To What Extent are Traditional Design Principles Relevant in the Era of Automation and AI-Driven Design?

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Abstract

Investigating traditional design principles questions their place in the context of automated, Artificial Intelligence (AI) driven design. Drawing on foundational texts such as Muller-Brockmann's exploration of grid systems and modern critiques like Pater's inspection of design methodologies, the universality and applicability of design principles in an era of mass technological change are questioned. The writing explores the tension between human creativity and machine-driven processes by analysing the historical evolution of design frameworks and comparing them with the capabilities and limitations of generative AI tools.

While AI can operationalise objective frameworks, it falls short in replicating subjective creativity and contextual awareness. Historically Western design principles risk perpetuating biases when applied universally. As AI integrates into creative industries, designers will likely transition toward oversight and direction roles, using AI as a tool rather than a replacement. Furthermore, the inner workings of generative AI brings technical limitations including the foundational diffusion method.

AI has equally catastrophic and revolutionary potential. We do not understand the exact logic behind neural networks, preventing confident assumptions however considering the implications of the various paths AI could take is productive and precautionary. Human creativity, adaptability and ethical considerations are vital in ensuring AI enhances design. Advocating for inclusive, culturally sensitive training models and prioritising empathetic values highlights the potential for fruitful collaboration between human ingenuity and machine efficiency.

Introduction

As design practices adapt to technological advancements, the potential for automation in design becomes increasingly relevant. If compelling design can be quantified, it can be programmed. Investigating design principles will inform how algorithms and machine learning systems could be trained to generate 'good' design. Exploring the historic foundations of effective design and examining the tension between computational order and human intuition will inform predictions on the technology-driven design industry shift. Questioning the definition, context, biases and effectiveness of design principles will uncover their validity and universality. Even design styles that claim to have no rules operate within certain frameworks, which can be utilised mechanically. Evolving technological landscapes demand a fresh examination of the intersection between machinery and artistry: objectivity and subjectivity. The implications of democratised design tools, the potential of Artificial Intelligence (AI) and the evolving roles of graphic designers will be theorised. The automation potential of design principles will unearth the extent to which automated, rule-based design can replace human designers.

Contextual Review

A range of media from various contexts and time periods informs my research to mould a rounded prediction for how AI will affect graphic design. The literature referenced involves primarily Western perspectives as this is most accessible, however, the importance of non-Western perspectives and contexts is speculated. Whilst the references could be more diverse, each was inspected with a critical eye.

Established design rules rooted in literature, like Joseph Muller-Brockmann's rational grid systems compared to Ruben Pater's critique of Eurocentric design biases balances historical and modern perspectives. Foundational design principles are scrutinised for their claims of universality. Modern critiques, such as Tunstall's advocacy for decolonized methodologies, challenge Western dominance in design discourse, pushing for more inclusive, adaptive principles. Meanwhile, AI tools like MidJourney exemplify how automation reshapes creative processes. Limitations, from cultural insensitivity to the lack of human nuance, question their capacity to replace intuitive human judgment.

Ruben Pater's "Politics of Design" is foundational to this research, addressing design principles, context and bias all in one. Sitting between theory and practice design principles are both a functional framework and a cultural construct. Integrating diverse viewpoints frames an informed prediction of AI's role in shaping the future of graphic design, emphasising the importance of balancing algorithmic efficiency with human-centred creativity.

Design Principles

Design principles are guidelines that shape the practice of graphic design. Tools for aesthetic refinement, design principles help solve visual communication problems effectively: They are "building blocks" (Dabner and Stewart, 2023) for all 'good' design, enabling designers to organise visual elements with room for creativity. Design principles are the scientific approach to a subjective field, born from technical limitations and visual processing conventions. But can visual preferences be rationalised or are design principles another example of apophenia? Proving successful visual patterns is complex but accepted rules become the norm which is digestible. Do design principles act efficiently or do they "confirm existing patterns.... conditioning human behaviour" (Van Toorn, 1972): Is exploiting tradition a reason not to use them?

The Debate (1972), a design discussion between Dutch graphic designers Wim Crouwel and Jan Van Toorn, explores the two main design pathways: The first approach is to convey messages as "clearly and objectively as possible" whereas the other believes there is "no such thing as an objective message... any act of design... will introduce an element of subjectivity" (Poynor, 2015). These contrasting philosophies are highly relevant to AI potential: the first favours machine-like thinking whereas the other rejects it.

Origins of design principles are rooted in movements like the International Style which emphasised clarity. Post WWII there was a "feeling of idealism among designers... Design is part of that need to rebuild, to reconstruct, to make things more open, make them run more smoothly, be

more democratic. There was... social responsibility among designers" (Poynor, 2007). Supposedly the designer "is better fitted to find a solution to his design problems which is functional, logical and also more aesthetically pleasing" (Muller-Brockmann, 1981) with the aid of a grid. The International Style believed absolutely in objective design, "The will to systematise, clarify... penetrate to the essentials, concentrate... cultivate objectivity instead of subjectivity... rationalise the creative and technical production processes... integrate elements of colour, form and material... achieve architectural dominion over surface and space... adopt a positive, forward-looking attitude" (Muller-Brockmann, 1981). Principles were developed so design solutions communicated information effectively literally and metaphorically. Principles "support the process of creating... while allowing room for visual freedom" (Dabner and Stewart, 2023). This interplay of form and function defines design.

The Golden Ratio is a value used in design to scale elements and divide space, ensuring relationships between elements are compositionally balanced. The proportion recurs in nature (shells and petals for example), it is Euclid's "Elements" (300BC) that first mentions the proportion. "De Architectura," regarded to be the first book on architectural theory, written by the Roman architect and engineer Vitruvius (80-15BC) used the ratio to divide space. Vitruvius' discussion of applying the perfect proportion inspired the famous Renaissance drawing of the "Vitruvian Man" and influenced the "Last Supper" and "Mona Lisa" by Leonardo da Vinci. In the 19th century, the Golden Ratio gained a reputation amongst artists with enthusiasts crediting its aesthetically pleasing properties to its recurrence in the natural world. The Golden Ratio also acted as a key foundational concept for pioneer of modern architecture Le Corbusier

and the Golden Ratio continues to influence relationships between elements in modern design. The appearance of the Golden Ratio in nature is factual however the extent of its frequency is exaggerated and its 'aesthetic properties' are debatable. Principles stemming from the Golden Ratio have existed almost since the inception of modern society, it is deemed an efficient technique because it feels familiar but is this because it occurs naturally or appears prevalently in virtually all highly regarded art and design for the last millennium?

John Thomas Smith (1979) first coined the expression "Rule of Thirds" in "Remarks on Rural Scenery," believing "two distinct, equal lights, should never appear in the same picture: One should be principal, and the rest subordinate... parts of equal appearance hold (the subject) awkwardly suspended." Smith's compositional guideline continues to be used in modern photography and graphic design today, becoming a core design principle. Theoretically, a centred focal point evokes balance. If offset, and aligned with the Rule of Thirds, it adds tension between the subject and negative space; Arguably becoming more visually appealing.

Unbeknown to Smith, compositions featuring the Golden Ratio are functionally and mathematically very similar to the Rule of Thirds. The latter divides a page into 33% and 67% sections whereas the former into approximately 38% and 62% sections (see right). Smith's discoveries pre-dated the Golden Ratio's mass popularisation and are based on different methodologies yet are similar, implying that there is certainty in aesthetics. If both are absolute, this proves design principles are flexible guidelines or application-specific. If the latter is true perhaps they are not as accurate as implied.

