

**Graphic Design in the Age of Artificial Intelligence: A
Speculative Co-design Investigation into the
Possibilities and Challenges of Artificial Intelligence on
the Field of Graphic Design in Saudi Arabia**



**This dissertation is submitted for the degree of Doctor
of Philosophy by**

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For you, Mama.

You will never be forgotten.

For Motasem, Ibrahim, and Tamim.

You are and will always be the guiding stars of my life.

Declaration

I hereby declare that this thesis, titled “Graphic Design in the Age of Artificial Intelligence: A Speculative Co-Design Investigation into the Possibilities and Challenges of Artificial Intelligence on the Field of Graphic Design in Saudi Arabia”, represents my research and work done during my PhD in Design at Lancaster Institute for the Contemporary Arts, Lancaster University. All the concepts and ideas stated in this thesis are the result of my work and my own words. Any ideas and work of others in this thesis were cited and referenced according to the original sources. This body of work has not been submitted to support an application for another degree at this or any other institution. Many of the ideas in this thesis were the product of discussions with my supervisors, Professor Charlie Gere and Dr Daniel Richards. I declare that I have adhered to all principles of academic honesty and integrity and have not intentionally or knowingly misrepresented, fabricated, or falsified any ideas/data/facts/source in this submission or the course of the research. I acknowledge that Lancaster University or other related sources may take disciplinary action against me if found to be in violation of the foregoing. Lastly, excerpts of this thesis have been published in the following conference manuscripts and academic publications:

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Duha

Abstract

The potential impact of artificial intelligence on graphic design has, in recent years, stimulated a range of questions and concerns from design practitioners and academics about the future of AI-driven designs. This impact has prompted researchers, academics and practitioners alike to rethink the new implication of AI on the role of the graphic designer in this progression. It has also led to consideration of a plethora of issues and challenges around academia and practice, addressing questions associated with the definition of creativity, cultural acceptance, and ethical issues, besides possibilities that AI can imply in having autonomous AI-driven designs.

In this research, I investigate the impact of AI from the graphic designers' perspective measuring the impact on their roles as designers in the design process, including an assessment of how to use AI as a self-governed system to generate visual designs autonomously rather than having AI as an application tool. This investigation will propose a new literature of theory and practice into the process of designing, particularly exploring and speculating upon new opportunities associated with combining data and algorithms with graphic design, in practice as well as in education. Co-design activities and semi-structured interviews were used in this research to initiate speculative provocative discussions and debates. In addition, this thesis presents the ADI card toolkit, a speculative design toolkit designed to help initiate collaboration in brainstorming and generate solutions to these challenges by using the gameplay approach. The ADI card toolkit was tested as part of conducting the research in Saudi Arabia, a country undergoing a transformation in terms of employing the 4th industrial revolution of technology and innovation towards building their infrastructure, economy, and quality of life under the government's Vision 2030. The findings suggest many actions to consider when using AI in education and practice one of which is equipping graphic designers with knowledge, skills and qualifications to be furtherly open and aware of the broad spectrum of AI potentials which allows for proactive collaboration as a self-driven system with graphic designers. The research also suggests using gameplay as an approach when introducing AI tools in academia which can aid in exploring opportunities to alternate the human-machine entanglements and enable designer and academics alike to explore self-generated designs and alternative futures in this field.

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Chapter 1

1 Introduction

1.1 Introduction

1.1.1 Motivation

Throughout my career as an academic teaching undergraduate graphic design courses in Saudi Arabia, I have come in close contact with undergraduate students teaching them studio courses such as visual branding, creative advertisement, packaging, and publication designs in addition to supervising seniors' graduation projects. I teach foundation courses such as the history of graphic design, and digital design software, besides teaching the studio courses which allows me to observe the students' work in close detail. How they initiate their brainstorming process, draw, sketch, or generate ideas to draw a character, design an endpaper¹, or build a storyboard of an animation clip or a book is different from how my generation used them during my undergraduate studies 20 years ago. Despite the fact that foundation courses are meant to teach students the steps of the design process and the foundation of constructing the designs using the traditional tools of pen and paper, this process is now becoming increasingly reliant on vectors, templates, and mock-ups. Not only are pre-structured designs now accessible, but they are also automated, taking the field of graphic design by storm.

I have closely observed this accelerated reliance on the use of automated applications, built-in AI tools, and generative designs, whether in designing a logo using an AI system or building a website using an AI interactive template. This transitional shift broadened my perspective promoting me to explore hypothetical scenarios and envision the evolution of graphic design education and practice over the next decade in the context of AI.

1.1.2 Setting the Scene of the Thesis

I never thought that my speculative questions would be converted into a PhD research because, for me, graphic design was always known as a form of visual communication that addresses a problem that needs to be solved, or a service that needs to be fulfilled by

¹ Endpaper is a two A4-sized connected paper that acts as a hinge between the outer boards of the book and the text block. The endpaper designed with patterns or plain colors that covers the inner corners of the book boards.

employing visual components like imaging, typography, colour, layout, and visual hierarchy. The chronological evolution of graphic design from handwritten manuscripts to printed media, and ultimately to its present digital form, inspired me to establish an investigation platform to examine the accessibility and utilization of automated designs sourced from the Internet. First, I inspected how various media and online platforms are impacting the design process and the kind of ethical issues relevant to the creative industry arising from this impact. Gradually, I came across the trends of using data tracking and algorithms to generate tailored advertisements, AI-driven and data-driven designs to target consumers and end-users.

Consequently, my understanding of the term ‘artificial intelligence’ has developed leading me to investigate the entanglement of AI with the creative industry, particularly with graphic design and its various disciplines since AI is no longer exclusively tied to data experts, engineers, or technology enthusiasts. With the advancements in AI technology, the landscape has evolved to offer platforms and user-friendly simplified tools that are more accessible to a broader audience from diverse backgrounds and professions to harness its power. AI encompasses a wide range of applications and is becoming more inclusive, enabling education, healthcare, and many other professionals, educators, and various other specialists to leverage AI for their specific needs and tasks. As a result, AI tackled by many academics and researchers from many other professions and backgrounds such as in the graphic design industry, through iterative cycles of implementation and investigation into this advanced technology. Some of these include but are not limited to, the adoption or discovery of new philosophies, methods, or approaches to work with AI proactively.

1.1.3 The Big Question: Why AI?

Recent literature reflects the fact that graphic designers have showcased many ways in which they use AI-assisted software in executing their design projects, which shorten the time dedicated to conducting the work, speed the process and yields more accurate

intended outcomes addressed by what is called “problem-solving loops”² (Verganti et al., 2020; Mattioli, et al., 2022; Cautela et al., 2019). This presence of AI-assisted tools has changed the nature of the design practice and the design process which was not only limited to automating tasks, skills and visual stimuli as stated by Verganti et al. (2020) but also by changing the context from designing solutions to designing for problem-solving loop. Although the presence use of AI in design is relatively new, designers are more likely to use at least one AI-embedded tool in their design software, adopting these into their daily practices and their design process, which was evident across, academics, design students and design practitioners alike (O'Donovan et al., 2015; Cautela et al., 2019). Gradually, the amount of effort and input for modifying the work by the graphic designers has lessened and became more dependent on AI tools, which has eventually affected the relationship engagement balance between graphic design and AI-embedded tools as Seeber et al. (2020) stated, AI has redefined the dynamic relationship between humans and machines evolving from a performance-enhancing tool to a more collaborative relationship in what is now termed as “problem-solving loop”. In exploring AI's role within the creative industry and its budding relationship with graphic design, I incorporated the design thinking methodology to structure my engagement with the research sample. This approach encompassed building empathy for the participants, identifying their needs, ideation, prototyping, and testing speculations. As Brown (2008) articulated, design thinking is a holistic, human-centred strategy for problem-solving and product creation, melding creative and analytical thinking. Subsequent chapters of this research will delve deeper into how design thinking informed and steered both the research and design stages.

1.2 Research Aim and Objective

To fully understand the dynamic relationship between graphic design and AI, This thesis aims to critically analyse the emerging challenges brought by AI by:

- Investigating the potential impact of AI on graphic designers ever since this advanced technology is developing a greater sense of agency.
- Redefining the role of the graphic designer within the realm of generative AI.

² A Problem-solving loop is referring to the autonomous system that replaces the designer with a computer's order to develop a specific task without the need of the designer. Further details in the paper published by Verganti et al. (2020).

Beyond investigating these emerging challenges, the research objective is to further:

- Identify a strategic roadmap to envision the possible trajectories of graphic design, considering the rapid advancements in AI technology through approaches, skills and knowledge that can help engage with AI in a provocative co-design environment.
- Explore and analyse the correlation of the ways in which AI can act as an independent, self-driven agent rather than an assisting application tool to generate designs and communicate with end users and consumers using data and algorithms with minimum or no interference from graphic designers.
- Propose a comprehensive creative framework that empowers graphic designers to seamlessly integrate AI into their workflows. This framework serves as a guideline for designers to navigate the AI-enhanced design system, potentially sparking further research and aspires to pave the way for future investigations and developments, fostering a culture of continuous learning and innovation within the design community.

1.3 Thesis Structure

In this section, I provide a brief summary of each chapter, highlighting the key aspects and content of each. I have structured the thesis into three parts. The first part consists of the Introduction, the Literature Review, and the Methodology. The second part of the thesis covers the main body of work, including the Semi-structured Interviews, the ADI card toolkit, and the Co-design Workshop. The last part of the thesis is the Conclusion chapter, followed by the thesis's appendices, bibliography, and references ([Figure 1](#)).

PhD | Thesis Structure

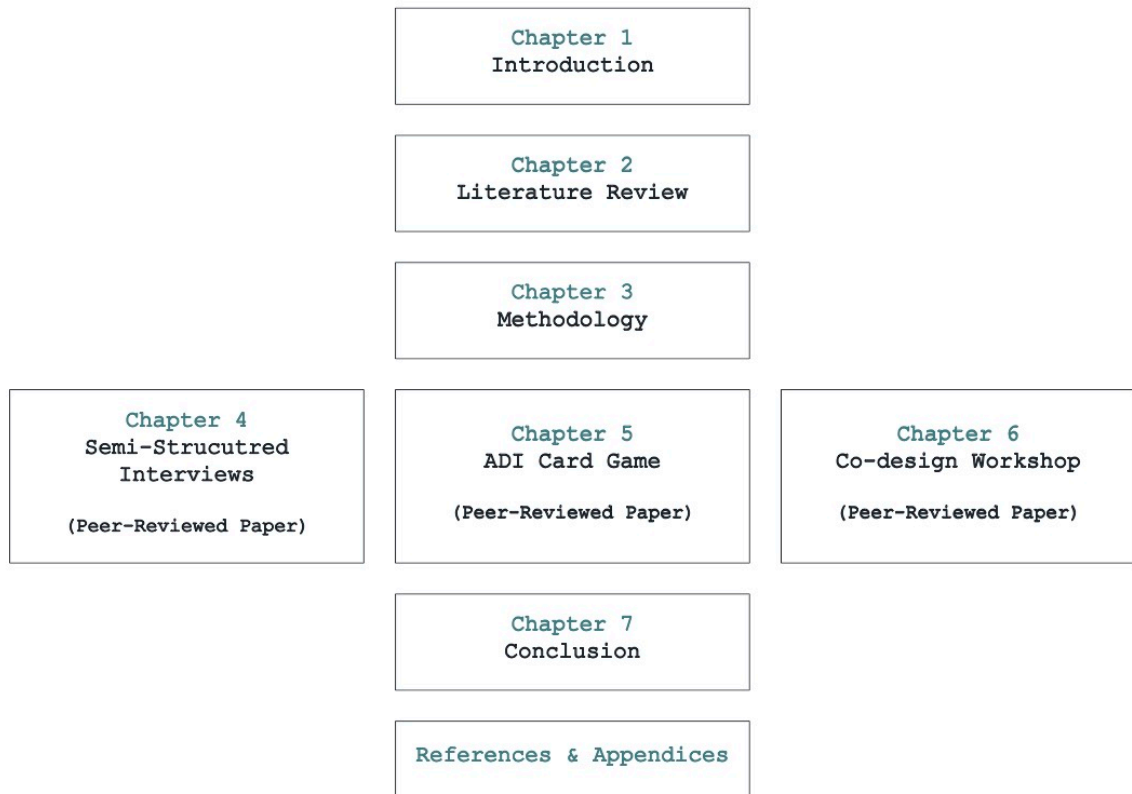


Figure 1 - A breakdown of the thesis structure.

1.3.1 Chapter 1: Introduction

The Introduction chapter presents the research background highlighting the motivation behind conducting this investigation and outlining the research aims and objectives. Furthermore, this chapter outlines why AI was selected as part of the investigation showcasing its impact on graphic design. At the end of the chapter, a comprehensive thesis structure gives an overview of the structure of the thesis.

1.3.2 Chapter 2: Literature Review

The Literature Review chapter presents a conceptual framework review of existing research conducted on the emerging topics of this research, looking at approaches, methodologies, and methods, as well as findings, arguments and questions raised by other academics, researchers, and practitioners. To synthesise the literature and identify the research gap in knowledge, the chapter is structured to emerge three domains by first, introducing the two main emerging domains of this research: graphic design and artificial

intelligence along with the third domain which focuses on Saudi Arabia, the location of where the research took place measuring how AI is emerging into the country's socio-cultural changes, which plays a big role in the scope of the research and is a key factor affecting positioning the research questions, the analysis, results, findings and suggested future work post this research. This chapter focuses on the revolution of the industrial revolution and how it impacted these three domains. Together, all these three domains enabled me to address changes that took place in the presence of technology and the growth of AI-driven designs has been established to address the gap in knowledge and in the research questions.

1.3.3 Chapter 3: Methodology

The Research Methodology chapter consists of a detailed discussion of the research design inspired by Maxwell's research design model and the three stages that explain how the paradigm, the qualitative approach and selected methods are employed. The chapter presents the speculative and co-design methodologies which are used to address the research question by investigating the means that have been deployed. The chapter also justifies the way the research sample was selected and the ethical considerations. The chapter concludes by addressing the limitations and challenges.

1.3.4 Chapter 4: Semi-Structured Interviews

This chapter presents the first method used for this research, the semi-structured interviews, which were a series of remote interviews with academics and industry experts in the areas of graphic design, AI, and data experts. After conducting the interviews, the second part of this chapter presents the data analysis process methods using the thematic analysis approach including how the data is extracted, translated, and transcribed followed by the results and reflections.

1.3.5 Chapter 5: ADI Card Toolkit

This chapter presents the Artificial Design Intelligence (ADI) card toolkit, which was designed as a result of the semi-structured interview's findings. It translates the findings from theories and speculations into an empirical method in the forthcoming second method in this research: the co-design workshop as an educational generative tool kit.

This chapter will explain how the gameplay was used as an approach to spark the graphic designers' imagination and help them interact, engage, and work with AI in a fun and playful co-design environment. The aim of this tool is to lessen graphic designers' apprehension of the unknown and provoke them to debate and interact with each other effectively.

1.3.6 Chapter 6: Co-design Workshop

This chapter presents the second method used in this research, the co-design workshop, which was conducted in Saudi Arabia. The chapter presents a brief about the workshop procedure of how the participants sample was selected among academics and industry experts and locating the venue. The co-design workshop consists of three phases which was audio and video recorded, and all data analysis processes are described, followed by the results and reflection.

1.3.7 Chapter 7: Reflection and Conclusion

This chapter provides a summarized reflection on the research conducted in this thesis. It discusses the contribution to the knowledge which includes 5 main claims and how the findings are interpreted and integrated with the literature. This chapter also presents the research impact and the research implications. Further, this chapter lists the limitations encountered during the process of conducting the research, and directions are proposed for future research and practice.

Chapter 2

2 Literature Review

2.1 Introduction

There is an established body of research examining the interdisciplinary integration of artificial intelligence with graphic design throughout the years many of which were focused on the use of AI within this realm whether as a tool to execute designs, a platform to enhance the design process such as Canva, or as a system to generate part of the intended design outcome such as a logo, a website or a typeface generator website (Gehred, 2020; BrandMark, 2019; Glez-Morcill et al., 2010). Despite the current development of research literature on this emerging of AI with graphic design, some perspectives are still underdeveloped and have a shortage of coverage which will be thoroughly presented in this chapter by exhibiting the recent literature and further addressing the gaps of knowledge.

Graphic design and artificial intelligence are two domains that were profoundly affected by the Industrial Revolution. Therefore, I will present a brief timeline for each domain, highlighting the key turning points in its development and progression from the first industrial revolution, which lasted from approximately 1760 to 1840 due to the invention of steam engines (Meggs and Purvis, 2016; Schwab, 2017), to the current so-called fourth industrial revolution, which ultimately led from the digital revolution in the 1960s and the age of the internet in the 1990s. The timeline aims to establish the framework for discovering existing knowledge gaps by identifying intersecting fields of AI and graphic design in Saudi Arabia that deploy algorithms and data which (1) generate new AI-driven designs and tools trends, (2) create a new sociocultural change in Saudi Arabia. Additionally, the shifts that accompany AI investment are also explored as shown in [Figure 2](#) which created a new area of research and practice, which therefore helped to develop the aims and objectives of this research and provide a platform to ask questions and make a contribution towards the field of graphic design. In the first section of this chapter, I will present an overview background for these three emerging domains by exhibiting their evolution alongside the Fourth Industrial Revolution. A gradual transition into the next section will showcase the ways in which AI and graphic design overlapped, as well as the reasons why I chose Saudi Arabia as a location for the research and as a dominant factor influencing the breadth of the literature review and the nature of the gaps

identified. In the final section of this chapter, I discuss the gap in knowledge and the process of identifying the research questions that emerged accordingly.

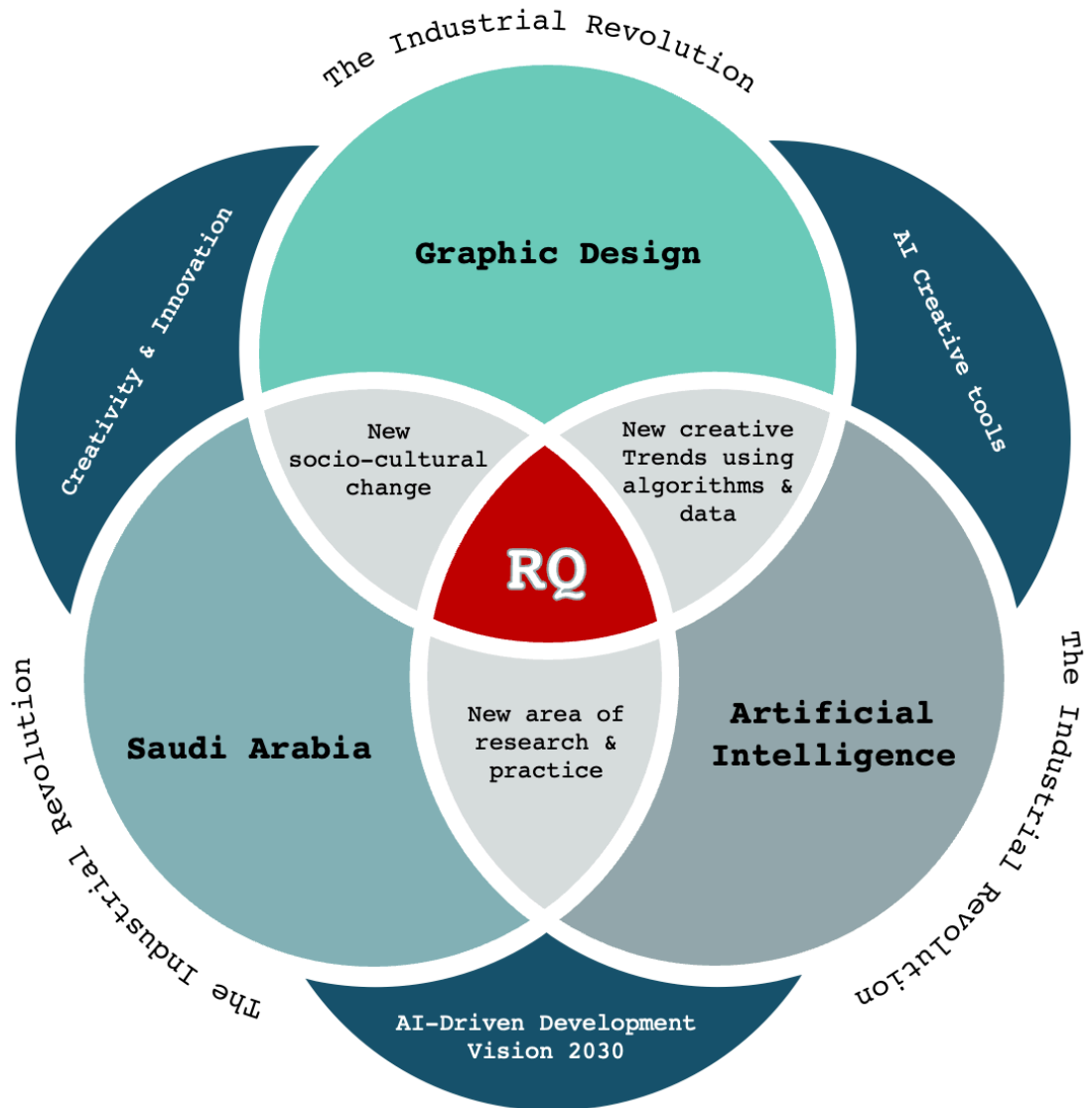


Figure 2 - The three main domains of the research combined to create intersected trends and changes that led to the RQ.

2.2 The Historical Background

2.2.1 Artificial Intelligence

2.2.1.1 *The Birth of AI*

To be able to introduce AI into the context of this research, I first present a brief definition of what AI is without extensively investigating its technical aspects. The controversy over artificial intelligence has raged for years addressed by many scholars such as Alan Turing's imitation game in his paper entitled "Competing Machinery and Intelligence" in 1950 (Turing, 2012; Russell, and Norvig, 2010). Turing posed the question "*Can machines think?*" and proposed a method for evaluating whether machines can think and have intelligent behaviour that is equidistant to humans through the imitation game. The imitation game is played by a group of an integrator (A), a human (B) and a machine (C), who sits in separate rooms from each other, and the interrogator tries to figure out who the machine is correctly by guessing based on typewritten questions and their answers. At the end of the game, if the interrogator is convinced the machine is human and cannot reliably tell who the machine is from the human, the machine passes the Turing test (Turing, 1950; Russell and Norvig, 2010).

The question proposed by Turing has streamed a plethora of debates as well as attempts by other researchers who are inconsistently argumentative to define what AI is. Although John McCarthy was one of the "founding fathers" of AI by coining its name and running extensive research in 1956, (McCarthy et al., 1955; Minsky, 1961), many have misinterpreted what AI is by either presuming that anything connected to the internet could be AI-driven and AI "is" robotic whereas others stated that AI is the computer that could imitate human intelligence and excel in any given task (Kirkpatrick and Klingner, 2009; Luger, 2009). On the other side, some have challenged the originality of AI and validity of the Turing test such as Jefferson Lister who argued "Not until a machine can write a sonnet or compose a concerto because of thoughts and emotions felt, and not by the chance fall of symbols, could we agree that machine equals brain-that is, not only write it but know that it had written it" (Kirkpatrick and Klingner, 2009, p. 3). Other scholars such as Hubert Dreyfus challenged the Turing test by hypothesizing that human intelligence cannot be imitated by the manipulation of a set of symbols (Dreyfus, 1972). On the other hand, Heidegger, a philosopher and theorist in the field of technology, has

advocated for a slowing of technological progress due to the devastation it wreaks on the human experience and the world around us. He argued that technology causes people to lose sight of who they are within this realm (Blitz, 2014).

2.2.1.2 What is AI?

AI, as defined by Russell and Norvig (2010) is a branch of computer science where the agents learn from their surroundings and respond accordingly. A function that converts observations into operations serves as the backbone of each such agent (Bartneck et al., 2021). To be able to align the definition of AI with the creative domain and to understand the broader implications of AI on graphic design in particular, I explored further into the types of AI, its divisions and applications to understand how it works. Artificial Intelligence is categorised into three types: Artificial Narrow Intelligence (ANI), Artificial General Intelligence (AGI), and Artificial Super Intelligence (ASI) (Russell, and Norvig, 2010). ANI, which is also known as weak AI, focuses on mimicking one narrow simple task such as winning at chess, IBM's Deep Blue³ (Campbell, 2002; McCarthy, 1990), email autofill using natural language processing (NLP), Alexa using speech recognition and gesture recognition and mobile facial recognition image recognition (Jurafsky, and Martin, 2008; West et al., 2018). AGI, which is also known as strong AI, focuses on human cognitive abilities and the ability to understand meanings within contexts. AGI witnessed some progression despite the number of debates, arguments and theories stating that AGI is still a far-off reality predicting that this "Intelligence" could be a threat to human existence and dominate the power of humans (Ng, 2018; Yudkowsky, 2008). The third type (ASI) would surpass the intelligence of humans (Russell and Norvig 2010).

AI has several subdomains such as Machine Learning (ML) and Deep Learning as shown in [Figure 3](#). Samuel has defined ML as a subfield of AI that gives computers the ability to learn without being explicitly programmed (Samuel,1959; Samuel, 2000). He furtherly added that "Programming computers to learn from experience should eventually eliminate the need for much of this detailed programming effort" (Samuel,1959, p. 535).

³ Deep Blue is a computer chess system created by IBM during the mid 1990s. The computer has defeated the World Chess Champion Garry Kasparov in a six-game match in 1997. This was the second encounter with Kasparov who won over Deep Blue in 1996.

Additionally, ML as stated by Bartneck et al., (2021) is focused on developing algorithms that incorporate task-specific experiences and performance-based feedback. Deep learning in contrast is a branch of artificial intelligence loosely inspired by the mechanics of the human brain (Russell, and Norvig, 2010). While the idea of deep learning has been around since the 1950s, three developments in the last decade made it viable (Singh, 2017).

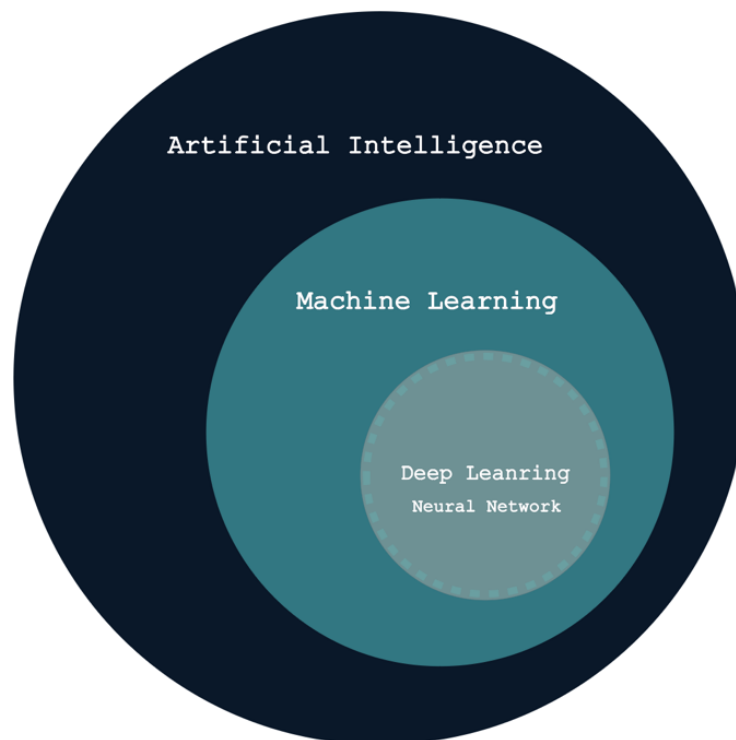


Figure 3 - Artificial Intelligence and its subdomains, Source: adapted from Russell and Norvig, 2010.

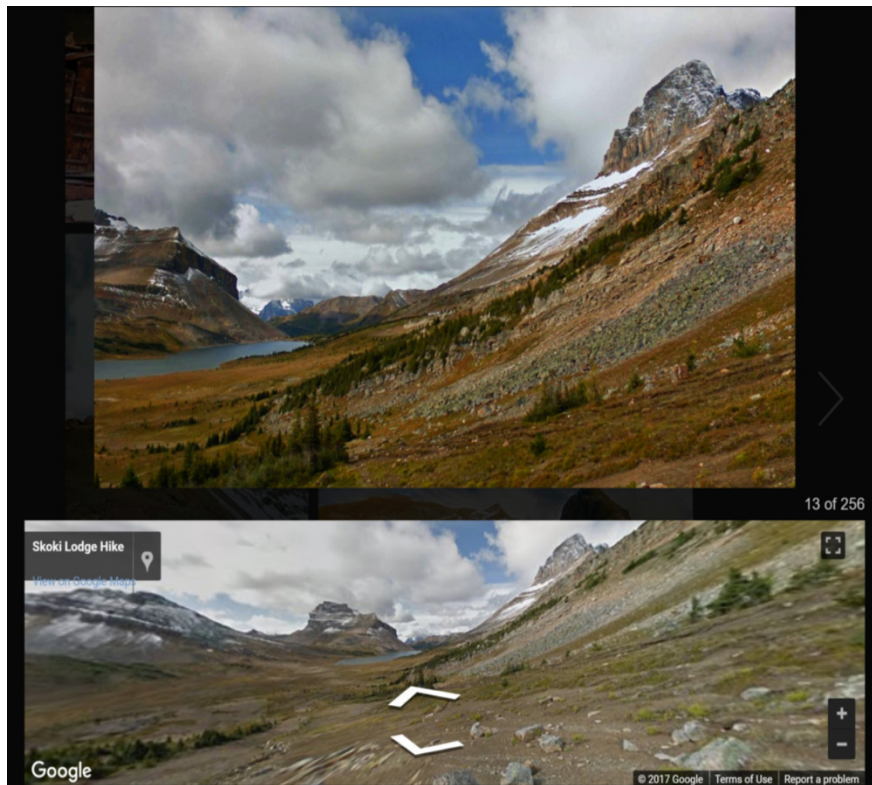
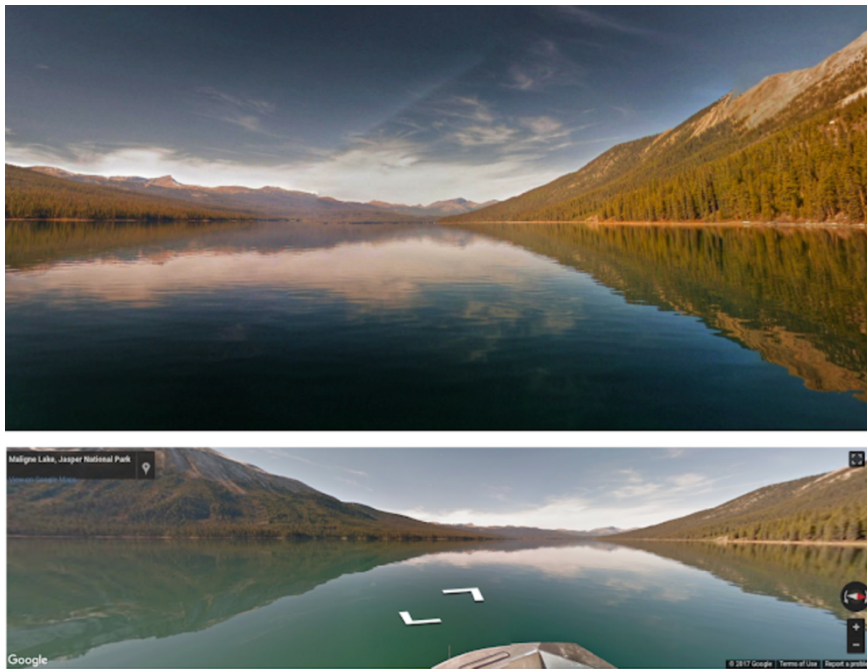
ML has several types of algorithms such as (1) supervised learning, (2) unsupervised learning, and (3) reinforcement learning. As many researchers such as Du Sautoy (2019), Hebron (2016) and Finn (Evans et al., 2019) assured, ML is changing the creative industry in both, how we consume creativity and how we make creative work as stated by Hebron “machine learning is in the midst of a renaissance that will transform countless industries and provide designers with a wide assortment of new tools for better engaging with and understanding users” (Hebron, 2016, p. 1). In contrast, experts and practitioners like Murray-Rust (2018), Klingemann (2019) and Bodegraven (2019) assert that machine

learning will provide designers with more dynamic resources and engaging tools on which to build originality and novel artwork and meet the expectations of their customers.

Algorithms and data are almost two inseparable elements in the AI structure where both are figuratively entitled as “the God” of creating order and rationalism in the structure of AI (Bogost, 2015; Lupi, 2016). An algorithm is defined by Finn as “lines of code designed to solve problems efficiently at the software level, make human-like decisions, execute lightning-fast calculations, and adapt to our behaviour (Evans et al. (2019, p. 363). Furthermore, data is not just a collection of numbers and graphs; it is a collection of facts and statistics that convey information said Lupi (2016), they are an essential element in creating human content and personalization.

2.2.1.3 How does AI impact the creative sector?

The significant progression in technology was leading to the invention and development of tools and gadgets says Meggs and Purvis (2016) where new technologies generate new perspectives, as the pioneer of media studies, Marshall McLuhan, pointed out (McLuhan, 1967, 2012). As the AI industry and the revolution in algorithms and data advanced, the meaning of artificial intelligence shifted beyond cognition automation to embrace emerging ideas such as collaborative AI and generative AI. Major corporations like Google, Amazon, and Adobe have funded research into the many avenues of creative and design innovation possible with the help of collaborative artificial intelligence systems. For example, an experiment done by Google using machine learning and deep learning to test if Google Street View on Google Maps can be used to generate professional photographs by automatically setting for the best composition and applying various post-processing operations to produce an aesthetically pleasing photograph (Fang, 2017). The goal was to see how well the AI can simulate a professional photographer's shot and whether the built-in system can mimic their work ([Figure 4](#)). As a result of this trail, the final generated photographs were given to professional photographers to measure out if there these photos were taken by amateurs, semi-professionals or an AI where the majority of the audience did not know these photos were enhanced by AI (Fang, 2017).



*Figure 4 - Google street view and the enhanced photograph,
Source: google AI blog, 2017.*

Funded innovative research labs kept developing the abilities and mechanisms of AI and other types of AI kept evolving until 2021, when OpenAI launched DALL.E, a cutting-edge generative AI model that is capable of generating digital images [Figure 5](#) from natural language descriptions, called prompts producing diverse and intricate images (Ramesh et. al, 2022). The model was able to generate iterations of elements with altered properties or in different scenarios which demonstrates an advanced understanding of context and attributes, with high level of accuracy and relevance.

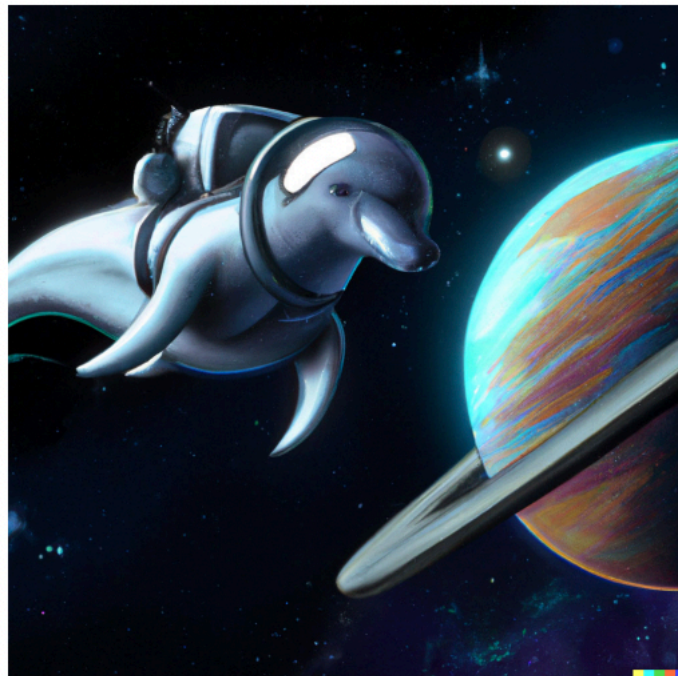


Figure 5 - A dolphin in an astronaut suit on Saturn, an image generate by the AI model, Source: DALL.E published paper by OpenAI, 2021.

With the presence of these tools and platforms, many have criticized the aesthetics of AI on the premises that it is incapable of novelty and creativity due to its lack of human-like intelligence, emotions, or a mental state (Hertzmann. 2020; Harari, 2018; Hertzmann, 2018; Mikalonyt and Kneer, 2021). However, this dilemma may be temporarily resolved through methods like creative learning or adapting neural networks of the human brain to

artificial intelligence (Wyse, 2019; Karaata, 2018). That was also evidenced when the GAN's algorithm-driven "Portrait of Edmond de Belamy" (Figure 6) sold at Christie's for \$432,500, nearly 45 times its high estimate, it marked a significant milestone in the creative application of artificial intelligence (2018).



Figure 6 - Model 2- A full layout of the model generated from the workshop with its original model and process sheet, 2020.

As AI accelerated the way humans react and interact with their surroundings, a new area of investigation and research became mandatory as stated by Iyad Rahwan, MIT Media Lab leader, “We need more open, trustworthy, reliable investigation into the impact intelligent machines are having on society, and so research needs to incorporate expertise and knowledge from beyond the fields that have traditionally studied it” (Liberty, 2019). This suggests that AI will play a critical role in reshaping many aspects of our lives where machines would complement or surpass humans in tasks that require intelligence and therefore, profoundly impact every aspect of our lives (Holmquist, 2017; Minocha et al., 2018). With this progression, human collaboration with AI was visible and accredited in

many sectors, subjects and studies that advise on the importance of AI collaborative studies (Stoimenova, and Price 2020; Du Sautoy, 2019). In contrast, this collaboration could generate some challenges as Holmquist (2017) defines it as "Designing for unpredictability", "Designing for evolution", "Designing for learning" and "Designing for transparency" (Holmquist, 2017, p. 32). This prediction of challenges was measured in many domains, including the creative domain with many conflicting opinions about whether technology is harmful or beneficial (Manovich, 2018). He stated in his arguments on AI aesthetics:

The original vision of AI was about automation of cognition. Today, AI also plays a crucial role in culture, increasingly influencing our choices, behaviours, and imaginations. For example, it is used to recommend photos, videos, music, and other media. AI is also used to suggest people we should follow on social networks, to automatically beautify selfies and edit user photos to fit the norms of "good" photography, and to generate and control characters in computer games. (Manovich, 2018, p.2)

With these rising concerns, alternation of the original definition of what AI is and the challenges that were brought with it, UNESCO has published a report addressing many issues and scenarios working with AI in many sectors such as communication, culture and education (UNESCO, 2022). Some of these challenges are represented through the risks of reproducing biases and discrimination whereas others are defined within the borderline of knowing the copyrights and the ownership of the work generated by AI. With their extensive research, one of the report's recommendations was to emphasise the importance of having these technologies governed through institutional and legal frameworks and ensure that these technologies are contributing to the public good. With this conceptualisation, embracing the change rather than resisting it is necessary to fully take advantage of the benefits that AI can provide (Manovich, 2018; Kelly, 2017).

Aside from this controversy of opinions, arguments, claims and guidelines set by many, generative AI tools have proven the ability to solve problems, imitate actions, comprehend analysis as well as engage in the creative industry by generating text, images and audio to create artworks, write a poetry and compose musical notes (Du Sautoy, 2019; Kaleagasi, 2017). AI became a reflection of the computing revolution of computer science as stated by Lindley et al. (2020) which offered lots of complicity in terms of computer-

human interaction. Certainly, this capability comes with the inevitable challenges and debates over whether or not humans are prepared to encounter AI and its attendant ethical and trust issues (Heaven, 2020; The Social Dilemma, 2020) and the level of biases AI could generate (Miller, 2018; Suresh and Guttag, 2019) Moreover, the current speculations are universal that AI is transforming every job, creating new roles, and improving economic prosperity (Luger, 2009; Karaata, 2018; Harari, 2018).

2.2.2 Graphic Design

2.2.2.1 Visual transformation

To better understand the situation in which graphic design operates in the presence of AI, it is essential to define what graphic design is and to coin the progression of how graphic design evolved throughout the evolution of the industrial revolution. This will help illustrate how the revolution of technology has impacted graphic design and eventually impacted the current context in which graphic designs are AI-driven and how graphic designers operate in that context.

