www.ijonses.net

A Conceptual Framework on the Relationship of Digital Technology and Art

Derya Özdemir
Hakkari University, Turkey

To cite this article:

Ozdemir, D. (2022). A conceptual framework on the relationship of digital technology and art. *International Journal on Social and Education Sciences (IJonSES), 4*(1), 121-134. https://doi.org/10.46328/ijonses.313

International Journal on Social and Education Sciences
2022, Vol. 4, No. 1, 121-134 https://doi.org/10.46328/ijonses.313

A Conceptual Framework on the Relationship of Digital Technology and Art

Derya Özdemir

Article Info

Article History

Received:
15 May 2021
Accepted:
17 December 2021

Keywords

Digital technology
Art
Digital art
Commodification

Abstract

The 'new digital art' genre has emerged to describe various works of art that have evolved with the development of digital technologies. In its broadest sense, digital art encompasses everything from high-end machine learning applications to the use of interactive elements in traditional media. There is also an increase in the interaction between information technologies and art. Science, art and technology has been increasing and becoming widespread since the 60s, when scientists, artists and inventors began collaborating and using electronic devices to create art. The experience that results from consuming art and culture is multifaceted in nature. It can be individual or collective, physical or virtual, active or passive, public or private, on-site or in private places, open-air or indoor. With the spread of digital art, there is a remarkable increase in the commodification of art. This article, in this context, analyzed and discussed digital art, its positive and negative aspects, and the commodification of this art type on the basis of literature.

Introduction

Computer graphics was first publicly exhibited as art by Georg Nees at the Studio Galerie at the University of Stuttgart in January 1965. The exhibition showed works generated with computer programs written by Nees himself and produced with a graphic plotter. Some of the early discoveries in computer technology were shown in the 1968 Cybernetic Serendipity exhibition held at the Institute of Contemporary Art, London (Jasia, 1968). The 1965 exhibition, the 1968 Cybernetic Serendipity event, and Reichardt's 1971 book showed the coming together of technologists and artists in various forms of partnership. Back then, it was remarkable for an artist to even talk to an engineer. However, more and more people with backgrounds in science, engineering and the arts have begun to present the 'art of technology' to the public in an unsuspecting and sometimes puzzling fashion (Candy & Edmonds, 2002).

From the 1980s to the present, there has been a phenomenal increase in experimental art and technology. Organizations were created to promote developments, and the number of artists active grew exponentially. The groups fostering such work came from a diverse range of disciplines, including visual arts, music, performance, and cinema. Each of these brought a unique perspective to art and technology (Hewett, et al., 1992).
In particular, after the 2000s, art and technology continued to develop hand-in-hand. The "exhibitionist" artistic

event, launched in December 2015, was held. Artists and other attendees attended a performance that was shown live online. Artists made the work using social media and live streaming. Viewers were encouraged to provide comments on it, and their responses formed part of the artistic project. The artists' intention was to break down barriers between daily display and art exhibition, as well as to bridge the gap between the public and contemporary art (Furmanik-Kowalska, 2021).

The 'new digital art' genre has emerged to describe various works of art that have evolved with the development of digital technologies. In its broadest sense, digital art encompasses everything from high-end machine learning applications to the use of interactive elements in traditional media (Knight, 2017). Digital art has provided people new ways to interact with art, rather than simply watching it and incorporating audience reactions into the artwork. This study reviews the literature on the relationship between digital technology and art. Thus, it is hoped that the study is important and will contribute to the field.

The number of digital images is constantly growing and there are currently billions of images available. To list a few of them, for example, Flickr (www.flickr.com) alone is home to several billion images. For example, Getty Images (www.gettyimages.com) is home to 80 million images, while akg-images (www.akg-images.de) is home to more than 10 million images in art, culture, science and art. Similarly, the New York Public Library's website (www.nypl.org) hosts more than one million artistic images. Just in terms of a special art, there are digital collections containing several hundred thousand images. For example, Albertina Wien (www.albertina.at) currently has a print run of around 900,000 pages of print pasted to historical volumes known as “Klebealben” (Pflüger, 2021). However, digital arts offer greater complexity and richness in terms of artworks, apart from the large number of images that make it impossible for a single researcher to get an overview of the entire art world.

Digital Technology Tools

Alongside the rapidly evolving digital economy supporting digital industrialization, industrial digitization and digital governance, the digital media industry effectively combines human creativity and technology. At the same time, the rapid development of the digital economy and information technology has supported the rise of global arts and culture (Yu & Jang, 2021). The capacity of digital technology to transform lives, economies, cultures and societies is universally recognized. In the relevant literature, it is argued that we have entered the 'Information Age' (Castells, 2010). The Internet has created digital networks through which a large amount of information flows through information and communication technologies. Unlike previous technological revolutions, information is now the central component around which technologies revolve (Castells 2010).