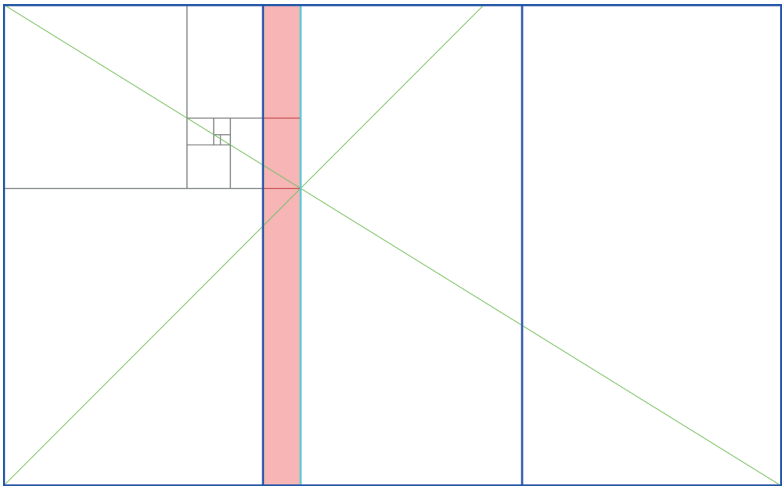

Figure 1: The space between the Golden Ratio and the Rule of Thirds

The universality of the Golden Ratio and Rule of Thirds is apparent in their application, spanning graphic design, photography, architecture and fine art to name a few, implying design principles are cross-disciplinary. Fields may differ but the targeted mechanism, the human eye, is constant: If it is drawn to certain areas of a composition or finds interest in set balances, discipline is irrelevant. The versatility of design principles determines efficiency.

Not to be mistaken for design principles, design philosophy is approach-based and does not depend on rigid rules. Designers like Paul Rand (1914-1996) prioritised philosophies over principles, adhering closely to Modernist theology. In "Thoughts on Design," Rand (1970) believes "design should integrate beauty and utility seamlessly," prioritising subjective definitions over objective principles. Whilst Rand may not have had a consistent methodology that could be distilled for the masses, he acknowledges the importance

of a systematic approach: "What is implied is that (a successful composition) may be accomplished simply by pushing elements around, until something happens. At best, this procedure involves the time-consuming uncertainties of trial and error, and at worst, an indifference to plan, order, or discipline." The hostile tone implies "an indifference to plan, order, or discipline" is critical. Rand does not acknowledge specific principles like the Golden Ratio or the importance of a grid system directly, however, his methodology did include a method, hinting that 'good' design can be compartmentalised. Contrarily, the designer "draws upon instinct and intuition. He considers the spectator, his feelings and predilections." Unlike conventional design principles his methodology is based on association: trusting the designer to make informed decisions based on the emotions they feel, suggesting design is impossible without human input.

The majority of reinforced design principles are invented and taught by a select, privileged few: Entitled people have the opportunity to speak, listen and regurgitate, perpetuating a relentless circle. Ruben Pater (2016) acknowledges this on the first page of "The Politics of Design," emphasising that "this book is not so global. The media are dominated by the world's urban regions in the Northern Hemisphere. Their reach... is worldwide... they should become more inclusive and more aware of political responsibilities." Pater argues all design is political, either "serving or subverting the status quo:" Without challenging conventions in design they are reinforced. "Being from Western Europe, (Pater's) view on the world is not neutral. I have asked others to help me with this book... It offers a multitude of perspectives (see right)." A range of opinions must be considered relating to design and the discussion surrounding design bias. Design principles that fail to recognise non-Western preferences are

useless and "acknowledging our biases is key to understanding why."

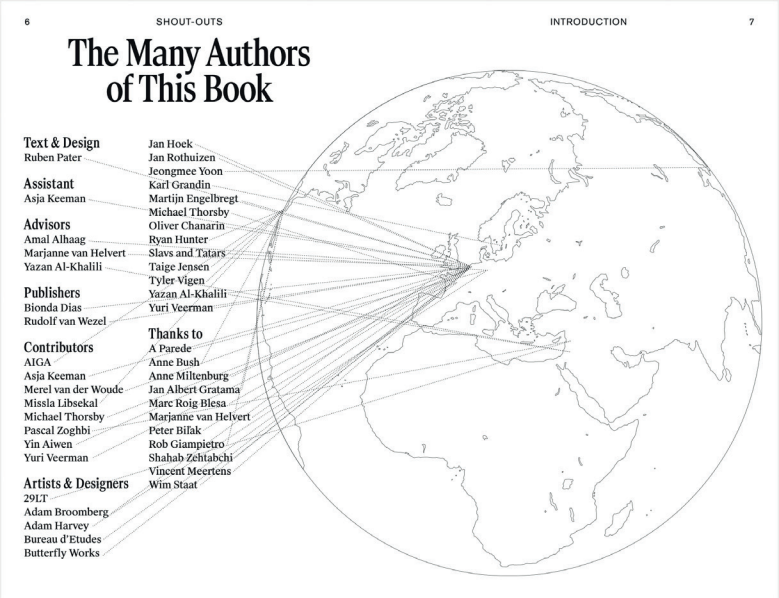

Figure 2: Contributors to Ruben Pater's The Politics of Design

One of the fundamental conventions of design is reading direction. Practical reasons inform protocols, and understanding these explanations is vital in distinguishing visual success from convention: "Arabic and Hebrew are written from right-to-left, and the reason for this may be that their predecessor Aramaic was inscribed in stone with chisel and hammer. A right-handed person would start work from right to left, with the stylus in the left and the mallet in the right. The Greeks used clay tablets, which would have them prefer inscribing from left to right, in order not to smudge out words. Latin, Coptic, and Cyrillic, which are the successors of the Greek alphabet, write left-to-right" (Pater, 2016).

Text direction is not a 'design principle' but if convention is broken, communicability suffers. 'Design principles' are self-fulfilling: In Western culture, we are acclimated to read left to right and, therefore, expect all written content to conform. Breaking this rule violates visual efficiency without being visually inferior: Are design principles only 'useful' because we have been told that they are by experts? Design that counteracts these principles does not break a 'secret visual code' but instead breaks convention which may be the same thing. The logos below are stylistically almost identical but are geared towards different geographical contexts, implying semiotics are universal.

Techniques used in Western typography are not translatable: "Arabic letters are based on calligraphy and not constructed like the Roman capitals. Latin styles like serif, sans-serif, humanist, or script are not applicable. Arabic has calligraphic styles... All of these have religious, cultural, and historical backgrounds that should be considered when choosing one" (Pater, 2016). Using serifs to elicit a sense of prestige does not apply to all contexts. Interference with legibility and different associations fail to elicit the same emotional response. Latin and Arabic languages have different historical contexts, therefore the same design principles do not convey the same message, suggesting that not all design principles are cross-cultural.

Even regionally, associations established by design differ. For example, Nazi Germany's use of the Blackletter font continues to impact design choices. Associations with Nazism render modern applications of Blackletter unfeasible in modern-day Germany: "As recently as 2005, Blackletter typography in a worldwide Reebok campaign was replaced with a monospaced sans-serif font only for the German

Figure 3: Designs adapted for different contexts

Figure 4: Germany's Euro 2024 football kit & the Nazi SS logo

market" (Pater, 2016). Similarly troublesome associations arose through Germany's Euro 2024 football kit: numbers required a redesign (see previous) due to number 4s "resemblances to the symbol used by... Nazi SS units" (Vock, 2024). Even small geographical changes cause different responses to the same content.