According to Poggenpohl, graphic design is a form of visual communication through drawings, photography, typography or computer-generated images that can set a certain message in order to communicate. It's the creative process that combines art and technology to convey these ideas. (Poggenpohl, 1993). Graphic design was known as visual communication that communicates and expresses visually through many channels which was later defined as "Disciplines" to the broader "field" of graphic design, including, but not limited to, illustration, publications, packaging, typography, branding, and web design. A number of factors, including shifts in politics, society, culture, and technology, contributed to the rapid expansion of graphic design during the Industrial Revolution that took place between c. 1760 and c. 1840 (Meggs and Purvis, 2016). As technology advanced and the number of factories grew, the need for human labour decreased, and the community shifted from an agricultural one to an industrial one as Meggs and Purvis described it "Larger scale, greater visual impact, and new tactile and expressive characters were demanded" (Meggs and Purvis, 2016, p. 152). Since this growth and the rise in public education and literacy, the demand for prints, manuscripts publications and books has grown, and the concept of graphic design has evolved accordingly. Manufacturing on a massive scale allows more products to be made in less

time for less money. With the rapidly printed periodicals came an increase in demand for graphic design services like typeface creation, poster art, and branding; this, in turn, fuelled the expansion of the marketing and advertising industries and the development of new product lines. Steadily, with the development of the Internet which marks the beginning of the third industrial revolution that was founded on the convergence of software, hardware, and communications technologies, where graphic design expanded as a visual communication changing many disciplines including illustrations and print production into web-based production (Meggs and Purvis, 2016). The rapid development of electronic and computer technology since the 19th century has affected the processing and appearance of how things works says Meggs, (Meggs and Purvis, 2016), and a sudden accelerated change occurred over the Internet which was all ‘new media’ assimilated into the so-called ‘global village’ by Marshall McLuhan (McLuhan, 1967) describing how the world is shrinking into a sort of a village through the use of electronic media which therefore create a platform of visual connection.

This growth in technology led to the 4th industrial revolution, where the presence and advancement of the Internet of Things (IoT), robotics, Virtual Reality (VR), Augmented Reality (AR) and Artificial Intelligence (AI) which was supported by the use of, algorithms, and data that have changed the creative field of graphic design, such as the disciplines of web design, packaging design, branding and advertising which showed promising results although considering that it is relatively underdeveloped and figuratively new (Bodegraven, 2018). AI-, algorithm-, and data-driven designs have significantly impacted how design is perceived and executed. It has also revolutionised how application tools are designed, changing them from traditional execution tools to “intelligent” tools (Bodegraven, 2018; Kaiser, 2019). Several notable attempts and examples from the academic literature and industry enterprises demonstrate the possibility of merging artificial intelligence (AI), algorithms, and data with design. For example, Mino and Spanakis (2018) demonstrated the use of AI and data-driven systems as a tool to design logos and visual identities such as BrandMark.com and Logomaster.ai. that generate logos, within a relatively short time. Another example was noted in the development of generative websites such as Wix and Canva where the website was adapted with a self-generative AI that assisted in creating visual designs based on the consumers' input. Platforms powered by AI have become easily accessible, enabling users to design logos and visual identities with minimum time and effort consumed in a normal

design process setting. Such examples were developed and improved in the presence of the increasing literature associated with AI and designs. For instance, a study by O'Donovan et al. (2015) proposed the importance of embedding Artificial Intelligence as a designing tool by proposing DesignScape, a system that uses layout suggestions for building an interactive layout with AI (Figure 7). They tended to test if the AI tool would make the design process less tedious and time-consuming which therefore advent consistency of quality, accuracy and reliability. These will manifest improvement in production and will reduce error which allows humans to maintain a steady flow of improvements. O'Donovan et al. (2015) used the experimentation and comparison method which was validated by participant's feedback where the major agreed with their raised assumptions. Similarly, Adobe has created Adobe Sensei, an AI and ML platform that assists in creating designs and digital experience solutions based on the data gathered from the user over time and with the support of AI and its algorithms (Adobe, 2016). It has been proven to either assist in the design process using AI-embedded tools such as Content Intelligence, and Spot Healing Brush or by refining the design content using the Generative Expand Tool and the Generative Fill tool. These advancements in the use of AI as announced by Adobe can increase potential creative expression by speeding up the process of conducting the work and improving end results (Adobe, 2018).

Furthermore, AI utilisation was evident on other platforms such as Netflix who invested in the use of algorithms and data by introducing an algorithm-data-driven advertisement engine to personalise the movies' visual posters based on tracking and predicting consumers' preferences and behaviours (Chandrashekar, 2017). Netflix took a significant step when they introduced this algorithm-driven designs which magnified the challenges in the movie streaming business. Netflix has used algorithms as a strategy for targeting people's personal data collection beyond using AI. The AI agent tends to analyse the users' viewing habits by tracking their browsing activity, interests, and recently viewed items. Once the engine tracks the user's behaviour, it displays movie advisements, shown in Figure 8, that is tailored to the user's interest, which will most likely catch the user's eye and attention and affect their preferences (Chandrashekar et al., 2017). This behavioural change caused by algorithms and data driven designs was labelled by Bogost, who named it "algorithmic culture" as it determines what we eat, what we watch and what sort of information we are exposed to (2015).

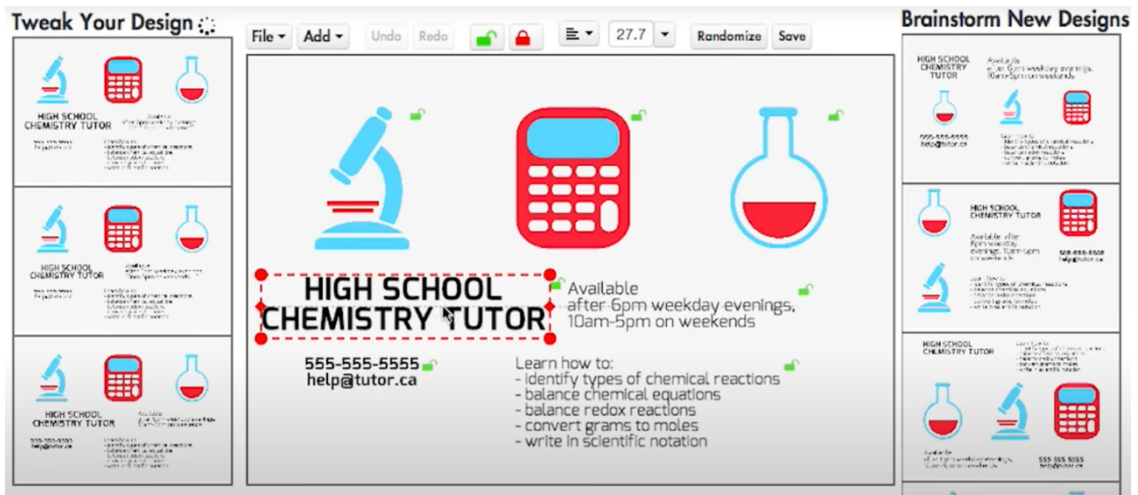


Figure 7 - A collection of Adv posters tailored to the user's preference using algorithms and data. Source: Netflix platform, 2020.

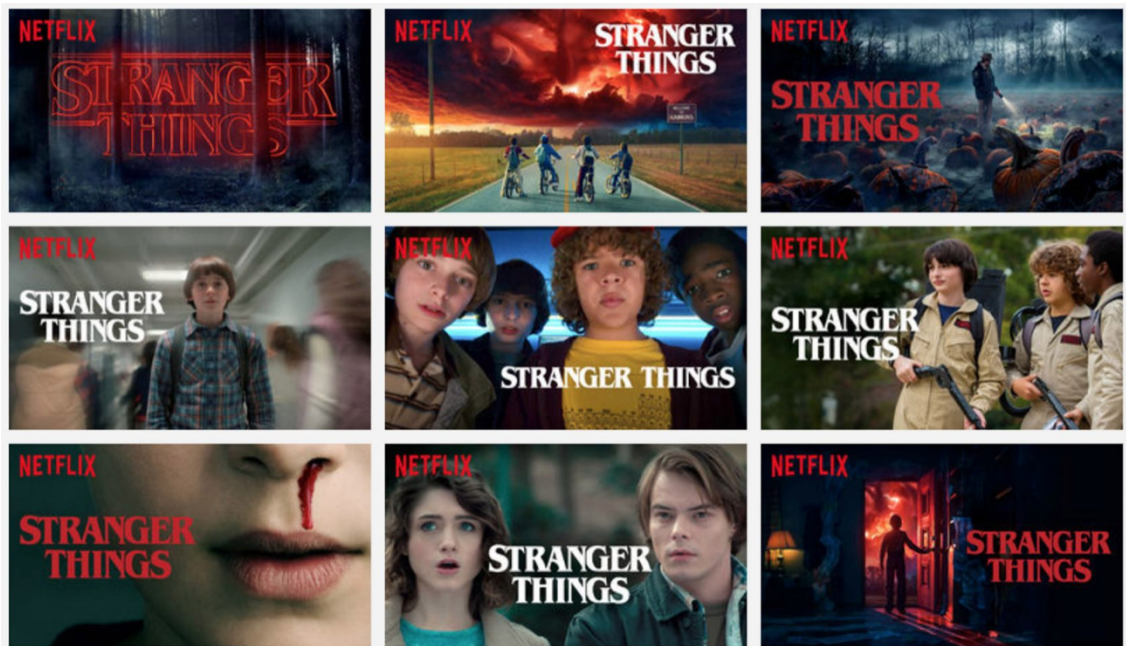


Figure 8 - A collection of Adv posters tailored to the user's preference using algorithms and data. Source: Netflix platform, 2020.

2.2.2.2 AI, Algorithms, Data and Graphic Design

Similarity to the use of algorithms and data to generate user-tailored posters on Netflix, Nutella ran a successful trial of using algorithm-driven design in brand packaging, where they used one algorithm combined with a database of dozens of patterns and colours created an output of seven million different versions of Nutella’s graphical identity as shown in Figure 9 (Aouf, 2017). Although the use of algorithm-driven and data-driven designs has been interpreted in some research literature and well as in industry projects, data, in particular, has yet to be considered a critical component (Richardson, 2016). There has been much debate about data collection in the creative industry concerning ethical and philosophical matters, such as trust, bias, copyrights, and privacy as well as defining what creativity is in that realm (Hansen, 2019). These challenges have raised many concerns, as using data will eventually mean leaving a digital trail (West, 2019; Bodegraven, 2018). However, data tracking on the other side has proven to assist many brands in becoming more effective at targeting and personalising experiences, resulting in a stronger brand strategy and, eventually, valuable selling points for expanding their digital presence, imagery, brand audits and profits (Maggioncalda, 2020).



*Figure 9 - The one Algorithm-driven packaging design by Ogilvy and Mather
“Nutella Unica”, Source: Ogilvy Website, 2017*

2.2.2.3 AI and Graphic Design Emergence

With the ethical concerns raised with the use of data and algorithms, many researchers have questioned the extent to which AI is changing the way design is practised, and whether it is affecting the design process and the design actions themselves (Verganti et.

al, 2020). Norman (2013) highlighted the challenge for graphic designers to make the most of these technological tools while also expanding their knowledge, experiences, and skills to engage proactively with AI generative designs. He declared that "I realize that design presents a fascinating interplay of technology and psychology, that the designers must understand both" (Norman, 2013, p. 7). As an example, for such an attempt, the Art Lebedev Studio proposed Nikolay Ironov in 2020, an AI graphic designer who was in a trained AI model that interacts with customers to design and create an entire brand's visual identities (Figure 10). The challenge in this experimentation was to conceal the identity of Nikolay and only allow remote engagement with potential and actual clients. The team members of the studio monitored the interaction between the AI model "Nikolay" and their clients and towards the end of the year, they revealed that Nikolay Ironov was only an AI-driven agent. The team recorded this reveal in a documentary video measuring the clients', reactions, behaviours and feedback when knowing that they were in contact with a machine. The project measured their level of trust as well as the User Experience (UX) working with AI-driven agents that generate designs focusing on consumers' psychological and physical behaviours, and feedback. Thus, the team stated that the visual representation of the relationship between the agent and users has changed how they see AI and will always question the aesthetic of this relationship (Ironov, 2020)⁴.



*Figure 10 - A collection of logos and visual identities designed by Nikolay Ironov
source: Art Lebedev Studio, 2020.*

⁴ For further information and to watch the documentary on <https://www.artlebedev.com/ironov/1/>

As a result of these experiments, both graphic designers and consumers were left wondering how they, as well as the industry as a whole, should approach AI models and data, and what exactly the role of graphic designers should be within this agent questioning the extended impact of such emergence. It is difficult to work with cutting-edge emerging technologies due to the complexity of their frameworks and the wickedness of their associated problems, and as Buchanan stated, “Design problems are "indeterminate" and "wicked" because design has no special subject matter of its own apart from what a designer conceives it to be” (Buchanan, 1992, p16). He also added that “design is slowly restoring the richer meaning of the term "technology" that was all but lost with the rise of the Industrial Revolution” (Buchanan, 1992, p19). For instance, graphic designers need to expand their understanding of AI to equip them and make the technology accessible and usable without infringing on anyone's privacy or intellectual property rights.

2.2.3 Saudi Arabia

2.2.3.1 The evolution of Graphic Design

It wasn't until the 20th century that graphic design began to emerge as a distinct field in Saudi Arabia. The discovery of oil in the 1930s transformed the Saudi economy and opened up avenues for modernization and global interactions (Shalaby, 1999). With the influx of Western companies and expatriates, there was a growing need for advertising, branding, and signage which initiated the first wave of graphic design that was heavily influenced by western aesthetics but adapted to the local context (Tuncalp, 1994). The 1970s and 1980s saw a surge in the importance of graphic design, paralleling the nation's rapid development where Saudi Arabia witnessed the establishment of its first design agencies and the introduction of graphic design courses in universities as the country modernized its infrastructure and hosted international events, there was an increasing demand for designers who could merge international design principles with local cultural nuances (Alrusais. 2010).

2.2.3.2 The Transformation

The fourth industrial revolution fundamentally transformed the entire structure of the world economy, the communities and the human identities as stated by Schwab (2017). Schwab also added that as citizens, government officials, and business leaders, we are tasked with making decisions and contributions towards AI with consideration to common values and clear purposes in mind that benefit everyone (Schwab, 2017). With such observation and as a country that is working towards high ambitions, Saudi Arabia pursued the global development of new technologies as the path towards achieving its strategic change programme titled 'Vision 2030' (Vision 2030, 2019). The Vision aims to diversify the economy and improves the services and quality of living (Alsedrah, 2021). The Public Investment Fund (PIF), which Saudi Arabia utilities as the vehicle to pave the way towards achieving Vision 2030, placed one of its most significant investments, 45 billion dollars, in Soft Bank's Vision fund (Massoudi et al., 2019), and expects further investments in the same sector with Soft Bank to reach 100 billion dollars (2019). The Vision 2030's Fund was by far, the most significant technology investment fund in the world assured by Massoudi et al. (2019), with a particular focus on AI-driven sector (SoftBank Vision Fund, 2019). That profound decision was part of the anticipant Vision 2030 that matches its programs to the global Institutes such as McKinsey Global Institute, which estimated that about 70 per cent of companies will have adopted at least one type of AI technology by 2030 and that 60 per cent of current occupations can be automated in the next 10 years (Enders et al., 2019). On the other side, a report by Harvard Business Review (2019) stated that 46 per cent of jobs in Saudi Arabia would be susceptible to automation, which might open new opportunities for new job positions, and roles that serve the requirement of the Saudi labour market and therefore improve the public sector and improve the quality of life that is part of the Vision aspirations (Vision 2030, 2019). According to another report by Ipsos in late 2021 was conducted across 28 countries including candidates from Saudi Arabia shows that 80% of candidates stated that products and services using artificial intelligence will profoundly change their daily lives in the next 3-5 years and will make their life easier. Additionally, the sample expected an

improvement in many sectors such as education and entertainment of 89 per cent change (2022)⁵.

2.2.3.3 A futuristic approach to the Vision 2030

When the Kingdom of Saudi Arabia announced its new Vision 2030 in 2016, the government forced a powerful and thriving economy with one of the themes to have an ambitious nation by engaging everyone. ‘We shall facilitate interactive, online and smart engagement methods and ways to listen to citizens’ views, and to hear all insights and perspectives by encouraging government agencies to improve the quality of their services’ (Vision 2030, 2019).

With this ambition, Saudi Arabia was embracing AI-driven innovation in many sectors to deliver a bold reformed program as part of their digital transformation through Vision 2030. AI technologies were key factors as AlTheneyan, the Deputy Minister of Technology, clarified where AI and robotics have huge potential to improve our lives, boost productivity and create a thriving digital society (Jewell, 2018). Therefore, as part of Vision 2030, the government established the Saudi Data and Artificial Intelligence Authority (SDAIA) in 2019, aiming to implement the Saudi national strategy by empowering the society with data-driven and AI-powered tools that enhances human well-being and strengthens the Saudi’s global competitiveness (SDAIA, 2019).

SDAIA hosted its first initiative in 2020, the AI Global Summit, which included a global competition entitled the AI Artathon, which brought together artists and AI developers to generate works of art using AI tools. Over 2,000 people from 60+ countries applied, and 300 were chosen to form the nominated teams and take on the task of coming up with innovative concepts in just three days. Over the course of seven weeks of intensive workshops, these groups learned how to use datasets, AI models, and algorithms to spark their creativity and create works of art that are powered by artificial intelligence. Artists and AI developers were given the chance to experiment with AI and exhibit their work at

⁵ The report measured the products and services that improves life quality in areas such as education, shopping, employment, safety, and environment. Ipsos Full report can be found on: <https://www.ipsos.com/sites/default/files/ct/news/documents/2022-01/Global-opinions-and-expectations-about-AI-2022.pdf>.

the AI Artathon. Ten of the nominated works were ultimately chosen, and the three winning teams—the Museum of GAN, Maruem, and the Emergent Typographies were revealed (Figure 11). The Museum of GANs artwork, inspired by a collection of famous



Figure 11 - The three winning artworks in the Artathon (from left to right: Museum of GANs, Maruem and Emergent Typographies, Source: SDAIA, 2020.

portraits categorised and collected by emotion and impression, was the first winning project with the use of AI model and algorithms used to reanimate the portraits. The second winning project was Maruem, The Chimaera Ant Queen, which was inspired by Hunter X Hunter and the queen ant's voyage. This art was created using digital graffiti paintings to train a CycleGAN algorithm model to generate various patterns which were then generated to recreate the artwork. The third winning project was the Emergent Typographies, a collaboration of using geographic and topographic graphics with existing lines and shapes to create a new digital artwork with new patterns generated by the AI model to reflect the beauty of Saudi Arabia's nature⁶

Following the Artathon In 2020 and as part of Misk Art Institute's Imprint Exhibition, Saudi artist Nasser Alshemimry presented an expressionistic work in the vein of the AI Artathon. Using artificial intelligence, alshemimry created an artistic video titled Land of

⁶ Further details about the Artathon and the winning artwork can be found on the following links: < <https://drive.google.com/drive/folders/1GH4j7ZH1RvhpYqly6XgMAiIK3ZNfnqbM>>, < https://drive.google.com/drive/folders/1-rs5CkL-x0nOyHveG_Yk5TBbd3TVozN8>, < https://drive.google.com/drive/folders/1LP_nwmyToGVRBU7H9U7GiSNdbNbxBiTC>.

the Future Past, a psychedelic voyage that depicts the landscape of Al Ula city through a compilation of roughly 500 images generated with the styleGAN algorithm⁷ (Figure 12).



Figure 12 - Land of Future Past, still photos from the artwork, Source: ALshemimry's Instagram account, 2020.

The second Artificial Intelligence Artathon was held in September 2022 in the Saudi capital of Riyadh. With a wider lens to investigate AI's role in various forms of artistic expression, such as music, literature, and the visual arts (SDAIA, 2022). By bringing together academics, researchers, and practitioners, this expansion of technological practise and understanding will create a fertile multidisciplinary environment for laying the groundwork for future breakthroughs in service of Vision 2030. With designers pushing boundaries and creating a distinctive Saudi design language graphic design landscape in Saudi Arabia became vibrant and diverse. From typography that melds traditional Arabic calligraphy with modern fonts to digital art that reflects the country's heritage and future aspirations, Saudi Arabia's graphic design journey continues to evolve, reflecting its dynamic cultural landscape which was reflected in the AI Index, Tortoise Intelligence reported in 2020 where Saudi Arabia was ranked first among Arabic countries and 22nd overall ⁸.

⁷ Further details about the work: < <https://www.instagram.com/desertfish/> > and < https://miskartinstitute.org/AttachmentFiles/806_Imprint%20Catalogue.pdf >

⁸ Further information on: <https://www.tortoisemedia.com/intelligence/global-ai/>.

2.2.3.4 AI Literacy

The integration of AI into various sectors underscores the need for clarity and legibility in its application, a sentiment echoed by Lindley et al. (2020). Consequently, there was a pressing need to establish educational frameworks that enhance the fundamental awareness and adeptness in skills, situating AI within an academic purview (Lyons et al., 2019). Relatedly, scholars such as Matthews and Roxburgh (Coates, 2020), Kaiser (2019), Meron (2022), and Wu (2020) have explored numerous avenues for embedding AI within the graphic design educational infrastructure. In an effort to advance this integration, many governmental and educational bodies in Saudi Arabia have recently taken part in this vein, for example, the minister of education in collaboration with SDAIA has launched the AI National Olympiad of Programming and Artificial Intelligence “Athka” (SBA, 2023) to grant society with comprehensive AI knowledge and proficiencies, starting from the school level. Additionally, in tandem with the AI Artathon, SDAIA held the Generative AI hackathon to facilitate the commercialisation of innovative research and development. Nonetheless, the impact of these initiatives on the creative sector has been minimal, as their focus was predominantly on public audiences or the broader educational sector catering to undergraduate students, rather than specifically targeting creative sector. While there have been endeavours, such as SDAIA's AI Artathon and the initiatives made by Misk, to cultivate spaces and masterclasses that fuse AI with creativity, these efforts to elevate awareness about the intersection of creativity and AI have not received endorsement or support from established educational bodies.

2.3 Gap of Knowledge

A comprehensive review of ongoing studies, historical research, and scholarly publications concerning the intricate convergence of AI and graphic design has illuminated a spectrum of both opportunities and challenges. These insights are instrumental in addressing existing research gaps within the field, which encompass:

2.3.1 Gap (1): Underdeveloped Area of Research

This thesis will be an extended work of other researchers and academics who advised on the importance of conducting further research into the implication of AI on graphic design

from the academic and practical perspectives of a graphic designer (Figoli et al., 2022, Meron, 2022; Doehling., 2019). This is because the majority of the existing peer-reviewed studies and industry projects were focused on computer science and technical aspects of collaborating AI with graphic design, such as how the models are built, which algorithms are best used to generate creative artwork or visual graphics, and what data is best to feed the model rather than focusing on the research from a graphic design perspective. By contrast, existing research conducted by graphic design academics has focused primarily on how AI could impact design schools in higher education and how a graphic design curriculum can further develop in light of this continuous progression to improve the postgraduate and undergraduate students' experiences and prepare them for the market needs. Others have investigated how AI can impact the design process itself by automating many of the steps of the design to reduce the effort and time of generating designs. Additionally, no previous study, to the best of my knowledge and based on searches in databases of peer-reviewed works, have explored the possibility of having an AI self-driven system built and monitored by graphic designers collaborating with AI and data experts. Such attempt to explore this area of research will help to capture and reflect the views of the graphic designers in the Saudi Arabian context of what the future of AI and graphic design will look like.

2.3.2 Gap (2): Transformation of Viewpoints

As stated earlier in this chapter, the exciting research on the emergence of AI and graphic design is insufficient and limited perspectives other than a graphic design perspective. A recent study by Meron (2022) and Stoimenova, and Price (2020) claimed that exciting research is almost exclusively computer-science-driven. Meron argues that research done from that perspective is clumsy and vague therefore narrowing the definition of a graphic designer into a “functional task driven practice” and narrowing the designer's purpose of aesthetics and creativity. This limitation was argued by Meron (2022) and Holmquist (2017) who called for inclusiveness to cover further research conducted by graphic designers for graphic designers who are working alongside AI tools and platforms. They argued that the challenges of AI brought into the design industry are acute and vivid, and the industry of graphic design needs to be prepared to deal with these wicked problems associated with this development in light of the continuous progression of technology.

2.3.3 Gap (3): Population Gap

Some gaps of knowledge are addressed as theoretical inadequacies, insufficient empirical studies or lack of corroborative data on tangible topics as identified by Robinson et al. (2011). On the other side, some other gaps of knowledge in research can be occasionally highlighted in terms of demographic representation or areas that have not been thoroughly explored specifically when the subjects of research are differentiated according to attributes such as gender, race/ethnicity, age, and various other sociodemographic factors (Miles, 2017; Robinson et al. 2011). In this research, I intended to conduct the study in Saudi Arabia and explore its demographic diversity and how its rich cultural, social, and geographical diversity towards AI since it has been found by Hagerty and Rubinov (2019) that the perception of artificial intelligence varies greatly depending on location and cultural background. Additionally, according to the Ipsos report (2022), there is a significant gap in how countries with high and low-income view artificial intelligence which therefore can change their trust level, interaction and working with AI. The Ipsos report provides valuable insights into the general perceptions of AI in various areas stating that people in emerging countries such as Saudi Arabia, with an average of 70 – 75%, are more likely to report familiarity with artificial intelligence and to have confidence in engagement with AI compared to underdeveloped countries, yet it was measuring the use of AI within services and products in areas relevant to everyday lifestyle and services such as transportation, shopping, safety products and employments and did not delve into industry-specific understanding relevant to the creative fields, which plays a significant role in shaping culture and public opinion. Subjects such as remains largely untouched in the study. As AI continues to penetrate sectors like film, music, design, and art, gauging the familiarity and trust level of professionals in this realm is paramount. Their views not only influence the products they create but also impact the broader audience's perceptions of AI. Therefore, it is anticipated to expect different findings when conducting the research on a sample that has a different socioeconomic status, ethnic composition, or cultural norms, all of which can have an impact on how the sample uses and interacts with technological tools. Additionally, this difference can be present when conducting the same research approach on a sample from another country other than Saudi Arabia where the perception towards AI and technology can, therefore, be different which helps in generating new findings and new results.

2.3.4 Gap (4): AI and Graphic Design Collaborative Research

As exhibited earlier in the chapter, a number of studies addressed collaboration research between designers and computer science researchers using the co-design approach (Figoli et al., 2022; Subramonyam et al., 2021), yet some research was either (1) limited with sample size, which were relatively small or focused only on a sample group with specific educational background or a geographical location (2) tested the collaboration between AI and graphic design using the experimentation approach (Wang and Kim, 2022). Some other research conducted the collaboration between UX designer and AI experts using co-design (Subramonyam et al., 2021). In this research, I intend to cover those gaps by offering a co-design approach that collaborate between graphic designers and AI experts within Saudi Arabia which could generate new finding that contribute towards the research community.

2.3.5 Gap (5): AI and Educational Development

Looking into the proposal set by scholars such as Matthews and Roxburgh (Coates, 2020), Meron (2022) and Wu (2020) which investigated the impact of AI and emerging technologies on the subject of graphic design from both a graphic design perspective rather than investigating this impact from a technical point of view. They argue that AI poses complex design frameworks and wicked problems with how graphic designers perceive AI and how they can align their work accordingly. Matthews and Roxburgh have asked questions such as (1) What does it look like in ten years' time to be affected by automation? (2) how do these insights relate to the design school in general? (Coates, 2020). Additionally, they worked on the project, *The Robot Ate My Homework*, which focuses on the context of visual communication design and AI within the classes of graphic design. In their project, they used thematic mapping and written responses of the participant's audience in the DRS2020 conference which enabled them to engage with a random sample of designers and to understand their viewpoints on this subject. Since the session was conducted remotely, the researchers reported a lack of direct engagement with the participants which limited their dialogue interaction in some areas across the session. Matthews and Roxburgh used the interview as their research method asking questions and recording the answers of various views points and knowledge of what AI

is and how it will impact the industry of graphic design. This approach was limited for only recording the current knowledge without giving the participants a chance to co-create or co-design in the process of design thinking or prototyping for example⁹. Another study was conducted by scholars Figoli et al. (2022) and Subramonyam et al. (2021) investigated the potential of using a co-design approach among designers to better engage with AI in a co-creating setting. The co-design approach was an effective methodology to capture and record results, yet the study sample was only limited to UX designers for example or limited to the undergraduate students. Conversely, embracing this technological shift, especially in domains like education, presents its own set of challenges, including the potential perpetuation of biases and discrimination—a concern highlighted in UNESCO’s ethical review of Artificial Intelligence (UNESCO, 2022). The report advocates for the imperative governance of these technologies within institutional and legal structures, ensuring their alignment with public welfare and ethical standards.

2.4 Research Question

A meaningful research question takes time to develop throughout undertaking a study said Gray (2004). In this research, the research question did not set from the beginning. It took time to develop and many steps to reshape and emerge as a result of a series of explorations in a series of conceptual theoretical frameworks in the area AI, automation, data and graphic design when the knowledge gap emerged in that process. These gaps presented new opportunities and challenge to be discovered and investigated Therefore, in this research I asked one question:

(RQ1): What is the implication of AI on the role of graphic designers in Saudi Arabia?

2.5 Conclusion

In this chapter, I provided an overview of the relevant literature and current practice about the emergence of artificial intelligence in graphic design. In the first section, I presented the three main domains of this research: graphic design, artificial intelligence and the

⁹ Matthews and Roxburgh have conducted these interviews as part of their participating at the DRS2020 conference entitled: The Robot Ate my Homework: A DRS conversation on automation and Design.

location of the research in Saudi Arabia. I provided a brief for the development of artificial intelligence and graphic design throughout the era of the industrial revolution, besides the development of the industry of Saudi Arabia under the vision 3030. After that, I discussed the most up-to-date findings and literature on AI-, data-, and algorithm-driven designs. After reviewing the relevant literature, I identified the knowledge gaps following with the research questions.

Chapter 3

3 Methodology

3.1 Introduction

In the previous chapter, I introduced the research's conceptual framework and how the literature review's overarching three categories focusing on graphic design and artificial intelligence (AI) as the two main emerging subjects. I also presented the research context, Saudi Arabia, a country with a cultural and diverse background—as an influencing factor.

To present the methodology chapter, I include how I positioned myself as a designer and researcher within the research's framework. In the first section of this chapter, I examine the assumptions, beliefs, and values of the numerous paradigms that led to the research paradigm most appropriate for the research aim and objective, the research questions, and the research methodology. In the second section, I explain the research design, and how I adopted Maxwell's research design model, which consists of five components—goals, conceptual framework, methods, validity, and research questions—in the design of my research model, as well as three stages: define, engage, and reflect. Following the second section, I present the research sample, listing the research sample criteria and the location of the research in Section 3. Ethical considerations are then presented in the fourth section of this chapter, including the ethical considerations of choosing the research sample, engaging with humans, anonymity, and the copyrights of using visual elements. In the last section of this chapter, I highlight the limitations accompanying these methodologies, including the challenges of the COVID-19 pandemic and the approach I used for the validation and reliability of the research.

3.2 Research Approach

3.2.1 Research Paradigm

A paradigm refers to a set of ideas, beliefs, values, and assumptions that lead to an ontological and epistemological understanding of the nature of the universe and the process through which knowledge is generated (Collis and Hussey, 2009; Creswell, 2014; Maxwell, 2005). In research, paradigms were defined as a theoretical viewpoint or a philosophical worldview first formed from the Greek term “Paradeigma”, which implies a pattern or a structure. The ‘paradigm shift’ was commonly associated with the work of

historian scholar Thomas Kuhn in 1962. Kuhn described paradigms as a collection of shared beliefs and agreements among scientists on how issues should be understood and treated within a scientific framework (Maxwell, 2005). They are integrated clusters of substantive concepts that can be used to analyse circumstances, answer questions, and look for necessary solutions (Maxwell, 2005). Other scholars, such as Collis and Hussey, have proposed paradigm frameworks to guide researchers on how research is conducted based on the motivation for undertaking a study and people's philosophical views about the nature of knowledge (Cohen and Manion, 1994). Furthermore, Cohen and Manion (1994) indicated that determining the philosophical motive for doing a research study is best accomplished from a theoretical standpoint.

I examined various paradigms described by Creswell (2014), such as positivism, constructivism/interpretivism, realism, and pragmatism, to determine the most relevant approach to the nature of the research, which represents the ideas and predictions of a specific phenomenon and permits answering the research questions within the boundaries of a specific ontology and epistemology. Starting with the nature of the study, which investigates how the rapid advancement of AI technology may impact graphic designers in the near future, I considered three factors, as shown in [Figure 13](#), the researcher, the nature of the study and the participant's viewpoint. Looking at the first aspect, the nature of the research, which is investigating graphic design and artificial intelligence, a creative realm that centres on the presence of human factors as a main part of the graphic design process, as Lupton stated (2011), whether it is myself or those I engaged with in this study, I made sure to mirror all the inputs, viewpoints and opinions of myself as a researcher and those I engaged with in this research, when raising questions, making assumptions and drawing conclusions about the difficulties and opportunities of using artificial intelligence.

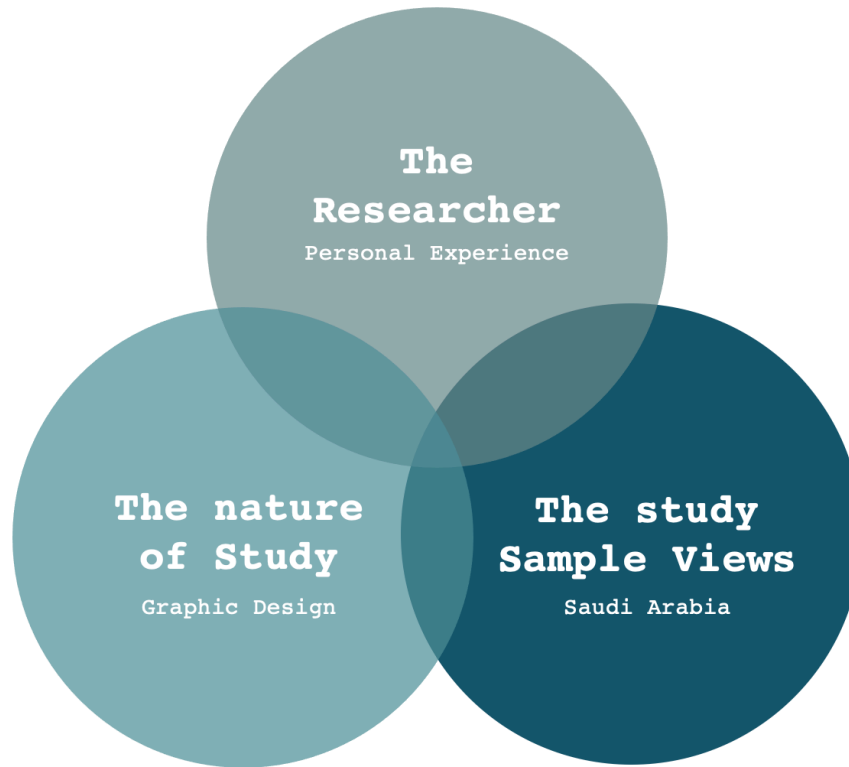


Figure 13 - The three aspects to determine the research paradigm selected for this research. Source: adapted from Creswell, 2014.

The second aspect of the diagram is my role as a researcher, taking into consideration being both an academic and a design practitioner in the field of graphic design. The presence of designers' values and experiences in light of their cultural backgrounds was considerably accountable in the design process (Lupton, 2017). The researcher's experiences and expertise, with any bias, may play a primary role in determining the design approach, which therefore adds value and validation to the study (Creswell, 2014). The third aspect of the diagram is the research sample views that influenced the selection of the paradigm. Human views of the world can help find the truth by providing insight into how others interpret the universe and the significance of a phenomenon via their own set of values, beliefs, actions, and decisions that revolve around the intention to understand the world of human experience (Creswell, 2014; Cohen and Minion, 1994).

These three aspects revolve around the human component, which may vary from one location to another, given that an individual's experiences, beliefs, and values can have an impact on the outcome of the research. Thus, I adopted the interpretivism approach which as Ritchie and Lewis stated (2003) help to seek the underlying meanings of events

and examine how humans and their views of the world around them can be part of the research.

3.2.2 Qualitative Approach

Since I adopted the interpretivism approach to emphasise the importance of understanding human experiences and interpreting their views in conjunction with the research aim, research questions, and how to subjectively interpret the researcher's perspective, I used a qualitative approach (Creswell et al., 2007, Creswell, 2014) to better understand the meanings of events manifested through human behaviours, beliefs, and values. This approach is the closest to expressing human engagement than using the quantitative approach or the mixed methods approach, which focuses on statistics exhibited by surveys, experimental research, and closed-ended interviews, whereas qualitative methods focus on narratives, engagements, and open-ended interviews. In the next section, I explain how I used the qualitative approach to define my research design.

3.3 Research Design

Using the interpretive approach for my study, I adopted Maxwell's (2005) research design model, which is an interactive model with a five-component element—goals, conceptual framework, methods, validity, and research questions ([Figure 14](#))—that connects the research in an integrative sequential form. The connections among the components are not rigid; they are cumulative to one other in a way that can be easily remedied with considerable flexibility (Maxwell, 2005). This model was the most similar to the core idea of what the design process is in its nature: an alternating cumulative interactive process (Brown, 2015). Over the years, graphic design has been defined as a series of steps and cumulative actions to achieve a particular goal or solve a particular problem (Koberg and Bagnall, 1972; Edelson, 2002; Lupton, 2011; Lupton, 2017). From this perspective, I adapted Maxwell's model to encompass design in a broader sense and to translate the research better with an interactive model, since graphic design is an act of a cumulative practice process on its own (Cooper and Press 1995; Brown, 2008). The design process is regarded as a form of research:

Design research is not a “kind” of research, but rather that research is always a “kind” of design. In this more appropriate framing, “practice” is the super-set: clearly scientists “practice” research just as designers naturally practice design. Furthermore, the approaches traditionally referred to as “research” include only those aspects of design that are conventionally accepted as research approaches. “Design research” is therefore creative research. It contains a subset of possible design-oriented strategies and, as design research methods become conventional, new unconventional methods arise to replace them. (Faste and Faste, 2012, p. 4).

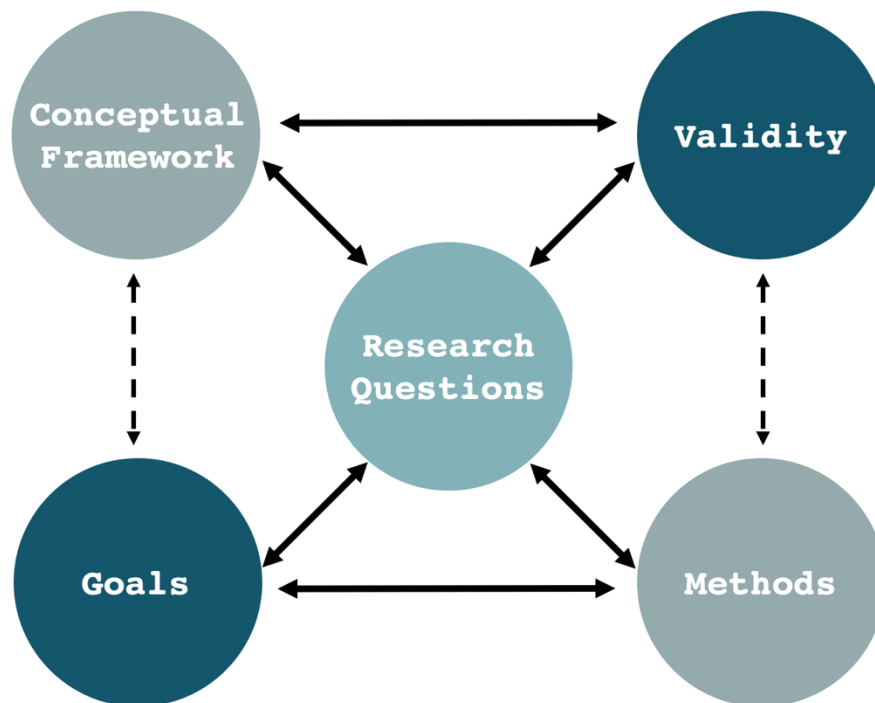


Figure 14 - The five-component elements of Maxwell research design model. Source: Maxwell, 2005.

My research design model was subsequently mapped into three stages of a cumulative coherent process that completes one another with components that frame the research (Figure 15). The first stage of this model was *define*, which offers a conceptual framework covering the set of theories of the methodological approaches I used for the research. The second stage was *engage*, which focuses on the methods I used and how

each one was designed and constructed to answer the research questions. The third stage was *reflect*, where I explained how I collected and analysed the data.