The World Wide Web and its accompanying advancements (e.g., widely available computers, broadband, Web 2.0, the Internet of Things) have changed existing and established new ways of business, management, communication, and governance throughout the last two decades. The ramifications for modern society are thought so significant that some sociologists have coined the term "Digital Age" (Orton-Johnson & Prior 2013). Therefore, the importance of technology, digital technology and tools of digital technology come to the fore.
Technology, in its broadest sense, includes blackboards, screwdrivers, computers, cars, etc. (Shettar, Lathiwale

& Kulhalli, 2021; Aagaard & Lund, 2019; Cole & Derry, 2005; Säljö, 2010).

Accordingly, the concept of digital technology includes all electronic devices, automated systems, technological devices and resources that produce, process or store information (Johnson, 2021). We can divide digital technology tools into two as old and new tools. We can classify old digital technology tools as televisions, overhead projectors and regular phones. New digital technologies include next generation telecommunications networks (e.g. 5G) (Ting, et al., 2020), internet of things (IoT), big data analytics (Shilo, Rossman & Segal, 2020), artificial intelligence (AI) using deep learning (LeCun, Bengio, & Hinton, 2015) and blockchain technology (Heaven, 2019). Digital technology tools have influenced all areas of our lives in the last 20 years. In fact, without this technology, much of our daily work is hampered. It is impossible to think that a technology that affects every aspect of our lives in this way would not affect art and artists. Therefore, in the context of technology, art and the new understanding of art have been a matter of curiosity.

Art: New Media in the Context of Technology

Digitization has been included into memory institutions as a means to contribute to the preservation of cultural items, their documentation in the form of a digitization of their appearance and all archives associated to, and lastly to increase accessibility. In today's digital world, historic organizations choose numerous digital paths, based on their collections, locations, and resources. Increasing opportunities opened by digital media have also infiltrated the art environment and contributed to the development of new works of art (Haux et al., 2020). According to Assmann (2008), our memories are culturally 'embedded'. In this way, they emphasize that not just social interactions between humans, but also interactions with objects, may result in memories. These items might be images or places. However, society may prefer to transfer this role to things like monuments and organizations. Any individual can contribute to artistic communication in this process, but contributions to cultural memory are usually conscious ones. In this whole process, the supporting aspect of digital technologies comes to the fore.

The interaction between information technology (IT) and art is becoming more common. Science, art, and technology have been linked since the 1960s, when scientists, artists, and innovators began to collaborate and employ electronic instruments to produce art. In 1960, Marshall McLuhan predicted that the period of "machine-age" technology was coming to an end, and electronic media would usher in a new way to perform art (Shanken, 2002). There are several examples in the literature of artists using mathematics, robotic technology, and computing to create art. This case is an excellent introduction to the intersection of IT and art, including genetic art, algorithmic art, complex system applications, and artificial intelligence. The intersection is attracting the attention of people from many backgrounds, and it is expanding in size and scope. For these reasons, it is useful for people interested in art and technology to be know each other's background and interests well (Ahmed et al., 2009).

With the continuous development of technology such as big data, cloud computing, machine learning, cyber-physical system, virtual argument, a new type of technological and industrial revolution has taken place. From

the mode of production to the way of life and way of thinking, world society has been reshaped in many ways and has undergone fundamental reforms. It also ingeniously inspired the concept innovation and artistic language of artists, constantly triggering a diversity of brand new art paradigms such as art and technology, computer art, media art, bio art, and human-machine hybrid art (Li, 2020). Thus, the field of digital art emerges as a new and comprehensive discipline among natural sciences, social sciences and humanities. With the advancement and innovation of science and technology, media technology emerges as time demands, and its application in digital media art creation is becoming more and more extensive. The application of art technology in digital media art creation helps to enrich the means of artistic production and improve the quality of the artistic production process (Gong, 2021). The Figure 1 image best summarizes the relationship between art and technology.

Figure 1. Pamela Rentz – 2018, Art and Technology

The interaction between media, computer, and art has grown in parallel with technological development since the introduction of new media arts using computers in the digital era. The emergence of interactive and virtual media formats, as well as a rising diversity of creative-aesthetic explorations into the capabilities of computers, has fueled media-theoretical discussion on the link between aesthetics and technology (Spielmann, 2012).
New media, according to Orrghen (2020), is a form of electronics. As a result, electronic art or digital art may be used to describe the new media or media art interaction. Socha and Eber-Schmid (2014) define new media as the use of electronic devices and signals to connect with other people and places, as well as reading signs in books, newspapers, and galleries.