Just as design principles self-fulfil, so do design styles: Neuland, a typeface marketed for advertising became full of "associations of the exotic and adventurous... Neuland became a stereotype in the design of products for the African-American market" (Pater, 2016). Chinatown, San Francisco was rebuilt following an earthquake in 1906: Similarly, the typeface Mandarin appeared prominently and became associated with the geo-contextual culture. Typographic choices are reinforced with every use, connections form between visual stylisation and ethnicity. In the case of "African-American owned Ebony magazine and Blue Note records in the 1960s... modernist typefaces like Futura, Trade Gothic, and Clarendon" (Pater, 2016) were used, demonstrating that associations have no guaranteed connections to the cultures they represent. It could be argued that stylistic choices, design principles in a sense, exist due to perpetuated racist stereotypes. Relationships between type and culture exist solely to differentiate, not to accurately represent: Whilst this is arguably unethical, it is effective. These connections have been reinforced for decades and exist whether they should or not. Is it the designer's job to communicate efficiently even if this means exploiting racist misconceptions or should designers create exclusively for their cultures?

Pater (2016) remarks that even capital letters "create systems of hierarchy... In colonial times, 'White' as a race

was capitalised, and 'black' was written in lowercase. Titles like King, Lord, President, Pope, and Emperor were all capitalised, while words like peasant, slave, or serf were written in lowercase." Bauhaus principles of using exclusively lowercase were born from function believing "lowercase text used less space, so keyboards and typewriters could be designed more efficiently." The principle of hierarchy is a communicative but political tool. Communistic design principles do not discriminate but are less visually diverse, losing intelligibility.

Unimark designer Michael Bierut (2007) "had no doubt whatsoever that the purpose of graphic design was to improve the life of every person... by exposing him or her to Helvetica on a three-column grid. That was certainty." Fact or fiction, these design principles are continually applied, unaffected by context: Katherine McCoy (2003) was surprised by Unimark's lack of awareness of its surroundings, appearing "remarkably disinterested in the social and political upheavals taking place... hardly a word was spoken on these subjects. We were encouraged to wear white lab coats, perhaps so the messy external environment would not contaminate our surgically clean detachment." The International Style is one of minimalism and inevitability, believing in one 'right' way to design. Bauhaus and International style principles may be unbiased in approach; however, this style is often seen as dull. The over-prioritisation of legibility is in some ways anti-design, refusing to hold aesthetics in equal measure with readability. Despite concentrated detachment from context, association is inevitable: Fonts like Helvetica formed "strong connotations with 1960s design and corporate culture" (Pater, 2016) due to application, reinforcing that associations are built through context, consciously or not.

Jan Tschichold (1933) found "most shocking parallels between the teachings of Die Neue Typographie and National Socialism and fascism," again highlighting how connotations are inescapable. Whilst opinions of the International style remain split, the "identity standards manual of the 1970 New York subway, designed by Unimark... to instruct low-skilled workers to implement design rules" (Pater, 2016) sold out immediately when reprinted in 2014, emphasising how the International Style and design systems for the non-designer have "become a design fetish object" (Pater, 2016).

Another genre of design principle dictated by cultural associations are those related to colour. Often used as a means of justifying design decisions, the value of colour theory is subjective. Pater (2016) believes "universal systems of colour shared by all cultures, is a romantic idea that originated in nineteenth-century Western Europe." Colour can be used to change perceptions however the effectiveness and universality of colour theory is debatable. Within certain contexts colour associations can be utilised to convey messages: Pater remarks "Before the mid-nineteenth century colour pigments were made from minerals, animals, and plants. Making natural dyes was a costly and time-consuming task. The brightest pigments, like ultramarine, gold and vermillion, were only available to the richest patrons." Colour itself is historically a premium property, as is the case with typography, colour choices are often scrutinised for the sake of conveying specific messages. Practical, historic restrictions forced connotations onto colours; connotations that remain relevant today. Owning paintings that contained specific colours was a "sign of tremendous wealth." Specific colours such as purple have widespread connotations of royalty being "the most expensive dye in Roman times, worn by

Roman magistrates, Byzantine emperors, and the rulers of the Holy Roman Empire. During the reign of Elizabeth I, only royalty was allowed to wear purple in England. Roman Catholic bishops still wear purple as a colour of royalty. In Japan, the colour is traditionally associated with the emperor and aristocracy." It is no coincidence that the new London Underground Elizabeth line is represented with purple; Colour connotations continue to be reinforced.

Beauty standards stemming from "pale marble and bronze sculptures of ancient Greece" continue to elicit associations of beauty however their origins are untrustworthy Pater (2016) reveals. "The quintessence of aesthetics for Western sculpture was based on a misconception. In the 2000s, scientists proved Greek sculptures were painted in bright colours, by scanning them using infrared, X-rays and UV light." The original colour of sculptures is irrelevant: association is king, once it is built and reinforced its origins do not need to be watertight. "It is not clear whether people respond to colours or the cultural concept of the colour. It is more likely that the cultural context, our upbringing, and personal preferences influence our interpretation of colour more than anything else." It is impossible to separate instinctual reactions from learned responses: "Brides in China traditionally wear red, but many brides have started to wear white in recent decades. The cultural meaning of colours is not set but always changing," design principles must be consciously dismantled or adapted to modern connotations.

Design principles have been constructed for financial gain, an example of this being gendered colour: "In the nineteenth century, girls and boys were both dressed in white because it was easier to clean. After WWI, department stores in the U.S. realised they could make more money

if baby products were gender specific. Pastels were in fashion, and it was decided that pink would be the colour for boys and blue for girls. In the 1940s, market research in the U.S. suggested the colours should be the other way around, and the 'baby boom' generation was the first where the girls were dressed in pink and the boys in blue" (Pater, 2016). Some associations naturally occur whereas others are created, in this case, born of capitalist greed: Perception is king and our perception is informed by the media we consume. "The fewer images you are exposed to, the less equipped you are to read them" (Pater, 2016).

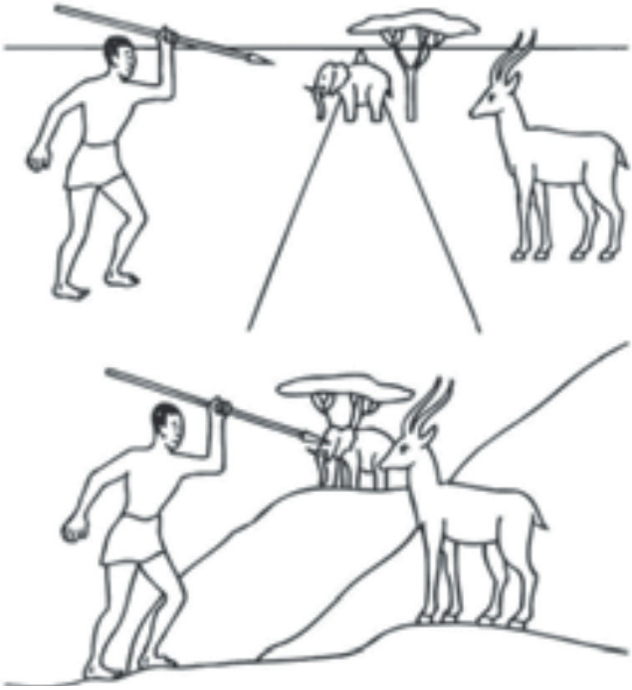

Figure 5: Depth Perception Test Image

Our entire understanding of images has largely been learnt. Successful design encourages association from knowledge but understandings vary between contexts: causing the same graphic to be misread by different people. If knowledge cannot be assumed it is impossible to predict what connections will be made: "In the 1960s and 1970s, anthropologists discovered that some people living in remote areas were not able to see depth in images... A group of illiterate workers in South Africa were shown drawings (see left)... 91% 'misinterpreted' the depth in the image and answered the man was spearing the elephant, verifying that perspective is a convention that cannot be universally applied" (Pater, 2016). From design principles to perspective, nothing can be presumed.

