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THE ROLE OF ARTIFICIAL INTELLIGENCE IN DESIGN: A STUDY ON THE REPRODUCTION OF PRESTIGIOUS UNIVERSITY LOGOS

• **Lec. Dr. Faruk DURSUN***

ABSTRACT

This study aims to understand the capacity and limitations of AI tools in graphic design processes. The research evaluates the potential impact of AI on corporate identity design through the reproduction of logos of prestigious universities. The research analyzes in detail the capacity of AI to interpret visual identities during logo reproduction. The research focuses on examining the current capabilities of AI technology in the context of reproducing university logos. In particular, the study seeks to answer the following questions:

- To what extent can AI tools accurately reproduce symbolically and aesthetically complex visual identities?

- How are the visual elements of corporate identities interpreted and redesigned by AI?

The methodology of this research consists of three main phases: Data collection, reproduction with AI tools and evaluation. In the data collection phase, the logos of the top 15 universities in The Times Higher Education World University Rankings 2023 list were analyzed. However, 5 logos consisting only of typographic elements were excluded from the scope of the study. Therefore, 10 university logos with visual and symbolic diversity (Oxford, Harvard, Cambridge, Stanford, MIT, Princeton, Columbia, Chicago, Pennsylvania and Johns Hopkins) were analyzed. The meaning and context of each university logo was compiled based on the descriptions from their official websites. These descriptions detail the logos' history, design elements and symbolic meanings. The logos were reproduced using 10 different generative AI applications (Artguru, CoPilot, Design.ai, Gemini Advanced, Genraft, Gettin.ai, Leonardo.ai, Chat GPT 4.0, Pixlr and Runwayml). These tools were selected based on their visual production capabilities and user-friendly interfaces. For each

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logo, descriptions taken from the official website of the relevant university were given as "prompt" (input) to the artificial intelligence. Each logo produced by the AI tools was evaluated according to the following criteria:

- Symbolism and Harmony of Meaning: The extent to which the logo generated by the AI reflects the symbolic meaning of the original logo was analyzed.

- Design Accuracy: The similarity of the design elements was analyzed by comparing it with the original logo.

- Detail and Composition: The accuracy of visual elements such as color palette, shapes and general arrangement were evaluated.

As a result, in the context of detailed and aesthetic design; Leonardo.ai and Artguru offer successful designs that reflect aesthetic harmony, richness of detail and academic identity in Cambridge, Columbia and Harvard logos. Leonardo.ai stands out especially in the Columbia and Harvard logos, while Artguru combines traditional elements with modern in the Cambridge logo. In terms of preserving historical elements, RunwayML and Artguru successfully modernize historical elements in the Cambridge, Columbia and Chicago logos, reflecting academic identity. RunwayML in particular has managed to create a contemporary feel while retaining traditional visual elements. Gencraft, CoPilot, Pixlr and Chat GPT 4.0 produced effective outputs with minimal and modern designs in the Stanford and MIT logos. Especially CoPilot offers a simple but remarkable solution in the MIT logo. Chat GPT 4.0, on the other hand, displays a balanced modernity in the Columbia and Harvard logos. Design.ai provides strong visual expressions in the Columbia and Harvard logos. The Chicago logo is characterized by minimalism, while the Chicago logo is characterized by artistic solutions, although some of the logos are complex. Gemini Advanced has successfully applied modern design techniques to the Cambridge, Columbia and Harvard logos. The Columbia logo stands out for its balanced design, even if it partially ignores traditional elements. Pixlr and Getting.ai, on the other hand, failed to reflect the corporate identity strongly enough in some logos (e.g. Pennsylvania and John Hopkins). Getting.ai tended to over-simplify in the Stanford and John Hopkins logos, while Pixlr was weak with a lack of detail in the Cambridge and Harvard logos.