Digital media art is a new form of art that combines human rational reasoning with artistic idea and is based on digital technology and modern media. Digital media is the last carrier of information after language, writing, and electronic technology (Wang & Yang, 2021). With the development and proliferation of digital media art, information transmission security is particularly important for the subsequent culture shaping and value realization of digital media art. Individual information interaction, the amount of transmitted information, and the safety and reliability of information transmission are all becoming more important as digital media art shapes culture and realizes value (Degand, 2019). The cultural formation and value realization of digital media art and analyzing the positive and negative values of digital media art from the perspective of culture have become an area of research. In all these processes involving the evaluation of digital art, a visible confusion has emerged regarding the roles and responsibilities of artists and technologists. There is also uncertainty about the

ways and means of cultural shaping of digital media art and strategies that promote a fluent realization of its cultural value by combining it with large number of art cases (Wang & Yang, 2021). Two basic assumptions are made regarding new media or digital media. The first is the eloquent critique of digital and technodeterminism, utopianism or dystopianism (Silver, 2004; Trend 2001), a second assumption considers contemporary social changes accelerated by globalization, post-nationalism and individualization. If it is accepted for a moment that these two basic trends are the constituent elements of global culture, the implication in the context of new media theory and digital art is that "cyberart" is actually the expression of an increasingly individualized society in a globalizing world where neither humans nor machines have a function (Deuze, 2005).

New media are social arrangements or organizations that form around devices and practices, and communication activities or practices we do to develop and use these devices, encouraging us to look at our environment in terms of artifacts or devices that provide and expand our communication capabilities (Deuze, 2005). Again, the relevance of such an approach to new media theory and the study of social phenomena lies in the assumption that humans and machines are interconnected rather than influencing or directing one another. Therefore, the popularity and corresponding commercialization of collaborative technologies at home and in the workplace (Virilio, 1997), our constant participation and departure from a wide variety of social networks (Wellman, 2002), and the experience in a global network society (Castells, 2005) characterizing new media should be seen as discernable works, activities and arrangements (Deuze, 2005). The concept of new media can be defined as digital media and electronic media. In this context, the importance of the relationship between media and art emerges. We can present this importance with the Figure 2 image.

Figure 2. Shahid Singh – 2021, Art and New Media

Digitization and dissemination of art have advantages as well as disadvantages naturally. Therefore, I believe that it would be useful to clarify the advantages and disadvantages of digital technology on the dissemination of art.

Negative and Positive Effects of Digital Technology on the Dissemination of Art

Internet and social media are an integral part of art in the globalizing world. Many arts organizations around the world welcome the use of technology in marketing and training, and even performance offerings. In addition, many organizations allow users to share content, leave comments and even publish their own content while using the internet and social media to increase the number of online performances and exhibitions, grow their viewers, sell tickets and raise money online. According to Thomson, Purcell, and Rainie (2013), the internet and digital technologies have disrupted much of the traditional art world. It has changed audience expectations; put more pressure on arts organizations to actively engage on social media, and, in some cases, undermined organizations' missions and revenue streams. They have even changed the notion of art.

We can see the negative effects of digital technology on art everywhere. For example, before the 2000s, we all had our own photo album. With the development of new technologies, the use of smartphones has become widespread. We have now started to use these devices widely instead of photo albums and we can say that our photo gallery has almost turned into a photo dump. Thomson, Purcell and Rainie (2013) explain the negative effects of digital on art as follows; there are some negative consequences associated with the use of this platform, especially in the context of social media.

- Artists use the profiles of the organizations they are affiliated with to promote their own work or different events on Facebook,
- Spam clutters Facebook or Twitter pages, or accounts that have hacked spam comments on website or blog,
- But by far, the most common with negative consequences is unfiltered public criticism of the organizations.

Platforms like Facebook, Twitter, and Yelp provide easy opportunities for the public to raise complaints, disagree with programming decisions, or complain about customer service issues. Unlike in the past, when such issues were managed one-on-one by staff via phone or email, social media displays these complaints for any reader to see. This situation ensures that ruthless criticisms are seen and spread.