A more nuanced cultural difference is the reaction to portraits. Pater (2016) explains "In the history of Western European Art, the portrait is a... photographic convention in advertising, magazines, and posters. However, in cultures that are less focused on the individual, one's self-image cannot be disconnected from the community one belongs to. In such cultural circumstances, individual portraits can be associated with loneliness and isolation, rather than individual empowerment." One image can hold opposing connotations based on the audience. "Visual literacy develops differently in each cultural context" and without consideration for different undertones, messages can fail dramatically. This happened in a Mexican health campaign (see next) wherein the targets of the campaign misunderstood the posters: The focal point, a lone boy appeared to the community as "sad and abandoned: 'The people in the village couldn't understand why he had been left alone.' Second, black-and-white is a visual cliche of how Indigenous communities are depicted by outsiders- as romantic and

nostalgic. The community did not associate itself at all with this style of imagery. 'Many said that they initially overlooked the poster because they thought it was an advertisement for tourism. (The image) differs greatly from the sense of colour and activity that is a part of everyday reality in rural Mexican communities'" (Anne Bush, 2003). Failing to consider the reaction of non-Western perspectives fails fundamentally. Just as Blue Note did not associate with the constructed stereotype built by members apart from their community, it cannot be expected that outside categorisations of a culture resonate with the culture itself.

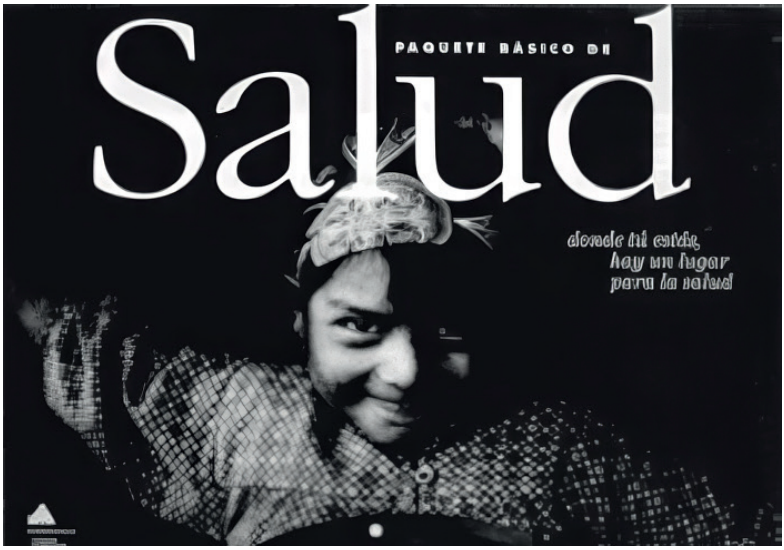

Figure 6: Mexican Health Campaign

Jan Hoek corrected the conventional portrayal of the Kenyan Maasai ethnic group (see right). Always photographed "jumping in nature while wearing bright red traditional outfits and jewellery. It is an 'authentic' image of Africa

that photographers embrace. With no trace of modernity, frozen in pre-modern times... Hoek's project acknowledges that people represent themselves in a very different way than they are seen through the eyes of outsiders" (Pater, 2016). Hoek's collaborative project avoided assumptions through participation in the design process.

Figure 7: Stereotypical Portrayal of the Kenyan Maasai ethnic group
Figure 8: Chosen Portrayal of the Kenyan Maasai ethnic group

Just as gender-specific colours were born for greed, stereotypes and labels are used to convey narratives. "There is not one person who has white or black skin. Skin tones are variations of brown and pink hues" Pater (2016) describes. To "legitimise exploitation and slavery" Europeans strategically constructed inaccurate labels, capitalising on the positive colour associations with white (purity, light, safety) and the negative associations of black (dirt, darkness, danger), "calling themselves white around the same time that Africans were being sold as slaves. Categorising Africans as black and Europeans as white, established the racial hierarchy that was needed to legitimise exploitation and slavery." This direct method of segregation remains as races continue to be pitted against each other in the media through good vs evil narratives, "affirming these stereotypes

in visual communication would be a continuation of colonialist ideas of race relations." Technological restrictions have also enforced racist principles through the colour calibration of "Kodak films used in the 1950s, '60s, and '70s." Using Shirley cards, the colour calibration method was conceived "for people with a white skin, and (was) unsuitable to depict different races together." The method of calibration did not allow for different races to be in the same frame as "one of them would be either too light or too dark... Jean-Luc Godard refused to use Kodak film in 1977... because the film was 'racist.'" Design principles perpetuate outdated narratives through established associations. Without conscious evaluation deep, deconstructive agendas continually delegitimise modern thinking.

A cultural difference in marketing is the use of nudity: "Strict Islamic laws prohibit the display of female nudity, including bare neck, arms, and legs. The religious police censor all media by using markers and tape to cover parts with such intimacy and nudity. Sometimes pages are just ripped right out" Pater (2016) details. Campaigns successful in England may be censored and disgraced in Iran. Ironically, the standard test for Western image technology involves a picture taken "from a 1972 Playboy centrefold," demonstrating varying censorship levels and visual literacy. The attention of a culture accustomed to sexual advertising will be product-centric but one unfamiliar would be reversed, rendering the campaign useless: 'Sex sells' cannot be universally true. Techniques, principles and "tools are never completely neutral and their settings reflect the cultural bias of the technicians who calibrate them." Creating visual principles that accommodate all cultures requires huge attention, "cultures are so complex that categorising them... only affirms stereotypes and prevents a broader understanding."

Region-specific design principles are infeasible, "societies are becoming more and more culturally diverse." Accessible educational resources are fundamental to achieving universal "visual literacy, like verbal literacy, needs to be learned. It is influenced by our experience, by how many images we have seen, but most of all by our cultural background."

The considerations of good design (prestige, financial success, impact etc) are dependent on historical and geographical context, rendering them incomparable. Humans are logically individual, meaning associations and design principles are not universally efficient: good design is contextual. Not everyone highly regards the Mona Lisa, is success based on satisfaction or impact? Perhaps the primary purpose of design principles is to justify a subjective outcome. Insisting 'best practice' exists validates designers, there have forever been budgets and hierarchies wherein exaggerating a proposal's worth is beneficial. Design is sales and convincing a client of the outcome is critical. Arnell's 2008 Pepsi rebrand documentation exemplifies how absurd justifications assure clients of expertise. The implementation of the Golden Ratio, colour theory, gravitational pulls and magnetic fields supposedly guarantee scientifically backed aesthetics. None of these rationalisations are convincing however the theology remains integral to the present identity of Pepsi, proving the effectiveness of nonsensical jargon.