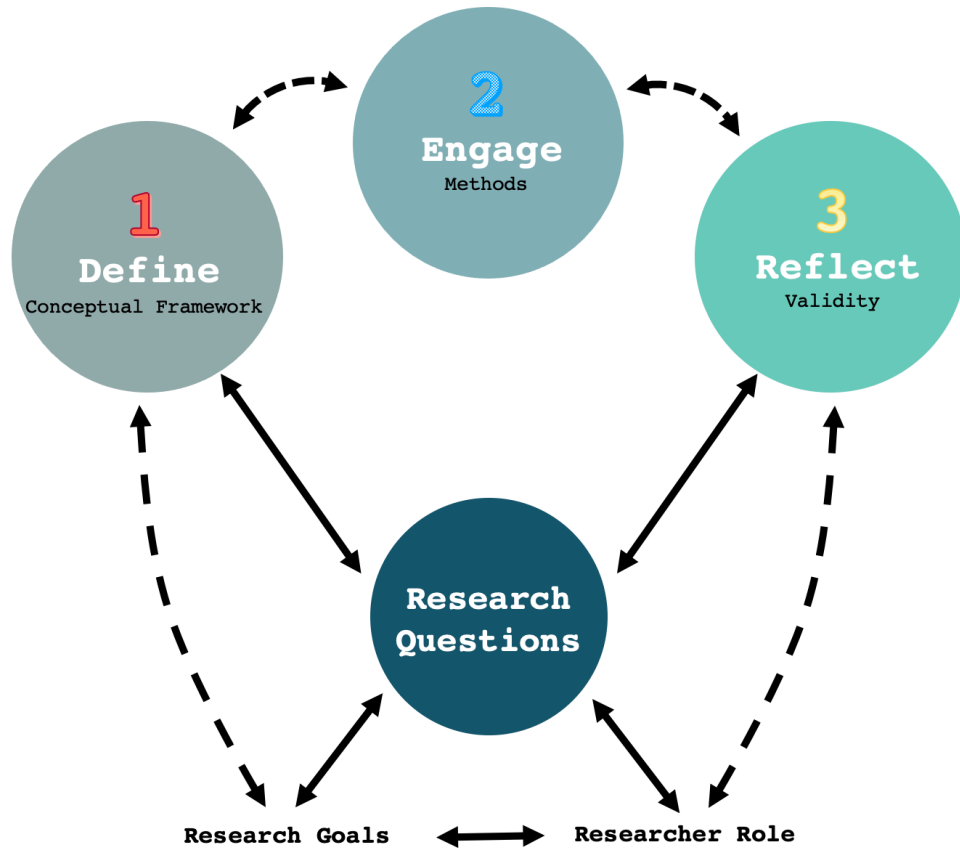
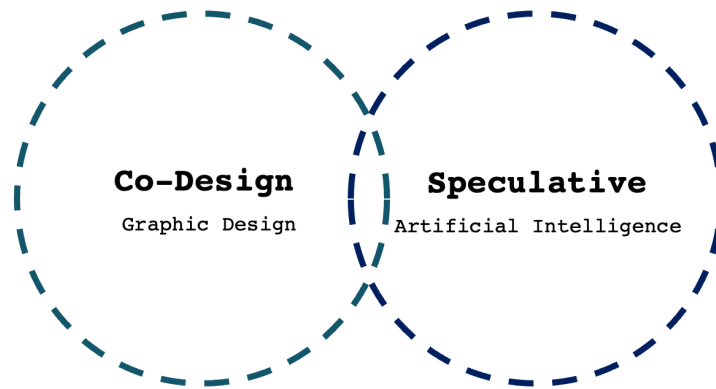


Figure 15 - Research design model developed from Maxwell Research Model considering the five components, 2022.

3.3.1 Stage One: Define

To answer the research questions, I used the conceptual framework of the literature review in chapter 2 to define the most adequate research methodology for this study, which must be responsive to the research context and relevant to the research question. “Methodology should not be a fixed track to a fixed destination, but a conversation about everything that could be made to happen” (Jones, 1992, p. 73). The methodology must be responsive to the research aim and objective, as well as to the research questions that are formed from the assumptions, theories, and concepts framed from the literature review. Furthermore, the research approach must be transferrable, communicatable, and descriptive to bridge the gap between the current research problem and its projected solution (Dilnot, 1998). Therefore, in this stage, I demonstrated the use of co-design and speculative design as the main methodologies of this study, which are more relevant to the nature of the study, as described in the next sections ([Figure 16](#)).



*Figure 16 - The first stage of the research design:
Define which exhibit the use of co-design and
Speculative design, 2022.*

3.3.1.1 Co-Design: Graphic Design

The first methodology I adopted for this research thesis was co-design, often called “co-creation”. Co-design is a form of design that involves individuals and end users engaging proactively in the process of generating a design and finding a solution for a particular product or service (Sanders and Stappers, 2008). Sanders and Stappers (2008) argued that everyone has an inherent capacity for creativity and should be encouraged to participate in the design process through the use of co-design methods. The authors added that engaging individuals who are more likely to use the product or service fosters a provocative environment, allowing them to become familiar with the design challenges and thus engage them in conversations, processes, and prototypes, which contribute to knowledge acquisition, idea production, and concept advancement that led to accurate results (Sanders and Stappers, 2008; Sanders, 2005).

The designer and the researcher collaborate on the tools for Ideation because design skills are very important in the development of the tools. The designer and researcher may, in fact, be the same person. The designer still plays a critical role in giving form to the ideas. (Sanders and Stappers, 2008, p. 12).

Co-design has been utilised in graphic design as a design process approach for many years, shifting the enquiry hierarchy from a linear one to an interactive loop and demonstrating

that interactive circular methods are more prevalent in the field of graphic design (Noble and Bestley, 2011; Lambert, 2017; Lupton, 2017). Co-design has been used not only in design practice but also in design research (Sanders and Stappers, 2008). Co-design helps to engage with people, not *for* or *by* them, by foregrounding their experiences, values, and visions in a co-creating environment, “We are designing for the future experiences of people, communities, and cultures who now are connected and informed in ways that were unimaginable even 10 years ago” (Sanders and Stappers, 2008, p. 10). Sanders and Stappers (2012) introduced a framework for co-design that consists of three elements: making, telling, acting, which involves making things, or telling stories about the future or enacting future experiences, therefore helping to find new solutions. Thus, when attempting to find answers to the research questions, it is more relevant to employ a co-design approach to address and respond to future questions.

3.3.1.2 Speculative Design: Artificial Intelligence

Putting people together in a co-design setting to find solutions to a particular problem, an explanation of a phenomenon, or an answer to a particular question mostly relies on their imagination in visualising the entire situation, especially regarding hypothesis, synthesis, and manifestations of aspects that will emerge in the future. This imaginative aspect is vital for visualising the future and therefore generating design (Cross et al., 1975). Imagination and speculation aim to establish provocative discussion and debates, exposing assumption about the unknown and the possibilities of alternative solutions and as stated by Dunne and Raby “Design speculations can act as a catalyst for collectively redefining our relationship to reality” (Dunne and Raby, 2013, p. 2). On the other hand, they introduced the word “critical design” in 1999 (Dunne and Raby, 2008) as by the creation of provocative objects and scenarios that challenge the status quo by speculating on future possibilities.

While both methodologies are used to explore the future implications of design and technology, Critical Design is more prescriptive in its critique of contemporary values and ideologies, using design to challenge and question rather than to solve or propose (Dunne and Raby, 2008, 1999). Speculative Design, on the other hand, tends to be more descriptive, more exploratory and open-ended which often aims to inspire and suggest a range of possible futures as an approach.

Numerous scholars have employed the speculative approach, both in the realm of research and participatory design, whether through speculative strategies (Dunne and Raby, 2013; Lindley and Coulton, 2016) or with interactive workshops and toolkits (Gorkovenko et al., 2020; Elsdon et al., 2017; Candy and Watson, 2014), with the aim of provoking people to think critically and proactively in representing alternative futures (Coulton et al., 2019; Brown et al., 2016; Lindley, Coulton and Cooper, 2017; Vines et al., 2012; Blythe et al., 2015). These examples exhibit how a speculative approach may serve as a platform for interactive exploration and collaborative analysis to visualise and speculate on solutions that might not yet be applicable, but that can be imagined as existing in the future. Cross et al. stressed the importance of speculation for designers because designers have to consider both the current scenarios of their designs in addition to imagining the future conditions that will exist when their designs will actually be in use. (Cross et al., 1975).

Ideas can be shaped in the people's interaction within the creative industries themselves in a wide variety of scenarios, including provocations during first encounters, provocations throughout the process, and also upon reflection of use (Boer and Donovan, 2012; Boer et al., 2013). Therefore, the next section describes my engagement stage, in which I integrated the various interaction strategies with the various research methods to spark conversations about the recent rise of AI technology and what the future of AI-driven designs in the field of graphic design in Saudi Arabia would entail. The speculative provocative discussions were meant to help identify the implications of AI on the role of graphic designers in Saudi Arabia and therefore help draw an imaginative future of the possibility of having AI-driven branding.

3.3.2 Stage Two: Engage

In research, the methods used to collect the data must fit together and integrate smoothly to provide the data necessary to successfully answer the research questions (Maxwell, 2005). Generating ideas in the creative environment tends to develop and emerge impulsively rather than fixedly from a set of investigated hypotheses in a controlled condition (Binder et al., 2012). Therefore, I used the triangulation approach to emerging data from a variety of research data samples and locations using multiple methods that are cumulative and integrated with each other. This allows for interactive exploration with

participants who can engage in the data collection process, resulting in comprehensive data from various sources and, therefore, a diverse range of results.



Figure 17 - The second stage of the research design: Engage exhibiting the methods used in the research. 2022.

The triangulation approach is employed to collect data from a range of participants and settings using a variety of methods (Maxwell, 2005). This approach helps reduce the risk of bias and increase the chances of data richness by integrating various methods in which, for example, the first method's results will be mirrored in the second method and the third method as a consequence of events, which was previously known as a validation process approach (Lambert and Speed, 2017; Maxwell, 2005). Moreover, bringing together cross-disciplinary professionals from professions relevant to the research subject helps answer the research question and find solutions for the future of design (Bryman, 1988; Maxwell, 2005; Fielding and Fielding, 1986). This method brings multidisciplinary collaboration and iterative improvement to the process of innovation (Meinel and Leifer, 2011). Hence, I chose semi-structured interviews, designed a card toolkit, and employed a co-design method by conducting a workshop, which will be discussed further in the following sections ([Figure 17](#)).

3.3.2.1 Semi-Structured Interviews

In qualitative research, interviews are a common method used in interpretative research for a variety of reasons, including developing thorough descriptions, a detailed narratives and examining research questions and hypotheses from multiple angles by asking questions of what, when, how, why, or what (Rubin and Rubin, 2012; Weiss, 1995). These questions allow for focusing on the interviewee's views on a particular subject while observing their novel responses in a semi-structured framework without being restricted

by any boundaries, offering greater flexibility and a more profound elaboration of their viewpoints (Bernard, 2006; Gordon, 2009; Rubin and Rubin, 2012; Creswell, 2014).

Interviews come in many forms, including unstructured, semi-structured, and structured interviews (Creswell, 2013). Structured interviews are when the interviewer asks predetermined close-ended questions that do not allow the conversation to deviate from the discussed topic (Berg, 2009; Babbie, 2007), which is similar to questionnaires that have the same set of order and sequence (Lune and Berg, 2017). Further away are unstructured interviews, which, instead of asking a series of questions, provide a framework of themes that allow the interview discourse to be non-directional in response to the interviewer's responses (Lune and Berg 2017). The third type of interview is the semi-structured interview. It covers a series of predetermined open-ended questions; however, these allow the interviewers to deviate from the main topic and offer greater flexibility and more profound elaboration to emerge in the conversation (Berg, 2009).

One of the benefits of semi-structured interviews is that they are accessible and feasible with less complicated equipment and settings (Creswell, 2013; Bryman, 2016; Brinkmann and Kvale, 2015). Furthermore, the interviewees who participate in qualitative interviews can explore their thoughts, feelings, and beliefs in a free-form atmosphere that encourages the emergence of a wide range of conversations. Interviewees may express themselves freely while considering the concepts and subjects presented to them (Creswell, 2013; Bryman, 2016; Berg, 2009). For these reasons, I chose semi-structured interviews as the first method in this research to better understand the current landscape of what the Saudi Arabian design society knows about AI and how they define AI within the creative industry. Moreover, these investigative questions will bridge the gap between graphic designers and AI and help answer the first research question (RQ): What are the implications of AI for the role of graphic designers in Saudi Arabia? This understanding of the participants' views and evaluation of their reactions to the research objective and questions allows them to express their thoughts and experiences in a deliberate narrative framework, with no boundaries as explained by Brinkmann and Kvale (2015) and Berg (2009).

As the area of the research is still relatively new, it was common for the interviewees' replies to be bounded to their current knowledge, as they had a limited understanding of

what they could encounter with AI in the future. This limitation of imagining the unknown was addressed by other scholars, such as Hollins and Hollins (1999) and Evans (2014). Therefore, I addressed scenarios and hypotheses in the semi-structured interviews and asked questions about how, what, and why. These questions will stimulate and provoke them to think, act and react creatively. In chapter 4 – Semi-Structured Interviews, I will be elaborating in further depth about the use of promoting questions as well as the challenges I encountered while conducting the interviews.

3.3.2.2 ADI Card Toolkit

The role of design is essential to the development of theories and their transformation into research material through evaluation and testing (Cobb, 2001). The act of practising design in order for designers to conduct research is equivalent to the act of practising research by scientists (Faste and Faste, 2012). To implement a successful design, scholars have proposed three sets of decisions: (1) how the design process would be undertaken to develop a design, (2) the kind of requirements and opportunities the design will endeavour to meet, and (3) the structure that the design will eventually adopt. Edelson (2002) rephrased these three design decisions as (1) the design procedure, (2) the problem analyses, and (3) the design solution. As a designer and researcher, I implemented these three stages in an attempt to translate the interview data into practice that I could evaluate and test among participants of my co-design workshop and therefore transform its findings into research material. Edelson (2002, p. 106) defined a design researcher as someone who engages in “iterative cycles of design and implementation” to complete a design study. These cycles of collecting data, prototyping, and producing an end result or “new knowledge” for research are the core processes of this research.

After conducting the semi-structured interviews, I then intended to convert their opinions, views and assumption that were analysed from the interviews sample into a practice to measure and test their reactions through action. Therefore, I intentionally designed a toolkit, which was implemented through play, as discussed by Tekinbas and Zimmerman (2003), who emphasised the significance of prototyping and playtesting in shaping design, as exhibited by many examples and scholars (Halskov and Dalsgrd, 2006; Michalko, 2010; Lockton et al., 2019; Chen et al., 2009). I employed the theory of gameplay to provide designers with a playful environment where they can use the card toolkit to assist in the

problem-solving process in a relaxed, fun, and easy-to-use environment. I designed the card design toolkit to allow designers to familiarise themselves with technology in a range of brainstorming processes, scenario planning, problem-solving and thinking ahead about the complex concerns of creativity, bias, and copyrights regarding AI. I tested the first version of the card toolkit in a co-design workshop, a playful collaborative environment situated in Saudi Arabia. The card toolkit will be further discussed in chapter 5 – ADI Card Toolkit , including a descriptive demonstration of how I designed the card toolkit and developed the iteration process to produce the first version of the card deck which was introduced in the co-design workshop.

3.3.2.3 Co-Design Workshop

I used a co-design workshop as the second method in the research to convert thoughts into action and to create a collaborative contribution to the graphic design’s research and practice (Cross, 2001; Swann, 2002). Co-design has been proven to enhance the creative abilities of the people involved in a setting using toolkits and handbook methods (Galabo and Cruickshank, 2021). With the ADI card toolkit and prototype testing, the workshop’s goal aim to test the ADI card toolkit by creating a provocative co-design environment, bringing together experts and academics to brainstorm, plan, debate, and build together. These co-design activities were meant to minimise biases by allowing all opinions and experiences to be heard and shared. Therefore, all participants were engaged in the problem-solving process to tackle their thoughts and imagination obliquely to think about the future of graphic designs in the age of age of AI? Each of the processes of building and conducting the workshop was divided into three phases: contextualisation, grounding, and speculating, which I elaborate in further depth in chapter 6 – Co-Design Workshop.

3.3.3 Stage Three: Reflect

The third stage of the research design was the reflecting stage, where I analysed the collected data by following the guidelines of Braun and Clarke (2006). I used thematic analysis as my qualitative research analysis, which identifies themes essential in describing what was being studied and the frequent themes linked to the study and the research questions (Daly et al., 1997). With this approach, I immersed myself in the collected data from the semi-structured interviews and the co-design workshop by manually analysing the data and extracting codes, subthemes, and main themes. This

analysis was used to interpret patterns and find meaningful answers to the research questions (Braun and Clarke, 2012). In the first method, I analysed the interviews to keep track of my data and to know when to reach saturation level (Bryman, 2016). I immersed myself by listening to all the video/audio recordings, taking notes, documenting a general understanding, and looking for any underlying ideas and thoughts. Then, all the content was translated where needed, transcribed, and anonymised in preparation for analysis. For the second method, I extracted the video/audio recording first, then transcribed, anonymised for analysis, documented the workshop materials and taken from the workshop. I revised all the data, making sure they were ready for coding and analysis (Braun and Clarke, 2012).

I used a hybrid approach in which I combined inductive, data-driven, and deductive theoretical-driven coding in both methods. The inductive approach started with looking at the data first and then cluster them into dataset to be able to code them and generate themes out of them, whereas the deductive approach was where I brought ideas, concepts, and topics from the research questions and the research literature into the analysis (Boyatzis, 1998; Swain, 2018). All the content of the interviews and the workshop were actively observed first to identify patterns and meanings that may appear across the data, following the inductive, ground-up approach. The other set of codes was driven from the research literature framework noted earlier in chapter 2, following the deductive, top-down approach, which helped to recognise patterns in the early stages of conducting the data collection methods. Consequently, I labelled and grouped all the codes into potential themes. Each of these themes is then categorised in the findings and reflection section of each method in chapter 4 and chapter 6.

3.4 Research Sample

3.4.1 Participant Sample

Considering that the research employed a co-design approach by bringing participants together through semi-structured interviews and a co-design workshop, it was not just a matter of taking a representative sample to have a general sense of what participants might think but also to provide adequate, reliable data for further research and studies in the research area (Morse and Field, 1995). As Creswell (2013) proposed, choosing the sample

approach is essential in understanding the phenomena; thus, I employed a targeted sampling approach, such as purposive sampling and cluster sampling, to choose a sample that is more relevant and targeted to the research.

The selection of purposive sampling criteria was based on characteristics related to the research questions, instead of sampling participants at random, as suggested by Bryman (2016). This selection was based on different sets of skills the participants had, the number of years of experience in their profession, and their level of knowledge about the area of my study. This approach is essential as Patton has stated “the logic and power of purposeful sampling lies in selecting information-rich cases for study in depth” (Patton, 1990, p. 169; Emmel, 2013). As suggested by Brink (1993), Guetterman (2015), and Yin (2015), it was critical to select a sample that was capable of providing relevant in-depth data to the research and further preventing insufficient or inaccurate ones. Furthermore, while conducting the first method, I used the snowball sampling approach: the first group of participants I recruited proposed other potential candidates that they thought could help enrich the context of the research. This strategy has proven to be efficient and effective in contacting the targeted sample (Bryman, 2016; Noy, 2008).

I also used the cluster sampling approach (Weiss, 1995), which groups individuals based on highly correlated attributes and offers every group member an equal probability of being selected from any cluster. To ensure that I chose a group of participants from each region of the three central regions in Saudi Arabia where the research took place, I divided the participants into regional clusters based on their geographical locations. After grouping the sample, I followed Onwuegbuzie and Leech’s (2005) scheme of selecting a group of participants using the single-stage sampling technique.

I nominated the sample for this research from various professional and academic institutions and invited them through an official email. I adhered to the ethical considerations and guidelines of Lancaster University when contacting participants for qualitative research, which I explained in depth in Section 4. I followed Lancaster University’s ethical regulations and procedures to guarantee the privacy, anonymity, and quality of research involving humans.

3.4.2 Saudi Arabia: A Geotargeting Case Study

As highlighted earlier in chapter 2, Saudi Arabia was chosen as the location where this research took place taking into consideration to measure the variable of cultural, ethical, and social factors that could impact the finding of the research in addition to the growing economy that developed through the Vision 2030. These factors of cultural diversity and location impact, as stated by Hagerty and Rubinov (2019), were enormously significant in the perceptions and understandings of AI which may help in coining new insights and knowledge from that regional area (Miles, 2017; Robinson et al., 2011).

3.5 Ethical Considerations

Since this research involves direct contact with human subjects as well as using visual content that brings issues concerning copyright and the right of usage, I adhered to all ethical codes and protocols regarding the privacy and confidentiality of participants, as well as sourcing and acknowledging all the visual and graphical elements retrieved from the internet (Bryman, 2016; Paulus, Lester, and Dempster, 2014).

3.6 Human Participants

During the qualitative research, I took into account any ethical issues that may potentially influence the participants and respected and protected their anonymity and privacy, regardless of the media or source from which the data was retrieved (Paulus, Lester, and Dempster, 2014). The most crucial feature of ethics in human-participant research is to act concerning other people's rights while being honest and transparent about the research aim and objective of the research process, without withholding any information that may make the participants feel uncomfortable or confused (Yin, 2015; Yin, 2014). When reaching out to a participant, I would first ask them if they were interested and willing to participate in the study, and allow them to ask any questions they might have about the study. Each participant was given a Participant Information Sheet, including information about the research, as well as further specifications about the method used in the process they were taking part in, such as the setting, timeframe, data collection criteria, withdrawal option, and confidentiality protocols. Additionally, I gave them a consent form to record their participation approval (Bampton and Cowton, 2002).

3.6.1 Anonymity

Throughout the process of conducting my research, as well as any subsequent conference papers, conference presentations, seminars, talks, and web-based articles in which I participated, the participants' privacy and anonymity were always respected, as the participant's right to dignity and well-being, as well as maintaining their confidentiality throughout the research process, is essential in any qualitative research (Kaiser, 2009), even if any of the participants opt to withdraw from the research (Kaiser, 2009). As a result, during the data collection, transcription, analysis, and coding of the semi-structured interviews and co-design workshop, I omitted all names and identities of all participants and anonymised relevant material that could harm, be used to trace, or identify them. I separately labelled and stored these materials on Lancaster University's OneDrive online platform, which will be kept there for a 10-year timeframe and exclusively accessed by myself and my supervisors in accordance with Lancaster University Research Ethics.

3.6.2 Copyrights

Margolis and Pauwels (2011) noted the importance of properly acknowledging and referencing the visual and graphical elements included in any research. Therefore, for ethical consideration, I cited and referenced all visual elements, where appropriate. However, some elements were retrieved from either open sources or paid platforms, such as social media platforms and vector platforms. Hence, all of these elements were appropriately indicated and referenced for copyrights.

3.7 Limitations and Challenges

3.7.1 Validity and Reliability

Validity in research refers to the accuracy with which the conclusions reflect the acquired data, as well as the integrity and application of the methodologies employed to conduct the study, where reliability helps assure that the findings are credible, accurate, and trustworthy (Le Comple and Goetz, 1982). The quantitative research approach is more rigorous and controlled by statistical or empirical calculations, whereas the nature of the

qualitative research methodology is more flexible, subjective, and adaptable to the human subject matter and new information based on data acquired (Creswell, 2014). One valid difficulty that may arise as a result is researcher bias—the tendency of the researcher to project their own views and own values onto the collected data and findings.

To overcome this issue, before conducting the semi-structured interviews and the co-design workshop, I made sure to initiate some short discussions and casual interactions, which aided the participants and myself in assessing each other and establishing a level of trust and comfort. This was crucial in setting the tone for both the interviews and the workshop (Corbin and Morse, 2003), which, as a result, helped define the rest of the setting. This level of trust and comfort is a critical human connection that deepens and strengthens throughout the interviews and workshop, allowing for the development of a trustworthy research partnership that permits each participant’s perspective to be heard and recorded. Therefore, participants could air their views towards the research context and be more confident in adding their input without any input from me.

Another approach to ensuring the study’s validity and trustworthiness was to choose the appropriate sample criteria when inviting participants to take part in the research. As described earlier in the research sample section, I used purposive sampling to limit the participants to those who had adequate experience and knowledge in the field of the study, both working in the industry and academia:

To avoid inaccurate or insufficient data, the researcher must use his/her judgement based on the best available evidence to choose subjects who know enough, can recall enough and can respond precisely to questions asked. (Brink, 1993, p. 37).

The third approach I used for validation was the triangulation approach (Maxwell, 2005), which was detailed in depth in Stage Two: Engage at the Methodology chapter. To this end, I merged and enriched the data collected for the research using more than one data collection method to ensure the variety and diversity of the data sourcing (Lambert and Speed, 2017; Brink, 1993).

3.7.2 COVID-19 pandemic

One of the primary obstacles to this research's progress was the impact of Coronavirus (COVID-19), which was officially announced as a pandemic by the World Health Organization (WHO) in March 2020. Since then, many restricted safety measures have been implemented to control the pandemic, such as a mandatory lockdown, travel ban, curfew, and obligatory social distancing, which have greatly affected the whole globe.

I, too, faced some challenges in many areas while conducting my research precisely when I was planning to travel from the United Kingdom, where I was living for my post-graduate studies, to Saudi Arabia, where my research sample was located, to conduct my semi-structured interviews. When the time of when COVID-19 took place and due to the uncertain circumstances associated with the pandemic, setting the timeframe of the research and the relevant budgeting for the semi-structured interviews and the co-design workshop, had some drawbacks. Therefore, I had to make some adjustments in regard to the methods; for instance, I changed the design and mechanism of conducting the interviews, the process of designing the ADI card toolkit, and later made changes to the time of conducting the workshop taking into consideration the new circumstances to the best of my ability at that time.

3.8 Conclusion

In this methodology chapter, I presented five sections, each of which described an approach that I followed to address the aim of this research and the questions I asked to address the gap in knowledge. To begin, I provided a brief overview of the research paradigm, the qualitative methodology, and how I used the three components of Creswell's design scheme (2014) to determine an adequate approach. My personal experience working in academia as a lecturer and researcher, as well as the nature of the research and the location of the research sample, were critical in determining the qualitative approach method. I also presented the research design, which included three stages: (stage 1) how I defined my conceptual framework of the merging subject of graphic design and AI; (stage 2) how I engaged with my research sample using the method of semi-structured interviews, design a card toolkit which then tested in a co-design workshop; and (stage 3) how I reflected on these data by using thematic analysis to find

themes and answers to my research questions. In the third section of this chapter, I explained the ways in which I selected my research sample and how I recruited them from Saudi Arabia following the ethical procedures and protocols of Lancaster University. Aside from the ethical protocols, I presented the privacy, anatomy, and copyright protocols for using graphics and internet sourcing. I ended the chapter by elaborating on the limitations and obstacles that I encountered, and the validation and reliability approach I followed to rigorously conduct the methods.

In the following three chapters, I discuss the methods of conducting semi-structured interviews, building the card toolkit, and conducting the co-design workshop. The primary objective of each chapter was the approach through which each of these engagements was structured, designed, and delivered.

Chapter 4

4 Semi-Structured Interviews

4.1 Introduction

This chapter presents the semi-structured interviews, the first research method I adopted in this research. In the first section, I briefly define what interviews are and how they can be used as a method of enquiry. I present how I employed the interviews using the seven stages outlined by Bourdieu et al. (1999) to adequately answer the research question. In the latter part of the first section, I mapped out the interview's guides, including how I structured my interviews and prepared for them. In the second section of this chapter, I describe the procedure I used for the participants's sample. Purposive sampling, cluster sampling, and snowball sampling approaches were used in this method. Following selection of the participant's sample, I listed the steps of conducting the semi-structured interviews, recording, translating, and transcribing the context of the interviews. Moreover, it was essential to consider ethical protocols when encountering human interaction, such as concealing their identities, anatomising data processing, and preserving and protecting the privacy of the data. Furthermore, in Section 4.3, I introduced the data analysis stage using Braun and Clarke's (2006) thematic analysis approach. I detailed how the codes and themes were recognised and how the arguments and discussion evolved around the research question. In Section 4.4 and 4.5, I synthesised the themes generated from the analysis and then recorded my reflections. I built my argument on how the results of the semi-structured interviews will employ the following research method, which was presented in chapters 5 and 6 of this thesis followed by the conclusion of this chapter.

4.2 Semi-Structured Qualitative Interviews

Qualitative research emphasises the researcher as a key instrument, an instrument for collecting data says Creswell (2014), beyond observing and examining what the world understands about a particular phenomenon (Creswell et al., 2007; Creswell, 2014; Brinkmann and Kvale, 2015). In qualitative research, several methods are used to collect the data using qualitative methodologies, such as ethnography, case studies, focus groups, observations, and interviews, where interviews are considered to be one of the most

commonly used methods in qualitative research, as stated by Creswell (Gordon, 2009; Rubin and Rubin, 2012; Creswell, 2014).

Many scholars, such as Brinkmann and Kvale (2015), have described an interview as a simple conversation between the researcher and the interviewee to *inter-view* a particular participant and gather information on an issue with a framework and a goal. Interviews serve a range of purposes, including complete descriptive details of a particular event or a process that can view and understand the interviewee's thoughts and feelings and define their perspective towards a particular phenomenon by asking questions about how, what, why and when (Weiss, 1995; Brinkmann and Kvale, 2015; Yin, 2015). The versatility and diversity of these questions allowed interviewees to elaborate on their responses and viewpoints without being restricted or limited by any boundaries or fears, thereby uncovering new insights into the investigated research subject (Fielding, 1994; Brinkmann and Kvale, 2015; Bernard, 2006). With consideration to the types of questions asked in qualitative interviews, I used interviews as my first method in the process of collecting data for this research.

4.2.1 Research Question

To answer a research question in qualitative research, the research method must be adequately tailored to the nature of the research approach to interpret and generate the correct data (Creswell, 2003; Maxwell, 2005). Therefore, I used semi-structured interviews to elicit provocative conversations from the current viewpoints of academics and practitioners in the area of graphic design in Saudi Arabia.

To convey views effectively and to relate current knowledge about the uncertainty of the future, I tackled sub-subjects that might influence the primary investigation and help provoke their conversations using the deductive theoretical-driven approach to key out variables such as cultural impact, individual biases, and personal experiences that may affect answering the first research question: What are the implications of AI on the role of graphic designers in Saudi Arabia? I selected three sub-subjects in questioning: (1) the definition of AI in the context of graphic design, (2) Saudi Arabia's current knowledge about AI from a designer's perspective, and (3) the extensiveness of AI encroachment

onto the terrain of graphic design. These sub-subjects influenced how I framed the interview questions and set my direction to extract adequate data for the research.

4.2.2 The Interview Design

A productive interview needs to be processed into seven stages for it to be successful: (1) thematising, (2) designing, (3) interviewing, (4) transcribing, (5) analysing, (6) verifying, and (7) reporting the interview content (Brinkmann and Kvale, 2015; Bourdieu et al., 1999). In these stages, the researcher might go in a circular direction, back, and forth between them, instead of proceeding in a linear approach to examine and extract new information from the transcripts and the analysis of the interviews from various angles during the research process (Brinkmann and Kvale, 2015; Bourdieu et al., 1999).

4.2.2.1 Interview Guides

An interview tool is an important step when creating a semi-structured interview detailing the content of the interview, including the list of questions, potential topics, themes, and areas of interest that might emerge during the interview's discussion (Bryman, 2016). Moreover, the interview guide specifies the location of the interview and the timeframe (Bryman, 2016).

Since the nature of the interviews selected for this research was semi-structured with open-ended questions, I set a predefined list of questions covering themes from the research literature review and themes related to the research questions. The predefined list of questions did not follow a specific order due to the interview's approach. Some follow-up questions were generated from the conversation, while others were synthesised from the interviewees' responses and answers (Bryman, 2016; Bernard, 2006). This rambling technique says Bryman (2016), allowed the interviewees to be more comfortable and flexible, engaging in a lengthy chat, and therefore enabling rich details of the consequences of relevant concerns to be raised during the interviews (2016).

Following the guidelines of Charmaz (2012) and Bryman (2016), I used three types of questions in the qualitative semi-structured interviews: preliminary open-ended questions, intermediate questions, and closing questions. First, I divided the interview session into four sections in accordance with the length of the interview, each with its own questions

associated with the area of the research I wanted to tackle and the desired length of the discussion. As shown in Table 1, the introductory section included three opening questions, followed by a few direct questions that gradually introduced my research, its aims and objectives, which helped me to measure the interviewees’ knowledge about the emergence of technology and graphic design, as well as their general habits and behaviour of using technology. The third section included a set of pre-listed questions, prompts, and follow-up questions to let the interviewees elaborate and engage as much as possible. The mapping questions addressed various AI and graphic design challenges in exhibiting case studies and projects to allow further engagement. Some questions were specific and direct to elicit their emotions, including inquiries regarding the possible opportunities and challenges of AI for the graphic designer in Saudi Arabia. When conducting the interviews, I consistently nudged the interviewees to relate their personal stories and experiences with AI, as this nudging technique could add further details to the study (Kvale, 1996; Bryman, 2016). At the end of the interview, I asked three closing questions to elicit more insights into the interviewees’ thoughts and predictions about the future of AI and any potential upcoming projects and developments that could add further details to the study (Table 1).

Introductory Section	
Preliminary Questions (Opening Questions)	<ol style="list-style-type: none"> 1. would you tell me more about your current role and position? 2. Positioning yourself on scale of daily use, up to what extent do you use digital technology in your workflow? 3. In light of the rapid development of technology “4th industrial revolution”, what are the new skills a graphic designer should learn in the future?
Follow-up Questions	Why? Explain more? How?
Second Section	
Intermediate questions	<ol style="list-style-type: none"> 1. How would you describe Artificial Intelligence and Machine Learning? 2. Do you think Artificial Intelligence have a significant impact on creative domains such as in graphic design?
Follow-up Questions	How? Why?

Third Section	
Mapping Questions	<ol style="list-style-type: none"> 1. What do you think the main opportunities are to utilize AI and ML in creative domain such as in: Graphic Design? 2. What do you think the main challenges are? 3. Reflecting from our conversation, Where do you think the role of the graphic designer will be in the loop of this technology in (working practices, Ethics, Creativity)? 4. Do you think the growing technology will take over creative professions such as graphic design)? Why? How? (Good design puts humans first?) 5. From your experience, have you been involved in projects /events where Artificial Intelligence or Machine Learning technology was used?
Follow-up Questions	prompts / follow-up
Closing Section	
Closing Questions	<ol style="list-style-type: none"> 1. How well do you think Saudi Arabia is positioned to utilize AI technology in creative sectors? 2. Do you think AI will be introduced to the Visual Communication curriculums in Saudi Arabia? How? 3. Are there other issues relating to this subject you feel are essential to talk about that we have not covered in the interview today?
Follow-up Questions	How? Explain?

Table 1 – The table shows the semi-structured interviews sections with a list of questions asked in each section, 2020.

4.2.2.2 Interview Preparation

While preparing for my interviews, which began in the first quarter of 2020, the COVID-19 pandemic struck the world in March 2020. The pandemic brought many uncertain circumstances, including the safety measures and restrictions enforced by the government, including lockdown, curfew, and social distancing, which impacted the length of time it would take to complete all 23 interviews on time. With all these sudden changes, I had to switch the interview format from in-person to remote. I chose Microsoft Teams as my leading interview platform, which fits the circumstances of pandemic restrictions with a

minimum impact on data quality. To ensure that the interviews go smoothly, I justified using the remote platform for the interviewees before commencing the interviews.

One of the advantages of conducting the interviews remotely was the flexibility of scheduling the interviews, even though Saudi Arabia and the United Kingdom are in separate time zones. In addition to being flexible, online interviews were more convenient, less expensive, and required little setup. Notably, this advantage has been expressed by several other researchers during the pandemic, including Self (2021). I took notes throughout the interviews focusing on the tone of voice, facial expression, and pauses in speech, and ensured that data were swiftly recoded to minimise the risk of losing information due to any technical difficulties that may occur. Due to the nature of conducting the interviews remotely, the comparative lack of visibility of facial expressions, body gestures, and clues was a potential issue, as stated by Self (2021). To compensate for this, I made sure to keep my camera open, and I advised the interviewees to open their cameras to compensate for the lack of body gestures and clues during the interview. Moreover, I used visual presentation slides shown in Figures 18, 19, 20, 21 *and* 22 to provide a brief overview of the research and showcased case studies and projects that reflected the study's conceptual framework. Visual elements were essential elements in interviews (Bryman, 2016) to prompt the conversation, stimulate the interviewees' attention, and help them think differently about details they might have taken for granted. Due to limited time and funding during 2020, postponing or conducting follow-up interviews was a challenge. I had to ensure that the interviews were simple in structure, transparent, yet rich in information, without jeopardising its authenticity. Each interview was limited to 1 hour and 15 minutes, including the visual presentation I used.

Interview Presentation
April 2020

Duha Engawi

Supervisors
Prof. Charlie Gere & Dr. Daniel Richards

1

Interviews

Underpin current knowledge

Provoke and challenge innovation

Reflect Current Potentials and responsibilities toward AI

2

Cross functional Interviews

3

Why AI

High level of debate within academic with / against

New research area
Match the pace of progression
Interdisciplinary domain

4

AI can be received by

Fear
Taking over jobs (Harari)
Losing the design aesthetics (Manovich)


Misunderstanding
What it can do
Bias and confounding
How far it can take us

5

A new perspective to Graphic Designers

6


Figure 18 - Introductory slides presentation of the semi-structured interview to communicate with the interviewees remotely, 2020.



Section One:

1. As a start, would you tell me more about your current role and position.
2. Positioning yourself on scale of daily use, up to what extent do you use digital technology in your workflow?
3. In light of the rapid development of technology "4th industrial revolution", what are the new skills a graphic designer should learn in the future, and why?

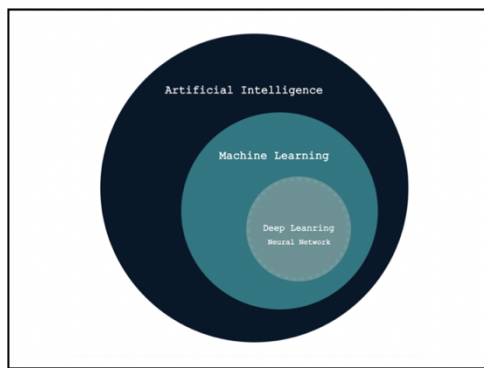
7



Section Two:

4. How would you describe Artificial Intelligence and Machine Learning?

8



9

Artificial Intelligence
A computer that can do a specific task

- 1 **Artificial Narrow Intelligence (ANI)**
can do a certain task
Smart speakers (Alexa, Siri), Self driving
- 2 **Artificial General Intelligence (AGI)**
mimic anything a human can do using rules, logics and decision trees
A common debatable topic in science fiction, movies and futures studies


10

Wall E Movie (2008)
Developed feelings of loneliness and love



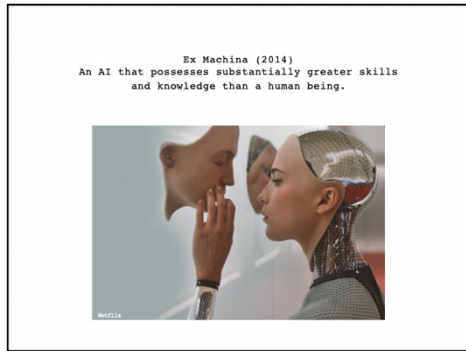
11

The terminator (1984)
AI system that sparks a nuclear holocaust

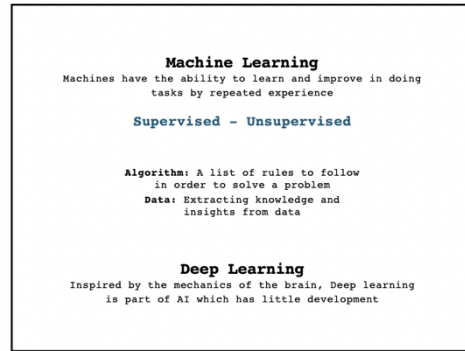


12

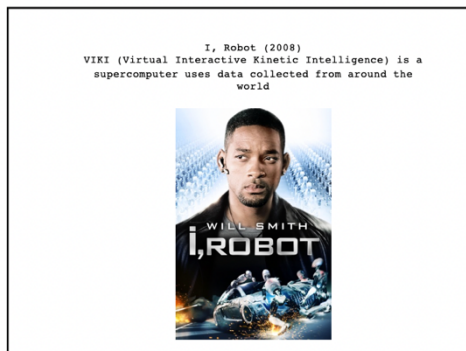
Figure 19 – Sample of the slide presentation of the semi-structured interview to communicate with the interviewees remotely, 2020.



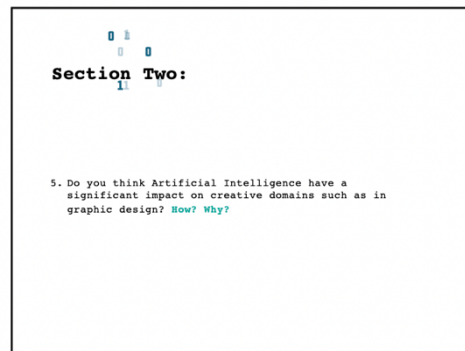
13



14



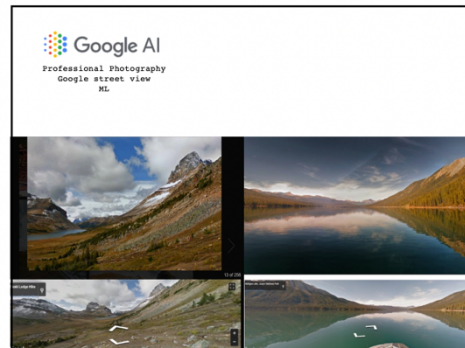
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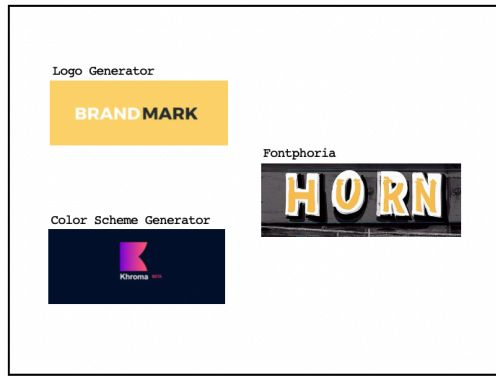


18



20

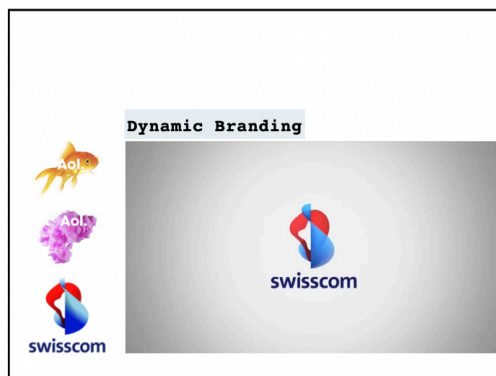
Figure 20 - Sample of the slide presentation of the semi-structured interview to communicate with the interviewees remotely, 2020.