Digital technology has had negative effects on art as well as positive contributions. We can even say that they have more positive contributions. The advent of digital media and computing tools has opened up new possibilities for creative practice. Cutting-edge technology in the digital arts is a fertile ground for exploring the role of creativity and new technologies. The demands of such studies often reveal the limitations of existing technologies and open the door to developing new approaches and techniques. This provides opportunities for the creativity researcher to understand the multidimensional features of the creative process. It also places new demands on manufacturers of technological solutions and improve our understanding of the future requirements of new technologies (Edmonds et al., 2005). Thomson, Purcell, and Rainie (2013) describe the positive effects of digital on art as follows:

- Increased participation in events
- More ticket sales
- Increased public awareness of arts organizations

- Supporting fundraising efforts
- Social media provides the opportunity to offer discounts and special ticket offers,
- Fans write propositions for artists/exhibitions/films they'd like to see, which helps arts organizations plan and gives them insight into what they're interested in.

Digital technology has a contribution to the artist as well as to art. However, there are various difficulties in using and adapting to this technology. Candy & Edmonds (2002) explains this situation as follows. Overall, the challenges inherent in working with digital technology can have an impact in encouraging artists to break with existing traditions and abandon established techniques, a development that is a core element of truly innovative practice. While deciding to use the new technology, the artist does not just change his medium, as he substitutes oil paint for computer-based image production. For example, there are many software applications that can make the creation of visual material very easy, but such technology-based art does not represent the entirety of current work. Where innovative concepts lead the artist to seek new digital techniques, it often takes significant time and effort to develop technology to a level that produces the desired result. Few artists are in a position to achieve this on their own, and this requires collaborative projects involving people from different fields and different levels of expertise. The increase in the use of digital in art has naturally led to an increase in the number of works of art. At this point, the issue of marketing works of art is important, and this issue will be discussed in the following section.

The Commodification of Digital Art

The experience that results from consuming art and culture is multifaceted in nature. It can be individual or collective, physical or virtual, active or passive, public or private, on-site or in private places, open-air or indoor. Obviously, the consumption and commodification of art is not just about the purchase of tangible cultural goods (e.g. artwork, books, records, DVDs, video games, etc.) (Radermecker, 2021). The industry of cultural services and participation in cultural events are part of the broader consumption experience (e.g., visiting exhibitions, attending concerts, theater plays, traditional folklore, etc.). When purchasing cultural products or participating in cultural events, people simultaneously seeks functional, symbolic, social and emotional benefits with varying degrees of experience (Botti, 2000; Colbert and St-James, 2014). These degrees of experience depend not only on the artistic discipline in question and the nature of the goods and services consumed, but also on the configuration of cultural markets that vary according to space and time (Moldoveanu & Ioan-Franc, 2011).
All modern life is a spectacle. Much of what contemporary man experiences in Western society is a false social fiction mediated by images. These mediated images create desires that can never be fulfilled and they create false needs that can never be met. Most of our daily decisions are governed by motivations that we have no control over and are unaware of (Berger, 2008). The constant spectator of the indirect image creates an endless cycle of desire, consumption and indifference by fueling a vulgarity in life that fosters the commodification of life. Life itself, increasingly, becomes a commodity and the image becomes more important than the reality it represents (Avramidis, 2012).

This commodification seeps into every aspect of human production, including art (Debord, 1998). Now the

work of art itself is not a commodity, but the image of the artist (brand) that has become a commodity. It is this spectacle that pushes the consumer to identify with a particular artist or brand (Avramidis, 2012).

Considering the industrialization of societies, the emergence of modernity and the strengthening of capitalist systems in the world, market focus, commodification and monetary exchanges between societies, the field of art has also witnessed a series of major changes. Perhaps the most important of these changes is the commodification of art (Zamani & Bagheri, 2020). In this case, does the digitization of art increase its commodification? Although there are opposing views in the literature on this subject, the more research is directed towards the commodification of art.

In a worldwide economic setting of hyper-commodification and financialisation, efforts to integrate digital art into the high-stakes commercial art market have been largely failed, likely because digital artworks cannot simply assume the status of precious object worthy of collection (Zeilinger, 2018). Researchers who argue the opposite of this view argue that especially with the digitalization of music and film art, its commodification has increased. Discrete pieces of music no longer have a price in music streaming services like Spotify, as has traditionally been the case in music commerce, both analog and digital. Digitization of music enables the spread of a wide-ranging culture (Katz, 2004). However, it also directly brings with it the way the music meta interacts the most. Accordingly, it is metadata that keeps various digital technologies in place and helps them interact. Thus, metadata mediates listeners' experiences with music. They contribute to the rise of what might be termed the commodification of digital music (Morris, 2012).

The freedom Google provides (free service access) has made possible the commodification of the art of film and music, while services created by Google envision a commons-based public Internet that benefits everyone and introduces new opportunities for human cooperation (Fuchs & Dyer-Witheford, 2013). With digitalization, it is seen that the trade of art has become widespread and this tradition is gradually increasing. Patrick Anthony Pierson expresses this situation of commodification of art very well with the Figure 3 image.