Keywords: *Generative AI, AI-assisted design, University logos, Visual identity reproduction.*

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TASARIMDA YAPAY ZEKANIN ROLÜ: PRESTİJLİ ÜNİVERSİTE LOGOLARININ YENİDEN ÜRETİMİ ÜZERİNE BİR ARAŞTIRMA

• **Öğr. Gör. Dr. Faruk DURSUN***

ÖZET

Bu çalışma, yapay zeka araçlarının grafik tasarım süreçlerindeki kapasitesini ve sınırlamalarını anlamayı amaçlamaktadır. Araştırma, prestijli üniversitelerin logolarının yeniden üretimi üzerinden, yapay zekanın kurumsal kimlik tasarımı üzerindeki potansiyel etkisini değerlendirmektedir. Araştırma, logoların yeniden oluşturulması sırasında yapay zekanın görsel kimlikleri yorumlama kapasitesini detaylı bir şekilde analiz etmektedir. Araştırma, üniversite logolarının yeniden üretilmesi bağlamında yapay zeka teknolojisinin mevcut yeteneklerini incelemeye odaklanmıştır. Çalışma, özellikle şu sorulara yanıt aramaktadır:

• Yapay zeka araçları, sembolik ve estetik açıdan karmaşık görsel kimlikleri ne ölçüde doğru şekilde yeniden üretebilir?

• Kurumsal kimliklerin görsel unsurları, yapay zeka tarafından nasıl yorumlanmakta ve yeniden tasarlanmaktadır?

Bu araştırmanın metodolojisi üç temel aşamadan oluşmaktadır: Veri toplama, yapay zeka araçlarıyla yeniden üretim ve değerlendirme. Veri toplama aşamasında, The Times Higher Education World University Rankings 2023 listesindeki ilk 15 üniversitenin logoları incelenmiştir. Ancak, yalnızca tipografik unsurlardan oluşan 5 logo çalışma kapsamı dışında bırakılmıştır. Bu nedenle, görsel ve sembolik çeşitlilik barındıran 10 üniversite logosu (Oxford, Harvard, Cambridge, Stanford, MIT, Princeton, Columbia, Chicago, Pennsylvania ve Johns Hopkins) analiz edilmiştir. Her üniversitenin logosuyla ilgili anlam ve bağlam, resmi web sitelerinden alınan açıklamalara dayanılarak derlenmiştir. Bu açıklamalar, logoların tarihi, tasarım unsurları ve sembolik anlamları detaylarını içermektedir. Logolar, 10 farklı üretken yapay zeka uygulaması (Artguru, CoPilot, Design.ai, Gemini Advanced, Genraft, Gettin.ai, Leonardo.ai, Chat GPT 4.0, Pixlr ve Runwayml) kullanılarak yeniden üretilmiş-

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tir. Bu araçların seçilmesinde, görsel üretim yetenekleri ve kullanıcı dostu arayüzleri gibi kriterler dikkate alınmıştır. Her bir logo için, ilgili üniversitenin resmi web sitesinden alınan açıklamalar, yapay zekaya "prompt" (girdi) olarak verilmiştir. Yapay zeka araçlarının ürettiği her bir logo, aşağıdaki kriterlere göre değerlendirilmiştir:

• Sembolizm ve Anlam Uyumu: Yapay zeka tarafından üretilen logonun, orijinal logonun taşıdığı sembolik anlamı ne ölçüde yansıttığı analiz edilmiştir.

• Tasarım Doğruluğu: Orijinal logo ile karşılaştırılarak, tasarım unsurlarının benzerliği incelenmiştir.

• Detay ve Kompozisyon: Renk paleti, şekiller ve genel düzenleme gibi görsel unsurların doğruluğu değerlendirilmiştir.