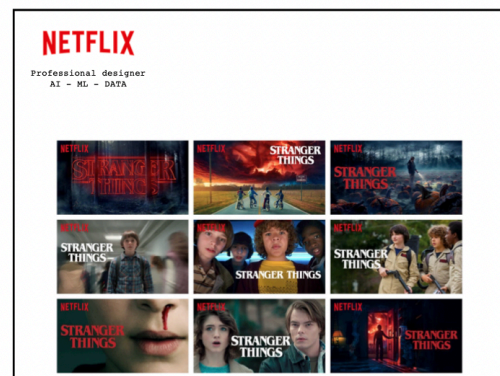
21



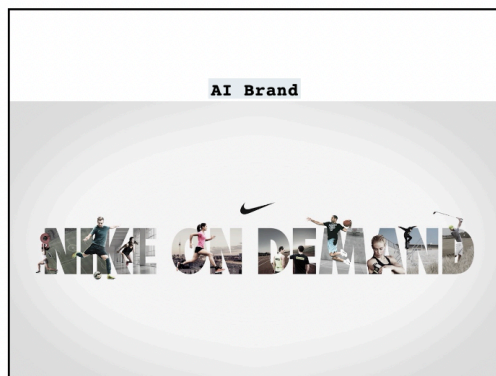
22



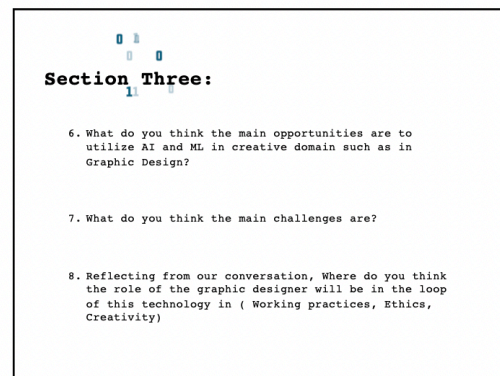
23



24



25



27

Figure 21 - The semi-structured interview slide presentation with examples and projects to communicate with the interviewees remotely, 2020.

0 1 1
0 1 1
1 1 1

Section Three:

9. Do you think the growing technology will take over creative professions such as graphic design)? why? How? (Good design puts humans first!!)

10. From your experience, have you been involved in projects /events where Artificial Intelligence or Machine Learning technology was used?

28

0 1 1
0 1 1
1 1 1

Section Four:


11. How well do you think Saudi Arabia is positioned to utilize AI technology in creative sectors?

12. Do you think AI will be introduced to the Visual Communication curriculums in Saudi Arabia? How?

13. Are there other issues relating to this subject you feel are essential to talk about that we have not covered in the interview today?

29

Geographical Context
Saudi Arabia



Vision 2030
NEOM project

Vision Fund
45 \$ Billion

30

Cultural Context

Understanding AI is a cultural response to the growing impact of AI over many disciplines

AI Response
90%


Economical Context
AI Adoption in companies by 2030


AI Adoption
70%

Debates
IBM - Adobe - Google - Amazon

McKinsey Global Institute, 2018

31

 **Kismet**
(MIT - 1997)
Emotional Robot

 **Sophia**
(Hanson - 2016)
First robot declared citizenship from Saudi Arabia
AI - Visual data processing - Facial recognition

Ai-Da
(Hanson - 2019)
First robot artist - Unsecured Futures exhibition

34



Happy

Disgust

Angry

Surprise

35

Figure 22 - Concluding slides presentation of the semi-structured interview to communicate with the interviewees remotely, 2020.

4.3 Interviews Procedure

Selecting the research sample is a multi-step procedure that considers the number of participants in the research, the number of encounters with each participant, and the timeframe of each contact (Creswell et al., 2007). This was a crucial process in the data collection stage because the sample is the element with which the researcher will build rapport and therefore provide relevant data for the study:

Purposeful sample that will intentionally sample a group of people that can best inform the researcher about the research problem under examination. Thus, the researcher needs to determine which type of purposeful sampling will be best to use. (Creswell, 2013, p. 147).

4.3.1 Participant Sample

As indicated previously in the methodology chapter, purposive, and cluster sampling were the approach to selecting the research sample to gain a broader understanding of the participants' views and thoughts about the research and thus assist in answering the research question. According to Patton (2002), "purposeful sampling is one of the core distinguishing elements of qualitative enquiry", which provides richness and depth to the study. Moreover, purposive sampling delivers a wide range of valuable insights into the research (Mugenda and Mugenda, 2003). By contrast, cluster sampling involves the extensiveness and appropriateness of selecting participants from various locations to cover an adequate sample size for the research purposes and questions (Onwuegbuzie and Leech, 2005).

For purposive sampling, I selected the participants of the semi-structured interviews based on deliberate characteristics, such as age range, gender diversity, and background experience. For the age range of participants, I targeted participants to be in the age range of 35–55 years. This age category has witnessed the early introduction of technology and computer-aided design software in taught degrees and courses, as well as learning the fundamentals of graphic design using traditional design skills such as sketching, screen printing, stencil typography, and darkroom photography, as well as using computer-aided programmes such as Adobe Photoshop, Illustrator, and InDesign. The combination of skills they have been exposed to will help them aid in the difference between the prior and post-introduction of AI to the graphic design industry and therefore enrich the context of

their interaction within this research. Additionally, it was essential to guarantee gender inclusion in the research for equal input, as each gender may exhibit different views, experiences, and opinions coming from a diverse background within the Saudi Arabian culture. Moreover, the diversity of professional backgrounds and experiences were important to consider when contacting the participants. Some of the participants reported working in academia for at least 10 years, particularly in higher education programmes and curriculum development, and being in positions such as head of a department and deanship or engaged with research groups. The selection of the research sample helped to obtain a diverse range of opinions and engagements, which therefore provided rich data for the research (Rubin and Rubin, 2012). The participants were from various professions, including graphic design, motion graphics, animation, branding, AI, and data science. Most of the participants had prior knowledge of technology, such as programming, coding, and data-driven designs (Table 2). Sampling practices by the graphic design field besides AI and data experts were notably limited to matching the characteristics of the purposive sample.

For cluster sampling, Weiss (1995) emphasised that having a variety of participants from different geographical locations can have different perspectives and can give the nominated participants an equal opportunity to participate in the study. Therefore and as I stated in chapter 3, I selected the participants' samples from the three central regions of Saudi Arabia, including clusters from the Central, Western, and Eastern regions, considering the major top-ranked universities in these areas when recruiting academics. I recruited the participants from various professional bodies and academic sectors of these regional clusters through an official email, adhering to Lancaster University Ethical criteria and protocol (Appendix A). The email included a brief introduction about me, the research, and additional information covering contact information. In addition, I attached a Participant Information Sheet (Appendix B) and a consent form (Appendix C) with further specifications about the interview, such as the timeframe, data collection criteria, withdrawal, and confidentiality protocols (Bampton and Cowton, 2002), which clarified the approach and confidentially. I aimed for a total of 30 participants, a ratio of 10 participants from each region of Saudi Arabia, divided between academics and practitioners. Qualitative research sample sizes should not be too small to achieve saturation or too large to obstruct thorough analysis from being performed.

Profession	Number of participants	Job Position	Years of Experience	Age Range
Graphic designers	4	Worked in private and public sectors	Range from 5 to 12 years	30 - 55 years Old
Branding specialist	4		15+ years	
Motion graphics/Animation	2		9+ years	
Academics	9	Besides teaching as academics: 5 participants worked as Heads and deans of graphic design department and artificial intelligence department (public and private universities) 4 participants worked at a higher education and curriculum development program	Range from 2 to 6 years	
AI and data experts	4	Worked in Academia besides private and public sectors	10+ years	
Geographical Distribution	All the participants were selected from the main three regions of Saudi Arabia (Western, Middle, and Eastern regions)			

Table 2 - A break-out of the semi-structured interviews participants' characteristics, 2020.

An adequate sample size in qualitative research is one that permits – by virtue of not being too large – the deep, case-oriented analysis that is a hallmark of all qualitative inquiry,

and that results in – by virtue of not being too small – a new and richly textured understanding of experience (Sandelowski, 1995, p. 183). Therefore, the total number of participants invited to participate in the interview was 40, of whom 23 agreed to participate, 6 rejected, 3 did not response and 7 participants withdrew before the start of interview for personal reasons (Figure 23). All the participants who agreed to participate signed the consent form and provided a copy of the document. I presented all the details relevant to the interview and the criteria for how it would be conducted at the beginning of the interview.

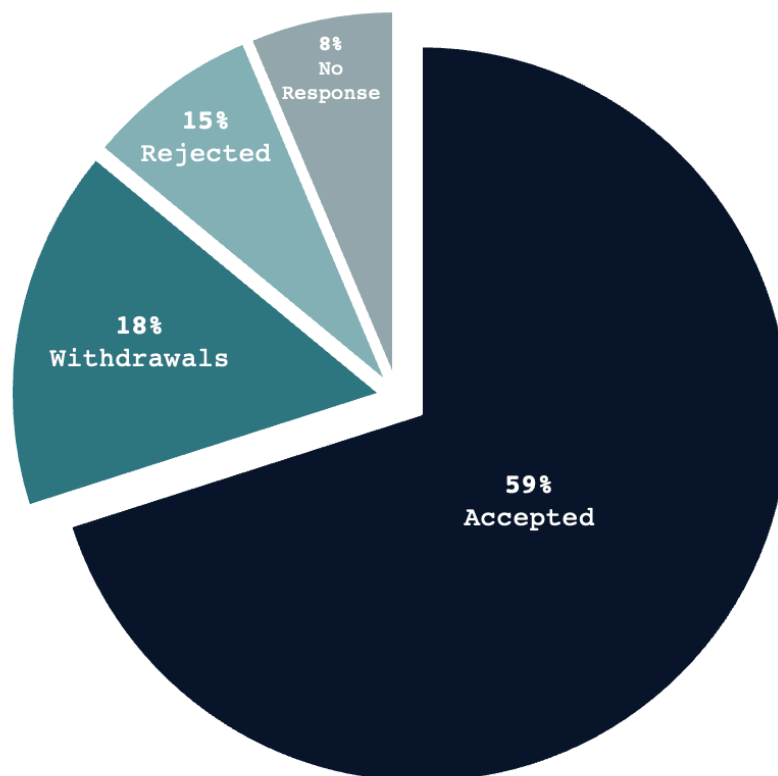


Figure 23 - A percentage ratio that shows the Participants' responses to take part in the research method. 2020.

4.3.2 Recording

Considering that all the interviews were conducted remotely, it was vital to clearly record what the interviewees said and how they expressed themselves in order to extract the best data for the analysis process. This step, as noted by Bryman (2016), was important to prevent the loss of any of the research data. I planned to synchronise the conversation as a real-time recorded interaction through Microsoft Teams to ensure that all the recordings

were documented. Once I recorded each interview, the record was stored at my university's OneDrive for confidentiality and privacy. After extracting the data and transcripts, I deleted the recordings from the platform. Many researchers, such as Lipson (1994), stressed the importance of conducting interviews in a quiet space in order to achieve a clear recording. Therefore, it was essential to ensure that all interviewees were aware of this before beginning the recording and that they remained in such a quiet place as much as possible.

4.3.3 Transcribing

Transcribing is the process of transferring an oral narrative into a written narrative mode, preventing the researcher from relying on empathy or memory when analysing data (Brinkmann and Kvale, 2015). The transcribing procedure was critical since it required close documenting, observation, attentive listening and analysing techniques (Weiss, 1995) if the researcher plans to use quotes from the interviews in the analysis process. Therefore, attention should be paid to the interviewees' tone of voice, pauses, and facial expressions whenever possible, as all of these gestures and poses are considered part of the data analysis process (Maxwell, 2005; Emerson et al., 1995).

4.3.3.1 Translation

All the participants in this research were from Saudi Arabia, where Arabic was their native language, with English as their second language. Although the interviews were meant to be done in English, the primary language of the research, I advised all the interviewees to speak in English to the best of their ability; however, taking in Arabic was not strictly prohibited. I gave them the chance to speak in Arabic within the dialogue to convey themselves and their emotions adequately. This linguistic variance was slightly challenging (Marshall and While, 1994), because language variance would change the content of the conversations due to the shift in terminology and language expression, leading to distinct interpretations (Marshall and While, 1994). To avoid losing the meaning context of the interviews owing to a lack of expressive ability or a language barrier, I made it a priority to re-quote and repeat what the interviewees said by asking them to affirm that what I understood was what they said (Marshall and While, 1994). Further, after having the Arabic sentences translated into English, I gave them a little additional attention to make sure the meaning and structure had not been altered and

that the entire discussion was clear and easy to follow. This followed Yin's (2012) recommendation regarding working with data content in a language other than the main language of the research.

4.3.3.2 Transcription

Following the guidelines of Brinkmann and Kvale (2015) in the transcription data of qualitative interviews, I started the transcription process by applying the edited transcription method. In this method, the transcribed content is edited by eliminating errors, slang, and unfinished phrases from the original transcript without altering its structure or sequencing. Further, I used an intelligent verbatim transcription method to remove filler terms, such as "you know," "like," and repeated phrases. Following the Intelligent verbatim transcription, I used the non-verbatim transcription method to eliminate pauses, such as "ah," "um," and "uh," as well as laughter. The transcription process took about five to six hours for the first batch of interviews. Subsequent interviews were much easier and faster, and each transcription lasted about four hours. Although it was time-consuming, the process fostered a better grasp of the interviews' content, which facilitated me with a rapid analysis process.

4.3.3.3 Anonymity

While transcribing the interviews, I kept the interviewees' names, occupations, and other identifying information respectfully hidden to maintain their anonymity and identity. I altered the sentence structure in areas where their data were exposed and excluded other sentences whose identity could be known by using letters and numbers to refer to them, for example, P23, P5, P10, or X.

4.4 Data Analysis

Braun and Clarke (2006) defined thematic analysis as a method of grouping and organising a set of data into a pattern of systematic meanings. This approach has been widely used in qualitative research to identify and manage themes associated with the research question, especially with semi-structured interviews, due to rich and detailed open-ended conversations (Daly et al., 1997). To analyse the raw data of my interviews using thematic analysis, I used Braun and Clarke's (2012) six stages: (1) familiarising

and transcribing data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. I performed the analysis manually instead of using computer-assisted software (CAQDAS), although software such as NVivo generates themes and codes faster and with less effort. Following Bell (2001), I opted to engage extensively with the 23 interviews and extract the data manually so that I could be closer and more sensitive to the content of the data.

After familiarising myself and transcribing the data, as elaborated in the transcription section, I mapped the initial codes from the research questions and the research literature using the deductive, theory-driven approach, looking at the data first to fracture the content into categories and connect them to the primary themes, following Crabtree and Miller's (1999) deductive approach. Then, I employed the inductive, data-driven approach, in which I labelled and categorised all of the codes into possible themes from the interviews' content using Boyatzis (1998) and Braun and Clarke's (2006) inductive approach. The two types of coding I used were not prioritised; instead, I followed Braun and Clarke's (2006) guidelines, in which I generated the codes when I evaluated meaningful information from the content of the interviews. Subsequently, the first set of theory-driven and data-driven themes were modified and grouped into a mind-mapping matrix. In the next stage of the analysis process, I defined the final themes that I generated from the data as follows: (1) intellectual resistance, (2) fear of automation, (3) Pedagogy and curriculum development (4) awareness, (5) ambiguity, (6) ethical concerns, and (7) job transformation (8) Autonomous AI-driven designs ([Figure 24](#)).

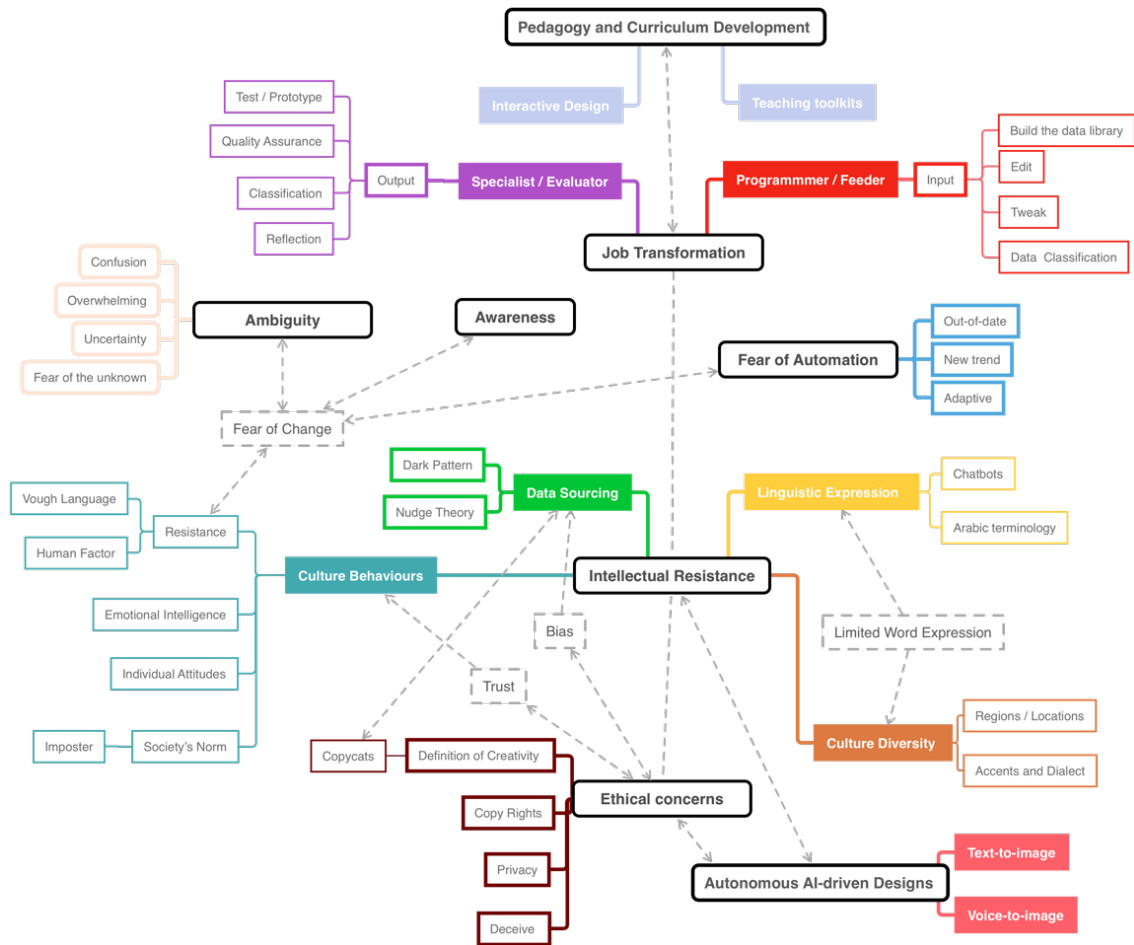


Figure 24 - The codes and themes diagram of the semi-structured interviews. Author, 2020.

Intellectual resistance was the most prominent theme from the thematic analysis, as the coding indicated a wide range of components pertinent to the theme, such as beliefs, attitudes and opinions tied to the cultural diversity and the nature of Saudi Arabian society and their background. One of the interviewees pointed out that the emergence of AI in graphic design is considered a foreign component of the Saudi norms and culture. *“This is not our language”* (P17), said the interviewee who worked as an academic and as a consultant at the Ministry of Culture, followed by arguing *“Particularly in the realm of graphic design, it is a vague language. We must first understand this new trend before we can embrace it”* (P17). Embracing, as stated by the interviewee, requires resilience, especially in areas where society’s resistance is held on the fact that anything that deviates from the norm is considered to be an imposter. This

was pointed out by another interviewee, who has over 20 years of experience working in the field of graphic design and human resourcing: “*A jack of all trades is a master of none*” (P10). The interviewee spoke distinctively about how the society of Saudi Arabia used to be biased about anyone working on more than one profession without holding a certified degree in either. The interviewee explained how he, among his peers, faced many challenges cutting through his passion to work in the area of graphic design by describing how the norm of society can be sceptical to judge those who dabble in multiple professions as either unqualified or dishonest. The interviewee stated that unless an individual holds a certified degree in a particular subject, his/her skills might be questioned and disqualified. Such a challenge therefore reflected the norm of society of Saudi Arabia; therefore, mastering a subject such as design with a complex field such as AI would be rejected by the society’s norms. The interviewee elaborated on the argument using his personal experience as an example of how mastering graphic design with a background in the business affected his incredibility as designer at the start of his career. The interviewee explained how becoming a certified trainer from a prestigious professional organisation in the field of design gave them credibility and trust until gradually, with the impact of globalisation, this openness to skill mastery became an additional strength to their resume and job qualifications.

The second intellectual resistance component that I measured in my coding process was localising AI using the Arabic language. Linguistics was a notable factor in the area of AI, which first coined the term natural language processing (NLP). NLP was defined as a branch of AI that focuses on the written and spoken language of humans, which allows computers to understand, interpret, and utilise human languages by having the ability to read text, hear speech, and interpret them. From that perspective, some of the interviewees, who were both academics with a post graduate degree in AI and computer science, pointed out that AI systems are generally built with a less complicated language, where using any other language, such as Arabic, might be challenging. One interviewee gave an example of how chatbots are being challenged in adapting to the Arabic language because of the language’s complexity of terminology, linguistic expressions, and dialects (P6, P15). Although there were many successful examples of Arabic chatbots, (P15) predicted based on experience in their field that AI probability needs another 5 to 6 years before becoming utterly compatible with the Arabic language and society accepts communicating with a robot!.

On the other hand, there was general optimism among the interviewees that Saudi Arabian society's reluctance to change was gradually diminishing as a result of globalisation, openness, open-access knowledge, and the rapid development of technology. One interviewee remarked that this transformation may now be measured, citing the recent dramatic change that occurred with COVID-19. There is a strong propensity for the younger generation in Saudi Arabia to pick on these new trends in the coming few years: *"There is a great tendency for the younger generation to learn these new trends even if these trends were not yet commonly accessible in the broad spectrum of design here in Saudi Arabia"* (P12). The interviewee added, *"I think the new generation is more aware, more knowledgeable and always enthusiastic about any new trend in technology"* (P12). According to another interviewee who worked closely with students in the subject of graphic design as an instructor and head of department, this bright vision is driven by the younger generation: *"We are driven by the youth population, and they are very technology-oriented!"* (P9).

Fear of automation was the second theme that emerged from the analysis. According to one interviewee (P10), this ability to adjust to a new trend or lack thereof knowledge was a prominent feature. If graphic designers can't keep up with the latest technological innovations, they may soon find themselves out-of-date and greatly endangered in their careers. *"I am not sure if this emerging trend is a healthy relationship or not... designers will be outdated, and they will be almost obsolete from the work environment"* (P5), said an interviewee who worked as an academic for over 10 years with a long experience in supervising graduation projects of undergraduates and postgraduate students in graphic design. Another interviewee who earned a PhD in cultural studies with a background in interdisciplinary arts media and design speculated that a degree in graphic design may be no longer needed in a few years, justifying that *"non-designers can do the work of a designer with three clicks of bottoms on Canva, for example!"* (P4). AI platforms and AI-driven designs have gradually reduced the need for designers to do small tasks that could be automated, which allows better results, shorter turnaround times for consumers, and, therefore, more time for designers to be more creative. Rapid development in automation is not a negative element as a number of interviewees claimed that the rapid growth of automation would force designers to enhance their skills and knowledge to keep track of this progression.

A few interviewees with academic experience mentioned that how they taught software courses in graphic design 20 years ago was totally different from how they are taught now. The process of executing the design on the software has changed with the introduction of skills the students need to learn to execute their work smarter and faster with less effort. An interviewee who had been an academic for over 15 years teaching graphic design and curriculum development in higher education pointed out that programming is a new language that design students need to learn: *“It is like learning English as a second language; it is a must, not a choice!”* (P18). Another interviewee added that apart from programming skills, students must learn to maximise their opportunities in relation to automating trends by learning emotional intelligence and conducting research (P4). One interviewee pointed out that these emerging tendencies may be worrisome, but they also highlighted how embracing automation and AI technologies had become the new standard. This interviewee (P8), who had taught in higher education for over 15 years and had seen the evolution of technology’s use across the sector, explained that the presence of AI tools can sometimes be misleading and that students can become reliant and consequently limited in their creativity and imagination.

Some interviewees highlighted the significance of enhancing the context of curriculums in order to equip graphic designers with soft skills and technical skills, and these observations addressed the importance of **pedagogy and curriculum development** in the creative subjects. According to the interviewee (P1), learning computational skills like coding and algorithms can assist designers incorporate various viewpoints into the problem-solving process. However, the interviewee stressed on the importance of "soft skills," which are defined as the ability to adapt to new situations, to think critically, and to interact effectively while using these technologies. *“Everything is turning into more of an interaction, more than just graphic design or animated design”* said the interviewee (P3) who also suggested proposing foundation courses of AI and then perhaps going further into the aspect of generative AI and machine learning *“to build a symbiotic relationship”* (P3). This will not happen unless the curriculum proposed this subject gradually by first, teaching the philosophies and foundations of art and design with all aspects, elements and principles, then introducing the 4th industrial revolution of AI and machine learning in relation to the context of art and design subjects. Interviewee (P5) agrees with this direction of thought when she proposed introducing an interactive design

course that offers students tools and skills to equip them to create better relationships among people, products, and environments with the use of AI, Interviewee (P5) stated that *“graphic design is all about solving problems and having solutions working hand in hand with the community’s needs. So Interactive Design is supposed to solve certain problems that have to be analyzed, defined and criticized by the students to figure out an interactive graphic design solution for that. I think I can call that the 101 of how to use Artificial Intelligence and Machine learning as tools under the umbrella of Graphic Design”* (P5). Yet another interviewee brought up the possibility of using AI into classroom lessons. For example, *“I think, it's possible because visual communication is pretty much linked to technology in many different ways where the curriculum relies a lot on having the latest skills, techniques, and some software technologies”* (P8). The interviewee did suggest improving pedagogy and teaching criteria when AI is encountered by controlling how AI should be taught and encountered in the curriculum to track whether or not students are plagiarising and to monitor the originality and novelty of the student's work since the student still needs to learn the basic elements and principles of design: *“Honestly, it is a positive-negative dilemma”* (P8). Notably, the interviewee, who was a former dean of the graphic design department teaching art and design for over 20 years predicted *“Artificial intelligence is going to change our careers”*. (P8). This prediction comes as designers and academics alike realise the importance of a new, structured pedagogy in order to understand how to introduce such an advanced mutant technology *“Artificial intelligence is going to change our careers whether we want to admit it or not, it is going to be a radically important change, and we have to embrace it”* (P9).

Around nine interviewees from the field of graphic design and branding, who were familiar with a few projects involving AI, noticed that graphic designers tend to think differently in terms of visualising and designing once they work with AI tools. They have a tendency to break boundaries and think out of the box once they become aware of what this tool could offer them in terms of design. To elaborate on this matter, some interviewees described this issue based on their own personal experiences. A few of the interviewees, for example, who held bachelor’s degrees in computer science have shifted their major to graphic design. This was due to the fact that graphic design was not taught in Saudi universities until the late 90s. Computer science was instead the closest subject at the undergraduate programmes in which students could study design programmes, as

mentioned by some interviewees who earned their bachelor's degrees in the late 1990s and early 2000s. According to them, the broader background in computer science gave them a sense of perspective in being able to bring design, programming, and technology together and, therefore, empowered them to be knowledgeable about the possibilities of emerging programming and software development with design; thus, they could at least understand technology better and utilise it to their favour in the near future.

Apart from the increased level of resistance and fear of automation, **awareness** was a common theme among the interviewees. One interviewee stated, *"Without our recurrent updates to these machines, they will always be obsolete and worthless"* (P19). Another interviewee also added, *"I do think the individual creativity will be replaced"* (P4); however, the interviewee was slightly doubtful because *"What I thought one day impossible is happening nowadays"* (P4). Another interviewee who worked in the industry of branding and marketing stated, *"If you want to be relevant, which is a very important component of success, you need to be current, and if you want to be current you have to use technology"* (P19). Agreed another interviewee, who noted that our interaction with AI's rapid advancement cannot be dismissed or ignored (P3). With this steady level of awareness, some interviewees questioned the position of the designers within this transformation: *"The size of the impact is in the hand of the graphic designers"*, as an interviewee (P21) said. In contrast, another one added that *"the job of the graphic designer must align with what the technology is offering and where the vision 2030 of Saudi Arabia is going towards"* (P5).

This level of awareness was acknowledged by the interviewee (P5), who was prominent in the opinion of another interviewee who taught graphic design courses as part of an undergraduate programme for over 20 years. The interviewee mentioned that the way Adobe software was introduced in 2000, for example, is different from now (P8). In almost 20 years, the software has become smarter, faster, and more reliable with automated AI tools. The programmes were more of an advisor or an assistant to the students rather than just software that consisted of six or eight basic tools. The interviewee said, *"When I studied Adobe, I encountered its earliest editions of Adobe 1.0 and Adobe 2.0, and since then, the tools have changed. It started to make my life easier because of the embedded AI tools within them"* (P8). This enhancement will save time and effort in graphic design, and enhance performance and the design outcome as stated by other

interviewees. To roll with this awareness progression, some interviewees pointed out the importance of being up-to-date: *“We are no longer living in the Stone Age era! Visual communication is a technology-driven sector, and the new generation of students are very much technology savvy”* (P8). Some interviews brought to the attention that development is happening everywhere worldwide, and Saudi youth should lead the design sector from within, especially when 75% of the population is youth under the age of 35 said (P10) and (P9). They must be empowered with knowledge and skill to match the pace of this progression: *“Ignorance will limit their development and therefore will limit our development as a growing country”* (P4).

With this notable escalating pace of awareness, there was, however, a notable level of **ambiguity** among the interviewees, which I recoded as the fourth theme of my analysis. Many interviews showed behaviours related to uncertainty, confusion, and fear of the unknown. A few interviewees stated that there is still the dark side of using AI in a generative, creative realm, such as graphic design. Around 20 percent of the interviewees also expressed that AI can be intrusive and can have a deceive effect, making people think that they are clever (P2, P3, P6, P15, P23). Other feelings concerning AI were also shared by a number of interviewees, one of whom said, *“Maybe I am old school! Although this is really interesting, it scares me a little bit. I don’t like to know that one day I would be depending on this technology 100%”* (P16). Although the interviewee was expressive of the feeling caused by this emergence, they followed up by saying, *“Although this advancement is scaring me, yet at the same time, I know that when I go out to buy a phone, for example, I would prefer to take the one that’s smarter”* (P16).

These intersectional feelings raised many probing questions, which prompted the coining of the fifth theme of the analysis on **ethical concerns** among the interviewees concerning originality, creativity, and copyright issues. It was questionable whether AI could be original and creative on its own. Several interviewees were adamant that AI would never be more than a limited execution tool within the design software, and that its use would be restricted to facilitating the designers’ job production. The nature of creativity can only be related to the distinctness of the human brain: *“Creativity is still very unique to human beings”* (P4). These views stem from the fact that AI will always require a data source to start its work. One interviewee stated that beauty is in the eye of the beholder, and the machine will only create what the [feeder] will feed into the model and what the data will

[generate] (P15). However, one interviewee with a degree and experience in data science and programming discussed an AI design project: *“I don’t feel the artwork that I generate within the AI-driven art project was originally my work, even though I wrote the code, did the training, the tuning, and made the model using an algorithm from an open-source platform”* (P21).

Meanwhile, the designers who participated in these interviews expressed that utilising AI is unethical. *“I did not see my imprint in the project”* (P10), said one interviewee. By contrast, another interviewee elaborated that this act might be out of society’s norms, ethics, and religious imprint: *“It is like stealing someone else’s work”* said the interviewee (P22), who is an academic and dean of the computer science department at one of the top universities in Saudi Arabia. To minimise these copyright issues, some interviewees suggested that AI can be treated as an embedded tool in the design software to track and filter images, vectors, illustrations, and artwork that are copyrighted or watermarked to prevent the designer from using them. Other interviewees pointed out that designers nowadays have become copycats and that most firms and companies in Saudi Arabia are trying to embed AI in their businesses and projects. This advancement may cause a repetitive conceptual style in the design industry because they will almost rely on the same data sources and AI generative platforms to create their design projects. This new trend will segregate AI-generated designs into two categories: *“there will be human-made and computer-made trends”* (P6).

The sixth theme that emerged from the analysis was **job transformation**, which indicates many concerns relating to the nature of the job of graphic designers in the near future. *“I don’t think it’s going to take over the graphic design scene, but it will definitely redefine it”* said interviewee (P9). Another interviewee supports the same conceptions projected from these interviews of how graphic design will be defined by saying *“graphic design was man-made with no digital resources and it used to be defined as illustrations, drawings and advertisings,,, since technology entered this sector, it gradually changed with this presence of technology, programs and computers-driven getting involved in this sector, I think this evolution would make technology and the machines to take over and graphic design to become as no longer what it was defined as”* (P5). Additionally, one of the interviewees has mentioned that *“I have an academic friend who is changing her focus and skills from designing into AI because that is the future!”* (P17). Furthermore,

another interviewee prominently said, *“This fear of automation is actually not a bad thing! ... If you lost your job from one side, you would find other opportunities from another side for sure”* (P10). Automation might change the role of graphic designers an interviewee assured. These views on the possible prominent impact of AI on graphic designers provoked many predictions, as many interviewees such as (P6, P11, P12, P15, P21) stated that graphic designers will no longer be called designers but will instead be referred to as curators, design directors, programmers, evaluators, and feeders. In addition, some stated confidently that, at some point, AI might eliminate some roles when working on sizeable projects. For example, one interviewee said, *“Big design projects usually consist of a team of graphic designers, illustrators, photographers, and design directors. AI is going to eliminate some roles, for sure”* (P9). Additionally, it might reduce the number of employees and, therefore, the overall cost, as an interviewee (P7) said where additionally interviewee (P6) added that graphic designer’s mindset will be different *“They have that mind of a programmer to conduct such tasks”* (P6). These statements suggest that designers will act in various other roles to help source the algorithms and dataset required to build generative AI models, which eventually, will generate the AI-driven designs.

Autonomous AI-driven designs were speculated by some of the interviewees when attempting to redefine the role of graphic designers and how their jobs will look like in the near future one of the interviewees mentioned *“We are developers, we need this technology to develop our skills and not to stand by any limits. For example, maybe in the near future, I can give a vocal description of a character's specifications and the machine can draw by itself based on the data that I have provided, without my interference”* (P12). The interviewee followed by saying *“instead of doing the movement step by step, you can use a generative technique”*. Additionally, another interviewee, who is an academic with a PhD degree in artificial intelligence and peer-reviewed publications, predicted the same scenario saying *“probably one way to maximise the utility of AI in graphic designing is to merge the pictures with the voice. So, let's say there will be a sort of communication between the designers and the computer, and the computer can understand what the designer wants and probably remind him or suggest the use of some techniques. I mean to have a sort of voice communication between the computer and the designer in an artificial way”* (P6). The interviewee also elaborated in this prediction by highlighting that the computer is able to understand how a certain brand could look like

using a feature called ‘feature extraction’ which allow the machine to easily understand the look and feel of the brand, for example, to understand how to build its visual identity and therefore generate designs that are relevant to its persona.

These two predictions from the interviewees show that AI has rapidly grown to become a transformative tool, exhibiting massive capabilities in the creative domain. The predictions cited glimpse into AI's potential involvement in text processing, vision processing, and voice processing which suggests that graphic designers are on the edge of an era where AI is not just a complementary tool but a driving force in transforming datasets into actionable and tangible visual designs¹⁰. With this level of growing capability of these machines an interviewees suggested the possibilities of having a speech-to-image generative AI that can be part of the design process concluding that with this knowledge and skill the machine is excelling and gathering from datasets, they can predict what we, think want and eligible to in the creative design process “*AI can identify the persona and the target audience*” (P10).

4.5 Reflection

In this section, I synthesise the views of 23 interviewees based on their opinions, personal experiences, and emotions towards the emergence of AI technology in the field of graphic design and how this emergence can impact the area of graphic design by opening a window of opportunities and potential challenges. I analysed the 23 interviews, with each interview lasting approximately one hour and 15 minutes in length. I took notes and observed the interviewees’ reactions to the subject of the study.

The first result to be observed was a prominent level of resistance at the beginning of the interviews, either by rejecting the idea of emerging technologies in the field of graphic design, which offers the potential of having generative AI-automated designs, or by not being able to visualise the position of graphic designers within the presence of AI in the process of conducting designs. Although the published Ipsos report on a population

¹⁰ These predictions were recorded from the semi-structured interviews taking place in February 2020, A year later OpenAI made an announcement of launching of DALL-E, an AI text-to-image generator that is capable of generating high-resolution images.

sample from Saudi Arabia suggests that the society of Saudi Arabia is more likely to be familiar with the use of AI and automation, the report only covered general domains aside from the creative domain; where in this research, the majority of the interviewees questioned the idea of new technologies entering the field of graphic design that offer the possibility of changing the realm of graphic design and how we understand and interact with it and therefore generative and AI-automated designs. Second, the interviewees struggled to imagine where graphic designers would fit into a future where AI played a fundamental role in the design process. This was due to (1) the lack of knowledge and personal experience about the abilities and possibilities that AI was offering in the area of design and (2) the fear of automation. It was evident in the majority of the conversations that the interviewees exhibited resistance reactions towards the concept of change, which hindered them from engaging in such ambiguous conversations. They demonstrated the nature of Saudi Arabian society and the diversity of norms, culture, linguistic expression and dialects. Lastly, they showed the limitations and challenges of establishing a provocative environment of trial and error that could bring both designers with AI expertise and programmers to engage, think, and test this emergence in a creative realm.

Furthermore, there was notable concern about the definition of creativity and originality when working with AI. Reactions varied regarding these opinions. Some were fearful of the unknown, whereas others had the tendency to push towards the unknown, trying to find answers to what was beyond the boundaries. In the book *The Creativity Code* by Marcus Du Sautoy (2019), Hinton was quoted as stating that people are pushing the boundaries of what they thought impossible because they witnessed the advancement of AI through composing musical notes, creating fine art, enhancing the production of filmmaking, or taking part in broadcasting and journalism (Du Sautoy, 2019). Upon close inspection of the data analysis, I found that interviewees were more receptive to new ideas and concepts when they had a firmer grasp of how AI works and what types of revolutions these technologies could bring to the of graphic design. The responses suggested that being equipped with the right knowledge and skills is crucial for graphic designers to engage adequately with this technology and enable them to build curiosity about, and comfort with the unknown scenarios that are brought with such advancement which, therefore, allows the designers to be open and acceptance to think, predict, visualize, and prototype using the new trends and tools related to advanced technologies such as AI. On

the other side, there were a number of interviews that recorded an escalating fear and hesitant about the unknown future from that aspect, I investigated adequate approaches to reduce these feelings and to equip designers working either in academia or in the design industry with the appropriate tools and knowledge to work sufficiently with AI. Additionally, I recorded a notable number of responses predicting how the role of graphic designers will be redefined in relation to the presence of AI and how it will significantly change their jobs and eventually change their mindset and perspective in the problem-solving process. Graphic designers according to my research sample will be redefined as a person who is knowledgeable and skilled with AI to curate, programme, evaluate, and feed the machine with the dataset and algorithms needed to generate design with minimum to none interference possible. In addition, some stated confidently that, at some point, AI will eliminate most of the automated design tasks when working with AI.

In summary, some of the interviewees demonstrated resistance to change, while others exhibited a limited understanding of the advancement of this technology; however, the most dominant perception I encountered revolved around feelings of ambiguity and the threat of the unknown. Scholars such as Linsambarth et al. (2017) stated that critical thinking and playfulness engagements might help reduce the fear of the unknown, uncertainty, and anxiety. Additionally, the approach of using a new engagement tools, and educational approaches can help and as a result, I used gameplay theory to design a tool kit to provide designers with demonstrative experimentation that can help them interact pleasantly with the concept of AI in a problem-solving environment. A description analysis of how to design the tool, use it and the iteration process, and the final first edition will be included in chapter 5.