Figure 3. Patrick Anthony Pierson – 2014, Money Lisa and the Commodification of Art

As it can be understood from the image, we can say that together with the industrial revolution and developing technology, the globalizing world and the modern process have reached the point where the artist has to be integrated into the culture industry, submitting to institutional structures and organizations in order to survive in production relations.

Digital Art and NFT-Crypto Art Reconciliation

The field of art history faces unique challenges in terms of digital practice. Access and accessibility to the art history corpus has been facilitated by the development of online archives, but the emergence of tools for analysis or computational processing has been slow (Drucker, 2013). Digital art, which is defined as digital-born, computable art that is generated, stored, and distributed via digital technologies and utilizes the properties of these technologies as a medium, (Paul, 2016) seems to be an only notable exception to hypercommodification tendencies so far. Various ways are being tried to increase visibility here. In particular, blockchains have been used in this direction in recent years. Indeed, McConaghy et al. (2017) summarizes the situation as the visibility and ownership of digital art can be achieved using blockchain technology as part of a broader solution for identification, attribution and payment for digital work. In this case, the question of what blockchains are and how they are used comes to mind.

Blockchain is a decentralized, cryptographically secure database technology for documenting the creation, reproduction, dissemination and trade of digital art objects. The blockchain is used through the Monegraph platform. Monegraph emerged in 2014 as an online platform that connects digital artifacts to unique blockchain hashes when Anil Dash and Kevin McCoy paired in the 'Seven on Seven' technology and arts incubator hosted annually at the New Museum by NYC-based digital organization. Monegraph allows creators, owners, and collectors to document and verify the authenticity and origin of digital works, it is hoped, so they can more efficiently secure the commercial value of such works of art. In its current form, Monegraph authenticates digital artworks using cryptographic blockchain hashes linked to the Bitcoin cryptocurrency system. Once generated, validation hashes are accessible in the public blockchain ledger, also referred to here as Monegraph's "public catalog". This database functions as a registry where rights holders can offer digital artworks for sale, share information about them or track their virtual movements. Digital licenses attached to artworks represent smart contracts that can be set up to semi-autonomously enforce rules attached to artworks (Zeilinger, 2015).

In this context, NFTs are needed when trading on the Monegraph platform. This platform, which enables them to buy, sell and distribute NFTs, is therefore of great importance to artists. Thus, explaining NFT will add depth to the research. Dean (2021) named NFT (non-fungible token) as a non-exchangeable token. They stated that a digital object is a unit of data stored in a digital ledger called blockchain, which confirms that it is unique and therefore not interchangeable. When the sales made on this platform and NFTs are examined, Mike Winkelmann ('Beeple') comes to the fore. Since the beginning of 2021, there has been a boom in NFT-based art-work sales, with the $250 million total NFT volume exchanged in 2020 being surpassed by March 2021 (Chernichaw, Vallabhaneni and Lizaso, 2021). Most notably, on March 11, 2021, artist Mike Winkelmann ('Beeple') sold an NFT of his work at Christie's auction house for a record $69.3 million (Thaddeus-Johns,

2021). This is the third highest price ever received by a living artist (Reyburn, 2021). This is best summed up by an image taken from the Monegraph site.

