responsibilities should be taken into account in the use of artificial intelligence in graphic design, and the fundamental values of design, human creativity and originality should always be kept at the forefront. In the future, the balance between artificial intelligence and human creativity will become increasingly critical in visual arts. The speed and variety offered by artificial intelligence will allow graphic designers to create more freely; however, the final design will be shaped by the human's interpretation based on emotional and cultural context. The success of this collaboration depends on how artificial intelligence will be integrated into graphic design processes and how graphic designers will use this technology as a tool. In summary, the interaction between artificial intelligence and human creativity will shape the future world of graphic design and have the potential to redefine the nature of art.

Conclusion

With the technological developments that continue to develop every passing day, computer technologies and digital transformations, which are effective on graphic design as well as in all design areas, continue to spread rapidly all over the world with the opportunities and speed they provide to today's designers. While digital transformation was initially used only to facilitate the production process, thanks to today's technological opportunities, technological developments have now entered art in their own right and are

becoming a tool of art. Works created with digital methods have affected every area of graphic design. The habits of traditional methods have almost disappeared because technological developments have become more efficient compared to traditional methods, and this efficiency has provided the designer with the ability to create a new form of expression in their works, to be easily understood by the desired audience, the desired message and to reach a much wider audience.

Although the positive aspects of digital methods are quite advantageous and contribute to design, if the design elements and principles are not used correctly in order to convey the message to the right target audience, confusion and detachment from reality, and perceptual complexity in the message to be given may occur. When technological transformations come together with design principles and elements and are expressed correctly, there has been no deterioration in the main structure and no regression has been observed. Design and technological methods will constantly renew themselves together and this innovation will continue to increase the quality of time and work.

Artificial intelligence models have begun to spread rapidly in all areas with the unique innovations they have brought to the whole world. They can analyze customer preferences and goals and provide rapid suggestions to graphic designers to a great extent. With artificial intelligence, graphic designers can work faster and more efficiently compared to the difficulties of traditional methods. Artificial intelligence has a limited capacity to fully reflect human emotional perception and experience. The graphic designer has the ability to establish and express emotional connections in the design process and still maintains the advantage of this field. The role of artificial intelligence in the graphic design process should be to use it as a tool and to strengthen the perspective of the design. To put it more specifically, the graphic designer needs creative thinking skills when creating a project. Thanks to developing computer technologies and applications, the perception that graphic designers learn and use these tools is becoming increasingly widespread. Artificial intelligence can be used as just one tool that can bring the creativity of designers who have this position to the forefront. This technology can enable graphic designers to focus their time on their more creative contributions and personal development. Therefore, in the future, artificial intelligence technologies will advance further in the field of graphic design and help graphic designers use their creativity more effectively.

Graphic designers are faced with some difficulties in transferring design knowledge due to the developing technology, digital art and artificial intelligence that are coming every passing day. Every process of art and graphic design fields requires knowledge of design principles and elements and typography, and naturally, it brings with it visual perception hierarchy, aesthetics and aesthetic concerns in addition to these technical issues, but artificial intelligence does not have such a technical knowledge. Artificial intelligence should be a tool that helps the designer in the production and design process in graphic design, and should not be in the position of the designer and the producer himself, that is, the designer. It is obvious that software and various programs with artificial intelligence cannot replace artists and graphic designers in the near future. It should be in a position where it can provide positive contributions to designers as a design tool in the design process. In summary, as a result; It is expected that artificial intelligence technology will take more place in graphic design in the future, but it has been concluded that this technological development should not replace graphic designers, but should be a tool that helps graphic designers and designers in all art-design branches to maximize their production potential.

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