4.6 Conclusion

In this chapter, I presented the first method of this research, semi-structured interviews, by briefly introducing qualitative methods and the importance of selecting a method tailored to the nature of the research, which helps to interpret and generate the correct data and therefore be able to answer the research question. Using purposive cluster sampling and a snowball approach, I conducted semi-structured interviews with 23 participants, including academics and practitioners from Saudi Arabia with various professions and specialities relevant to the area of research. Following the data collection,

I used Braun and Clarke's (2006 and 2012) thematic analysis for the data and synthesised them, identifying challenges and opportunities of introducing AI to the field of graphic design, especially in generating design autonomously.

I built my argument on how the six themes that were generated from the analysis helped in tackling some main issues relevant to intellectual resistance, fear of the unknown, the transformation of job descriptions, and many ethical concerns involved. To measure these responses in actual practice, in chapter 5, I will explain how I designed a card toolkit, followed by chapter 6, in which I tested that card toolkit in a co-design workshop.

Chapter 5

5 ADI Card Toolkit

5.1 Introduction

In this chapter, I introduce the Artificial Design Intelligence (ADI) card toolkit, a design tool that I designed as a reflection of the findings of this study's first method, the semi-structured interviews. This tool will translate the findings from the theories and speculations into an empirical action in the second method in this study: the co-design workshop. It is necessary to retrace the steps I took in the first method presented in the previous chapter to present this one. I conducted semi-structured interviews by interviewing academics and practitioners from various professions to answer the first research question: What are the implications of AI for the role of graphic designers in Saudi Arabia. I generated many themes concerning how graphic designers encounter AI in their field, many of which were prominently revolving around cultural sensitivity in regard to the use of technology within a creative sector that mostly relies on experiences and interactions when working side by side with humans. The analysis revealed a number of behavioural and cognitive factors, such as (1) designers' lack of familiarity with the many possibilities in which AI can be used in the design process, (2) designers' quantified inability to work effectively with AI due to their limited knowledge, training, and experience, (3) designers' fear of automation and the inherent uncertainty that comes with it, and (4) designers' reluctance to change in light of attitudes tied with cultural, social, or behavioural diversity within the society of Saudi Arabia.

In this chapter, I present these findings and address associated limitations by introducing the gameplay approach and explaining how it was used to equip graphic designers with a tool that can spark their imagination and help them interact, engage, and work with AI in a co-design environment. The aim of this tool is to lessen graphic designers' apprehension of the unknown and provoke them to debate and interact with each other effectively. In the first section of this chapter, I explored how to vocalise the interviewees' feelings and thoughts into a tangible tool by designing an ADI card toolkit . In the second section, I explained how I used gameplay as an approach of enquiry by showcasing similar card toolkits that inspired me to design the ADI card toolkit and its associated model. Section three includes the process of designing the card toolkit and the mechanism of how the tool works followed by a conclusion.

5.2 From Words to Actions

The impact of AI has raised critical questions among graphic designers about the nature of working with AI, particularly regarding designing, generating, and interacting with visual content. Many participants in this research acknowledged the powerful presence of AI in the field of graphic design, but they were limited to visualising or extending their expectations of where and how far this technology can be part of their design process and the design outcome in academia and practice. For instance, introducing an environment or a tool to prompt designers to engage with AI whether through practice or experimentation, which will help them to understand and engage better, as stated by Cross (2001) and Swann (2002), who pointed out that practising design is a core element in design research to generate visual content.

As Faste and Faste (2012) stated, the act of practising design for designers is equivalent to the act of conducting research for scientists. To practice design within the framework of conducting research, researchers become part of the incremental steps of creating visual content that intends to solve a particular problem, convey messages, or reach a precise goal by embodying meaning, objectives, and interactions (Lupton, 2011; Lupton, 2017). Therefore, as a researcher/designer, I used my educational background and my graphic design experience to play a role in determining the research approach as Creswell (2014) pointed out by transforming the outcome results of the interviews into a tangible practice that can be engaged with, prototyped, and tested. This approach was discussed by Salen and Zimmerman (2005), who emphasised the significant role of prototyping and playtesting in shaping a design (Halskov and Dalsgrd, 2006; Michalko, 2010; Lockton et al., 2019; Chen et al., 2009). I employed the theory of gameplay to design a tool that puts graphic designers in the position of a problem-solving process that is happened to be a relaxed, fun, and co-creative environment.

5.3 Gameplay as an approach of Enquiry

Gameplay was once thought of as a liberating method to discover the world without limitation, allowing players to immerse themselves in a narrative or a challenge where they might put their skills to use in pursuit of pleasure, education, or only for the thrill of victory (Flanagan, 2009). By looking closely into the word *gameplay*, it is a terminology

that consists of two words: game and play. *Game* has been described as an activity that includes a specified set of rules and objectives played by one, two, or a group of players in a social setting with the intention of achieving a goal (Flanagan, 2009). Games are also characterised as both a procedure and a result, with the possibility of not having clear victors and losers but rather a framework in which everyone would work together to achieve a shared objective (Flanagan, 2009). *Play* was described as an action or an activity to engage in an environment for enjoyment, recreation, or to pass the time. From definitions of gameplay, the activity of gaming is considered to be an ideal setting to bring people together not only for the purpose of entertainment but also to challenge and explore outside of the ordinary with what facts we have within a given set of rules. According to Bogost (2016), “Play isn’t doing what we want, but doing what we can with the materials we find along the way” (p. 3). Bogost (2016) also argued that gameplay is an experience that can be a mindset of getting outside the typical environment to do something different that could be associated with a familiar situation. Therefore, gameplay can be used as an approach to test the ability of players to act “other than whom they original are” as they attempt to solve a challenge, problem, or mystery they have in hand. This means that gaming can generate a result by placing the players in someone else’s shoes to showcase the importance of visualising and investigating a particular setting in a role-playing scenario (Bogost, 2016). As a result, I used the gameplay approach as a setting for my research participants to test their ability to act as curators and developments to engage with AI adequately by (1) understanding the advancement of this technology without jeopardising their role as graphic designers and without risking their fear of the unknown, and (2) considering the gameplay as an act of a procedure as well as a result. In the next section, I explain my goal of learning how game design can serve as both a process tool and a creative catalyst.

5.4 Designing the ADI Card Toolkit

Gaming can be classified according to its physical form, whereas other games can be classified according to their purpose and function (Laird and van Lent, 2000). One of the popular examples out of these classifications is card games, such as Slap Jack and Solitaire. These games were very versatile and popular for many generations because they

are compact, portable, and have minimum complex set-ups and time to play in comparison to other games such as board games like chess and Monopoly, for example.

Card games have undergone a steady transformation over time that has altered not just the rules, but also the atmosphere in which they were played (Schell, 2008). On many occasions, card games are meant to challenge oneself or others or to pass the time and achieve victory. Gradually and with the dynamic change of using the approach of gameplay in many sectors, such as teaching tool kits (Rowley et al., 2012) and education (Odenweller et al., 1998; Gutierrez, 2014), card toolkits became a successful tool in fostering learning, aiding in conceptual retrievals, and improving engagement in the discussion of topics. Many sets of card toolkits were invented which have also been used effectively as creative design thinking kits in the design industry to simulate creative processes and innovative solutions and ideas, such as ThinkPak and IDEO method cards (Halskov and Dalsgrd, 2006; Michalko, 2010; Lockton et al., 2019; Chen et al., 2009; IDEO, 2003). These toolkits are used as a brainstorming tool and role-playing approach that puts players in the shoes of someone else to produce scenarios and storytelling settings to fully understand the needs of others. Thus, these tools demonstrated the ability to encourage collaboration among players in a playful environment to generate new ideas, find ways to address existing issues, or solve a particular problem with no pressure of having presets of rules (Bogost, 2011, 2016). From this perspective, many scholars have questioned the main purpose of gameplay:

What if some games and the more general concept of ‘play’ not only provide outlets for entertainment but also function as means for creative expression, as instruments for conceptual thinking, or as tools to help examine or work through social issues. (Flanagan, 2009, p. 1).

Such a question provoked several researchers to further investigate the area of gameplay environment, which sparked thought-provoking discussions on the purpose of games beyond gaming itself and rather as an engagement environment. This opened a new area of research into gaming: “Games aren’t the opposite of work, but experiences that set aside the ordinary purposes of things” (Bogost, 2016, p. 6). Candy and Watson (2014) investigated, prototyped, and tested the use of games, particularly card decks, through

their award-winning card game “*The Thing From the Future*”, a structural tool method that provides a playful framework for players to explore, imagine, probe, and navigate the game setup with futuristic insights. The card game is a tool that is “part scenario generator, part design method, and part party” says Candy (2018, p. 235), where he highlighted that players can collaborate to narrate, sketch, or prototype artefacts that may exist in an alternative future. Following a series of iterations and developments, Candy stated that working in a fictional setting allows players to obtain more profound insight into the activities presented in the game. The card game was widely used and accredited nationally and internationally and was translated into many languages with open access for other researchers and users to explore, which further validates its success. A similar game paradigm was presented by Akmal (2020) in his IoT boardgame “*Internet of Things*”, which focuses on the ideology of procedural rhetoric where interactions within IoT spaces are understood from a non-anthropocentric perspective. The game’s narrative was to place players in a scenario in which the corporation was attempting to extract data from average users to work together within a fictional setting, allowing them to obtain more profound insight into the activities present in the game (Akmal and Coulton, 2020). These games, along with other examples such as the ThinkPak and the IDEO method cards, demonstrated the ability to immerse players in speculative and fictional scenarios and be used as a creative brainstorming approach to develop ideas, and generate creative solutions in an interactive environment. These capabilities can be provocative and of value for graphic designers in a variety of settings, such as using card toolkits working on developing a design brief with other interdisciplinary team members, conducting a focus group to research, brainstorm, or generate new areas of practice or by simply using the card as part of the design process. From these perspectives and looking back into the behavioural and cognitive factors of the sample of this research, and the necessity of introducing AI into the educational sector of creativity, I began by speculating on how to create a setting of proactive engagements using a portable, easy-to-use toolkit that graphic designers can use to visualise and extend their imaginations. I also considered the extent to which AI can be part of their design process and what sort of value and solution it can bring into their designs. Furthermore, I used IDEO method card as a guided toolkit to embed the concept of teaching card toolkit as a strategic instrument to help lessen anxiety and confusion about the unknown by employing something as simple as a set of cards.

5.4.1 The Card Toolkit Mechanism

To design the toolkit, I constructed the process by first, reframing the research background and literature in addition to the interview results. The triangular sourcing of data collected from the research sample, the research literature review and the research background manifested that the design toolkit is an effective approach to learn through playing and generating answers through co-design engagements. This magnification helped to construct the rules and guidelines of the card toolkit while taking into consideration how the toolkit will be engaged with, and what the results are that can be yielded from using the cards (Figure 25). As demonstrated in the interviews' analysis and the outcome results explained earlier in chapter 4 - Semi-Structured interviews, some of the interviewees proposed many scenarios to visualise a speculative scene where AI can be self-driven. Pertinent productive questions include the following: (1) What if graphic designers gave commands to a self-generated system through text-to-image or speech-to-image to generate designs? (2) what If designers were able to engage with AI, what would the near future of this engagement look like? These speculative questions and conversations prompted me to think of a mechanism by which interact using the card toolkit can present a fictional scenario of a self-driven AI model that can generate designs through a given design process, using the challenges that were coined from this research's interviewee¹¹.



Figure 25 - The ADI card toolkit was generated as a result of the interview analysis and the research literature, 2020.

¹¹ The interviewees' perceptions of having a text-to-image or speech-to-image generative designs were recorded and documented on 2020, before the launch of DALL-E on January 2021 and the launch of Midjourney on July 2022 which was followed by another updated version of DALL-E 2 on November 2022 while writing this thesis. These platforms allowed designers and non-designers to experiment with the use of deep learning models to convert words and prompts into generative images.

These challenges can be found in the day-to-day design–technology collaboration spectrum, where a graphic designer might be limited because of their shortage of knowledge or lack of skills to work with AI. The resulting models from playing with the card toolkit will be able to generate designs with the minimal interaction of the graphic designers in a wide range of brainstorming scenarios and design thinking techniques that can prompt thinking about complicated issues and challenges relevant to trust, bias, copyrights, and creativity. Hence, in a co-design setting, the participants who are engaged using this tool will construct an AI model using the provided artefacts and gain an understanding, appreciation, and knowledge skills for working with AI. The other result the players will gain from engaging with this toolkit is that the card toolkit will not be limited to designers but also can be used by academics in creative classroom setups to facilitate creative thinking and engage with the human-centred design mechanism. Additionally, professional practitioners can use it relevant to the graphic design field to connect and contribute through visual storytelling, design thinking, brainstorming, drawing, and prototyping AI models, leading to a deep and stimulating dialogue integrated with the possibilities of AI. In the following sections, I demonstrated how I first prototyped an AI model, and second, I presented the ADI card toolkit and how I designed the visual content of the cards, which was then tested in the co-design workshop, which will be presented in the following chapter.

5.4.2 The ADI-GAN Model

Since the early exploration of the collaboration between creativity and AI made by many scholars, such as Harold Cohen, who introduced AARON in 1973, decades before the recognition of AI in the current AI-driven art world. AARON was an AI computational program that produces drawings and artwork by following sets of rules and steps in collaboration with the programmer shown in Figure 26, the potential of the emergence of technology and creativity has been investigated.

Creativity ... lay in neither the programmer alone nor in the program alone, but in the dialog between program and programmer; a dialog resting upon the special and peculiarly intimate relationship that had grown up between us over the years. (Cohen, 2010, p. 9).



Figure 26 - A drawing by AARON, Untitled, Source: Cohen, 1980

This dialogue between AI and the creative sector has grown gradually where models like AARON have refined and evolved using generative exploration such as the neural networks and the machine learning models Mazzonen and Elgammal (2019) generated the Artificial Intelligence Creative Adversarial Network model (AICAN) shown in Figure 27 which produces artwork without human intervention. The term AI model in this context refers to generating a set of rules but also defined as the process of designing, developing, and deploying a machine learning agent equipped with algorithms that replicate human actions, logic, and decision-making in response to data input (Mazzone and Elgammal, 2019). Notably, the model showcased evidence of the efficiency of AICAN by generating many artworks (Figure 28) which were generated through the use of the input of big set of data, algorithms, and codes. The first set of generated artworks were then modified, processed, and regenerated using a generative algorithm such as the GAN algorithm that was coined by Goodfellow in 2014 (Mazzone and Elgammal, 2019; Elgammal et al., 2018).

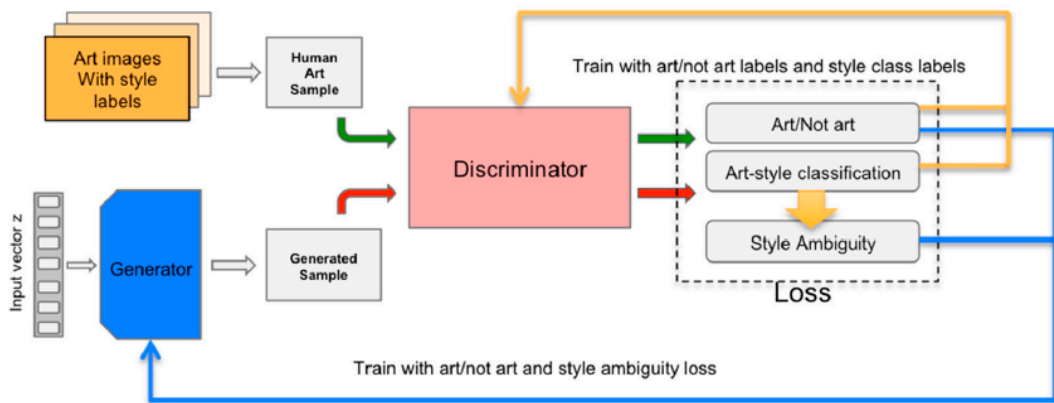


Figure 27 - The Creative Adversarial Network. Source: Elgammal, 2019.



Figure 28 - A collection of artworks generated by using AICAN model. Source: Elgammal, 2019-2020.

Another generative model was presented by Gatys et al. (2015) where they used deep neural network (DNN) model to generate images that were inspired by well-known artworks showcasing the ability of the model to imitate the image content ([Figure 29](#)).



*Figure 29 - An example of generative images that combines the photograph and the style of the well-known painter such as Van Gogh (*The starry Night*) and Edvard Munch (*Der Schrei*) Source: Gatys et. al, 2015.*

Keeping these artefacts in mind besides taking into consideration the intended outcome of using these models to generate designs rather than artworks, I reconstructed an AI model inspired by Elgammal's AICAN model with as minimum human interference as possible. To be able to construct this model, I first have to define the type of AI model that I am using in this research whether it is a traditional model that consist of (a model, rules, data) or an advanced AI model (that included an ML agent to generate outcome autonomously in a loop action). Additionally, instead of having a closed data input limited to the designers or the team members generating the designs, I have altered that part by having a main dataset of relevant designs fed by the graphic designers, consumers, and potential clients from massive open-data tracking sources such as social media, consumers feedback surveys and chatbots services. Consumer behaviour tracking and digital trace was proven to be more effective in targeting and personalising experiences by helping to understand the targeted audience and their needs, which therefore enhances the outcome of the anticipated designs (Maggioncalda, 2020). The first proposed model I designed consisted of four main components; data, a generative ML agent, a designer and a design output ([Figure 30](#)). The data input is the source of images that will be fed into the agent, the agent will use the algorithms to generate designs with monitoring from

the designer and the final component is the design's output which can be used again to generate more designs based on feedback and digital tracking of consumers. Hence, this model proposal was then tailored to fit the card toolkit and the workshop setting where the participants can imagine a scenario in which a model can mimic a human creative intelligence and generate designs autonomously based on the challenges arising from the technology–design entanglement presented while engaging with the card toolkit. I made further editing on the model to fit the card toolkit and the workshop setting which consists of four main components as shown in [Figure 31](#), input (data), output (designs), ML agents, algorithms, and a feeder (designer/ programmer). Using these four components, the model will be able to make decisions, adapt to new circumstances and be able to gradually solve design problems and take part in the design process by generating designs that fit the need of the consumers based on their feedback. Once the model learns the pattern of consumption and what designs fit their needs, the model will gradually take a big part of the design process and eventually generate designs autonomously with minimum intervention from the graphic designers.

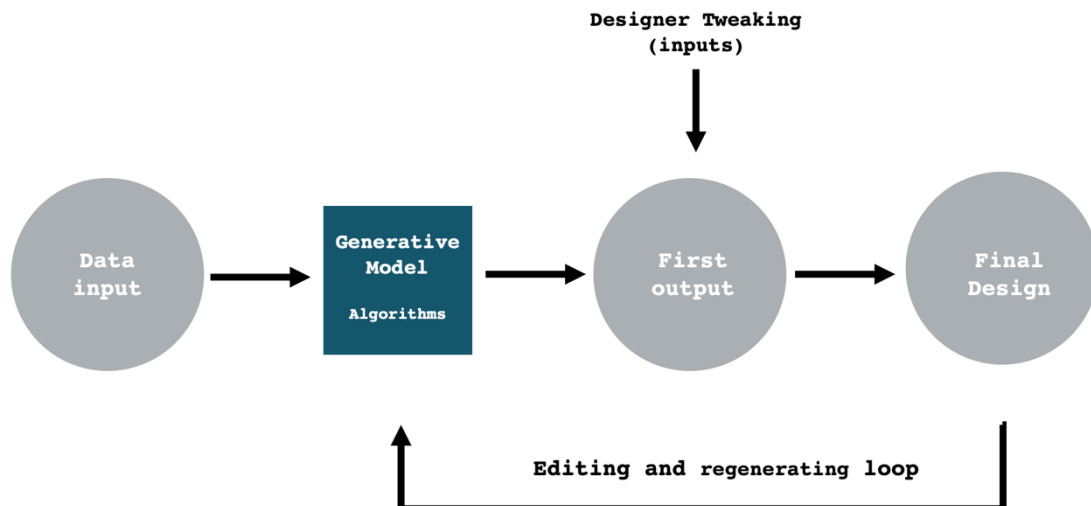


Figure 30 - The first diagram of the ADI-GAN model.

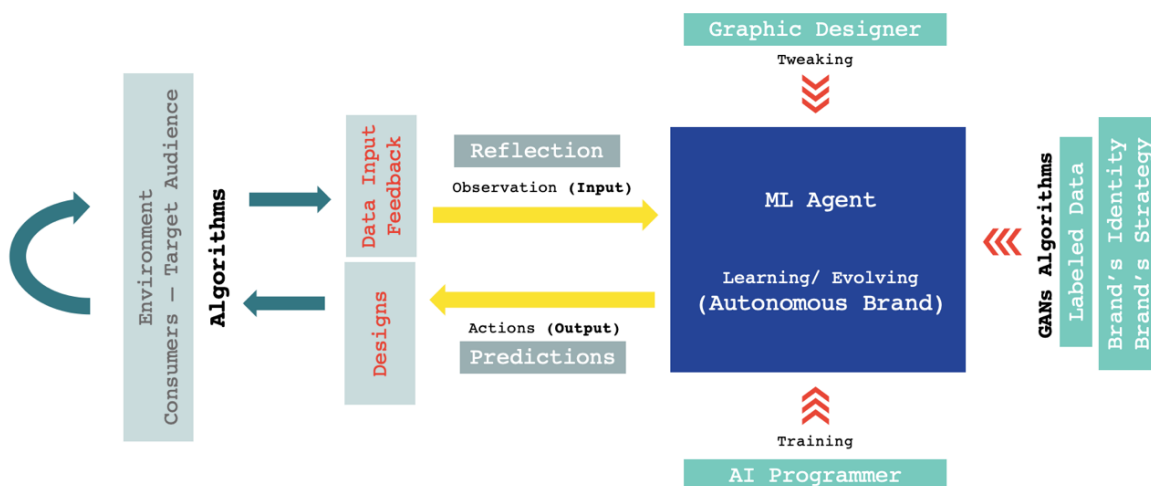


Figure 31 - The ADI-GAN model, a trained machine learning agent to generate designs (outputs) based on data and algorithms (Input) with minimal tweaking from the graphic designer. Author, 2020.

5.4.3 The ADI Toolkit

In this section, I introduce the Artificial Design Intelligence card toolkit (ADI) card toolkit. The toolkit was generated as a result of the semi-structured interviews which aim to help the graphic designers to build an AI model that can generate designs autonomously based on the given artefacts presented while using the toolkit to engage with each other. It does not aim for winning or losing but tends to create an interactive environment with

AI in a simple playful setting without the fear of making a mistake or without the limitation of ignorance where the participants can engage, predict and learn something apart from their visual language. To begin constructing the framework of the card toolkit, I built a bank of words and statements sourced from the data gathered during the interviews. This collection laid the groundwork for the card deck's foundation, which was subsequently segmented into three suits or categories. Each category corresponds to a specific area that reflects the issues and challenges highlighted in the interview discussions and is pertinent to the model and its desired outcomes as shown in table 3. The categories were design, technology, and challenge, which were mainly drawn from the categories of The Things From The Future card game revised edition (Candy, 2018), *Arc – possible futures*, *Terrain – physical and emotional context*, and *Object – the form of the thing itself*. When designing these sets (Figures 32), each category includes that bank of words and statements and artefacts that can represent an area in building the model in relation to the use of AI (Figure 33). For instance, design included areas that cover the elements of identity guidelines, such as logo, layout, imagery, and typeface, as well as marketing advertising and social media channels where the model can extract the data required. Further, the technology category covers the types of algorithms that are most associated with creative generative artwork, the type of data processing, and data sourcing channels.

Categories	Design	Technology	Challenges
The bank of words	Can we? I can see you Too many/less clicks Patterns Generative prints Visual potentials	Social Dilemma Tracking Huge datasets Classifications Discrimination Trained algorithms can find us! Feedback	Can we engage? Do you speak Arabic? User Experience Privacy Who knows you better?

Table 3 - A bank of words retrieved from the interviews that helped building the categories of the card deck, 2020.

Although Candy and Watson’s card game and the IDEO method cards were an inspiration for my card toolkit structure, I intended to add a joker card to the card deck set for the

purpose of structing the AI model. The joker acts as a universal action card that can fit any of the three categories to fill in/add to any missing element in the process of using the card toolkit. In addition to the joker card, I included the option to use a pre-set descriptive sheet like the one shown in Figure 34, on which players can sketch, brainstorm, and contemplate before translating their ideas and designs into the sheet to assist in developing their AI model with the card in hand.



Figure 32 - The process of designing and setting the categories of the card deck.

Author, 2020.

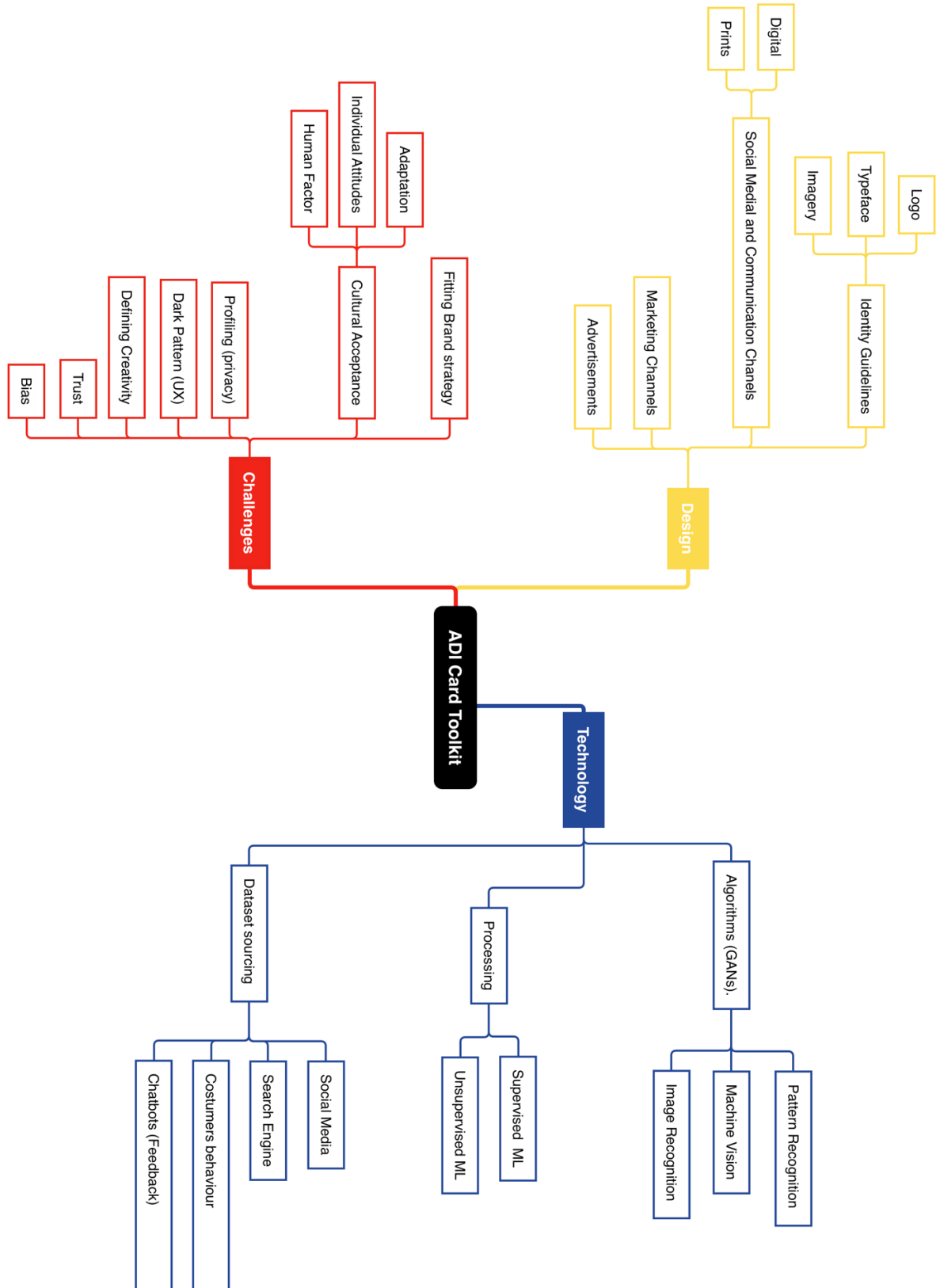


Figure 33 - The Three categories of the card toolkit which were extracted from the interview Author, 2020..

1:
Your-
Cards

2:
Descri-
ption

3:
Your-
Model

Figure 34 - A predetermined spreadsheet where players can use it to layout their cards, brainstorm, sketch and draw their ideas and then co-create their final design of the generative AI model. Author, 2020.

5.4.4 The Card toolkit's Visual Representation

When designing a card deck or an interactive playful environment, a certain sets of components are necessary, such as determining the rules, the guidelines, the action mechanism, the space where that setup takes place besides defining the goals and objectives of (Lankoski and Björk, 2015). As stated earlier, the goal of the card toolkit in this research was not to determine winners and losers, but rather to encourage a co-creative environment where players can cooperate towards a shared objective in a shared place. With that in mind, I identified the objective and action mechanism, and then moved on to the visual elements using the design process technique: empathise, define ideate, prototype, and test, which is elaborated in the next sections ([Figure 35](#)).

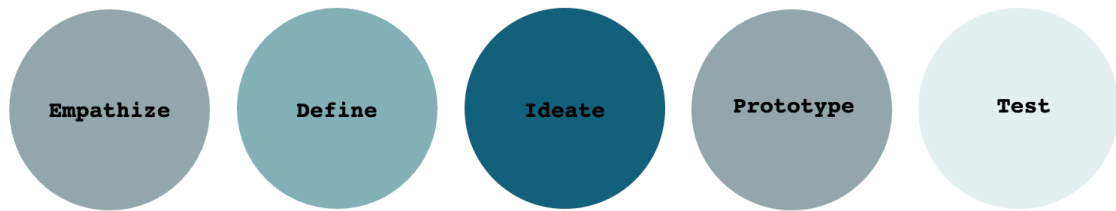


Figure 35 - The Design process of the card toolkit was inspired by the Design Thinking approach Source: Stanford School.

Step 1: Empathise

The first step in any design process is empathise, which is a step to observe, understand, and engage with the needs of your audience to build empathy towards what is important for them (Brown, 2008; Shanks, 2021). In this research, I engaged directly with my research sample through the semi-structured interviews, which helped me to furtherly define the challenges and the opportunities that graphic designers might need to proactively engage with AI. After a thorough observation, listening, and analysing of their needs, the idea of the card toolkit started to form as a result of (1) examining the interviews which acts as an interactive toolkit to engage with AI models and think of how designs can be generated autonomously, which was explained earlier in this chapter (2) facilitate the end users of a tool that can serve them as a tool to think, engage and educate at the same time. To further design an accurate design toolkit that serves their needs, I moved to the next step of the design process: define.

Step 2: Define

The level of empathy built with the selected sample, both academics and practitioners, equipped me to define the type of tool needed for them to engage with AI. In this step, I defined the pattern that stood out when talking about and observing the research sample. The research sample need revolved around clarity, simplicity, and ease of working with AI, away from the strains of ambiguity and fear of the unknown. After defining these requirements based on the end users' needs rather than on my personal assumptions, I then moved to the third step of the design process to ideate a tool that fits their needs and serves the purpose of the research. After determining this step comes the third step of the design process, which was ideate.

Step 3: Ideate

In the design process, the “ideate” step, involves hypothetical questions such as “what if” and “how may”, which plays a crucial role in facilitating creative thinking and the generation of new ideas and designs (Shanks, 2021). Schell (2008) noted that there are three questions to answer when creating a game specifically: (1) What feelings do I want my players to experience, and (2) How do I want them to feel? (3) How to bridge the gap between what they feel and how I want them to feel. To tackle these questions, I set out to design a card toolkit following the elements of Schell’s game design that includes the aesthetic elements besides having a story, mechanism and structure (Schell, 2008). Once I structured the story and mechanism of the card toolkit mentioned earlier. I then provide participants with a relaxed and enjoyable experience, through the toolkit mechanism, visual content, and mode of engagement. As a result, it’s important to create a basic, colourful deck of cards that is both visually appealing and easy to read, understand, and engage with.

Step 4: Prototype

In this step, the iteration of ideas started to generate and come together through the design of more than one prototype. One of the first generative ideas was to design the card toolkit using the traditional card deck, which consists of hearts, diamonds, clubs, and spades suites. I chose three suites, as shown in [Figure 36](#), to match the number of categories I have in my card deck, and I used colours and patterns reminiscent of technology-driven themes, such as glitch patterns, digital typefaces, and numerical sequences. This prototype was then presented to peer PhD researchers who stated that it was too busy and not eye-catching. I made further editing using simple tech-driven vectors and figures with simple and minimal designs. I designed vectors, such as a robot to represent technology, a brain to represent design, and a speech bubble to represent conversational challenges ([Figure 37](#)). Once I decided on the selection of vectors, I then divided each category with a distinct colour, such as using the primary colours to emphasise and distinguish each category ([Figure 38](#)). The front side of the card included the category’s name with its representing symbol, and the back side included the action word beside a prompt sentence that helped the players to further understand the action, use the toolkit, generate ideas, and design their models accordingly.

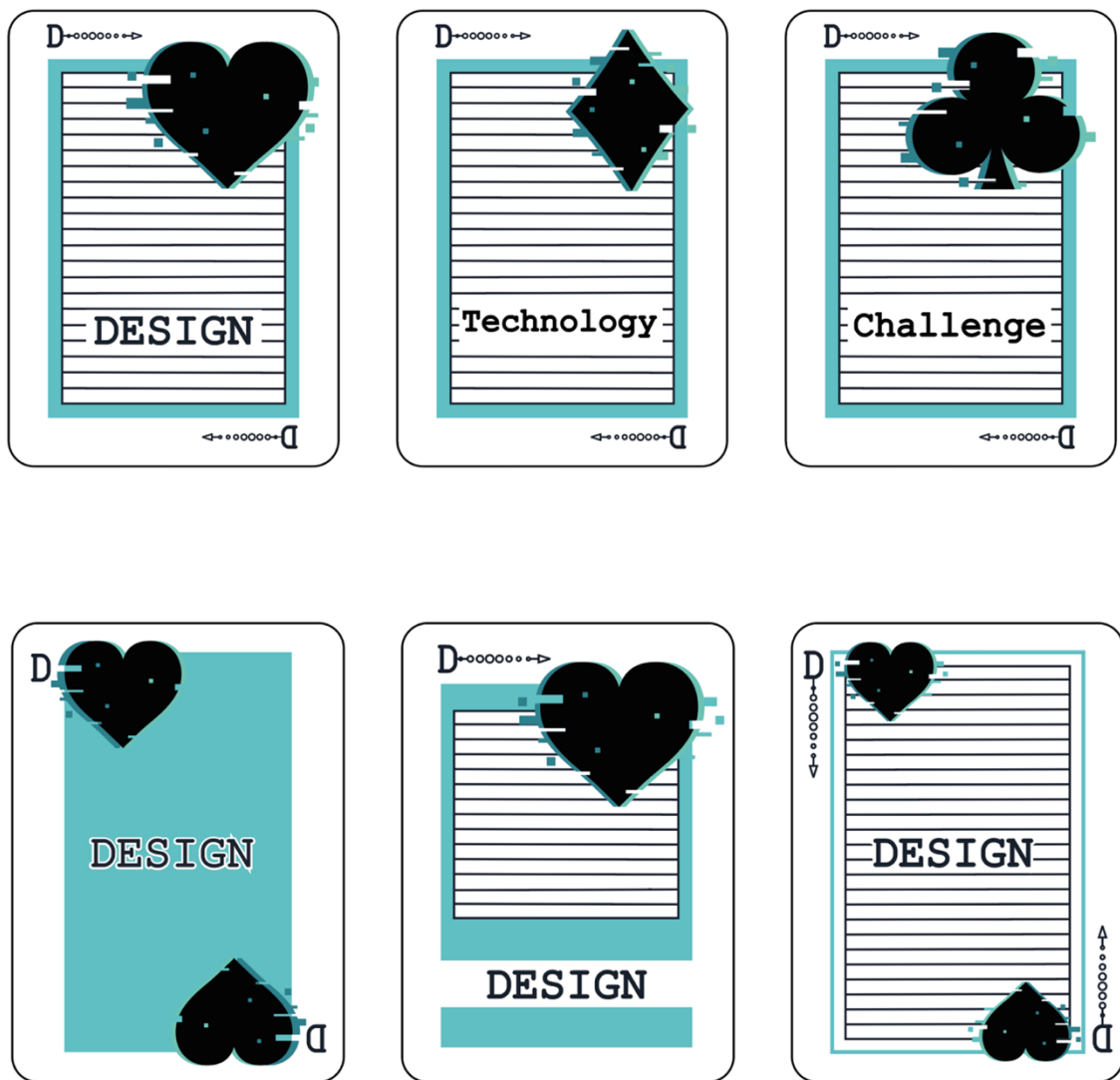


Figure 36 - Multiple attempts were made in the prototype phase using various layouts and patterns in this stage of the design. Author, 2020.

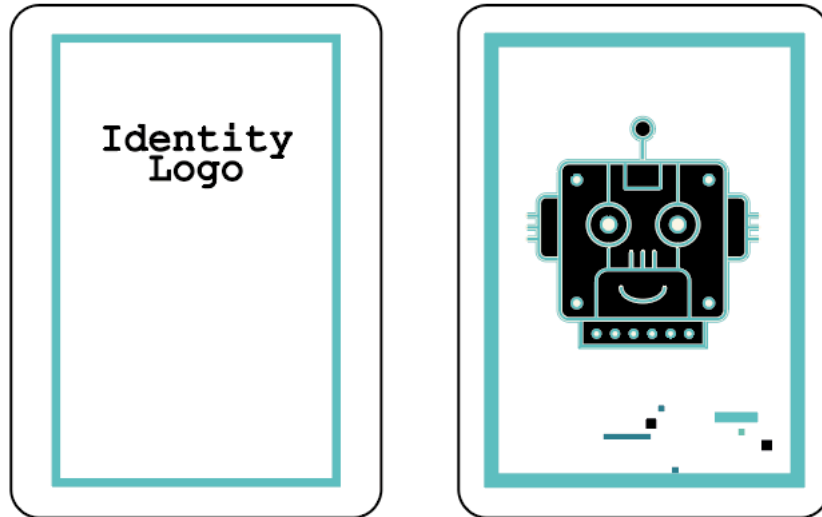


Figure 37 - An iteration using vectors with less patterns and glitches details. Author, 2020.



Figure 38 - The final layout of the three card categories. Author, 2020.

For the packaging of the card deck, I chose an acrylic transparent finishing material with a carved logo on its cover representing the card toolkit , an interactive dialogue between a robot and a human ([Figure 39](#)). The transparent package showcases all the toolkit components, which includes a full deck of cards with a rule guide. In this version, I designed the deck with 66 cards, including 15 design cards, 18 challenge cards, 27 technology cards, and 6 jokers. The acrylic box can be filled with up to three complete decks of cards for bigger groups ([Figure 40](#) and [Figure 41](#)).



Figure 39 - A detailed close-up into of the design and finishing of the box. Author, 2020.



Figure 40 - The first version layout of the ADI card toolkit. Author, 2020.

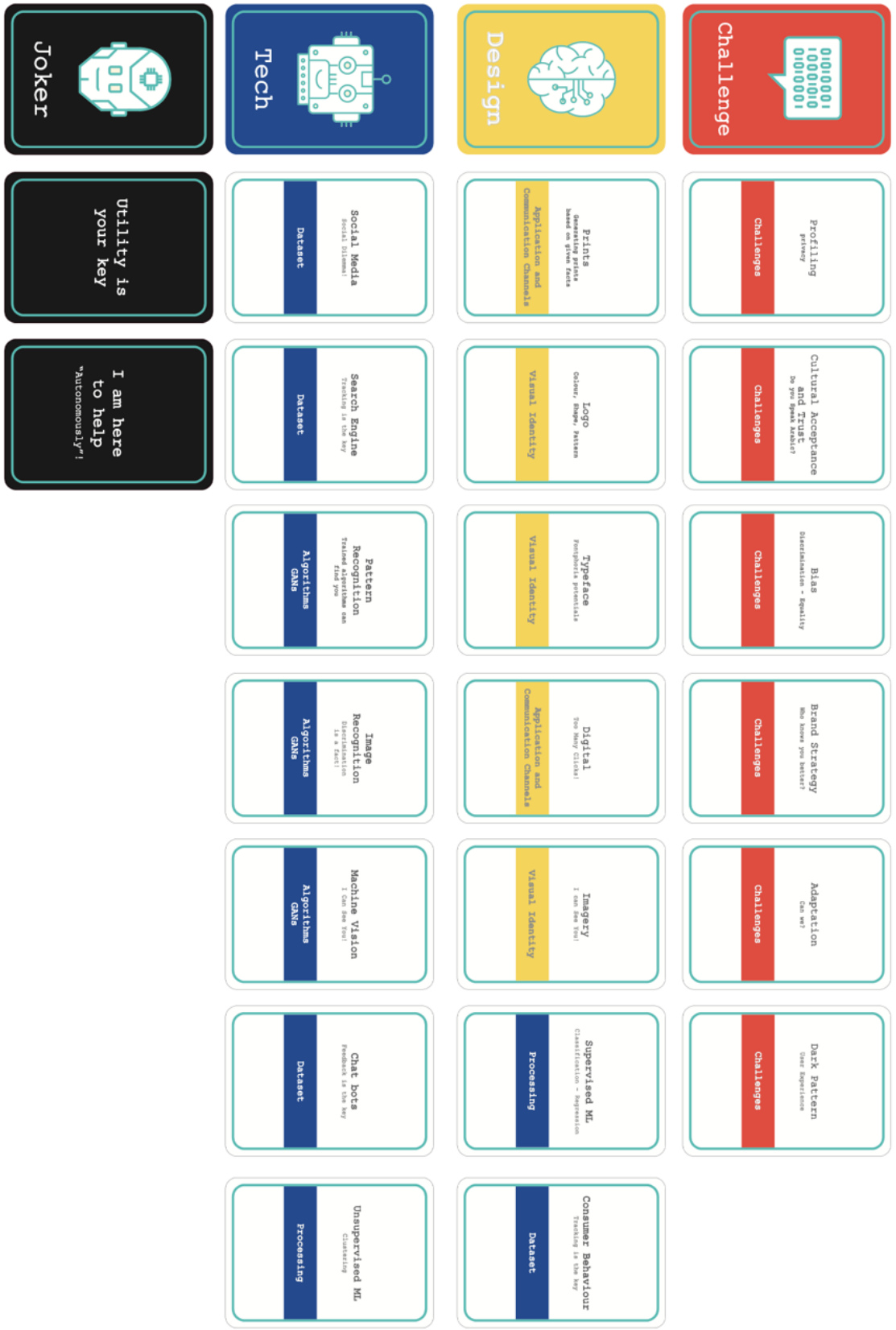


Figure 41 - The total category spread of the ADI card toolkit. Author, 2020.