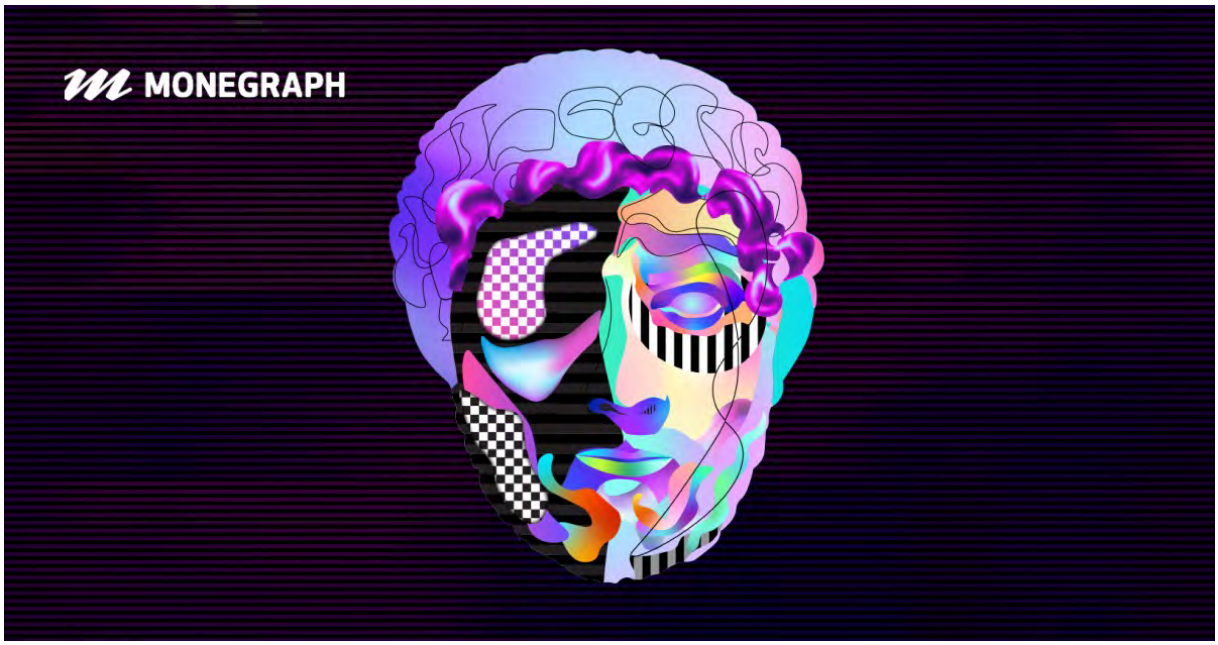

Figure-4. https://monegraph.com/ – 2021, The New Platform of Digital Art

In conclusion, Monegraph's digital art aims to empower digital artists, or we can say that it accelerates the commodification of art. According to Russell and Levy (2012), arts and culture are consumed for various reasons such as education, leisure time, evasion, relaxation, enjoyment, self-reflection. The strong relationship that cultural suppliers and intermediaries can connect with consumers derives primarily from the hedonic value of cultural goods and services or the pleasure that results from their consumption. According to Caldwell (2001), clients are constantly looking for a pleasurable experience when it comes to arts activities.

The creative, emotional, and symbolic components of consumer behaviors reflect the social and emotional purpose of art consumption (Arnould and Thompson 2005). However, digital and virtual consumption enables new and interactive forms of cultural activity (Morrone, 2006). As pointed out by several institutions, the opportunity to participate in free and open-access virtual cultural events has been game-changing for new publics, which can be viewed as an opportunity to democratize access to art and culture.

References

Aagaard, T., & Lund, A. (2019). *Digital agency in higher education: Transforming teaching and learning*. Taylor and Francis. doi:https://doi.org/10.4324/9780429020629

Ahmed, S. U., Camerano, C., Fortuna, L., Frasca, M., & Jaccheri, L. (2009). Information technology and art: Concepts and state of the practice. In *Handbook of Multimedia for Digital Entertainment and Arts* (pp. 567-592). Springer, Boston, MA.

Arnould, E.J., & Thompson, C.J. (2005). Consumer culture theory (CCT): twenty years of research. *J Consum., 31*, 868–882. doi: 10.1086/426626.

Assmann, J. (2008). Communicative and Cultural Memory. In: Erll A, Nünning A, editors. *Media and Cultural Memory.* Berlin, New York: De Gruyter; 2008. pp. 109–118.

Avramidis, V. (2012). Damien Hirst and the Commodification of Art. *Damien Hirst and the Commodification of Art*.

Berger, A., A. (2008). *Seeing is Believing: An Introduction to Visual Communication*. New York, NY: McGraw Hill.

Botti, S. (2000) What role for marketing in the arts? An analysis of arts consumption and artistic value. *Int J Arts Manag, 2*,14–27.

Caldwell, M. (2001). Applying general living systems theory to learn consumers' sense making in attending performing arts. *Psychol Mark., 18*, 497–511. doi: 10.1002/mar.1018.

Candy, L., & Edmonds, E. (2002). Interaction in art and technology. *Crossings: Electronic Journal of Art and Technology*, *2*(1), 1-8.

Castells, M. (2010). *The information age: Economy, society, and culture. Vol. I: The rise of the network society*, 1st ed., 1996. Chichester: Wiley-Blackwell.

Castells, M., ed. (2005). *The network society: A cross-cultural perspective*, Northampton, MA: Edward Elgar.

Chernichaw, A., Vallabhaneni, P. ve Lizaso, S. (2021). The Rise of NFTs – Opportunities and Legal Issues (*White & Case,* 20 April 2021) https://www.whitecase.com/publications/alert/rise-nfts-opportunities-and-legal-issues

Colbert, F, St-James, Y. (2014).Research in arts marketing: Evolution and future directions. *Psychol Mark., 31*, 566–575. doi: 10.1002/mar.20718.