Sonuç olarak detaylı ve estetik tasarım bağlamında; Leonardo.ai ve Artguru, Cambridge, Columbia ve Harvard logolarında estetik uyum, detay zenginliği ve akademik kimliği yansıtan başarılı tasarımlar sunmaktadır. Leonardo.ai, özellikle Columbia ve Harvard logolarında öne çıkarken, Artguru ise Cambridge logosunda geleneksel unsurları modernle birleştirmiştir. Tarihsel unsurları koruma bağlamında RunwayML ve Artguru, Cambridge, Columbia ve Chicago logolarında tarihsel öğeleri başarıyla modernleştirerek akademik kimliği yansıtmaktadır. Özellikle RunwayML, geleneksel görsel unsurları korurken çağdaş bir his yaratmayı başarmıştır. Gencraft, CoPilot, Pixlr ve Chat GPT 4.0, Stanford ve MIT logolarında minimal ve modern tasarımlarla etkili çıktılar üretmiştir. Özellikle CoPilot, MIT logosunda sade ama dikkat çekici bir çözüm sunmaktadır. Chat GPT 4.0 ise Columbia ve Harvard logolarında dengeli bir modernlik sergilemektedir. Design.ai, Columbia ve Harvard logolarında güçlü görsel anlatımlar sunmaktadır. Chicago logosunda minimalizmle öne çıkarken, bazı logolarda karmaşıklık yaratsa da sanatsal çözümleriyle dikkat çekmektedir. Gemini Advanced, modern tasarım tekniklerini Cambridge, Columbia ve Harvard logolarında başarılı bir şekilde uygulamıştır. Geleneksel unsurları kısmen göz ardı etmiş olsa da Columbia logosundaki dengeli tasarımıyla öne çıkmaktadır. Buna karşın Pixlr ve Getting.ai, bazı logolarda (ör. Pennsylvania ve John Hopkins) kurumsal kimliği yeterince güçlü yansıtamamıştır. Getting.ai, Stanford ve John Hopkins logolarında aşırı sadeleşme eğilimi gösterirken Pixlr ise Cambridge ve Harvard logolarında detay eksikliğiyle zayıf kalmıştır.

Anahtar Kelimeler: *Üretken yapay zeka, Yapay zeka destekli tasarım, Üniversite logoları, Görsel kimlik yeniden üretimi.*

1. INTRODUCTION

Graphic design is a process that requires divergent thinking. However, how far current generative design techniques support this requirement (Singh and Gu, 2012, p.185). Visual appearance is often one of the key attributes of a product. At the conceptual stage, designers explore the solution space, looking for appealing concepts to develop in later stages (Alcaide-Marzal et al., 2020, p.144). Generative Artificial Intelligence (GenAI) has been making remarkable progress in recent years, showing impressive performance in a variety of generative tasks in different domains such as visual design (Ye et al., 2024, p.43). In support of this argument, Takale et al. (2024, p. 20) underline that generative AI models are used in various fields such as image analysis, text generation, music composition and creative design. While traditional approaches face challenges in terms of time, limited resources and lack of customization, GAI application enables automation of design processes, dynamic content generation and adaptation to individual user needs (Ganović and Avdić, 2024, p. 392). Generative text-image models (as exemplified by DALL-E, MidJourney, and Stable Diffusion) have recently made tremendous technological leaps, producing impressive results in many graphic fields, from logo design to digital painting and photo composition (Schetinger et al. 2023, p. 421). Huang et al. (2023, p. 2) underline that the creation of a coherent design in graphic design processes requires careful selection and combination of different visual elements, which can be challenging and time-consuming; in order to speed up the design process, new AI techniques have been proposed to automate tedious tasks and facilitate human creativity. Li et al. (2024, p. 1), in a study of 20 UX designers, found that designers see AI applications as a helpful instrument in their design process. Shin et al. (2024, p. 1) utilized generative AI tools to create design cards from articles and found that designers perceived these cards produced with AI tools as more inspiring and productive than reading the original article texts. Tran et al. (2024, p.3) produced comics and visual narratives for use in nursing education through DALL-E, one of the generative artificial intelligence models, and these outputs revealed that GAI, especially DALL-E, has significant potential to fill the gap in creating visual narratives for nursing education. Chauhan et al. (2023, p. 1102) state that medical researchers are also supported in the use of AI tools and can create artificial X-ray images of the head, chest, shoulders, abdomen, hand and ankle. Furtado et al. (2024, p. 6) explores how generative AI models can enhance creativity in urban planning, engineering and product design, envisioning a future where GAI becomes a real-time collaborator to complete specific automated tasks, freeing designers to focus on transformational innovation. Jaruga-Rozdolska (2022,p. 101) examines the potential use of generative AI tools in architectural practice and argues for the potential of images

generated by AI tools. In 2022, Jason Allen submitted a digital artwork to the Colorado State Fair in the fine art category and won first prize out of 20 entries. The winning work was created with Midjourney, a generative artificial intelligence tool. For this work, which he named "Théâtre D'opéra Spatial", the artist made a statement as "I will not apologize for this. I won and I did not violate any rules" (Coşkun, 2024, p. 476). Based on this work, which was created with the productive artificial intelligence tool and even won first place, it is possible to conclude that productive artificial intelligence applications are used in many areas of life and produce effective results.