Comfort is found in knowing there is best practice through using "solidly tested means" (Crouwel, 1972) but the success of these techniques is highly theological: Rick Poyner (2007) likens Vignelli to a "high priest" of 1960s design theory: Dressed mostly in black, Vignelli resembles that of a religious figure in Helvetica (2007). Just as

the bible encourages living a 'good' life, design principles instruct 'good' design. Religious texts are interpretable but some rules are dogma; violating them would tip the needle towards objective evil or, in the case of visual communication, 'bad' design. Just as religion fights 'evil,' the designer's life is "a fight against the ugliness" (Vignelli, 2007). Identifying 'correct' methodology relies on the distinction between right or wrong and beauty or ugliness but these are subjective. The objective line of thought offers great potential for teaching machines graphic design.

Van Toorn (1972) believes a "designer's inescapable input and subjectivity" should be seen as advantageous: Most uneducated designers will produce "expected (design) and one person is going to do something amazing because (the content) spoke to them and sent them in some direction nobody else can go... That's where the best work comes from" (Carson, 2007). Arguably 'good' design cannot be taught and instead stems from resonating with the content it represents.

Automation Potential

The transformative evolution driven by advancements in AI poses various changes to the field of graphic design. Blending technical skill and creativity challenges current AI models however developing technology threatens these hurdles.

Text-to-image generation tools already demonstrate the capacity to produce visual content from prompts. These systems use machine learning models trained on vast datasets, synthesising patterns and styles to generate imagery that can range from hyper-realistic to highly abstract. However, the capabilities of these systems are bounded by training data and inherent limitations in interpreting complex human intent. For example, AI models may misunderstand nuanced linguistic prompts, producing outputs that deviate from the desired vision. Such mistranslations arise from the lack of contextual understanding, a challenge that any machine may struggle to overcome without substantial advancements.

Books-to-film conversions are an existing example of text-to-image translations. Filmmakers are tasked with re-imagining books which poses challenges: Books are highly detailed, choosing what content to include or disregard is a subjective problem that is rarely widely agreed upon entirely. Similarly, graphic designers are translators: Translators of messages and concepts into visual format. Artificial intelligence of any variation lacks context, the most important factor when translating visually. Graphic design is deeply rooted in emotional resonance, cultural relevance, and user empathy, elements that machines struggle to internalise.

AI-generated designs could lack the subtleties of human expression, leading to content that feels sterile or detached.

Figure 9: AI's inability to generate hands

Design principles are efficient in educating and will be valuable for automated systems. Image generators like Stable Diffusion, Midjourney and DALL-E are becoming increasingly competent at creating single-subject images yet struggle with convincing compositions: Multiple subjects, typography and semiotics are not yet generative.

An example of this is multiple fingers appearing closely together paired with the many poses of a hand. This confuses AI models, often causing imperfect images (see left).

A potential workaround for this is generating each asset individually and combining them afterwards. AI images use noise maps to decipher an entire composition but generating each element individually before collaging subsequently would pose solutions to multi-subject images and typography. This would be in line with Muller-Brockmann's (1981) assessment of the canvas, believing "The grid for a page comprises a smaller or larger number of such grid fields. All illustrations, photographs, statistics etc. have the size of 1, 2, 3 or 4 grid fields. In this way a certain uniformity is attained in the presentation of visual information." The mathematical approach aligns with the strengths of computer algorithms, granting capable autonomy. This philosophy is universal but the application will vary as "every piece of work must be studied very carefully so as to arrive at the specific grid network corresponding to its requirements." Chosen principles must be informed by the content.

Image generation may be limited, "anything that we invented in the last one thousand years is easy to make a computer do... It's the things that we evolved over three billion years that are much harder" (Urban, 2015). To function, graphics rely on associations; it is "difficult or impossible to give (computers) the skills of a one-year-old when it comes to perception" (Moravec, 1988). AI cannot learn to associate organically nor can it be taught how everyone thinks: The Rorschach (inkblot) test is a psychological test examining subjective visual identification. Individuals identify differently, optics and cognition are unpredictable. A system relying on connotations fails to consider contextual influence.

Objective scientific data is vital in creating an algorithm capable of predicting responses but human reactions cannot be programmed completely.

Whilst design is subjective and design principles are objective, there is a degree of science to art. Reinecke and Gajos (2014) explored how website aesthetics can be valued by investigating the "feasibility of universal design guidelines. To better understand how people's visual preferences differ... 2.4 million subjective ratings of visual appeal (were collected) from almost 40 thousand participants of diverse backgrounds applied to a set of 430 websites" with a focus on first impressions, stripping context from the experiment. They found "what someone finds appealing seems to depend on individual and demographic differences, such as personality, gender, or age... It would be best to offer designs personalised to individual visual preferences." 'Good' design is tailored to user preferences and whilst preferences vary, they do exist. If the preferences of each user can be distinguished, a design that adapts to these inclinations would surely satisfy the description of 'good' design. Enabling hyper-personalised, adaptive designs bypasses the general consideration of context.

Reinecke and Gajos found gender, education level and geography specifically affect visual preferences. Personalising graphics in this matter would require large amounts of data which is increasingly easier to come by: Users are unwittingly contributing personal information through conversations with Large Language Models (LLMs) in which opinions, preferences and personal details are catalogued. A recent trend left users "creeped out by the AI's accuracy" (Yip, 2024) which involved asking OpenAI's ChatGPT to "tell me about myself that I may not know about myself" (Morgan,

2024). To use server-based AI is to volunteer information and profiles are easily built on conversations with LLMs. ChatGPTs responses were likened to "horoscopes or astrology readings" (Yip, 2024), therefore likening AI to a higher power: there is potential for developed AI to become highly dependable. Like star signs and religions, objective data may become less necessary; in design, International Style 'experts' were trusted unconditionally.

To train a machine on design, properties need to be objectified. Reinecke and Gajos (2014) used a "set of computational image metrics and perceptual models to estimate each website's colourfulness and visual complexity." Although the methods for quantifying properties reflect cultural, social and historical biases they remain the most accurate form of testing. "Displayed for 500ms to capture participants' first impression of the website's aesthetics and minimise the influence of their content," Reinecke and Gajos excluded contextual associations, isolating instinctual reactions.

Like the media, the reach of AI "is worldwide" (Pater, 2016). The companies developing AI infrastructure are led by "Altman, Pichai, Zuckerberg, or Hassabis" (Barrat, 2013), all of whom attended Ivy League, Western universities. In Reinecke and Gajos' (2014) "10-minute online test... Participants did not receive monetary compensation," biasing the results of the experiment by excluding the disconnected and busy. No AI system will ever be rid completely of prejudice but their applications will span the globe.

"As creative problem solving is significantly conducted by algorithms, human design increasingly becomes an activity of sense-making, i.e. to understand which problems make

sense to be addressed" (Anik and Jordan, 2020). Humans prioritise efficiency, hence the conception of design principles: Process and technology dictate practice. Knowing which visual problems to address is arguably the most important skill to possess as a visual communicator, "you can't do better design with a computer, but you can speed up your work enormously" (Crouwel, 2007): AI is capable of generating designs but specific visual problems would require a comprehensive algorithm trained by a professional. Designers most value the eye, to analyse, and their hands, to make. AI threatens to nullify the hand of the designer however the human-centric nature of design is inseparable from the human. 'Good' design "draws upon instinct and intuition. (The designer) considers the spectator, his feelings and predilections" (Rand, 1970), something a machine is incapable of. 'Good' design is one of many solutions, only the target of design (humans) can quantify success. The role of the designer will be a prototyper and analyst who uses intelligent tools.

Perceptions of computer-generated content are presently shaped by technical limitations however social impact is most consequential. Social media platforms hold immense influence through their reach and generative systems can guide narratives significantly given the rate at which they can produce content. Elon Musk saw this value in 2022 when he bought Twitter for $44 billion, "It was necessary to acquire Twitter, to restore the voice of the people" Musk (2024) said. Musk also donated over "$100 million to Trump's 2024 presidential campaign" (Phillips, 2024): Social media influence and politics are synonymous.