Cole, M., & Derry, J. (2005). We have met technology and it is us. In R. J. D. Sternberg & D. D. Preiss (Eds.), *Intelligence and technology: The impact of tools on the nature and development of human abilities* (pp. 209–227). New Jersey: Lawrence Erlbaum Associates.

Dean S. (2021). *$69 million for digital art? The NFT craze, explained.* Los Angeles Times.

Debor, G. (1998). Showing Seeing: A Critique of Visual Culture. Ed.Nicholas Mirzoeff, *The Visual Culture Reader.*. New York, NY: Routelage, 142-144.

Degand, D. (2019). Stereotypes vs. strategies for digital media artists: the case for culturally relevant media production. *Theory Pract., 58*(4), 368–376. doi: 10.1080/00405841.2019.1626617.

Deuze, M. (2006). Participation, remediation, bricolage: Considering principal components of a digital culture. *The information society*, *22*(2), 63-75.

Drucker, J. (2013). Is there a "digital" art history?. *Visual Resources*, *29*(1-2), 5-13.

Edmonds, E. A., Weakley, A., Candy, L., Fell, M., Knott, R., & Pauletto, S. (2005). The studio as laboratory: Combining creative practice and digital technology research. *International Journal of Human-Computer Studies*, *63*(4-5), 452-481.

Fuchs, C., & Dyer-Witheford, N. (2013). Karl Marx@ internet studies. *New Media & Society*, *15*(5), 782-796.

Furmanik-Kowalska, M. (2021) Social media art and/or interactive art? *Exhibitionist: PeeP Stream* by Ye Funa and Bei Ou, World Art, DOI: 10.1080/21500894.2021.1991464

Gong, Y. (2021). Application of virtual reality teaching method and artificial intelligence technology in digital media art creation. *Ecological Informatics*, *63*, 101304.

Haux, D. H., Dominicé, A. M., & Raspotnig, J. A. (2021). A Cultural Memory of the Digital Age?. *International Journal for the Semiotics of Law-Revue internationale de Sémiotique juridique, 34*(3), 769-782.

Heaven, D. (2019). Bitcoin for the biological literature. *Nature*, *566*(7742), 141-143.

Hewett, T., et al. (1992). *ACM SIGCHI Curricula for Human-Computer Interaction.* New York: Association for Computing Machinery, 1992. https://web.archive.org/web/20210311193732/https://www.latimes.com/business/technology/story/2021-03-11/nft-explainer-crypto-trading-collectible

Jasia, R. (1968). *Cybernetic serendipity: The Computer and the Arts.* Studio International. London; New York: Praeger.

Johnson, K. (2021). *What Is Digital Technology? 25 Best Examples.* Retrieved from https://honestproscons.com/what-is-digital-technology-25-best-examples/

Katz, M (2004). *Capturing Sound: How Technology has Changed Music.* Berkeley: University of California Press.

Knight, J. (2017). *The Aesthetics of The Artificial – Critical Design's Lost Dominion, The Design Journal, 20*(1), S354-S364, DOI: 10.1080/14606925.2017.1352883

LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. *nature*, *521*(7553), 436-444.

Li, Y. (2020). Art and Technology Exhibition under the Context of Artificial Intelligence. *IFAC-PapersOnLine*, *53*(5), 103-105.

McConaghy, M., McMullen, G., Parry, G., McConaghy, T., & Holtzman, D. (2017). Visibility and digital art: Blockchain as an ownership layer on the Internet. *Strategic Change*, *26*(5), 461-470.

Moldoveanu, M., Ioan-Franc, V. (2011) The impact of the economic crisis on culture. Rev Gen Manag 14(2):15–35

Morris, J. W. (2012). Making music behave: Metadata and the digital music commodity. *New Media & Society*, *14*(5), 850-866.

Morrone, A. (2006) Guidelines for measuring cultural participation. Available via https://www.uis.unesco.org/template/pdf/cscl/framework/CUL_particip.pdf

Orrghen, A. (2020). Art criticism and the newness of video art: the reception of video art in the Swedish daily press, 1985–1991, *Journal of Aesthetics & Culture,* 12:1, DOI: 10.1080/20004214.2020.1729539

Orton-Johnson, K., & N. Prior (2013). *Digital sociology—critical perspectives*. London, U.K.: Palgrave Macmillan.