Step 5: Test

The card toolkit was meant to be used among small groups, with a minimum number of three players in each group. To use the card toolkit, it starts by shuffling the cards. Each group draws one card from the Design and Challenge suits and two cards from the Technology suit, so each group has four cards in total. As I stated earlier, the aim of engaging with the toolkit is to construct an AI model rather than winning or losing against each other, therefore and as play progresses, each group will use the cards drawn to think of a possible scenario for a future autonomous model based on the given ADI-GAN model. Once completed, each group will present their new model to the other groups for further discussion, exchanging thoughts, and debating whether the model they have presented could work autonomously and replace the role of the graphic designer to generate designs within all the artefacts given in the card deck. The duration of engaging with the participants can last between one and two hours, and the total time can be divided between playing and building the model and the other half in giving feedback and constructive interactions between the players and the groups¹².

5.5 Conclusion

In this chapter, I introduced the ADI card toolkit by first giving a brief about the previous chapter and how the semi-structured interviews led to designing the ADI card toolkit, which then led to how gameplay can be used as a method of enquiry. In the further sections of this chapter, I explained how I designed the card toolkit based on the feedback given from the research sample, which included designing the toolkit mechanism, designing the visual content of the cards, and the ADI-GAN model aimed at developing the workshop setting where the toolkit will take place. To accomplish an adequate design process for generating the toolkit, I used the design thinking approach, which emphasizes on understanding the needs and perspectives of the end-users, fostering empathy, and iteratively prototyping solutions on five steps: empathise, define, ideate, prototype, and test. Once the card toolkit was printed and tested, I presented it in Chapter 6, where the ADI card toolkit took place in the co-design workshop. In the next chapter, I present

¹² In Chapter 6, I went through further details on how to use the ADI toolkit among graphic designers and other academics and experts participants who took part at the co-design workshop.

further details on how the card toolkit was put into action among the research sample, as well as how, where, and what results the toolkit generated.

Chapter 6

6 Co-design Workshop

6.1 Introduction

As stated earlier in Chapter 3, I introduced the triangulation approach to collect data from different sources, using various methods for the purpose of the study. The first method was presented in Chapter 4 by conducting semi-structured interviews, which was followed by designing the ADI card toolkit. The second method in this research was the co-design workshop. Using various methods, as stated by Maxwell, makes the data richer with information and therefore more credible results (Maxwell, 2005). In the first section of this chapter, I present the co-design workshop by giving a brief about co-design and the workshop as a method in qualitative research, including the procedure I followed to address the results of the first research question, build the workshop content, and integrate the ADI card toolkit to test its feasibility and applicability with my research participants. Moreover, I showcase how I recruited the participants and selected the venue following the rules and regulations applied during the time of the COVID-19 pandemic. I also present how I assured the privacy, anonymity, and quality of the data collected from the workshop while recording transcriptions and translating them in preparation for the data analysis. In the second section of this chapter, I introduce the workshop design and explain all three phases of how the workshop was designed and constructed to meet the requirements of the aims and objectives of the research. Each phase was thoroughly described, including how the participants engaged in each experience and activity, including playing the card toolkit and the models they generated as an outcome. In Section 6.6, I present the data analysis, how I dealt with the data to generate codes and themes using the thematic analysis approach, and then present the results followed by the conclusion.

6.2 Co-design Workshop

A workshop, as outlined by Lain (2017), is a qualitative method that allows participants to engage in a collaborative discussion and constructive feedback, exchanging knowledge and experiences between the participants and the workshop facilitator themselves. It is a common method used in qualitative research that allows participants to co-create and work in a proactive environment without the restraints and limitations of quantitative methods (Lain, 2017). This quality of engagement in qualitative research is one of the primary ways of creating a valid trust bond between researchers and participants, in

addition to ensuring the reliability and validity of the findings (Merriam, 1998; Creswell and Poth, 2017). Furthermore, Sanders and Stappers (2008) highlighted that the co-design approach creates the value of giving participants authority in decision making and in the development of new ideas. Sanders and Stappers added the importance of incorporating co-design into the design process, as well as in the ways in which this form of participation challenges conventional understandings of the relationship between the researcher, end users, and the subject (Sanders and Stappers, 2008). Therefore, and as elaborated earlier in chapter 3, I have decided to use co-design activities in the workshop to allow all opinions and experiences of the participants to be heard and shared in a co-creative, relaxed environment to add value to the research aim and objective with minimum biases possible.

6.2.1 Research Question

In this section, I explore how the initial research topic prompted a conversation about the efficient collaboration between graphic designers and the numerous potential that AI technology offers. Therefore, in the course of this workshop I focused on testing the feasibility of the ADI card toolkit which aims to provide graphic designers with the tools required to engage with AI models in a relaxed provocative environment and help them to co-design and collaborate for experiment with AI models that can generate self-driven designs and autonomous visual branding. This suggests a roadmap of an intangible future between graphic designers and AI technology and the workshop will contribute to equipping the designers with a toolkit and a possible environment in which they can test their ability to work with AI generative models with the minimum knowledge and skills possible. It will also allow them to collaborate working on their knowledge and practical skills and think of something new out of the box.

6.2.2 Workshop Procedure

A workshop procedure in this research consists of selecting the research sample that reflects the needed data as well as selecting the venue and time, assuring that the quality, anonymity, and data privacy are dealt with respect. As stated by Creswell et al. (2007), selecting the research sample is a cumulative progression of steps that considers the number of participants in the research, the number of encounters with each participant, and the timeframe of each contact. While conducting this study, there was a growing body

of research literature looking at co-creation and co-design, pairing the collaboration between designers and AI engineering and experts to co-create, work, and engage in a conversational framework (Figoli et al., 2022; Subramonyam et al., 2021). These growing interdisciplinary emergences were vital in the area of design research to tackle what was once called ‘wicked problems’, as Buchanan stated (1992) in bringing complex and incommensurate layers of enigmatic assemblages across past, present, and future contexts. Since it has been established that co-designing effectively contributes different perspectives and experiences to problem-solving in design (Sanders, 2005), I have adopted it as a strategy to bring together graphic designers and AI experts for this workshop.

6.2.2.1 Participant Sample

According to Creswell and Poth (2017), researchers can elicit rich information from participants in workshops because those present have volunteered to meet and take part in the study (2017). Creswell remarked that the quality of the data extracted and the interpretive researcher “tends to rely upon participants’ views of the situation being studied” (Creswell, 2003, p. 8; Ritchie and Lewis, 2003). According to Patton (2014) and Mugenda and Mugenda (2003), the depth and richness of the collected data require the use of the purposive sampling technique, which therefore delivers valuable insight into the research. Adhering to the ethical criteria and protocol set forth by Lancaster University, I approached a total of 18 participants, of whom 9 agreed to participate. The size of the sample was intentionally small so that everyone had a chance to speak freely and receive adequate attention, as advised by Ørngreen and Levinsen (2017), who highlighted the importance of nominating the size and the characteristics of the participants who are expected to actively participate and influence the workshop’s course of direction and outcome. Therefore, participants were nominated and recruited based on categorical characteristics such as their professional background, which is relevant to the area of the research. There were 4 academics with over 10 years of experience and 5 design and branding practitioners with over 15 years of experience in their field. Their age range varied between 30 and 50 years old, and the diversity of gender was reasonably equal between male and female participants. These characteristics help reflect a wide range of perspectives and levels of engagement in the fields of graphic design, branding, data, and AI in order to improve the overall discussion and reach the desired data and

outcomes. I formally contacted the participants via email, where I provided a brief introduction to myself and my research, as well as links to relevant resources such as the Participant Information Sheet (Appendix D), workshop guidelines, including the timeline, date, and venue, and additional information about data privacy, withdrawal policy, and confidentiality protocols (Appendix E).

6.2.2.2 Locating the Venue

The workshop was held in Riyadh City, the Saudi Arabian capital, where the research was designed to be carried out, as outlined in the literature chapter and the methodology chapter. I made sure that the space of the venue was proportional to the number of people attending the workshop and carefully planned the seating arrangements and layout. Additionally, I collaborated with the hosting organisation to ensure that the venue's facilities, catering, and audio/video recording equipment all worked as planned during the workshop. When including all scheduled breaks and time for participants to socialise before and after the workshop, the total time spent on the workshop was around five hours in total.

6.2.2.3 The Privacy, Anonymity, and Quality of Conducting the Workshop

According to Yin (2014), the most important aspect of ethics in human-participant research is to behave in a manner that protects the rights of others while also being open and forthright about the research's purpose and objectives. These rights are to conceal their privacy and anonymity, even if a participant decides to drop out of the research (Kaiser, 2009). The participant's right to dignity and well-being is essential in any qualitative research (Kaiser, 2009). Hence, throughout the stages of conducting this workshop, I anonymised all the participants' names, professions, and any other details that might reveal their identities. For example, where their personal information was apparent, I deducted some scenes and sentences from the workshop transcription and rewrote some other sentences using numbers and letters, as follows: P23, P5, P10, or X.

6.3 Workshop Design

The workshop was divided into three main phases: (1) contextualisation, (2) grounding, and (3) speculating. In each phase, I gave a brief introduction to what the phase was about and what the outcome would be. Since workshops are an environment of engagement, interaction, and collaboration between all the members engaged, I acted as a participant observer, who is able to create a conducive environment for sharing views within the workshop, as well as acting as a researcher who other participants can be open to share and discuss their perspectives with confidence bearing in mind to take workshop notes, which can help for the purpose of transferability and credibility of the results (Lincoln and Guba, 1985; Darsø, 2001).

6.3.1 Contextualisation Phase: Ice Breaker

In the contextualisation phase, I first introduced myself and gave a brief background about my research with more information about the research's aims and objectives and the recent literature and studies conducted in this area to help the participants comprehend the workshop's content and understand the main purpose of conducting the study. I presented my research questions to prepare them to build their first thoughts and arguments about how graphic designers and AI experts might contribute to the context of AI and machine learning in relation to academia and practice. Prior to starting the visual presentation slides, I made sure all participants were fully aware of the workshop content and had agreed to sign the consent form that was sent earlier through email. Starting the visual presentation, I gave examples and presented current work done in academia and the practice that showcases the recent advancement of AI and graphic design emergence, as well as the current questions, arguments, and dialogues raised by scholars, researchers, and other practitioners working on AI-design-driven projects to promote the participants' thinking and provoke their imagination ([Figure 42](#), [Figure 43](#), [Figure 44](#) and [Figure 45](#)).

Time-line

Start	End	Length Minute	Phase
11:00 am	11:05 am	5	Reception - Setting and taking place
11:05 am	11:10 am	5	Introduction to the workshop, participants and timeline
11:10 am	11:20 am	10	Phase 1: Introduction to Artificial Design Intelligence
11:20 am	11:30 am	10	Reflection and Discussion on phase one
11:30 am	12:30 pm	60	Phase 2: Identifying key challenges for A2I-GANs - Questions Sheet
		15	3 Questions - (1 for each group)
		5	Placing Answers on the matrix
		15	3 Questions - (1 for each group)
		5	Placing Answers on the matrix
		15	3 Questions - (1 for each group)
		5	Placing Answers on the matrix
12:30 pm	12:40 pm	10	Reflection and Discussion on Phase 2
12:40 pm	1:00 pm	20	Break: Prayer, Coffee and Refreshments
1:00 pm	2:00 pm	60	Phase 3: Exploring possible future of A2I-GANs model - Card Game
		10	Guidelines: Explaining the model and how to play the game
		40	Generating Models (One for each group)
		10	Illustrating Final model
2:00 pm	2:10 pm	10	Break: Coffee and Refreshments
2:10 pm	2:55 pm	45	Presenting Each model, Reviewing results, exchanging ideas and thoughts
		15	Team (1) will present their model (5min) - Feedback (10min)
		15	Team (2) will present their model (5min) - Feedback (10min)
		15	Team (3) will present their model (5min) - Feedback (10min)
2:55 pm	3:00 pm	5	Conclusions & Workshop Closure

When GANs Meet Graphic Design:
Exploring the convergence of graphic design and machine learning to generate autonomous branding



The Aims

Contextualisation
(Facts, Assumptions)

Understanding how graphic designers can be part of the context of AI and ML

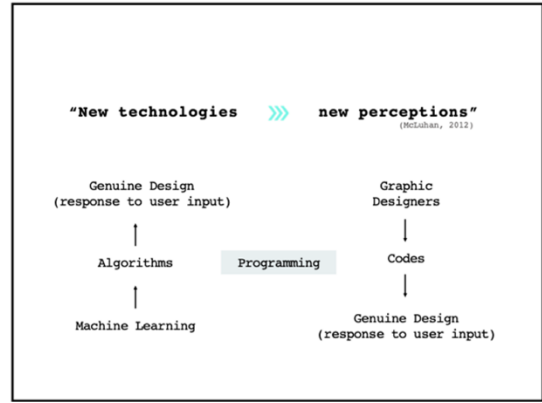
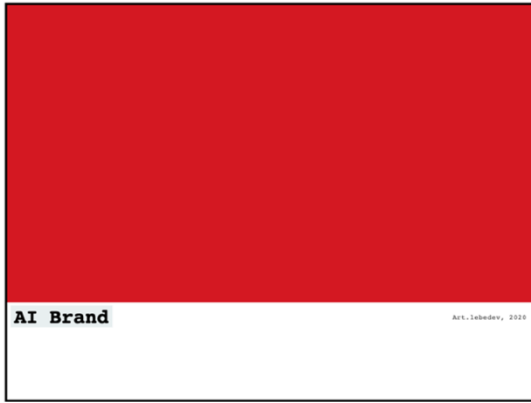
Bridging between design and the potentials of AI Technology

What do I know?

The future of branding is marketing with people and not at them

(Morgan, J., 2012)

Figure 42 - The workshop's slides presentation giving a introductory brief, the structure and visual information about the workshop, 2020.



and make each jar as unique
and as expressive as the italian people

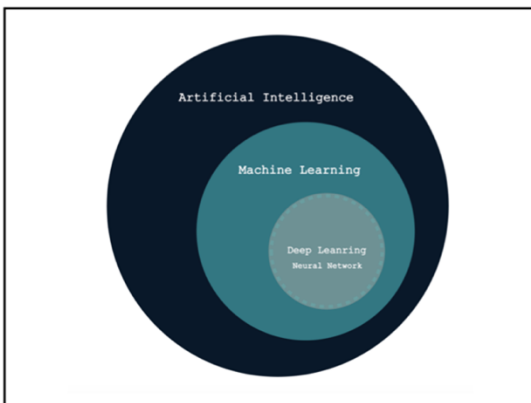


Figure 43 - A set of presentation slides showcasing the research literature and projects conducted in the area of the research, 2020.



The Aims

Grounding
(Provoking Model and Key challenging)

Identifying Key challenges and opportunities by casting 23 interviews' outputs on this workshop

How graphic designers may work with AI-agent models and what is their role in the process of autonomous branding

Addressing ADI-GANs Model

Inter-views

Sampling: (Non Random)

Purposive sampling: Focus on a particular characteristic in the selected sample. This includes the type of skills and years experience in their field.

Cluster sampling: Dividing participants into clustered profession (categorization) which has been selected from the main three engine in Saudi Arabia

Data Analysis
Thematic Data Analysis: Using themes and codes to analyze the interviews

```

    graph TD
      P[Participants (23)] --- A[Academics]
      P --- AI[AI and Data Experts]
      P --- GD[Graphic Designers]
      P --- BS[Brand Specialist]
  
```

Opportunities

- Efficiency and quality of work
- Faster understanding of customer needs
- Human-centred perspective

Required Skills

- Psychological Skills
- Technical Skills
- Awareness of AI Technology Potential

Perception of Challenges

- 90% Change of Role Definition
- 80% Ethical Issues
- 95% Cultural Acceptance

New Definition

- Executor
- Curator
- Processor
- Art Director

Over Loaded?

Oh Humans!

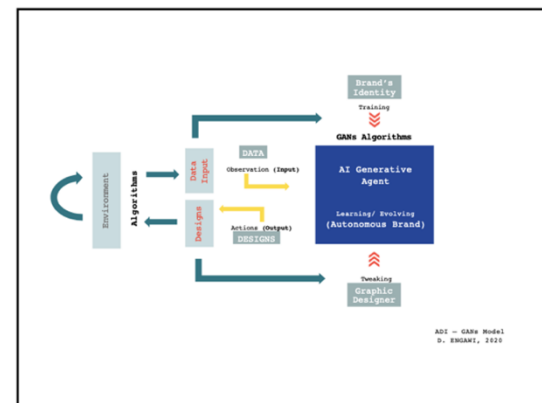
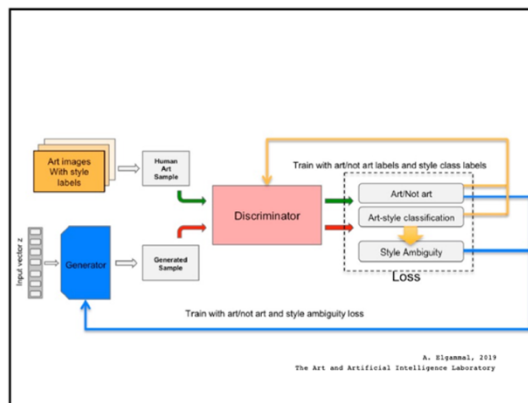
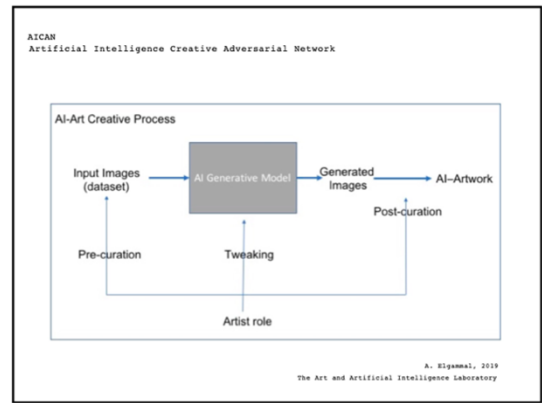
Have a break



Figure 44 - A set of presentation slides showcasing the results of the semi-structured interviews and how it was reflected on the workshop structure, 2020.


AI Agent
 What is my Utility?
 We can measure the agent productivity
 And the ability to become autonomous

"AID-GANs" Artificial Intelligence Design
 Generative Adversarial Networks



Game Card

This is a collaborative exercise to develop new models based on the prototype model presented.

- Participants will be divided into groups (Consist of an AI expert, Brand Specialist and a Graphic Designer)
- Each team will work to generate a new model using the card games (Design, Technology, Challenge)
- Each team will present their proposed models for further discussion and exchanging thoughts and ideas



Figure 45 - A set of presentation slides presenting the ADI card toolkit, 2020.

6.3.2 Grounding Phase: The Matrix

This phase was meant to be the first encounter for the participants to engage in an activity I called “The Matrix”, a short prompting exercise to stimulate in-depth discussion on how to address AI-Design challenges. Numerous studies have showcased the importance of group work and skill-building activities in workshops where participants feel valued and heard through short-term activities, which are essential in this phase of the workshop

(Gorkovenko et al., 2020; Halskov and Dalsgard, 2006; Galabo et al., 2020). Each challenge lasted 15 minutes to prevent participants from getting bored or distracted and to consider their attention spans, as well as the likelihood of information overload and ambiguity in the AI context, which was also eliminated as much as possible.

To start the activity, I divided the participants into three groups, with a graphic designer, an AI expert, and a brand specialist in each group. They were all presented with a set of AI design challenges that were already spotted from the semi-structured interviews earlier in the research and then were given time to think about them, argue about them, and build connections with one another as they sought ideas and solutions for these challenges. These challenges were presented to allow them to feel that their voices are important, and their opinion matters in constructing the research outcome and results, as suggested by many scholars, such as Ørngreen and Levinsen (2017) and Ahmed and Asraf (2018). Additionally, adding question prompts, cues, and activities provoked participants to respond actively and positively towards the research. I presented the challenges in the form of questions listed on a whiteboard, where each group was given an A1 plain sheet and an A1 matrix sheet to help classify responses according to the significance impact and applicability of each challenge. Participants used post-it notes to annotate keywords and sentences that might help them locate the feasibility and practicality of their answers through this exercise ([Figure 46](#) and [Figure 47](#)). I observed their way of rhetoric analysing, conversations, and brainstorming for answers with minimal interference and three sets of matrixes were generated ([Figure 48](#), [Figure 49](#), [Figure 50](#)) all of which will contribute towards establishing the credibility and rigour of collecting the data of the research (Spradley, 1979; Lincoln and Guba, 1985; Pandey and Patnaik, 2004).



Figure 46 - Each group member collaborated together in prompts and discussion using post-it notes to find answers and ideas of how to solve the challenges they had in front of them, 2020.

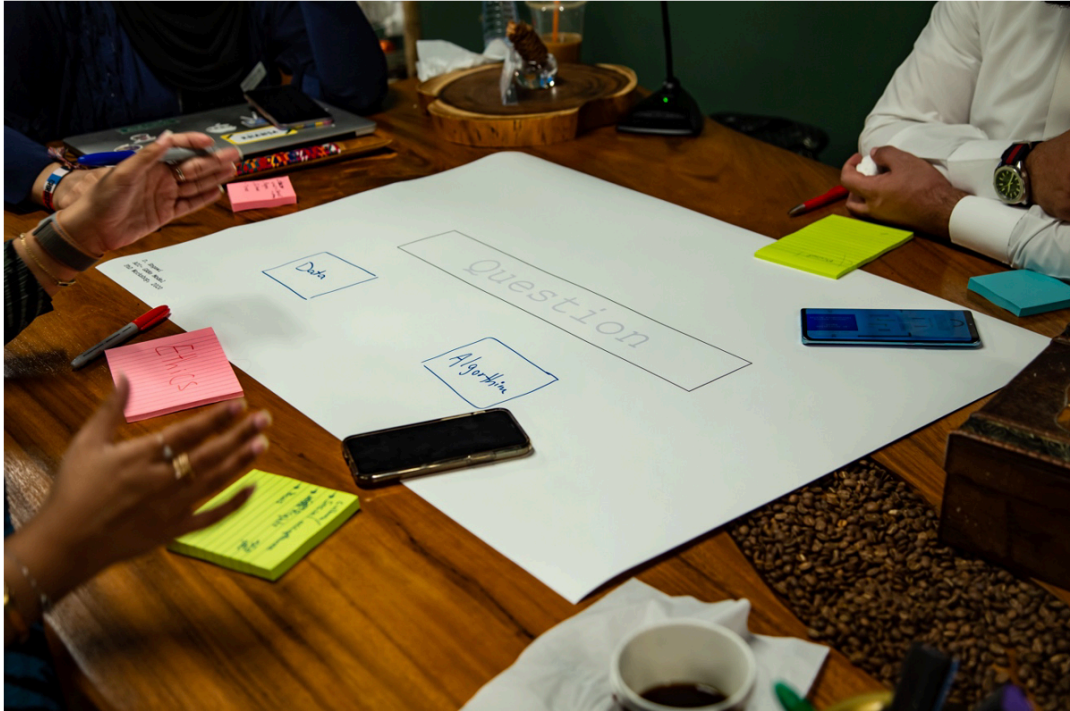


Figure 47 - Side of the matrix activities were the participants used post-it notes to label and write their thoughts, 2020.

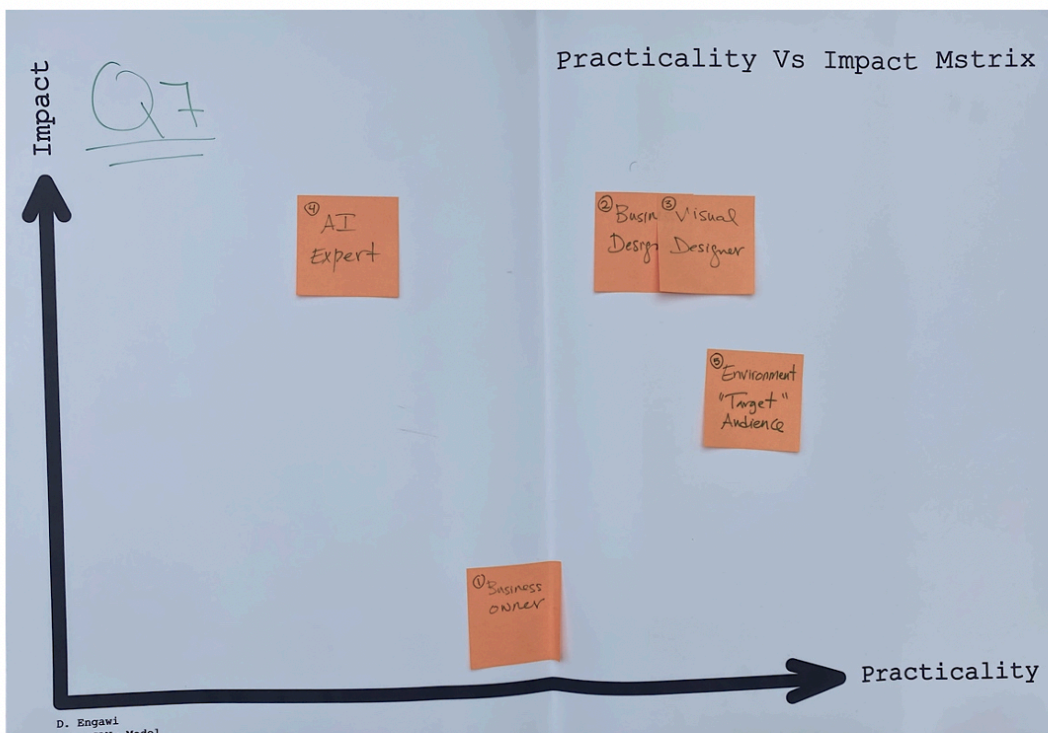
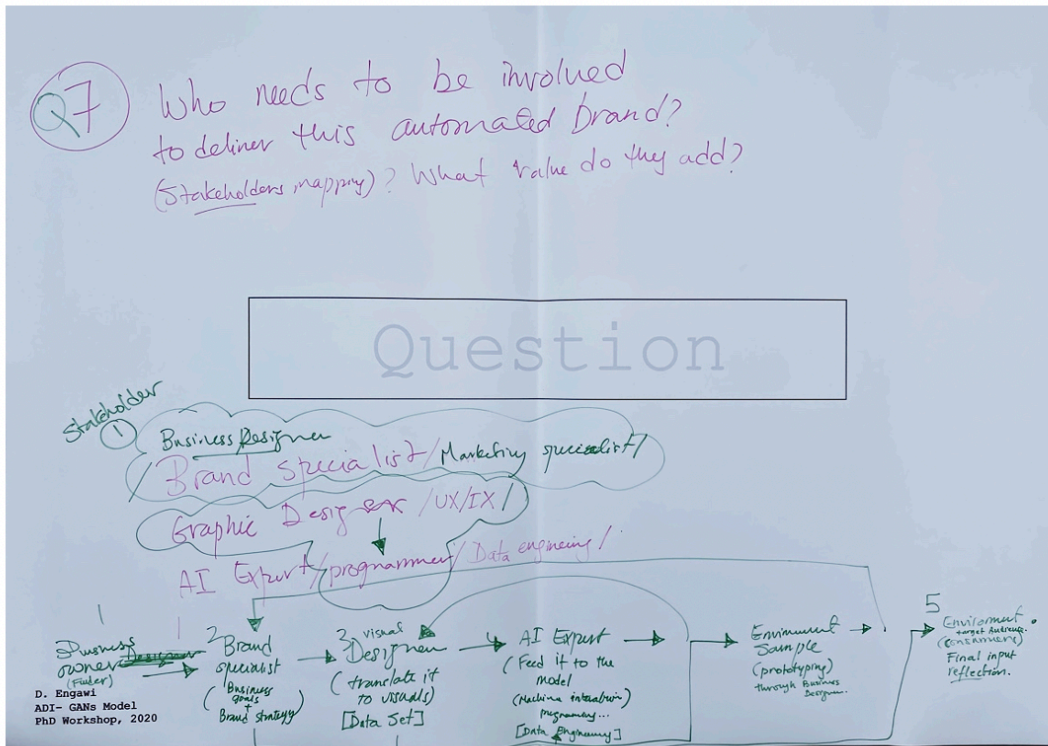


Figure 48 - Result 1 - At the top is an example of one of the questions selected by the participants and below is their attempt to place the impact and practicability of their answer on the matrix, 2020.

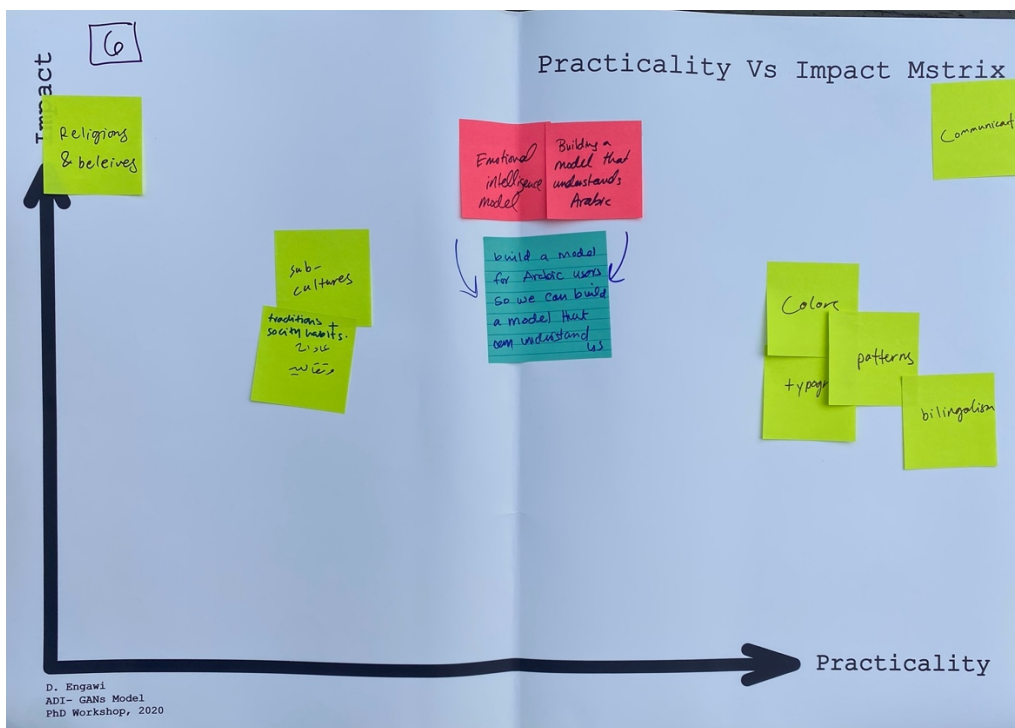


Figure 49 - Result 2 - At the top is an example of one of the questions selected by the participants and below is their attempt to place the impact and practicability of their answer on the matrix, 2020.

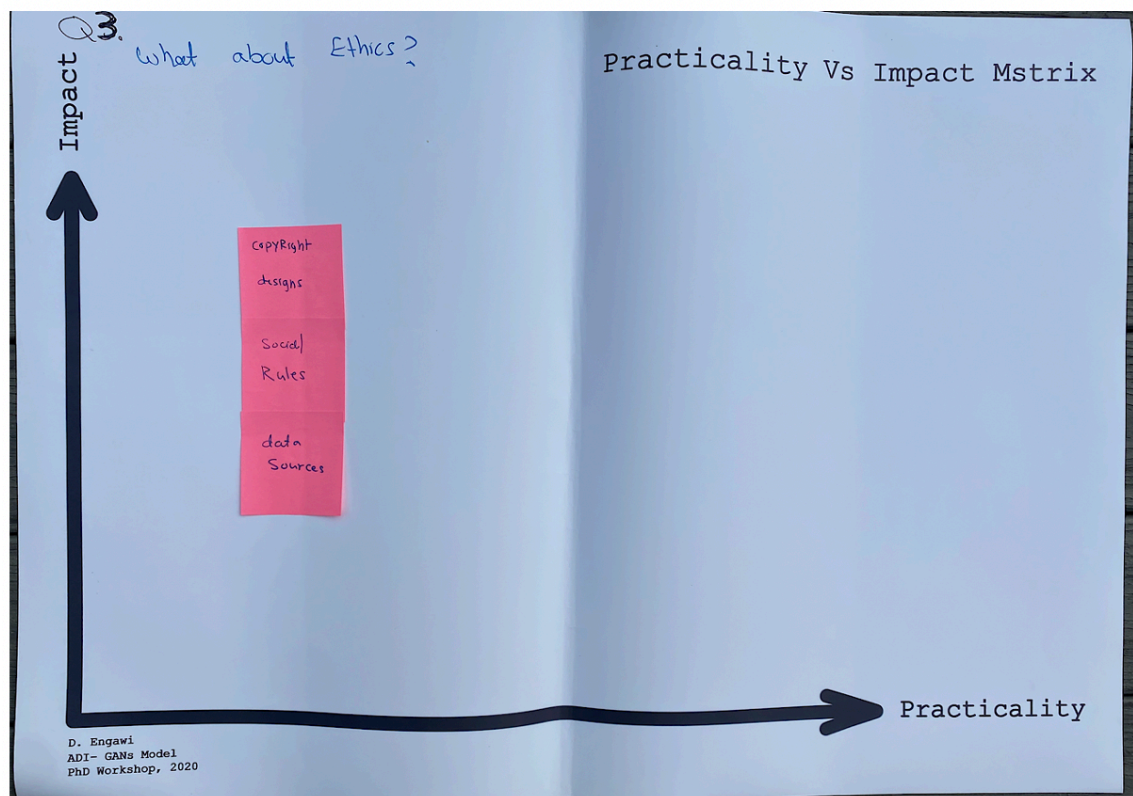
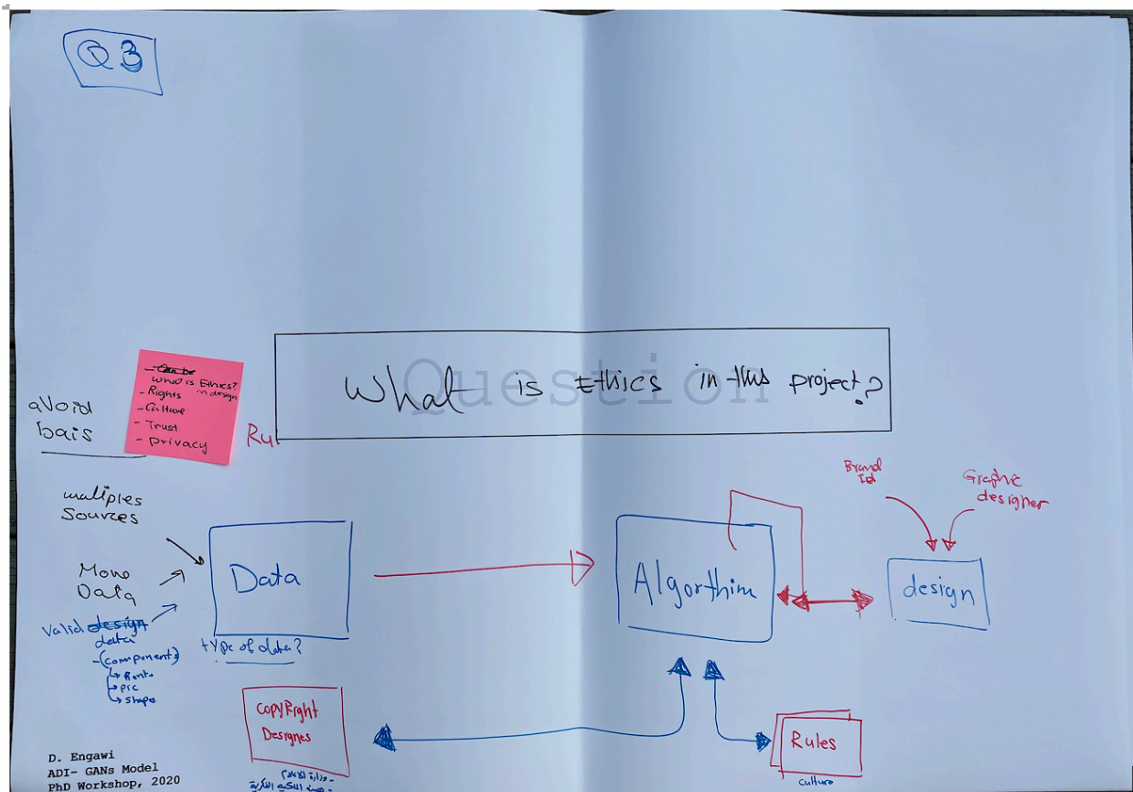


Figure 50 - Result 3 - At the top is an example of one of the questions selected by the participants and below is their attempt to place the impact and practicability of their answer on the matrix, 2020.

6.3.3 Speculating Phase: Playing the card toolkit

It was intended that the card toolkit be played in groups of three to five players, as discussed earlier in Chapter 5. In the workshop setting of this study, I assigned one graphic designer, one branding expert, and one AI/data specialist to each of the three groups. In addition to the deck of cards, each group was also given a description sheet on which they could record their group's brainstorming sessions, sketch ideas, and create the models. The card toolkit starts by shuffling the cards. Each group draws one card from the Design and Challenge suits and two cards from the Technology suit, so each group has four cards in total. As play progresses, each group will use the cards drawn to think of a possible scenario for a future autonomous brand model based on the given ADI-GAN model. Once completed, each group presented their new model to the other groups for further discussion, exchanging thoughts, and debating whether it could be functional (Figure 51 and Figure 52). The activity in this workshop lasted for two hours and was divided into two parts. In the first hour, participants got to know the card toolkit and how to play it. Then, the players started to brainstorm, generate ideas, and build their final models. In the second hour, each group had approximately 15 minutes to present their model to the other groups for further discussion, debate, and exchange of thoughts (Figure 53).

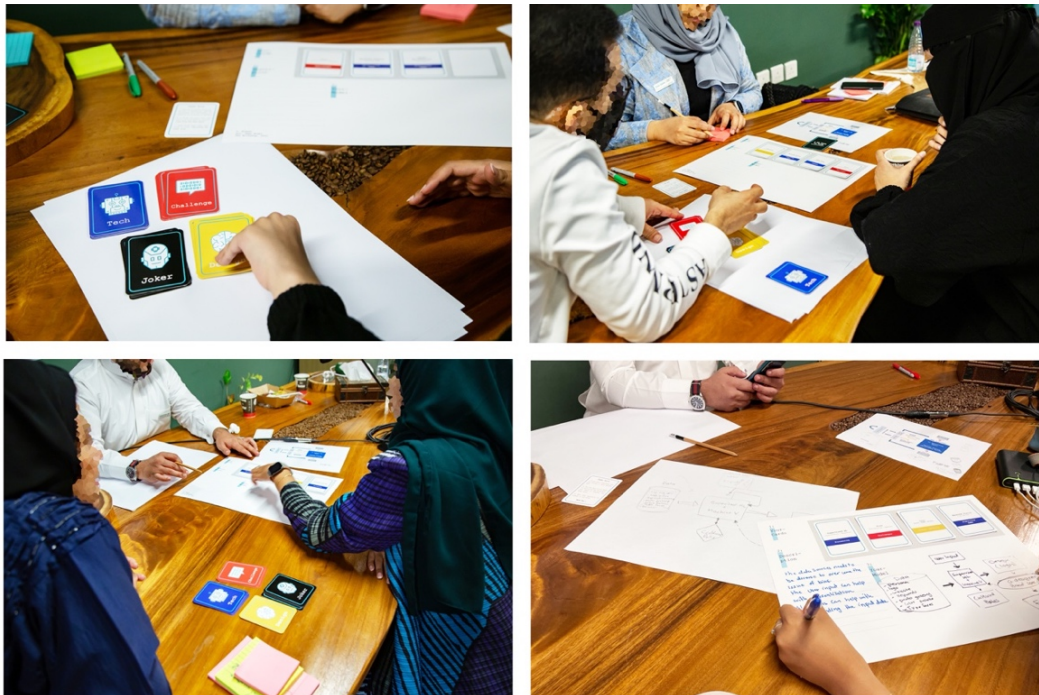


Figure 51 - The players started the game (top left), co-designed and brainstormed their ideas together and built their final model (bottom right). 2020.