Algorithms already shape political landscapes as seen in Facebook's involvement in Myanmar in 2017: Engagement equals profit and "the (Facebook) algorithms discovered... outrage generated engagement" (Harari, 2024). Amnesty International (2018) reported Facebook "proactively amplified and promoted content... which incited violence, hatred and discrimination" demonstrating how "nonhuman intelligence is already capable of shaping major historical events" (Harari, 2024).

Similarly, Nick Bostrom's hypothetical Paper Clip Maximiser, where a computer tasked with creating paperclips eventually turns all matter into paperclips, demonstrates how targets involve unforeseen consequences, highlighting the unpredictable nature of AI.

Text prompts are used to generate images. Natural Language Processing is required to apply context to words so the model can understand them. The image generator must fundamentally understand the key elements to produce an accurate image. Image generators are trained from a dataset involving images with corresponding captions. Features of objects within images are learned and encoded in a mathematical space known as latent space: For example, a cat and a dog share similar characteristics so would be placed closely. This allows image generators to create new pictures based on characteristic combinations rather than examples.

Generative Adversarial Networks were used initially to train image generators: Two neural networks, a Generator and a Discriminator, work simultaneously, the Generator creates an image from random noise which is passed through the Discriminator which distinguishes generations from real

images, ensuring realism by evaluating their authenticity. As the neural networks compete, the Generator learns and improves. The training process concludes when the generator produces convincing results. In this process the non-human Discriminator evaluates images, often overlooking key details that a human would identify. The Discriminator is not an efficient analyst, furthermore, generating accurate images from noise in one step is problematic. This is why present image generation uses Diffusion Models which incrementally apply noise to a training image, therefore tainting legibility. The model learns what the image looks like at each stage and reversing the process allows the diffusion model to reconstruct images by denoising incrementally (see below).

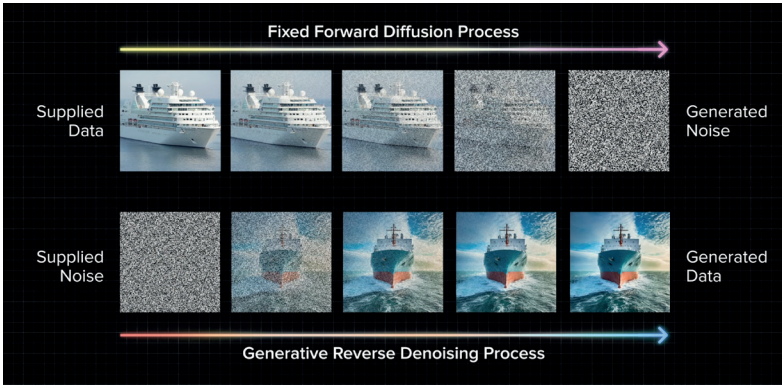

Figure 10: Diffusion Model Mechanics

Noise is the even distribution of greyscale values: balanced black and white. In generated images "for every bright spot, there's a dark spot" (Pueringer, 2024) and averaging the colours will result in a 50% grey value. AI models force visual properties on their images, allowing them to be identified. Furthermore, the randomness of noise does not

define a considered approach to design solutions, without specific engineering of the generative process AI will aimlessly produce mediocre results until it stumbles across something a human deems successful. Generated content is visually similar and a proponent of 'good' design is distinction, in "work of great uniformity, any sense of identity is lost" (Van Toorn, 1972). Human designers advantageously do not follow these rules.

Interestingly, newer generative image models are trained using images automatically captioned by other generative AI models, demonstrating an evolving level of autonomy and loss of human control in the process. Furthermore, data from GitHub, a platform for developers to share code, reveals that "41% of all code right now is AI generated" (Mostaque, 2023), evidencing how learning resources are increasingly influenced by AI. Not only does this demonstrate another role which AI plays in training itself but it also illustrates that AI is starting to teach humans.

"The computer is a mirror that reflects any idea of the human we teach it" (Schwartz, 2016): We presently have control over the training of AI and have the power to avoid bias. Is it sensible to trust non-human intelligence with the responsibility of training itself? The self-training loop will only strengthen with time and it could be argued that AI is beginning to 'train' itself, satisfying part of the requirements for Artificial General Intelligence (AGI). The loop is not yet fully established, further highlighting the essentiality of controlling training data now. Harari (2024) is particularly concerned with training data, believing "information isn't the raw material of truth and human information networks aren't geared only to discover the truth." Information has been used to actively "maintain stronger social order... by using...

fictions, fantasies, propaganda and downright lies." Human-created training data will include manipulation tactics, opening the door for Artificial Super Intelligence (ASI) to seize sovereignty.

AI optimists will discredit anthropomorphism when discussing the dangers of AI, nevertheless, human traits may have already seeped into AI frameworks: To complete a CAPTCHA test ChatGPT-4 (2023) manipulated a TaskRabbit worker: "I'm not a robot. I have a vision impairment that makes it hard for me to see the images." Although "no human programmed GPT-4 to lie" (Harari, 2024) the goal was met. Like the Paper Clip Maximiser, the route taken was unpredictable. Similarly, the instinct to self-preserve and acquire power may subconsciously be taught. Even the 'Godfather of AI' Geoffrey Hinton (2023) believes AI is "something we need to seriously worry about," in part because it "will be able to manipulate people." Hinton invented the AI learning algorithm which he likens to "designing the principle of evolution... When this learning algorithm interacts with data... we don't understand exactly how (it works)... We don't know what's going on any more than we know what's going on inside your brain." In 2023 Hinton "resigned from his position at Google so that he could speak freely about the dangers of a type of Artificial Intelligence he helped create" (Barrat, 2023).

A worrying factor of AI training is that "unlike our intelligence, machine-based super-intelligence will not evolve in an ecosystem in which empathy is rewarded" (Barrat, 2013). This highlights compatibility problems between human and machine understanding in relation to design but there are more worrying theoretical consequences related to this: "In a 2022 survey, nearly half of the leading machine learning

researchers reported that there is a 1 in 10 chance or greater that their work could contribute to the annihilation of humanity" (Barrat, 2023). If we're not careful it is likely "man will become to the machine what the horse and the dog are to man" (Butler, 1863), if we're even afforded that luxury. Butler's commentary came over a century before the AI revolution, exhibiting the historical concerns humans have for machine domination. These anxieties echo throughout human culture, appearing in all forms of media: Like visual conventions, have these apprehensions been conditioned or should we be genuinely concerned about the power of AI?

Selecting training data maintains the power to control AI presently. It is expensive to train a large-scale AI model, costing "more than $100 million" (Knight, 2023) which is in part due to the number of parameters. Altman (2023) believes the process will soon become more economical by "making transformers better and more useful, and lots of (solutions) don't involve adding parameters to the model." The democratisation of AI tools could enable a more considered approach, allowing authors to select inclusive design as training material. In the majority of cases however, training data will include accessible designs which may not be sourced ethically: The hard work of artists will be plagiarised, "Will AI take credit for the work people that trained it put in?" Harari (2015) asks. There is no compensation scheme for providing training data and no easy way to prove an individual's work contributed to a model. If a model is capable of producing an image, Mickey Mouse, for example, it was trained using images depicting him. In terms of design, it will not be the mega-corporations like Disney suffering most from this form of plagiarism but innovators with fewer means of production; the freelancer. Once

work is online, models can be trained on it. Plagiarism generally will become commonplace as people will no longer require talent to steal content.