Pflüger H. (2021). A language to analyze, describe, and explore collections of visual art. Visual computing for industry, biomedicine, and art, 4(1), 5. https://doi.org/10.1186/s42492-021-00071-3

Radermecker, A. (2021). Art and culture in the COVID-19 era: for a consumer-oriented approach. *SN Business & Economics*, *1*(1), 4. https://doi.org/10.1007/s43546-020-00003-y

Rentz, p. (2018). https://www.techwell.com/techwell-insights/2018/12/why-state-art-technology-needs-art-and-tech

Reyburn, S. (2021). 'JPG File Sells for $69 Million, as 'NFT Mania' Gathers Pace' *(The New York Times,* 11 March 2021) <https://www.nytimes.com/2021/03/11/arts/design/nft-auction-christies-beeple.html>

Russell, C.F., Levy, S.J. (2012). The temporal and focal dynamics of volitional reconsumption: a phenomenological investigation of repeated hedonic experiences. J Consum. 39, 341–359. doi: 10.1086/662996.

Säljö, R. (2010). Digital tools and challenges to institutional traditions of learning: Technologies, social memory and the performative nature of learning. *Journal of Computer Assisted Learning*, 26(1), (pp. 53–64).

Shanken, E. A. (2002). Art in the information age: Technology and conceptual art. *Leonardo*, *35*(4), 433-438.

Shettar,R.M., Lathiwale, M.S .Z.& Kulhalli, M.(2021). Role of ICT in higher education in selected places during COVID-19.*Journal of Research in Social Sciences and Language*, 1(1),42-54.doi. http://dx.doi.org/10.20375/0000-000D-FF90-1

Shilo, S., Rossman, H., & Segal, E. (2020). Axes of a revolution: challenges and promises of big data in healthcare. *Nature medicine*, *26*(1), 29-38.

Silver, D. (2000). "Introducing cyberculture". In *Web studies: Rewiring media studies for the digital age*, Edited by: Gauntlett, David. 19–30. Oxford: Oxford University Press. http://www.com.washington.edu/rccs/intro.asp

Socha, B., & Eber-Schmid, B. (2014). What is new media. *Retrieved from New Media Institute http://www. newmedia. org/what-is-new-media. html*.

Spielmann, Y. (2012). Perceptual-responsive environments: sense and sensibility in Japanese media artist Seiko Mikami's installations, *Journal of Aesthetics & Culture,* 4:1, DOI: 10.3402/jac.v4i0.18395Singh, S. (2021). https://ticktocktech.com/blog/author/shahidsingh/

Thaddeus-Johns, J. (2021). 'What Are NFTs, Anyway? One Just Sold for $69 Million' (*The New York Times,* 11 March 2021) <https://www.nytimes.com/2021/03/11/arts/design/what-is-an-nft.html>

Ting, D. S., Lin, H., Ruamviboonsuk, P., Wong, T. Y., & Sim, D. A. (2020). Artificial intelligence, the internet of things, and virtual clinics: ophthalmology at the digital translation forefront. *The Lancet Digital Health*, *2*(1), e8-e9.

Trend, D. (2001). *Reading digital culture*. Blackwell Publishers, Inc..

van der Wal, R., & Arts, K. (2015). Digital conservation: An introduction. *Ambio* 44, 517–521. https://doi.org/10.1007/s13280-015-0701-5.

Virilio, P. (1997). *Open sky*, Edited by: Rose, Julie. New York: Verso.

Wang, J., & Yang, J. (2021). Culture shaping and value realization of digital media art under Internet+. International Journal of System Assurance Engineering and Management, 1–10. Advance online publication. https://doi.org/10.1007/s13198-021-01463-7

Wellman, B (2002). "Little boxes, glocalization, and networked individualism". In *Digital cities II: Computational and sociological approaches*, Edited by: Tanabe, Makoto, Van den Besselaar, Peter and Ishida, Toru. 10–25. New York: Springer.

Yu, W., & Jiang, T. (2021). Research on the Direction of Innovation and Entrepreneurship Education Reform Within the Digital Media Art Design Major in the Digital Economy. *Frontiers in psychology*, *12*, 719754. https://doi.org/10.3389/fpsyg.2021.719754

Zamani, A., & Bagheri, S. (2020). Phenomenology of the Commodification of Art: Understanding the Lived Experiences of Music Artists in East Azarbaijan. *Journal Of Social Sciences*, *16*(1), 346-323.

Zeilinger, M. (2018). Digital art as 'monetised graphics': Enforcing intellectual property on the blockchain. *Philosophy & Technology*, *31*(1), 15-41.

Author Information

Derya Özdemir

https://orcid.org/0000-0003-0471-7132

Hakkari University

Art Education Department

Turkey

Contact e-mail: *derya5505@hotmail.com*