Figure 52 - The players worked on their final model and the steps of how their model were created. 2020.



Figure 53 - Each team presented their final model among the other groups for further discussion, debate, and exchange of thoughts. 2020.

6.4 The Card Toolkit Output

6.4.1 Group (1) Model

The first group in the workshop drew the following four cards from the three card categories:

- Algorithms GAN's (image recognition)
- Dataset (consumer behaviour)
- Challenge (cultural acceptance)
- Design (digital output)

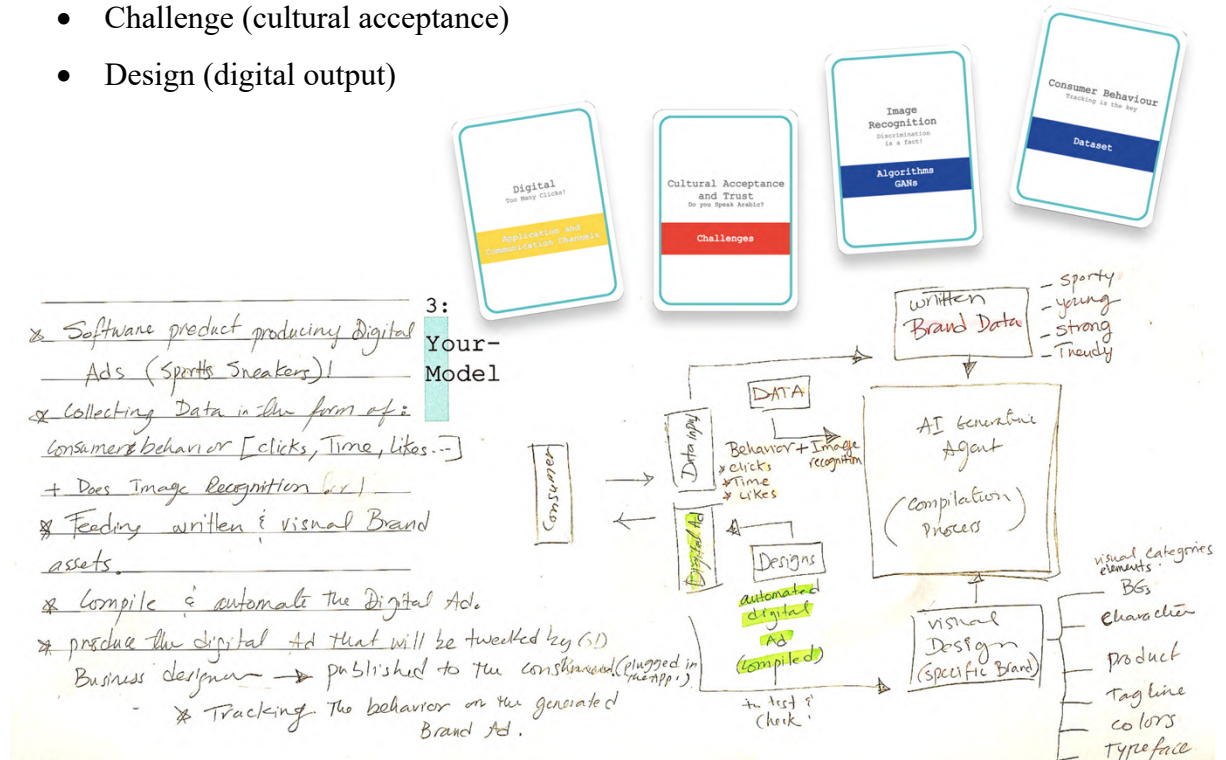


Figure 54 - Group (1) has illustrated their model based on the four cards they had in their hands without using a joker card. 2020.

In this setup, the players proposed an AI model for a sport's industry brand to generate digital advertisements posters and posts on various applications, such as Snapchat, Facebook, and Instagram. The model aims to advertise sneakers and sports garments to their targeted consumers on social media platforms using tracking and generative posts (Figure 54).

The advertisement in this model will be created based on the brand's strategy in addition to a range of look-and-feel visions (sporty, young, trendy), which will be in the form of text data input. The brand strategy is the primary dataset in this model, and chatbots and

pattern recognition are also used to track consumers' behaviours (clicks, time pauses, and digital tracing impressions). Predicting consumers' behaviours and having enough data to feed the agent will help create digital posts and advertisements using the AI model, which could target consumers directly based on the consumers' preferences. Many of the poster's design elements can be adjusted regularly, such as backgrounds, colour schemes, patterns, taglines, and typefaces. The generated designs will be tracked again by the model based on consumers' behaviour to generate further new advertisements for these consumers. Although the model here can be applicable, it might result in a challenging 'positive feedback loop', where the more prediction and tracking from the model towards specific designs and posts, the more designs are generated from that particular preference design. This loop will result in the agent developing biases towards specific actions, which will eventually generate particular designs repeatedly (Suresh and Guttag, 2019). Although this was always a complex challenge with AI and machine learning, some players encouraged the idea of having a biased model: 'We want the model to be biased to be closer to the local culture we are targeting, for example' (P5). Conversely, other players suggested that a human should update the data sources regularly to prevent bias, meaning that the model would eventually become human dependent.

6.4.2 Group (2) Model

The second group in the workshop drew the following four cards from the three card categories:

- Algorithms GAN's (pattern recognition)
- Dataset (chatbots)
- Challenge (bias)
- Design (visual identity – a logo in their proposed example)

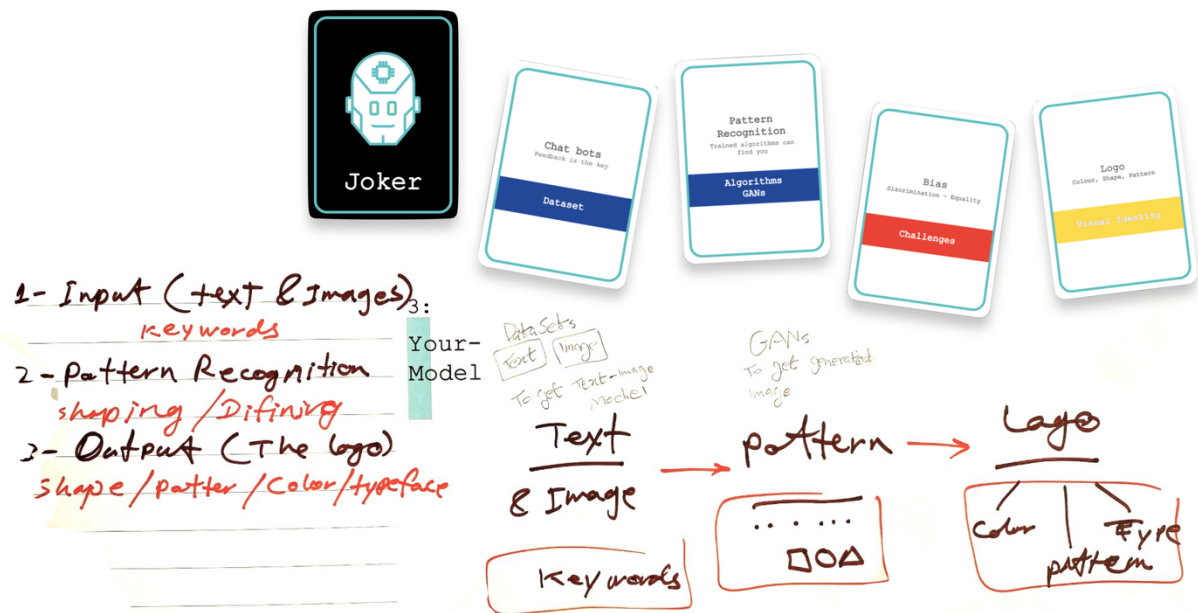


Figure 55 - Group (2) has illustrated their model based on the four cards they had in their hands in addition of using a joker card to improve their model content. 2020.

In this model, the brand proposed by the participants will have a dynamic identity that adjusts and develops according to their consumer preferences. A chatbot will collect all the data input from the targeted audience of the brand. In building their dataset, the players decided to use a joker card to add another data input: an image library of the brand's persona. This library will allow them to build a text-image model with a rich imagery dataset to develop their brand's identity. After training the model with all the input required, the model will use pattern recognition algorithms to create the output in terms of images relevant to the brand's identity. To prevent the model from becoming biased, the graphic designer, who acts as a feeder in this model, will supervise the text-image input to ensure that it is consistent with the brand's strategy and visual identity [Figure 55](#)).

In the proposed model, the players aimed to generate a mutant brand identity that changed its visual based on the given artefacts and datasets fed into the model. 'The challenge here is to keep the brand's persona strong and consistently rigorous, as many examples of mutant brands I have seen nowadays have lost their identity because of the constant change' (P6).

6.4.3 Group (3) Model

The third group in the workshop drew the following four cards from the three card categories:

- Algorithms GAN's (machine vision)
- Processing (supervised ML)
- Challenge (bias)
- Design (visual identity – a logo in their proposed example)

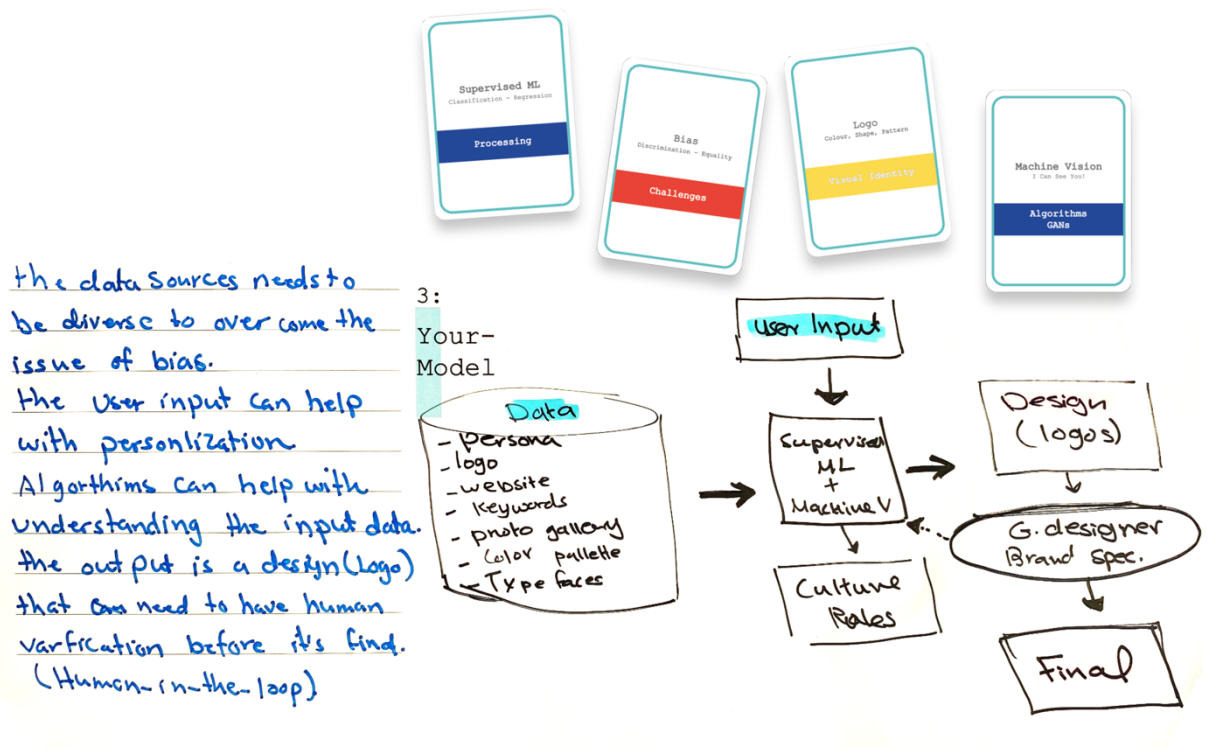


Figure 56 - Group (3) has illustrated their model based on the four cards they had in their hands without using a joker card. They also emphasised the importance of the two-technology card they had which allowed them to focus on data and user input. 2020.

The players in this group presented a model of a mutant brand that would generate a visual identity using the dataset of the brand's persona, keeping in mind the diversity of data resources to prevent issues of bias. The initial datasets will be collected from the brand persona (identity, website, typeface, keywords, photo gallery) in addition to the secondary dataset, which will be from the target consumers of that particular brand. The diverse dataset would aid in better understanding the data input and generating accurate designs,

as the players mentioned. Further, the players suggested coding some cultural rules and regulations in addition to having a human in the loop (a designer and a brand specialist) to prevent the agent from producing biased designs. Many iterations and attempts were made by the players to define the final model, yet they concluded that the AI and algorithms they have in this proposed model are not yet trustworthy and that a human must be present at all times to monitor the actions of the machine ([Figure 56](#)).

6.5 Collecting the Data

6.5.1 Recording

The entire co-design workshop, including the ADI card toolkit setting, was audio and video recorded, and I took still photos throughout the process. The matrix exercise and the ADI card toolkit produced several visual prints and materials, including the participants' sketches, post-its, and final generated models, all of which were also recorded and documented. As mentioned in Section 2 of this chapter, all the content of the workshop and the setting of the card toolkit were actively observed to detect patterns and meanings that might surface across the data to gain a complete coherent understanding of the meaning and clues emerging from the data in preparation for the analysis process ([Figure 57](#), [Figure 58](#) and [Figure 59](#)).

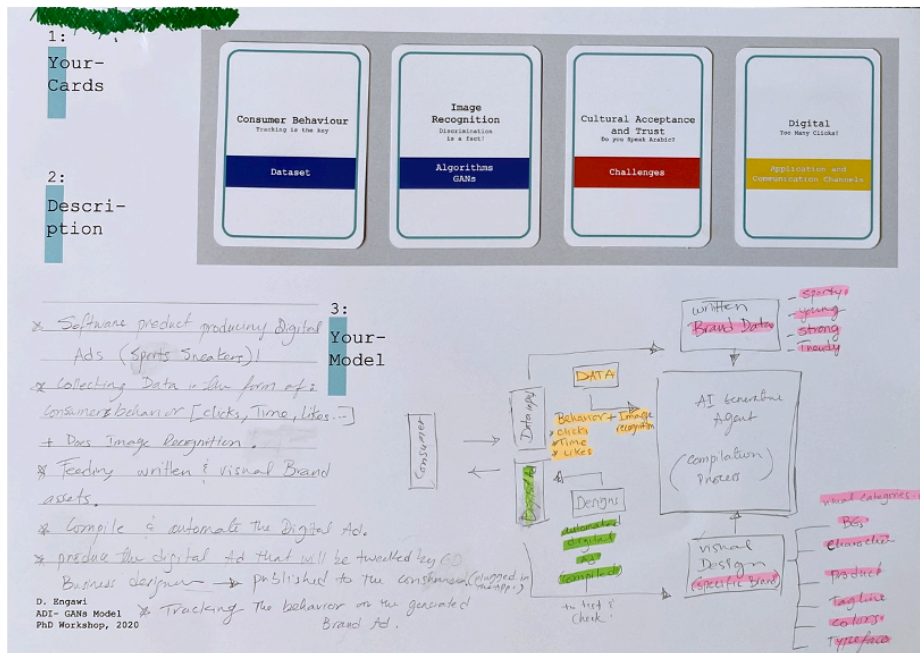
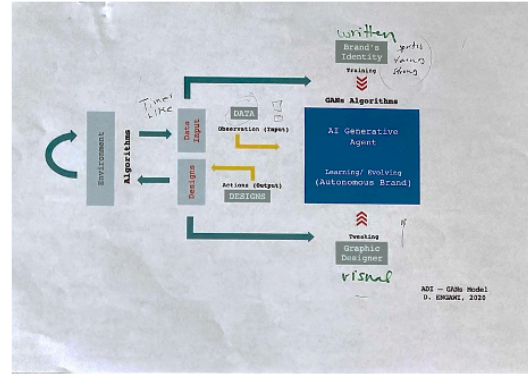
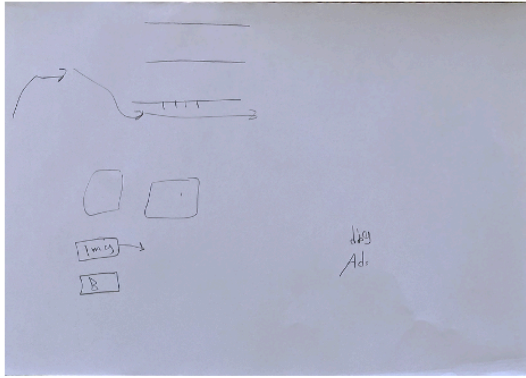


Figure 57 - Model 1- A full layout of the model generated from the workshop with its original model and process sheet, 2020.

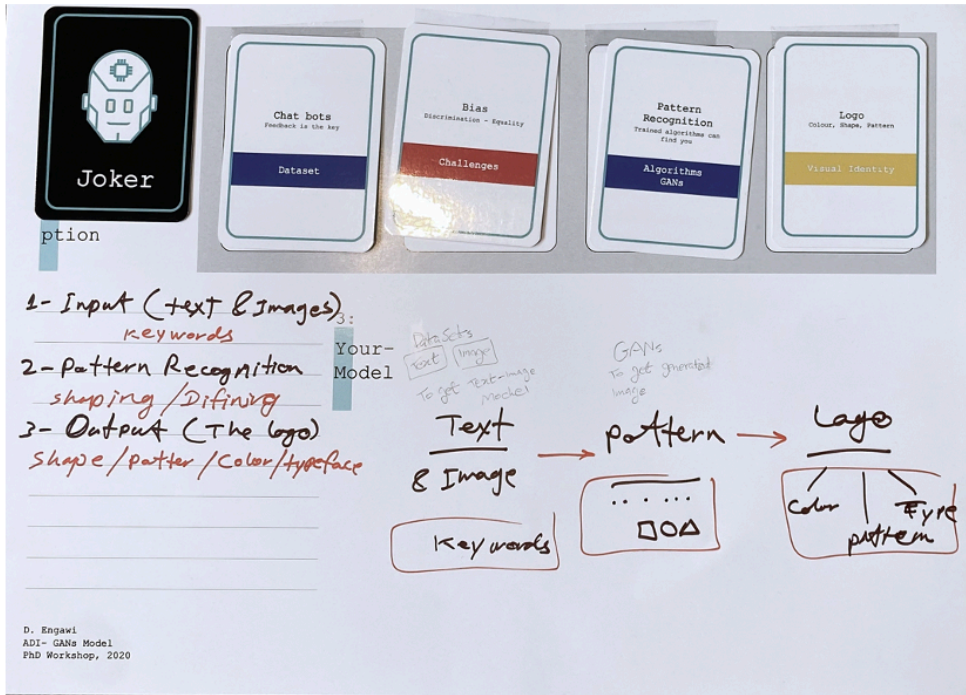
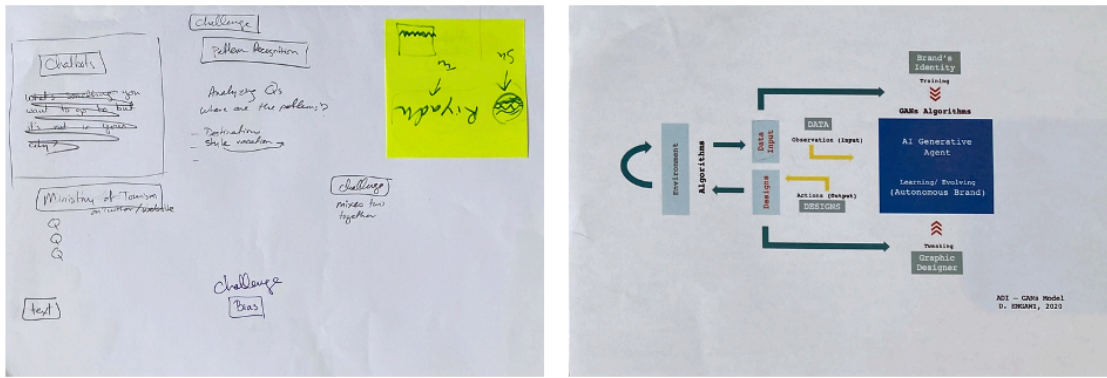


Figure 58 - Model 2- A full layout of the model generated from the workshop with its original model and process sheet, 2020.

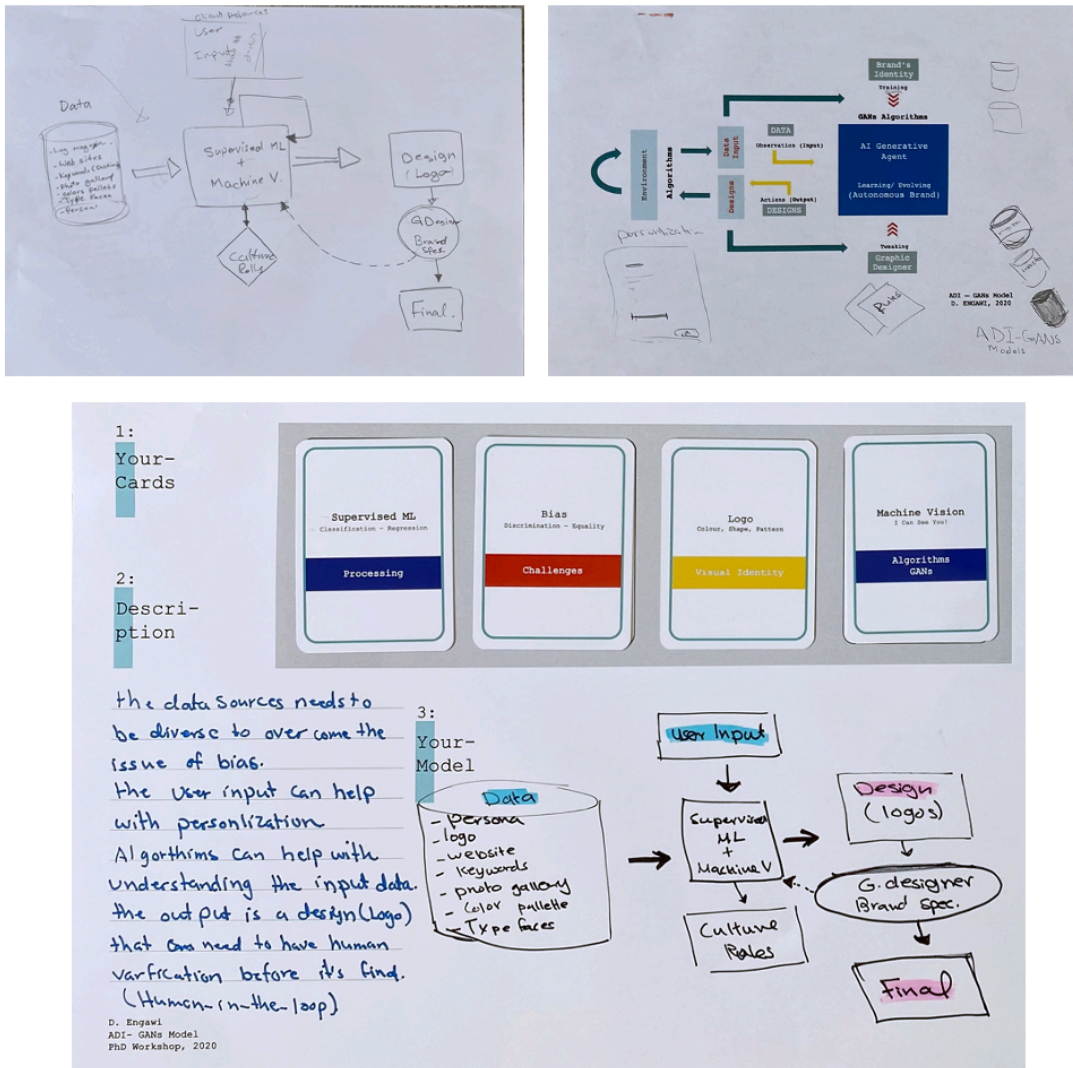


Figure 59 - Model 3- A full layout of the model generated from the workshop with its original model and process sheet, 2020.

6.5.2 Transcribing

To ensure the accuracy of the workshop content during the data analysis, the transcription process consisted of two phases. At first, I had to convert the audio narrative of the workshop into a written script to avoid losing any of the data or content. Before moving on to the second step of the process, I took extra care to ensure that all the script was in English, since all the interviewees were native Arabic speakers, and some Arabic words were found in the script. The second step of the transcript process was to edit and clean the scripts so that they were ready for analysis and contained no stray words or fragments that could reveal the identities of the participants.

6.5.3 Translation

Since most of the workshop attendees were native Arabic speakers, the workshop dialogue included some words and sentences in Arabic, even though English was the official language of the research and the workshop. I encouraged participants to speak in the language of the study, but I also gave them the option to use Arabic if they felt it would help them get their points and express their thoughts more effectively. The process of translating the small number of sentences and words from Arabic to English took 6 hours.

6.5.4 Transcription

The entire recording was transcribed anonymously into a document of 15,598 words, following the same methodical process as the semi-structured interviews discussed in Chapter 4. To use the edited transcription method described by Brinkmann and Kvale (2015), I made sure to eliminate any typos, grammatical mistakes, or slang words. After that, I used both the non-verbatim and verbatim transcription methods to get rid of any words or cues, such as “ah”, “um”, “oh”, and “you know”, as well as any tangential discussions that did not pertain to the workshop’s topic at hand.

6.6 Data Analysis

For the data analysis of this method, I used the thematic analysis approach, following the principles and the six stages described by Braun and Clarke (2006, 2012). Their method was to group data and set codes and themes into a set of systematic meanings and patterns (Braun and Clarke, 2006).

To ensure deliberate, rigorous results and richer insights, I manually examined the data and familiarised myself with them to map out the initial codes, looking for any underlying concepts and thoughts in preparation for the data analysis (Appendix F). To produce the initial codes, I employed deductive coding, the theory-driven approach by Crabtree and Miller (1999), as well as using the inductive, data-driven approach by Boyatzis (1998) where all of the codes were labelled and categorised into possible themes. The final set of theory-driven and data-driven themes was then grouped into a mind-mapping matrix, as illustrated in [Figure 60](#). Subsequently, two main themes were generated that were all relevant to intellectual resistance which are cultural resistance and cultural diversity. The other themes were adaptation, acknowledgment, data sourcing and ethics.

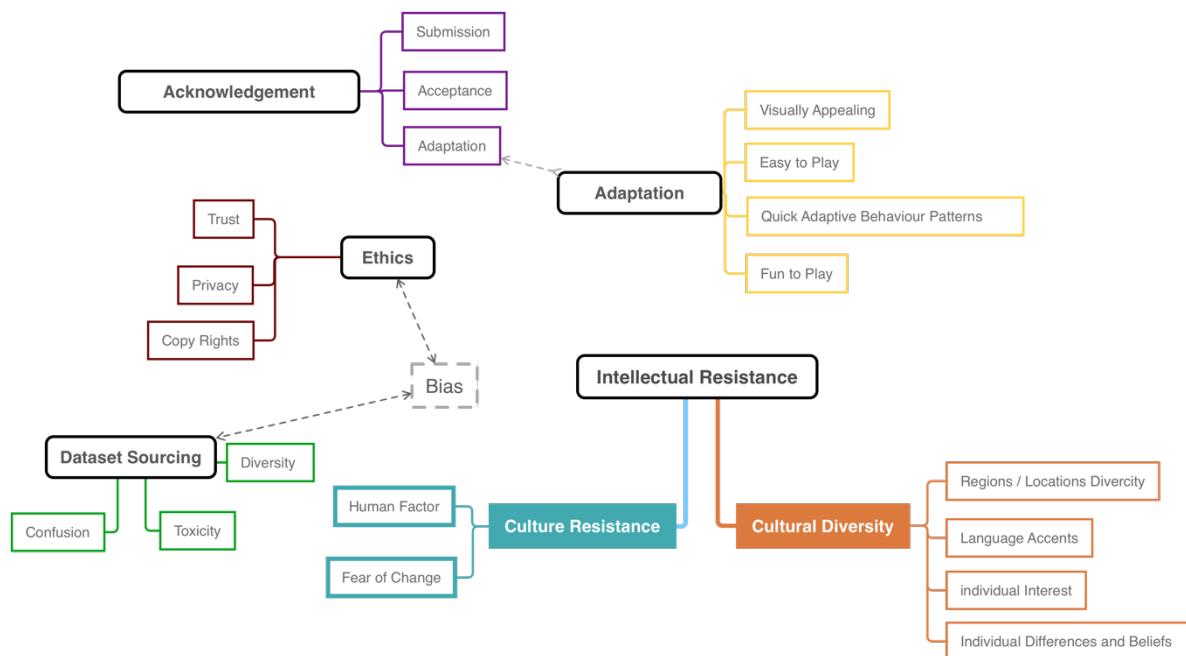


Figure 60 - The codes and themes of the workshop. Source: Author, 2020.

Several arguments and conflicts of opinion were observed throughout the workshop. Many of these were related to the fine boundaries between the integration of AI and graphic design, as these arguments addressed questions such as what AI may offer in the near future. However, among all the raised arguments, all participants prominently agreed on **acknowledgement**, as participant (P7) said, “*Once you know, you will never un-know, we cannot deny now the fact that this technology is emerging fast towards design and*

could affect our work” (P7). Another participant also made an observation while using the ADI card toolkit: “The more we shuffle the cards and draw new sets, the more models will be created, and consequently more challenges and problems can be coined and solved—even if it was solved imaginary on papers, for now” (P5).

With the acknowledgement and acceptance came the **Intellectual Resistance**, a theme developed from the thematic analysis because of cultural diversity and cultural resistance. This workshop took place in Saudi Arabia, a country that is rich in cultural diversity and intellectual background, where culture refers to origin, language, assumptions, views, and a wide range of interests in a single context. According to an ethnographic study conducted in 5 global regions, with a particular focus on 14 countries, perceptions and understandings of AI are likely to be affected strongly by cultural context, and local cultural and social contexts are likely to have a significant impact on people’s views and understanding of AI (Hagerty and Rubinov, 2019).

Many researchers have pointed out that when presenting AI and data in any industry, especially in human-centred designs, trust, and ethical considerations, such as the privacy and copyright of the generated designs, are always present (Manovich, 2018). These concerns became more visible when gameplay started. A debate arose about potential cultural resistance and the fear of change, especially in a diverse culture like the one in Saudi Arabia, which is characterised by numerous subcultures, social norms and individual differences, making change a potential challenge. According to one of the participants, who described the emergence of AI, *“We have seen how AI is changing many brands’ behaviours and graphic designers’ perceptions of what this technology can achieve, resulting in a gap in the present design industry that has grown outdated” (P9).* Another participant said, *“The fear of change by machines can also affect our jobs, and that for sure will change the mindset of the new generation” (P7).* While these changes may be worrisome to some, they may also open up new creative opportunities and spur innovation, resulting in the emergence of new schools of design in areas such as AI-driven, data-driven, and algorithm-driven design, which correspond to various schools of art. As a result, there will be more obstacles and uncertainties about how these designs can be classified in the future. One participant wondered if AI-driven models, and what they bring to the design industry, would be classified as AI design schools or if they would involve a mix of all schools created entirely by a machine.

While running the workshop and playing the ADI card toolkit, observations revealed that the participants did not take long to understand how to use the card toolkit, indicating that the participants exhibited **adaptive** behaviour patterns. Since this was most of the participants' first experience using the card toolkit mixing AI and design, they showed the ability to create AI models with little to no prior knowledge or expertise in AI, data, or algorithms. One of the participants remarked, *"I thought there is no way a machine can replace me until five or six years ago, when I discovered a feature in Adobe called Content-Aware Tool; it was a shock!"* (P7). This reality has presented researchers in the educational sectors and educators with the opportunity to incorporate bespoke technical programmes such as AI, machine learning, coding, and programming into the graphic design curriculum and restructure graphic design course curriculums (Kaiser, 2019; Hansen, 2019).

The ADI card toolkit appears to be a suitable demonstrative design tool that can be introduced into courses such as visual branding, packaging design and advertisement design, creative coding, and programming to help students grasp how AI might be utilised in the graphic design industry from a designer's perspective as an autonomous problem-solving and design-thinking model. This is especially true, given AI's significant impact on industry and design processes through increasing experiences and creativity (Verganti et al., 2020). This was mentioned by almost half of the academic participants, with one of them stating the following:

Working in academia for the past ten years, I see this as an opportunity rather than a challenge; I've supervised numerous graduation projects in which students were required to learn how to programme and code, for example, in order to create an animation or a website that would improve their project's outcome; and in which other students attempted to learn how to generate algorithms in order to build a product as a dissertation project. (P3).

Many design principles and marketing strategy approaches will be impacted when AI is introduced to branding; therefore, testing it in practice is possible. This is because, as one participant who has worked in the design industry for the last 15 years pointed out, many branding specialists use the human factor as a selling point to gain consumers' trust. When

the human element is removed from the design process, it becomes more difficult to inspire confidence in the final product. However, if the brand is unable to keep up with rapid changes in future technology, it will struggle. This could severely affect the brand's image or even result in its closure. As one participant put it, *“a gap of knowledge, gap of skills, and gap of experience as well”* (P4).

Ethics was one of the main themes spotted from the beginning of the workshop, moving from the first stage of the workshop all the way to the matrix activity and later playing the ADI card toolkit. Ethics as stated by many of the participants are always an issue when it comes to working with AI and data, as one of the AI experts in the workshop highlighted that although the researchers say algorithms are less biased than human, *“this statement, from my point of view, is not true”* (P8). As wherever data sourcing is involved in any project, biases will eventually be an issue. The argument raised by this participant was contracted by a data specialist participant who declared that AI could have the full authority to take decisions throughout the design process and generate something new that can be less biased than humans since humans are significantly biased by their nature (P5). Carrying with the conversation, some participants suggested that biases can be eliminated or at least reduced by proposing more **dataset sourcing** channels into the model and therefore into the design process of generating designs. Dataset where one of the themes that were coined from the data analysis which is essential to generate the designs. One of the participants has added that data is the "golden fuel" of the twenty-first century and to make the brand model as effective and trustworthy as possible, participants suggested a number of measures, including utilising a variety of data resources and constructing an archive library. On the other side, seven out of nine participants have agreed that open data sourcing channels are “almost” all toxic and can be unreliable sometimes with all the openness that is taking place on social media and other open-sourced online platforms. Therefore, models can locate data pattern recognition not only from social media tracking but also from consumers' interaction with the AI system and the loop of the consumer's feedback.

6.7 Reflection

Overall, the workshop and the ADI card toolkit clearly stimulated the participants to think out of the box and to push their boundaries to think, debate, and argue new possibilities of what could be a self-driven AI design. Although the participants tried to be creative and innovative, they also tried to strike a balance between being speculative and being realistic in terms of how this proposal could be applicable. Throughout my observations, I recorded that the process of engaging with the card toolkit was straightforward, simple, and enjoyable for the majority of participants, even though none of the players had used a card set similar to this one before. These adaptive behaviour patterns showcased by the participants' behaviour of having fun engaging with the card toolkit support the evidence stated by Koster's asserted "Fun is just another word for learning" (Koster, 2010, p.46). The participants were encouraged to speculate on the future of AI and graphic design without fear of being criticised or making mistakes. Despite some disagreement and resistance regarding how AI will act in these emerging scenarios, as well as the ADI card toolkit and its proposed models, one participant remarked "practice makes perfect, someone has to start, as like everything else, always the first attempt will have defaults" (P2). Generally, the card toolkit has positive feedback from the majority of the participants recorded on a post-activity survey that gives a summary of response from the participants (Table 4). A notable acceptance was observed and documented by both professionals and academics, with 66 percent of the participants indicating that they believed AI could be self-governed despite ethical issues. Furthermore, 88.89 percent of the participants stated that the card toolkit allowed them to speak out their thoughts more clearly and helped them visualise their ideas "*My mindset has defiantly changed after the workshop*" (P3). Consequently, one participant stated, "*I am more excited to explore this world and break the traditional barriers of my generation towards technology emergence*" (P7). On the other side, another participant questioned these whole experiences saying, "What is creativity!" (P2).

Feedback	Agree	Neither Agree nor Disagree	Disagree
The Card toolkit was fun to play	6	2	1
The card toolkit was engaging	7	2	0
The Card toolkit was easy to understand	6	2	1
Learning through gameplay was an effective method to interact with AI	9	0	0
I would like to (engage/use) the card toolkit in my (research/project)	9	0	0

Table 4 - Post activity feedback, 2020.

Additionally, the models were generated by the participants exhibited the possibility of AI to generate and maintain a consistent visual branding with the initial help of the designing team (graphic designers, director, etc). This consistency of generative loop of designs by AI can have the potential of building a brand consistency¹³ across social medial platform and across various brand channels such as, chatbots, voice interactions, websites, visual merchandise, and consumers portals which therefore improve the image of the brand and its trust and loyalty from their consumers. Finally and as a result of this workshop, I proposed a roadmap that suggests: (1) developing the ADI card toolkit and (2) conducting further investments in enhancing and developing the ADI-GAN model and the three AI models generated from the ADI card toolkit as follows:

6.7.1 Developing the ADI Card Toolkit

Play-based learning carries a considerable potential for delivering both knowledge and behavioural outcomes, which were recorded while conducting the workshop and playing the card toolkit. The toolkit acted as a storytelling scenario that helped the participants build their scenario and visualise it through prediction and speculation. However, there were a set of challenges, including how the toolkit could be positioned in all the various types of practices in the graphic design industry. Therefore, I considered developing a modified second version of the ADI card toolkit based on the interactive encounters and feedback recorded from the first version that took part in this workshop. This presents opportunities for this card toolkit to be introduced in various settings in the design industry, such as brainstorming for a project design brief, design thinking within focus groups, and in classroom settings, such as in graphic design courses and design school curriculums. Proposing the card toolkit in various encounters will generate different experiences said Schell (2008) who described gameplay as designed experiences. Each individual will encounter a unique experience other than another individual who is using the card deck at the same time.

¹³ Brand consistency is when the visual and interactive channels of the brand is having the same look and feel to preserve the adequate impact and experience that the consumers build with the brand to maintained loyalty and trust.

Some of the observations lead to consideration of future modification to the card toolkit mechanism and rules. The majority of the participants proposed the idea of having an open-access ADI card toolkit in which the stakeholders and the designers could add their own content to each of the categories to make it more versatile and playable. There is another additional opportunity for researchers, educators, and designers in the design industry and education sector to investigate possible iterations of the ADI card toolkit . This iteration can allow for a broader range of technology cards, such as adding other algorithms (CNN, RNN), reinforcement learning, and deep learning models (attention model, sequential model). Moreover, design cards, such as UX and UI designs, might be included in the design suites. Designers and researchers will be able to utilise this open-source version to address many new emerging trends and to use the toolkit as a method of enquiry for future research collaboration. Regarding the visual content, the majority of the participants liked the visual content of the cards, including the colour pattern, the graphic, and the overall simplicity of the design and the layout. On the contrary, they suggested changing the acrylic packaging to a compact packing made with compact production materials that are less costly and easily maintained, such as the examples in [Figure 61](#).



Figure 61 - Proposed examples of packing finish and material for further ADI toolkit iteration. Source: Thinkpak Game, Waraq Game, 2020.

6.7.2 Further Research and Investment in AI Models

In this workshop, graphic designers worked with AI and data experts, which resulted in creating three AI models that can be used as autonomous models to generate new designs that can be used for the purpose of branding, advertising, and marketing. This

encouraging finding may motivate research groups, academics, and the creative industry community, such as leading brands, advertisements, and marketing agencies to further invest in the original ADI-GAN model in order to further prompt the “What If” dialogue for further development and possibilities. These developments can be either in the type of algorithms used to construct the model, the data sourcing approach and the problem-solving techniques related to biases and toxicity of online sourcing.

6.8 Conclusion

In this chapter, I presented the co-design workshop, the second method of this study, and introduced the ADI card toolkit in the third phase of conducting the workshop. The workshop was conducted in Saudi Arabia to elicit innovative thoughts, ideas, and creativity indirectly through gameplay. A considerable effort was made during the setting of the ADI card toolkit to tackle issues relevant to AI and design. While playing and engaging with this toolkit, each group of participants generated three different models, each of which was targeted at investigating at least one complex challenge raised during the card encounter. Having the ability to generate additional models and discussions with each new deck of cards opens the door to new explorations and iterations. In the fifth section of this chapter, I presented the outcome of the workshop using thematic analysis, followed by the conclusion section.