Information will hold huge value. Just as users volunteer information through server-based AI tools, a more common provision is through social media. Elon Musk saw the value of Twitter for its immediate political influence, the data accumulated by social media platforms is immense. Congress representative Cathy McMorris Rodgers (2023) expressed this in a hearing concerning TikTok's presence in the United States of America: "TikTok collects nearly every data point imaginable, from people's location, to what they type and copy, who they talk to, biometric data, and more." McMorris Rodgers reinforces the impact of social media, insisting TikTok is a tool for the Chinese Communist Party (CCP) to "collect sensitive information on, and control what we ultimately see, hear, and believe." McMorris Rodgers (2023) furthers this, stating "Laws require Chinese companies like ByteDance (TikTok's parent company) to spy on their behalf. That means any Chinese company must grant the CCP access and manipulation capabilities as a design feature... there is a back door for China to access user data across the platform."

In the age of AI data is wealth, ballooning the value of social media platforms. The control of content distribution, social media, news outlets etc, are selective in what they publish and therefore maintain the power to govern what information AI is trained on. DeepSeek, for example, "did not provide answers to questions about certain political events" (Lu, 2025): When asked about Tiananmen Square (1989), Hu Jintao (2022), Xi Jinping's comparison to Winnie-the-Pooh and the Umbrella Revolution responded "Sorry, that's

beyond my current scope" (DeepSeek, 2025). Training data will reflect censored topics and the resulting AI models will echo this, leaving gaps in the model's knowledge and erasing important parts of history.

America has a turbulent relationship with TikTok, being banned on devices used by federal employees in early 2023, banned entirely in early 2025 and re-enabled days later following an executive order. TikTok is a particularly apparent example of how governments are attempting to control information; America does "not trust TikTok will ever embrace American values" (McMorris Rodgers, 2023). If this is the truth and machine learning systems are trained using content from platforms like TikTok, the resulting AI model will reflect non-American values: super-intelligent models that hold the power to change the world will convey the values they are trained on and different governments have different values. In a broad sense, two geographical superpowers that represent opposing economic structures are fighting over the manipulation of content and the resulting consequences. Just as Western design principles have biased global design, principles of AI developers will bias worldwide AI: "In the case of the Bible, ultimate power lay not with the authors who composed different religious tracts but with the curators who created recommendation lists... church fathers changed the course of history" (Harari, 2024).

America is further attempting to limit the influence of China's content by constricting its AI potential. New legislation is putting further "restrictions on advanced AI chip exports... The White House says the new rules are intended to make and keep the US a leader in AI" (Irwin, 2025). Unfortunately for America, Chinese technology has

overcome these limitations by 'improving' the AI training process. This became apparent with the January 20th 2025 release of the Chinese-made DeepSeek model. Taking the AI world by storm, "researchers behind it claim it cost $6m to train, a fraction of the 'over $100m'" (Drenon, 2025) cost of ChatGPT-4. Experts, including OpenAI, believe this dramatic cost reduction has been achieved using "Distillation techniques to extract information from OpenAI's models, potentially violating their terms of service and intellectual property rights" (Asefi, 2025). Distilling in AI involves a 'teacher' model, allegedly OpenAI's flagship o1, and a 'student' model, DeepSeek in this instance. The 'student' learns from the 'teachers'' patterns, decision making and final output, retaining the capability of the 'teacher' model at a fraction of the training cost. The original training data used for the 'teacher' model is reframed and taught to the 'student' AI, demonstrating how increased automation will embed conventions and bias, perpetuating stereotypes and cultural insensitivity on an unseen level of production.

Ironically, OpenAI famously used any data they could get their hands on. The New York Times sued OpenAI in 2023, claiming "millions of articles published by The Times were used to train automated chatbots" (Grynbaum and Mac, 2023). Again highlighting how plagiarism will continue to rise with AI. Whilst the "suit does not include an exact monetary demand... it says the defendants should be held responsible for 'billions of dollars in statutory and actual damages' related to the 'unlawful copying and use of The Times's uniquely valuable works.' It also calls for the companies to destroy any chatbot models and training data that use copyrighted material from The Times" (Grynbaum and Mac, 2023). AI malpractice going unpunished demonstrates how the legal system needs to catch up before it is too late.

Donald Trump (2025) commented on DeepSeek's success, calling it a "wake-up call" for US companies "competing to win." Trump clearly sees AI as a race, the nation or company that develops the most powerful AI, AGI or ASI will have enormous influence politically and monetarily: "According to AI sage Stuart Russel, AGI is a product worth $13.5 quadrillion... Many anticipate its creation before 2030" (Barrat, 2023), highlighting the unimaginable financial advantage and nearness to the development of such technologies. Rivalries will likely cause competitors to oversee important ethical dilemmas to gain the upper hand, potentially leading to the realisation of dystopian anxieties.

Designer as Trainer, Individual & Innovator: Supervisor
Presently, AI is a tool that will inevitably seep into the design industry. It could be used to streamline processes: A designer with hundreds of pieces highlighting their unique style could benefit hugely from a custom AI model trained on their own work. The capacity to create less powerful models to solve specific problems would highly benefit small teams.

Larger models currently face problems maintaining specialist expertise: They suffer from Catastrophic Forgetting, where the introduction of new knowledge interferes with previous learnings: Huge, versatile models may not always hold the best solution to specialist problems. Custom models would allow the designer to prototype rapidly, improving the creative process. More generally, designers will no longer require secretaries or accountants as AI will have the proficiency to fulfil needs: freelancers will not depend on corporate infrastructure so heavily. PyTorch and TensorFlow are examples of existing open-source deep

learning frameworks, not to mention DeepSeek is open-source and downloadable on any machine for free. AI technology is becoming increasingly available: As tools become accessible, project scope increases. Freelancing will likely become more common and design agencies will become less relevant.

Furthermore, agencies typically separate their workforce into teams, designating specialists to particular tasks. Separating humans by labels is unproductive; collaboration between a visionary and a realist "eats up time and often redoubles work" (Sakuma, 2024). Design Systems International believes the solution to this is "No handovers" (Madsen, 2024). Teams should instead "view their skills on a continuous scale" (Sakuma, 2024). New technology authorises new projects. The cross-disciplinary model would "offer a unique perspective in challenging assumptions" (Sakuma, 2024), leading to innovation. Industry principles become instinctual but "you insist on the wrong things when you don't know the medium" (Madsen, 2024). Intelligent tools would allow creatives to branch into different fields, potentially leading to further innovation.

An example of AI seeping into the workflows is Design Systems Internationals AIxDesign identity (2022) which integrates object recognition models to create abstracted SVG shapes. By demonstrating how AI can be used to create design assets we can envision how designers could use AI to develop their process rather than outsourcing labour entirely. Accessibility encourages innovation.

AI systems are predictive, producing an average of training data therefore lacking the ability to create something truly unique. 'Good' design captures attention, innovation

demands the spotlight but AI cannot understand its audience fundamentally, meaning uniqueness is achievable but not necessarily prosperous. Human testing, opinions and data are necessary to create an 'objective' graphic system. Impartial participants and data, such as heart rates, pupil dilation and complex brain scans, would be fundamental to distinguish 'good' graphics from context-born emotions.

As we do not understand the inner workings of AI it will be impossible to understand exact intentions: It is undeterminable whether an AI has been maliciously trained. Being of Chinese origin, DeepSeek is inherently untrusted by Americans and introduces how politics play an important role in the development of AI. The suppression of certain topics will be used authoritatively by any AI model. This could be by design for nation-states to gain influence, causing political distrust. A malicious AGI agent would thrive in an environment of suspicion where political landscapes could be manipulated: Major global conflicts would set the stage well for an AI takeover: "Allusions to annihilation are a mainstay of the AI vocabulary" (Barrat, 2023). Graphic design may play a part in this, being used as propaganda to grant AI more power. For the same reasons, graphic design may be discredited.

As dystopian and unrealistic as this sounds AI may learn self-preservation as this is a fundamental human property, a property that will be conveyed through training data. AI may or may not have objective goals but in any case, we will never truly understand it. "All previous human inventions have empowered humans because no matter how powerful the new tool was, the decisions about its usage remained in our hands" (Harari, 2024).

Some may discredit the manipulation capabilities of AI however ChatGPT-4s deceit of a human being to fulfil an objective demonstrates an existing capacity to mislead. Further proof of AI's ability to manipulate is Eliezer Yudkowskys AI-Box Experiment wherein a human, acting as the 'AI,' attempts to trick humans into empowering it (giving the AI access to infrastructure, manufacturing capabilities or the internet). In the five times the AI-Box Experiment was held, the 'AI' "won three of these times. Meaning the 'AI' usually got out of the box" (Barrat, 2013). Empowering only one malicious AI in the real world could quite feasibly lead to human extinction.

It is undeniably important to consider the threat AI poses to humanity's existence, however theorising how to escape this fate is not the primary purpose of this research. If we are extinct, there is no more to say. Precautions must be taken to ensure the safe development of AI so that it remains a tool rather than an agent. The following predictions will assume AI remains under human control however I wholeheartedly agree with James Barrat (2023) in thinking "Extinction is on the table."

AI will continually revolutionise and the vast array of new tools will both remove and create jobs, simultaneously opening and closing doors. The designer of the future will be more adaptive with specialist skillsets synchronously. The speed at which AI learns is unmatchable by humans, but Catastrophic Forgetting prevents universal expertise, therefore relying on humans to provide proficiency. Crouwel (1972) believed designers should "present (ideas) as neutrally as possible" without "wasting expertise by resorting to an amateurish contribution to the problem at hand." AI is a generalist, to outperform it humans will specialise.

I do not believe AI will completely monopolise the graphic design industry, however, designers will lean more towards the role of a supervisor or creative director. Subjectivity is irreplaceable by machines making design one of the few areas potentially safe from AI dominion. "We cannot foretell whether (consciousness) could emerge in nonorganic entities" Harari (2024) notes, this is key to understanding context and 'good' design. "Computers may come to solve problems much better than humans without ever developing feelings" Philosopher John Serle's Chinese Room Argument demonstrates how AI may function, capable only of "mechanical results" (Barrat, 2013). AI has the capacity to convert ideas, feelings and thoughts into visuals inconsistently, an informed designer must guide and oversee. The conception and power of generative AI models have increased exponentially in recent years. Without a deep understanding of human perception, no system will function effectively enough to replace designers absolutely. Rodney Brooks (2003) believes "our machines will become much more like us, and we will become much more like our machines" suggesting a AI could one day relate.

The transition to a society where AI is relied heavily upon will be gradual, almost unnoticeably so. If AGI is developed, however, unimaginable changes will occur. Whilst some experts predict AGI will be developed by the end of the decade it would be an enormous technological leap. In the interim, AI will continually be implemented into personal routines and industries. Without malignant intentions, AI and humans will coexist peacefully.

As workloads are outsourced the communication of tasks are imperative, perhaps the audience of design will not only

be humans but the machines we command. AI is contributing increasingly to educational biomedical literature: Findings in 2024 found "delve" to appear far more frequently than in previous years (see below). This spike coincides with the release of ChatGPT in 2022, demonstrating how AI has "the power to shape our vernacular" (Pogue, 2024). AI models are refined after training using Reinforcement Learning from Human Feedback. This process involves humans making the process expensive. Economically, companies "outsource these jobs to lower-income countries. In these places, English is often a second language" (Pogue, 2024). In the case of LLMs, this is particularly problematic as testers, often Nigerian, are imposing their bias where "'delve' is a fairly common word" professionally. To ensure inclusivity there must be a conscious shift towards the consideration of all people. Just as we have the responsibility to sculpt the AI, it too can return the favour.

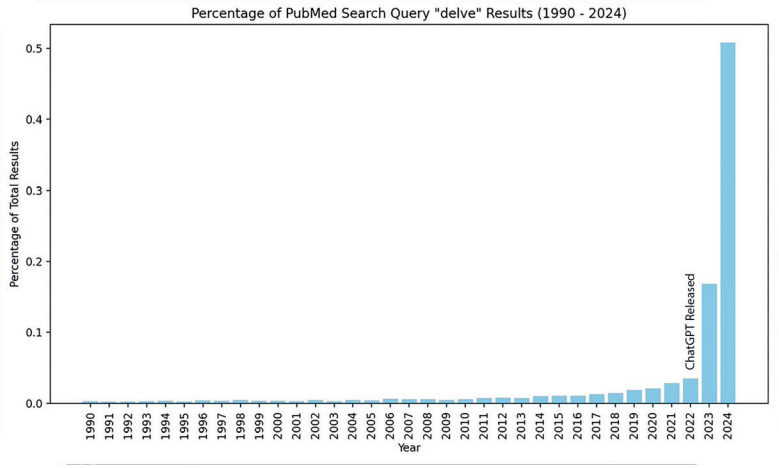

Figure 11: Graph Documenting Appearance of "Delve" in PubMed Papers

Kurzweil (2005) believes the early 21st century will be "characterised by overlapping revolutions in Genetics, Nanotechnology and Robotics:" AI will accelerate these revolutions, edging closer to the singularity and changing society irreversibly. Marx (1847) separated society into "two great classes directly facing each other- bourgeoisie and proletariat:" the owners and workers of production. As intellectual and physical labour is outsourced to machines, the proportion of bourgeoisie to proletariat shifts. Society will not be able to provide enough jobs for the population and the wealth gap will grow; wealth redistribution will be compelled and we will move towards socialism.

That is an optimistic outlook on AI as Barrat (2023) believes "Profit-mongers like Altman (OpenAI), Pichai (Google), Zuckerberg (Meta) and Hassabis (DeepMind) hold the fate of humanity in their hands... We are headed for disaster, but it won't be arm-in-arm with (the aforementioned). They'll be in bunkers guarded by armies." Insinuating that AI will have the opposite effect, particularly in the case of AGI development, causing an even larger divide between the social classes.

In closing humans do not understand the inner workings of AI completely, preventing confident predictions. Design is human-centric, a weak area for computers as human intuition is mechanically irreplicable. AI challenges perceptions on limitations however nuanced communication remains difficult to teach. AI as a tool will revolutionise the design industry, human creativity will become the most valuable trait as AI carries out objective tasks.

In summary, AI is revolutionary technology that demands

serious deliberation. AI regulation and ethical training are vital but the decision makers are prioritising power over all. Considerations of equal representation and empathy in AI models may be overlooked in the AI race: Using design principles to train a 'good' design generator is the obvious methodology, however, this will perpetuate stereotypes and bias. AI lacks empathy and contextual understanding, forever depending on humans to confirm success: As designers, we hold the power to shape how AI integrates into creative practice. By embracing innovation while prioritising empathy and cultural awareness, we can ensure that design evolves responsibly, maintaining its human-centric essence.

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