Chapter 7

7 Reflection and Conclusion

7.1 Introduction

The purpose of this chapter is to give a summary of this PhD and shed light on its findings, outcome, research impact and future work recommendations. In the first section, I presented a summary conclusion derived from the two methods I used to collect data besides the ADI card toolkit I designed. In the second section, I addressed the 6 claims as the research contribution of knowledge by listing the research's aim and objective how I addressed the RQ and how it was coined through my findings identified in the relevant literature. In the third section, I discussed the research impact towards the research theory and professional practice and why it is essential in timbering. This section follows Section four, where I exhibited the limitations and challenges, I encountered throughout this study. In the last section of this chapter, I outlined the potential opportunities, suggestions, and future recommendations for work towards the area of research and practice.

7.2 Summarized Reflection

While conducting this research, I have focused my observation and investigation on the recent and ongoing growth of Artificial Intelligence, particularly on how technological progress is influencing the creative graphic design industry. As I demonstrated earlier in chapter two, many potentials and opportunities were coined and presented for these two emerging fields through research literature and innovative creative projects looking at AI and creativity. Some examples of these potentials and opportunities included were limited to, data-driven designs, AI-driven designs, algorithms-driven designs in architecture, manufacturing and product designs, movies and theatre production, and graphic design. Although graphic design was one of the subjects that were impacted by artificial intelligence, showcasing examples of AI-driven designs in visual branding, logo generating, packaging and visual advisements presented by researchers, academics, and practitioners, there was limited literature conducted from the perspective of graphic designers themselves.

In order to fulfil the aim and objective of this research and make a contribution towards research and practice, I investigated these two emerging fields looking for potential opportunities and challenges that AI may offer graphic designers in general as well as speculating the possibilities of having an AI self-driven system that could generate

designs autonomously. First, and by building my literature review framework, I defined many gaps as I investigated previous literature and research conducted by other scholars in the three main areas of the study; graphic design, Artificial Intelligence and data and algorithms. As stated at the end of the literature review chapter, I found many gaps of knowledge as listed in the literature review: (1) Underdeveloped Area of Research, (2) Transformation of Viewpoints, (3) Population Gap, (4) AI and Graphic Design Collaborative Research and (5) AI and Educational Development. These gaps led me to first, conduct the semi-interviews with the local population from Saudi Arabia, where the research sample was mainly selected for this research. In the semi-structured interviews, I interviewed 23 participants academic and professional practitioners who had been nominated from various positions and professions with an average of 10 years of experience. Cultural sensitivity in understanding AI-related concepts like creativity, privacy, and ethics was identified in these interviews with Saudi participants. The uncertainty of working with artificial intelligence, automation, and self-driven systems has made several graphic designers wary of integrating these technologies into their practices. This reluctance led to a lack of skills and knowledge on how to adapt efficiently and productively working with AI, as a result of which they were unable to respond to the cultural, social, and behavioral variety in Saudi society. Therefore, I have decided to create the ADI card toolkit to reduce the uncertainty of the situation and increase their knowledge and skills. This card toolkit was used as an instrument to visualize possibilities, generate creative expressions and conceptual thinking and build a generative AI model that can develop designs autonomously with minimal interference from the graphic designers. This speculative scenario took place in a co-design environment that was relaxed and playful for the participants to participate and engage in.

Leading to the second method of the research, I used the co-design approach to build my workshop aiming to allow all participants' ideas and experiences to be heard and shared in an open, collaborative setting. This engagement will bring the speculations and debates of all participants together to generate insights into the research topic and contribute to the study's goals and objectives with as few biases as possible. As stated earlier in chapter six, the number of participants nominated and selected to participate in this workshop were 9 from academic and creative industry backgrounds. The workshop took place in Saudi Arabia. Both of the methods data were collected and thematically analyzed to extract themes and find answers to my research questions. As part of my research, I

divided my findings into two categories: the research contribution and the impact contribution, which highlight the research contribution of knowledge and the impact the research made on the community of Saudi Arabia, where the research took place.

7.3 Research Contribution

7.3.1 Claim (1): Insights into Behavioural and Cognitive Factors

Throughout the process of conducting this research, I recorded many behavioural and cognitive factors as findings of this research by using the speculative co-design approach through two methods: semi-structured interviews of 23 participants and a co-design workshop in which I co-created and designed with 9 participants from Saudi Arabia, which both generated the following:

- (1) Cultural Sensitivity: Individuals working with AI can exhibit resistance and reluctance to change due to (a) beliefs and norms related to their cultural background, such as the belief that AI cannot be self-driven or have an individual mind on its own to think and create; (b) ethical concerns related to the copyright of the work or its originality and crediting the right source; (c) languages other than English posing barriers to communicate, understand, code, and moderate AI models, which therefore suggests further development of AI system compatibility with the Arabic language, such as the adaptation proposal by Aldahshan (2020) (d) lack of familiarity with the many possibilities AI could offer in the industry and graphic design research, which leads to rejecting the progression of emerging technologies in the graphic design industry.
- (2) Fear of Automation: Graphic designers may demonstrate fear of interacting with automated and self-driven systems due to the inherent uncertainty that comes with AI and the fast progression pace associated with AI. This can create ambiguity and uncertainty about the possibility of AI and hinder graphic designers from engaging in such ambiguous conversations.
- (3) Co-design Playfulness: The gameplay approach and playful co-design environments, such as playing the ADI card toolkit, could help when working

with wicked and complex problems. This can help graphic designers to be more resilient and receptive to work and interact with technical arenas such as AI to solve a challenge or problem related to AI/graphic design-driven trends. Card toolkits show evidence of fostering a relaxed environment for graphic designers which leads to aiding in conceptual retrievals and improving engagement in provocative speculative discussions.

- (4) Ambiguity: Designers' inability to work effectively with AI due to skill impairment and limited knowledge and experiences can be gradually improved through adoption of the learning and pedagogy systems that introduce AI and gameplay toolkits to design academia and industry, besides using open-access knowledge platforms to harness technology progression and globalisation.

7.3.2 Claim (2): Saudi Arabian Context

As mentioned in Claim (1), resistance to change and fear of automation when working with AI was evident in individuals' attitudes, and opinions towards the notion of self-driven AI were tied to the cultural, social and behavioural norms and beliefs linked to Saudi Arabian society. These findings support Hagerty and Rubinov's (2019) claim, which was mentioned earlier in this thesis: individuals' perceptions and understandings of AI are strongly affected by cultural context and the geographical location where recipients of technology vary from one place to another. Therefore, I chose to conduct this research on Saudi Arabian participants who were academics and professional practitioners from the fields of graphic design, AI, and data. I recorded factors such as cultural norms, social background, ethnic composition, and socioeconomic status that influenced the end result and therefore generated a finding that allows other researchers to compare the context of Saudi Arabia with other sample studies from different countries and measure these contrasts and variants.

Moreover, the co-design and gameplay approach used in this research was the first of such an approach to be conducted and tested among academics and practitioners in Saudi Arabia, as stated by the sample of this research and documented through the lack of peer-reviewed studies on sample Saudi Arabian graphic designers. Although such an approach has been widely used on other samples from different countries and various sample backgrounds, as mentioned earlier in the literature review, to the best of my knowledge

during the writing of this thesis, none has been conducted among graphic designers from Saudi Arabia. Additionally, the contribution of the Saudi Arabian context indicated that localising AI using the Arabic language with various linguistic expressions and dialects within Saudi Arabian society poses new challenges for the researchers to improve the possibility of using the Arabic language in AI modelling and therefore solving this complex problem. Lastly, introducing emerging technology such as AI to the field of graphic design will empower the society of Saudi Arabia to engage and work effectively with this technology to fulfil the country's Vision 2030 especially with the giga projects of The Line¹⁴, Neom city¹⁵ and Red Sea Project where AI is a fundamental pillar of its infrastructure.

7.3.3 Claim (3): Job Transformation

The findings of this research suggest that AI is eliminating many tasks associated with the job of graphic designers articulating a new definition for their role where Autonomous AI models can re address their jobs title to be as curators, design directors, programmers, editors, evaluators, and also act as model feeders in the near future to generate design with minimum to none interference possible and as one of the research participant strongly stated *“the job of the graphic designer must align with what the technology is offering and where the vision 2030 of Saudi Arabia is going towards”* (P5)¹⁶.

7.3.4 Claim (4): Educational Development

Since the previous claim suggests that the role of graphic designers in practice will be redefined within the industry of generative AI and creativity, The findings from the semi-structured interviews and the generated results from the use of ADI toolkit at the co-design workshop suggest the possibility of introducing AI into the educational sector and as this suggestion was framed in the literature review chapter, Introducing generative AI

¹⁴ The Line, the first city fully serviced by autonomous AI. More details found here:

<https://www.neom.com/en-us/regions/theline>

¹⁵ NEOM City which was announced in 2019 as part of the vision 2030. More details found here:

https://www.neom.com/en-us?gclid=Cj0KCQiA6fafBhC1ARIsAIJl8lvPyDfaBXQ4yVGnJnr6-iHZtK6IxNJIokzK55C9iE3c0vofhmH9KUaAo47EALw_wcB

¹⁶ This claim was generated from the semi-structured interviews in 2020 then published in a peer-reviewed conference (2021). It is aligned with a published report from UNESCO (2021).

into the courses of graphic design program can be done in two ways: (1) as foundation courses which will empower knowledge and foster creativity and innovation through the early stages of the graphic design undergraduate program and will help build a solid curriculum that upscale the students' knowledge and skills that serves the development happening in labour market. Also, (2) as an embedded assistant tool for students to use within the design process to generate visual elements in their indented courses taking into consideration ethical bylaws of using AI within the creative sector proposed by the UNESCO.

Additionally, The ADI card toolkit could be introduced in the academic framework to improve graphic design pedagogy and the graphic design curriculum. For example, the card toolkit could be used as a design thinking tool in courses that are teaching visual branding, advertising, packaging, professional practice and senior graduation project courses. Alternatively, it could be used to introduce new courses and curricula, such as artificial intelligence for graphic designers, algorithms, and data-driven courses, as well as courses teaching the foundations and principles of artificial intelligence, machine learning, and data science, which could be tailored to serve the creative sector. This proposal can help students as well as teaching faculty to visualise, integrate and think of the possibilities of having AI agents in their projects and end designs, as well as helping them tailor their courses towards the future offered by the emergence of AI design.

Second, the ADI card toolkit is an educational generative toolkit that allowed me to provide a relaxed, fun environment for the participants to co-design by brainstorming ideas and speculative scenarios without being judged or criticised and without being constrained by concerns about whether their ideas and solutions for visualising and speculating on an autonomous AI-driven brand were inapplicable or out of the norm. Additionally, with the development of an AI system, the AI agent will be able to listen to, respond to and interact as a team member with other graphic designers to find solutions for a particular project and generate designs for, for example, a specific advertising campaign. These implementations support McLuhan's statement that with new technologies come new perceptions, with technology altering "the patterns of perception steadily and without any resistance" (McLuhan, 1967, 2012, p. 27).

7.3.5 Claim (5): Bank of AI Generative Models

Through this research, I designed and co-created a series of models with graphic designers, AI and branding specialists, and data experts, which resulted from playing the ADI card toolkit . These models were published in a peer-reviewed paper presented at the 9th International Association of Societies for Design Research (IASDR) in 2021. The conference proceedings were published in the Springer Journal in November 2022, titled “With Design: Reinventing Design Modes”. From this thesis, I anticipate that the ADI-GAN models are the beginning experimental attempt to create a bank reference of ADI-GAN models that can be accessed by other researchers, scholars, academics, and designers as a first step in the endeavour to explore AI generative models that could autonomously generate designs for self-driven branding with minimal/to no-interference by graphic designers. Importantly, I stress that these current versions are the result of many explorations attempts and need further development. They are not end products but trials to stimulate curiosity and provoke other researchers and stakeholders to engage further with speculative provocative scenarios, which may allow to answer many questions in the realm of text, vision and speech self-generated systems. Therefore, they will provide more opportunities to build on and experience AI and open new spaces to stimulate debates and generate discussions and lead to new findings, insights, and new knowledge.

7.3.6 Claim (6): Inclusiveness

The findings of the research focused on investigating the possibility of generating visual designs of an autonomous AI-driven brand as a whole, whereas previous studies, as mentioned earlier in the literature chapter, have focused on testing the possibilities of generating logos, websites, packages, and artwork. This research, thus, suggests a roadmap for AI models to be self-driven acting as an individual brain for a particular brand that can generate designs and visuals that represent its value and identity. Additionally, the research findings can be experimental and empirical to other areas of the graphic design disciplines such as motion graphics, mutant typefaces, self-generated animation, advertising designs and interactive visual campaign productions which act as a result of the self-driven brands.

7.4 Research Impact

7.4.1 Awareness and Dissemination

The relative nascency of this area of research and the many findings highlighting the importance of disseminating awareness about this area of research indicate that without our recurrent updates to the progressions and trends of these technologies, they will always be obsolete and worthless. I set out to spread the word about the work I have conducted, the conclusions I have drawn, and the implications I predict for the future. I first submitted an abstract and a presentation at the Lancaster University Faculty of Arts and Social Sciences Intellectual Party/Summer Conference in 2018. Then, I presented another poster at the PhD Consortium at the peer-reviewed Design Research Society (DRS) International Conference in 2020. In 2021, I was the lead author of two peer-reviewed papers presented at the 9th International Association of Societies for Design Research (IASDR) which was first presented in 2021, and published its proceedings in 2022 by Springer Journal, titled “With Design: Reinventing Design Modes”. Participating and speaking at these conferences to share my ideas and preliminary findings with my peers and other interdisciplinary audiences allowed me to receive helpful constructive feedback, network with other researchers in the same field, and disseminate information about the revolutionary effects of AI technology.

In addition to these conferences, I was invited by a local university in Saudi Arabia as a guest speaker as part of their postgraduate master’s programme and by another university as part of the graphic design undergraduate programme to share my research findings and to expose the design students to new knowledge and new opportunities associated with AI. I also used my Twitter feed as a social platform to participate in open Twitter Spaces as a guest speaker with an average of 60 Saudi academics and graphic design professionals and practitioners, hoping that by exposing my research, I could assist others in learning more about the revolutionary effects of AI and the natural impact of these activities. These public events may aid in the discovery of novel concepts and insights by others. For instance, I have been contacted by several graduate students, as well as some of my peer academics and graphic designers who were either pursuing postgraduate research in AI and graphic design or have been inspired by the research methodologies and methods and were interested in steering their work towards the emerging field of AI-

driven designs. For example, a respected academic used the same co-design gameplay approach to present a workshop as part of the Saudi Design Week 2022. The workshop “Matchmaking Game” was meant to combine Arabic and Latin letters to create visual design, logos and more in a co-design environment with amateur and professional participants (Figure 62).



Figure 62 - The Matching Game, a co-design gameplay workshop inspired from this research methodology approach. The Workshop was conducted as part of the Saudi Design Week 2022 Source: Saudi Design Week, social media (open access account), 2022.

7.5 Research Implications

The findings of this thesis can be related to the theory and practice of graphic design in two ways. First and as it was stated earlier in the literature review chapter and as a contribution of knowledge, many of the educational sectors have introduced the foundations of artificial intelligence in their programs either as general theory courses or as elective courses such as Stanford University introducing AI to their law school (2019) where other institutions are introducing AI in business schools and design schools (Xu and Babaian, 2021; Kaiser, 2019; Hansen, 2019). This, as suggested in Claim (3) and Claim (4), is an attempt to integrate AI and improve the higher education pedagogy and

curriculum development to match the labour market requirements and the speculated jobs of the future.

7.6 Research Limitations

There is no complete research study that does not involve coming across some limitations and challenges at a certain point. There was one notable limitation that affected the progress of this research, as well as certain other limitations related to the methods of conducting the research. These limitations are described in the following sections.

The first significant limitation was the impact of the coronavirus that affected the globe in 2020. This was when I was preparing to collect the data, reach out to interview participants while designing the ADI card toolkit and preparing for the co-design workshop at the same time. As a result of all the challenges and difficulties that COVID-19 has brought globally and personally, I only managed to run the semi-structured interviews remotely. In addition, only one ADI card toolkit could be tested before running the gameplay in the co-design workshop that took place in Saudi Arabia. Due to the course of the extended COVID-19 safety protocol, which lasted for another year, I only managed to work on extracting the data, analysing it and drawing out the findings and results in preparation for the final year of writing the thesis. The research timeline was a major constraint in terms of running the interviews and workshops, which therefore limited the number of interviewees and the number of workshops that took place. Due to all of these challenges caused by COVID-19, the research timeframe was changed more than once, affecting my progress and the overall research plan. I attempted to mitigate this by maintaining steady progress without sacrificing the quality of the research and the validity of the data collected throughout the research.

7.6.1 Limitations and Challenges of the Interviews

While conducting the interviews, I experienced several limitations due to the uncertainty brought about by the COVID-19 pandemic at the time that these interviews were conducted. Contacting potential candidates and getting their approval to participate was time consuming, as people at that time were very vulnerable and insecure, which thus caused a number of candidates to withdraw, not respond in time or be hesitant to

participate. Overall, despite the fact that COVID-19 led to certain limitations in the nature of conducting the interviews, carrying them out remotely did not hinder the content of the interviews. Although the tone of voice, pauses in speaking, and some facial impressions were the only non-verbal cues that could be discerned in a remote interview, as pointed out by Opdenakker (2006), the data extracted from the interviews were sufficient and valuable for the study.

Moreover, many interviewees who took part in the interviews admitted that the breakout of COVID-19 affected the nature of their work environment, forcing them to shift to a technology-dependent and digitally driven environment. Academics, for example, expressed how these remote courses hindered their direct contact with students in terms of delivering their courses, assessing student projects and interacting with students effectively. However, some other interviewees admitted that this dramatic change raised their awareness and added a broader perspective regarding the necessity of accepting the technology revolution and handling any changes that come with it, including in the communicative content of the design itself. As stated by one of the interviewees, “it is a positive–negative dilemma” (P9).

Although semi-structured interviews were an effective method to measure the level of knowledge among participants from Saudi Arabian society and record their emotions, opinions and views regarding how AI might impact them, the method did not offer them an actual experience of how that impact might transform their thoughts and feelings into tangible practice. Therefore, I tailored the results of these interviews by looking into the challenges and opportunities that AI can bring to the field of graphic design by using gameplay approach, designing a card toolkit and testing this in an interactive playful collaborative environment, that was introduced in the co-design workshop.

7.6.2 Limitations and Challenges of the Card toolkit

The design of the card toolkit was constrained by a number of limitations, such as the accessibility of production houses and the materials used for the printable version of the toolkit. Moreover, it was challenging to run multi-able prototypes and tests prior to implementing the gameplay with the research sample. This was due to the circumstances of and safety precautions taken during the COVID-19 pandemic, which was when this

phase of the research took place. Therefore, to ensure that the toolkit was functional, playable and technically feasible, I ran one pilot test with some of my PhD peers. Although the COVID-19 pandemic was a challenge at that time, it brought an opportunity to consider developing a digital version of the card toolkit once the initial vision has been published and tested among designers, academics, researchers and stakeholders. This may result in further developments for future research and design purposes, as well as making the toolkit accessible to other designers, researchers and stakeholders.

7.6.3 Limitations and Challenges of the Workshop

Two main challenges were faced while preparing for the workshop. The first was to locate a venue that could accommodate the number of participants and the organising team, taking into consideration the rules and safety regulations of conducting an in-person workshop during the COVID-19 pandemic. The second challenge was to present and execute the model in a simple and readable format that the participants could understand and work with. It was a challenge to ensure that the participants could understand and build complex AI models and then test their applicability and feasibility with other participants in a real-world setting within a limited timeframe. Additionally, as experimentation with AI generative models is still new, issues of biases feeding the model with accurate data can be complex due to the positive feedback loop that can occur when using repetitive data sourcing (Suresh and Guttag, 2019). Some massive data sources require a lot of time and effort to process because data origins constantly change. This limitation was encountered during model development when sourcing, extracting, labelling and utilising data became complex. As a result, many brands may see this as an opportunity to invest in an ADI-GAN model so that they can lead the trend of autonomous branding, while ensuring adequate time and funds for this trend to grow and develop.

7.7 Recommendations and Future Work

My PhD research is merely the first step of a broader body of work investigating the possible benefits and potential challenges that artificial intelligence imposes on graphic design. It was a long journey to learn from, engage with and reflect upon my design experiences and my career as an academic and it was an opportunity to use the recent trends of generative AI and what it brought into the creative sectors, some rails were

tested were other I am still in process of discovering and implementing in my own projects and my career as an academic to bring into my teaching journey. Therefore, in this final section of this chapter, I will detail how my research findings can be expanded upon and improved in further research in the future.

My doctoral research represents an initial foray into a comprehensive investigation of the multifaceted impact of AI on graphic design. This journey has been extensive, providing rich opportunities to learn from, engage with, and reflect upon my design practice and academic career. It has enabled me to harness emerging trends in generative AI, observing its influence on the creative industries. While certain methodologies have been rigorously tested, others remain in the exploratory phase, with the potential for integration into my projects and pedagogical approach. This concluding section of the chapter will articulate how the insights gained from my research could be further refined and extended in future scholarly endeavours.

7.7.1 Future Co-Design Workshops

Ethical concerns concerning accountability, ownership and legitimacy in the generation of design could be sparked by exposure to the diverse range of perspectives afforded by participation in a co-design workshop, which draws participants from a wide range of cultural backgrounds and countries. To find strategies for adapting to and merging with the society where the research takes place, and to quantify the extent and character of these strategies, I advocate carrying out more co-design workshops with a wider research sample. For example, the empirical research could be conducted using a sample from all five regions of Saudi Arabia, which could then be compared with one another to measure how each region interacts with AI. Additionally, this comparative approach could be conducted among other countries that have various cultural backgrounds and social norms that are different from the Saudi Arabian culture, such as the United Kingdom or China. This would also help generate more results, more models and more behavioural and cognitive insights, which would thus generate new results and findings for these countries.

7.7.2 Developing the ADI-GAN Model

As mentioned earlier in the limitations section, this is an excellent opportunity to invest in developing and improving the mechanisms of the ADI-GAN model proposed in this research. This would allow further experimentation by creative practitioners, AI experts, stakeholders and leading brands to test the feasibility and productivity of autonomous models, particularly in terms of how they can be part of the design process by generating ideas, proposing initial designs and helping with the final design outcome. Additionally, I propose investing in a platform where generative AI models can be accessible to and usable by both creative practitioners of different disciplines in art and design, and model developers, which would open opportunities for invention and the discovery of new trends.

7.7.3 Diversity of the Research Sample

This research was conducted with 23 interviewees and nine percipients, whereas some other studies were conducted with a more limited sample size of, for example, 16 participants. Additionally, the sample of this research consisted of professionals and experts as well as academics from the graphic design domain, AI, data and branding, while the samples and background experiences of the other participants stated earlier in the literature review involved either design students, start-ups and graphic design practitioners or graphic designers and AI only. Therefore, I am offering the opportunity for this research to be conducted on a wider range of graphic designers collaborating with AI experts. For example, the investigation could be expanded to a minimum of 50 participants from each domain, or other UX and UI designers can be part of the sample study.

7.7.4 Open Access ADI Card Tool kit

As an extension of my closing remarks and reflections in the ADI card toolkit chapter, I am working on a second, improved version of the ADI card toolkit, which will allow more options in terms of the technical side of the constructing the toolkit and the supporting material that comes with it such as the ADI-GAN model. I am also working on proposing an open-access ADI card toolkit allowing other researchers, academics and post degree design students to experiment with, and improve the mechanism of how to

use it and interact with it within classrooms and other educational setups. This would enable them to generate new results and versions that could serve different design audiences other than those in graphic design.

7.7.5 Experimenting with Open-Source AI Generators

Many other research groups and labs have developed open-access platforms, such as Midjourney and Stable Diffusion (Borji, 2022) which, as stated earlier in the literature review have had an impact on the creative industry by using a text-to-image generative model that can read prompts, words and sentences and then transfer them into an image, thus allowing users to experiment with their imaginations for the AI generative artwork. This revolution has been astonishing, not only in terms of the speed of execution, which can take just seconds to be generated but also in terms of the quality and variety of the ideas produced, which have been of sufficiently high quality for designers and artists to experiment with them. Text-to-image has not been the only attempt; other research groups and research labs, such as Runway, have also developed text-to-video, which enables the editing and generating of videos by using text descriptions in natural language (Valenzuela et al. 2018).

7.7.6 Collaborative Research Groups

In conducting this research and writing up the thesis, I argue that additional activity should be considered throughout the stages of the research process. In fact, I propose an alternate experimentation route by inviting other research peers to collaborate and investigate together, which would provide the opportunity to focus on new insights and generate new ideas by using text-to-image, speech-to-image and text-to-video models. Nonetheless, I hope that the ADI card toolkit and the ADI-GAN model that I have developed will provide a format where non-academic stakeholders can interact with and learn from my research.

7.8 Conclusion

This thesis is a milestone of a continuous journey investigating the emergence of AI within the field of graphic design, which marks a significant pivot, especially in the context of Saudi Arabia's ambitious Vision 2030. This thesis has navigated the

complexities of AI looking into the challenges as well as possibilities brought by AI in reshaping the role of graphic designs and the nature of their proactive presence in academia and practice.

The cumulative discussions and debates, engagements and academic publications fuelled by the semi-structured interviews and the co-design workshop have revealed a tangible enthusiasm mixed with cautious optimism among the Saudi design community towards the strong presence of AI in their culture. They recognize the potential of AI to generate autonomous visual designs while recognizing that designers can think, ideate, and engage with AI to mitigate challenges while unlocking innovative opportunities. Furthermore, the research findings emphasize the necessity for graphic designers to expand their repertoire to credit the presence of AI within the creative industry allowing them to become a collaborative force. Lastly, the research concludes that the future of graphic design, particularly in Saudi Arabia, will be characterized by a symbiotic relationship between human creativity and machine intelligence to foster a culture that thrives on partnership, where both educational and practical frameworks will encourage the coexistence and mutual growth of AI systems and design professionals.

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Appendix A – The Official Email Sent to Participants

Participants' Invitation Email

Name of Researcher: Duha Engawi (PhD Candidate)

Supervisors: Prof. Charlie Gere and Dr Daniel Richards

Title of Project: Graphic Design in the Age of Artificial Intelligence: A co-design speculative driven research on the advent of AI to Graphic Designers in Saudi Arabia

Sponsor: The Saudi Arabian Cultural Bureau (SACB) - PNU Scholarship

Dear Participant,

I am a PhD candidate at Lancaster Institute for Contemporary Arts (LICA), Lancaster University, United Kingdom. My study aims to investigate the potential impact of AI on graphic designers, including an assessment of how those designers can use AI as a 'self-governed' system in branding rather than an innovative application tool. Furthermore, the research will assess how designers can use this technology to create innovative designs.

I would like to invite you to become a part of my investigative journey and participate in the interview phase of the study.

As Graphic Design is becoming increasingly reliant on automation and AI applications in Saudi Arabia, the expected output of the research is to present theories and prototypes of alternative futures for the use of Artificial Intelligence. Furthermore, the study will look into how brands can utilise AI as an independent system rather than an application to generate designs and communicate with consumers through data and algorithms.

I foresee a thought-provoking experience for professionals experts and academics from different professions to participate in this research and understand the relationship between Artificial Intelligence and Graphic Design and how it can impact graphic designers in Saudi Arabia. This research is a co-design speculative driven research which will evoke new and practical innovative insights and solutions across several creative sectors in Saudi Arabia.

A participation Information Sheet (PIS) and a Consent Form are attached to this email to provide further details about the interview. Please take time to read the information provided to determine your level of interest in participating in the research. The study is supervised by Prof. Charlie Gere and Dr Daniel Richards from Lancaster University, United Kingdom.

Once you confirm your agreement to participate in this research, can I kindly ask you to email the completed consent form to me. I will contact you shortly afterwards to arrange a suitable date, time and a method of virtual communication to conduct the interview.

Thank you for your kind consideration, and I am looking forward to your response.

Best,

Duha E. Engawi

Email: d.engawi@lancaster.ac.uk

Phone: +966504384546 (WhatsApp)

Lancaster Institute for the Contemporary Arts (LICA), The LICA Building
Lancaster University, United Kingdom

D.Engawi

Appendix B – Interviews Participants Information Sheet

Participation Information Sheet

Can I kindly ask you to take the time to read the following information carefully before you make a decision whether or not you wish to participate in this study.

Who will conduct the research?

Duha Engawi, a PhD candidate at Lancaster Institute for the Contemporary Arts (LICA), Lancaster University, United Kingdom.

What is the study about?

The potential impact of Artificial Intelligence (AI) on creative disciplines is opening up a range of questions and concerns from both design practitioners and academics about the future of design. This study investigates the potential impact of AI on graphic designers, including an assessment of how those designers can use AI as a 'self-governed' system in branding rather than an innovative application tool. Furthermore, the speculative design will be used to provoke and challenge the ways in which graphic designers may work with AI in a productive future design 'relationships'.

This research uses co-design and speculative design as core methods to initiate discussions and debates through semi-structured interviews and co-design workshops. Co-design activities will be conducted with local participants from a cross-section of professions in Saudi Arabia, a country undergoing a massive change and transformation dubbed 'Vision 2030' which is led by innovation in digital technologies, with many transformations focusing on the use of Artificial Intelligence as a leading technology.

Why have I been invited?

I have approached you because you have been identified as an active member in your field of profession in Saudi Arabia, and your qualification and experience fit the sampling criteria of this research. I would be very grateful if you would agree to take part in this study.

What will I be asked to do if I take part?

If you decided to take part, this would involve being interviewed (approximately an hour-long) about your profession, general knowledge and background use of Artificial Intelligence in your work experience. I will also ask your permission to take Audio and video recording of the interview, which will be anonymised to conceal your identity prior to transcription. If you do not agree to be recorded, I will take notes during the interview, which will be later anonymised.

Do I have to take part?

No. It's entirely up to you to decide whether or not you take part.

What If I changed my mind?

If you change your mind, you are free to withdraw your participation from the study at any time, and up to two weeks from the date of the interview. If you want to withdraw, please let me know, and I will extract any ideas or information (data) you contributed to the study and destroy them. However, it is difficult and often impossible to take out data related to one specific participant when its already been anonymised or pooled together with other people's data.

What are the possible benefits of taking part?

There is no financial benefit for participation in this study. However, you may find that this study provide you with the opportunity to be a part of the movement to develop and contribute to Artificial Intelligence impact on graphic designers in Saudi Arabia. Moreover, it might offer you an opportunity for reflection on your work experiences within the subject of the research.

What are the possible disadvantages and risks of taking part?

There are no risks concerned related to taking part in this study, and it is unlikely that you will experience any disadvantages.

Will my data be identifiable?

The researcher and her academic advisers are the only ones who will have access to all data collected, which will be treated with confidentiality and respect. All reasonable steps will be taken to protect the anonymity of your participation in this research, and your identity will not be revealed and will not be shared with others unless otherwise, you intend to do so.

How will I use the information you have shared with me, and what will happen to the results of the research study?

I will use the data for research purposes only. This will include my PhD thesis and other publications, for example, journal articles, conference papers and I may also present the results of my study at academic conferences. When writing up the findings from this study, I would like to reproduce some of the views and ideas you shared with me. I will only use anonymised data so that although I will use your exact words, you cannot be identified in my publications.

How my data will be stored?

Your data will be stored in encrypted files (that is no-one other than the researcher will be able to access them) and on password-protected computers. I will store hard copies of any data securely in locked cabinets in my office. I will keep data that can identify you separately from non-personal information (e.g. your views on a specific topic) following University guidelines, and I will keep the data securely for a minimum of ten years.

What if I have a question or concern?

If you have any further questions or concerns in which this study is being conducted, you are welcome to contact me at any time through the email provided. If you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, you can also contact the head of the department through the following contact.

PhD Researcher

Duha E. Engawi
Email: d.engawi@lancaster.ac.uk

Head of the Department

Name: Judith Mottram
Email: judith.mottram@lancaster.ac.uk
Tel: +44 (0)1524 594395

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This study has been reviewed and approved by the Faculty of Arts and Social Sciences and Lancaster Management School's Research Ethics Committee.

For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection

Appendix C – Consent Form

Lancaster Institute for the
Contemporary Arts



Consent Form

Project Title: Graphic Design in the age of Artificial Intelligence: A co-design speculative driven research on the advent of AI to Graphic Designers in Saudi Arabia

Name of Researcher: Duha Engawi

Email: d.engawi@lancaster.ac.uk

Please tick each box

1. I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and receive satisfactory answers.	<input type="checkbox"/>
2. I understand that my participation is voluntary and that I am free to withdraw at any time during my participation in this study without giving a reason. If I withdraw within two weeks of taking part in the study, the data which has been collected may be used. I understand that it will not be possible to remove my data once anonymised and forms part of the data set.	<input type="checkbox"/>
3. I understand that as I am participating in the interview, any information disclosed within the conversation will remain confidential, and I will not discuss it with or in front of anyone who was not involved in the research without my consent unless agreed with the researcher in written.	<input type="checkbox"/>
4. I understand that any information given by me may be used in future reports, academic articles, publications or presentations by the researcher. However, my personal information will not be included, and I will not be identifiable unless I have chosen to do so.	<input type="checkbox"/>
5. I understand that a fully anonymised data will be offered to Lancaster University's institutional data repository and will be made available to genuine researchers for re-use (secondary analysis) with an appropriate data license.	<input type="checkbox"/>
6. I understand that my name/my organisation's name will not appear in any reports, articles or presentation without my consent.	<input type="checkbox"/>
7. I understand that interviews will be audio/video recorded and transcribed. Data will be protected on encrypted devices and kept secure.	<input type="checkbox"/>
8. I understand that data will be kept according to University guidelines for a minimum of 10 years after the end of the study.	<input type="checkbox"/>
9. I agree to take part in the above study.	<input type="checkbox"/>

Name of Participant

Date

Signature

I confirm that the participant was given the opportunity to ask questions about this study. All the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the participant has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher /person taking the consent _____ **Date** _____

One copy of this form will be given to the participant. The original will be kept in the files of the researcher, Lancaster University.

V18-9-19

Appendix D – Workshop Participants Information Sheet

Participation Information Sheet Workshop Participation

Can I kindly ask you to take the time to read the following information carefully before you make a decision whether or not you wish to participate in this study.

Who will conduct the research?

Duha Engawi, a PhD candidate at Lancaster Institute for the Contemporary Arts (LICA), Lancaster University, United Kingdom.

What is the study about?

The potential impact of Artificial Intelligence (AI) on creative disciplines is opening up a range of questions and concerns from both design practitioners and academics about the future of design. This study investigates the potential impact of AI on graphic designers, including an assessment of how those designers can use AI as a 'self-governed' system in branding rather than an innovative application tool. Furthermore, the speculative design will be used to provoke and challenge the ways in which graphic designers may work with AI in a productive future design 'relationships'.

This research uses co-design and speculative design as core methods to initiate discussions and debates through semi-structured interviews and co-design workshops. Co-design activities will be conducted with local participants from a cross-section of professions in Saudi Arabia, a country undergoing a massive change and transformation dubbed 'Vision 2030' which is led by innovation in digital technologies, with many transformations focusing on the use of Artificial Intelligence as a leading technology.

Why have I been invited?

I have approached you because you have been identified as an active member in your field of profession in Saudi Arabia, and your qualification and experience fit the sampling criteria of this research. I would be very grateful if you would agree to take part in this study.

What will I be asked to do if I take part?

If you decided to take part, this would involve taking part in a workshop (Four hours long). It is meant to collect data by using the co-design method. The workshop will introduce a thought-provoking experience for participating professionals, experts and academics from three professions relevant to the research subject. The aim of the workshop is to address how graphic designers may work with AI-agent models and what is their role in the process of autonomous design and brands. Moreover, it will engage participants through provocative expertise to encourage them exhibiting new possibilities, refining challenges and feasible outcomes.

Do I have to take part?

No. It's entirely up to you to decide whether or not you take part.

What if I changed my mind?

If you change your mind, you are free to withdraw your participation from the study at any time, and up to two weeks from the date of the workshop. If you want to withdraw, please let me know, and I will extract any ideas or information (data) you contributed to the study and destroy them. However, it is difficult and often impossible to take out data related to one specific participant when its already been anonymised or pooled together with other people's data.

What are the possible benefits of taking part?

There is no financial benefit for participation in the workshop. However, you may find that this study provide you with the opportunity to be a part of the movement to develop and contribute to Artificial Intelligence impact on graphic designers in Saudi Arabia. Moreover, it might offer you an opportunity for reflection on your work experiences within the subject of the research.

What are the possible disadvantages and risks of taking part?

There are no risks concerned related to taking part in this study, and it is unlikely that you will experience any disadvantages.

Will my data be identifiable?

The researcher and her academic advisers are the only ones who will have access to all data collected, which will be treated with confidentiality and respect. All reasonable steps will be taken to protect the anonymity of your participation in this research, and your identity will not be revealed and will not be shared with others unless otherwise, you intend to do so. I will also ask your permission to take Audio and video recording of the workshop, which will be anonymised to conceal your identity prior to transcription.

How will I use the information you have shared with me, and what will happen to the results of the research study?

I will use the data for research purposes only. This will include my PhD thesis and other publications, for example, journal articles, conference papers and I may also present the results of my study at academic conferences. When writing up the findings from this study, I would like to reproduce some of the views and ideas you shared with me. I will only use anonymised data so that although I will use your exact words, you cannot be identified in my publications.

How my data will be stored?

Your data will be stored in encrypted files (that is no-one other than the researcher will be able to access them) and on password-protected computers. I will store hard copies of any data securely in locked cabinets. I will keep data that can identify you separately from non-personal information (e.g. your views on a specific topic) following University guidelines, and I will keep the data securely for a minimum of ten years.

What if I have a question or concern?

If you have any further questions or concerns in which this study is being conducted, you are welcome to contact me at any time through the email provided. If you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, you can also contact the head of the department through the following contact.

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This study has been reviewed and approved by the Faculty of Arts and Social Sciences and Lancaster Management School's Research Ethics Committee.

For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection

Appendix E – Workshop Guidelines



Lancaster Institute for the
Contemporary Arts



Workshop Guidelines

Workshop Title

When GANs Meet Graphic Design: Exploring the convergence of graphic design and machine learning to generate autonomous branding

Workshop Description

This workshop constitute a major milestone in my PhD research entitled: **Graphic Design in the Age of Artificial Intelligence: A co-design speculative driven research on the advent of AI to Graphic Designers in Saudi Arabia**. It is meant to collect data by using the co-design method with a speculative approach. The workshop will introduce a thought-provoking experience for participating professionals, experts and academics from three diverse backgrounds related to the research subject.

Workshop Time and Date

The workshop will be **Four hours** in length (including breaks) starting from 11:00 am until 3:00 pm, It will be held at Makana Space, Riyadh, Saudi Arabia ([Location on Google Maps](#)).

Workshop Outline

The Workshop will be divided into three phases, this will include a presentation and a number of provocative exercises. Participates will be randomly divided into three groups, on the basis that each group will include an AI Expert, a Brand Specialist and a Graphic Designer (ATTACHED)

Attendees

Due to the rules and regulations enforced by the local authorities to limit the spread of COVID-19, the number of people in the provided space will be limited to 15 persons, this includes the researcher, the participants and the organising team.

Event Recording

- Audio and Video recording of the event is required to cover the entire workshop. This will include a cameraman to take still photo shoots for academic purposes only which is only accessible by the researcher and her advisors. The video recording will help with analysing the event for aspects which can not be captured by audio recording alone.
- Whenever possible, The identity of the participants will be kept anonymous and will be dealt with respect, and confidentiality which are maintained throughout the whole research process.
- This protocol is followed according to the ethical measures of Lancaster University.



- All gathered research data will be stored securely on only encrypted computers and servers and accessed only by the researcher for purposes of this research. Upon completion of transcription, all original recordings will be securely erased from data storage.

Start	End	Length (Minutes)	Phase
11:00 am	11:05 am	5	Reception - Settling and taking place
11:05 am	11:10 am	5	Introduction to the workshop, participants and timeline
11:10 am	11:20 am	10	Phase 1: Introduction to Artificial Design Intelligence
11:20 am	11:30 am	10	Reflection and Discussion on phase one
11:30 am	12:30 pm	60	Phase 2: Identifying key challenges for ADI-GANs - Questions Sheet
	(60 min) Total of 9 questions must be answered	6	Guidelines
		15	3 Questions - (1 for each group)
		3	Placing Answers on the matrix
		15	3 Questions - (1 for each group)
		3	Placing Answers on the matrix
		15	3 Questions - (1 for each group)
		3	Placing Answers on the matrix
12:30 pm	12:40 pm	10	Reflection and Discussion on Phase 2
12:40 pm	1:00 am	20	Break: Prayer, Coffee and Refreshments
1:00 pm	2:00 pm	60	Phase 3: Exploring possible future of ADI-GANs model - Card Game
	(60 min) Total of 3 Models	10	Guidelines: Explaining the model and how to play the game
		40	Generating Models (One for each group)
		10	Illustrating Final model
2:00 pm	2:10 pm	10	Break: Coffee and Refreshments
2:10 pm	2:55 pm	45	Presenting Each model, Reviewing results, exchanging ideas and thoughts
		15	Team (1) will present their model (5min) - Feedback (10min)
		15	Team (2) will present their model (5min) - Feedback (10min)
		15	Team (3) will present their model (5min) - Feedback (10min)
2:55 am	3:00 pm	5	Conclusions & Workshop Closure

Regards,

Duha Engawi
PhD Candidate



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