Figure 1. *"Théâtre D'opéra Spatial" painting produced with Midjourney (Coşkun, 2024).*

Ganović and Avdić (2024, p. 393) investigate the possibilities of applying GAI in web design and identify its importance in the context of the modern digital environment. In their research, Ganović and Avdić (2024) developed two websites, one using the classical method and the other using GAI tools (ChatGPT, Canva, WixADI) and found that the website designed with GAI tools provided a deeper insight into the potential for advancing the creative processes in website design in terms of experimental testing and user experience evaluation. Lively et al. (2023) found that integrating AI tools into the web design and development workflow resulted in students reporting fewer deficiencies and producing better final projects. Hutson and Cotroneo (2023, p.10), in a study to identify the development and adoption of generative AI tools in art and design education, found that students were receptive to utilizing generic AI tools to enhance their sketchbooks and ideation processes. Mayahi and Vidrih (2022, p.3) argue that in the marketing world, it is necessary to have visually appealing content, and that the integration of visual content with artificial intelligence is the key to acquiring and retaining loyal customers; they underline that the absence of any production in the overarching marketing strategy will ultimately result in a smaller market share for that company. Smolinski et al. (2023, p. 4) aimed to evaluate the effectiveness of generative AI in creating marketing content

and the method of integration of generative AI with an information system that processes, profiles and produces marketing content. They found that AI can create high-quality visuals that are as effective as human-generated visuals and is successful in personalizing ads to consumers and increasing customer engagement. In a study on the use of generative AI models in fashion design, Jin et al. (2024, p. 36) found that these models significantly improved the early stages of fashion design by providing diverse and rapid visual stimuli. Designers have utilized AI tools to improve text prompts, refine hand-drawn sketches, and enhance digital sketches to facilitate creativity and decision making. Lyu et al. (2024, p. 14), in their study on the use of generative AI in jewelry design, emphasize that generative AI has a significant impact on the idea generation phase of jewelry design, especially on the shape factor at the technical level, such as depth rather than breadth and detailing and unexpected composition, and also underline that making use of AI image generators shifts the designer's focus from technical tasks to strategic decisions related to visual appeal, cognitive engagement and emotional resonance. Barut and Türker (2024, p.115) redesigned the covers of children's books with artificial intelligence tools and found that Gemini and Midjourney tools can make significant contributions to the cover design process. Artificial intelligence tools, especially their textual analysis capabilities, help to identify visual elements that reflect the content of the book and attract children's attention, and more creative designs emerge. Kulishova and Tsykalo (2024, p. 34-35) developed a game character with artificial intelligence tools, underlining that artificial intelligence applications are used in game and multimedia designs in addition to areas such as building, clothing and web design. Ling et al. (2024, p.18) similarly emphasize the potential of GenAI to facilitate multidisciplinary collaboration by enabling designers to prototype using creative drawing techniques that may exceed their current abilities. Han et al. (2024, p.1) found that generative AI models can be useful for teachers in generating adaptive teaching materials, enhancing idea development and providing personalized, timely feedback to students. In graphic design, the primary goal was optimization and speed - replacing designers in performing repetitive tasks or analyzing large amounts of user data to create better solutions, AI tools not only speed up processes, allowing designers to focus on the creative part of their work, but also create designs from scratch by tracking users' input. AI tools offer more flexibility and creativity in finding the best solution for different tasks such as font and color selection, image editing, creating the best layouts and compositions. Below are the logos created for a fictitious business called "iCreate", where the keywords are "art, design, modern, creative, design agency", the font is defined as "modern" and we do not choose a color (Tomić et al. 2023, p. 89).

Figure 2. *Logos designed with artificial intelligence (Tomić et al. 2023).*

Putjorn and Putjorn (2023, p. 353) conducted a workshop with 25 high school students in Thailand to evaluate their experiences with generative AI in creative content creation, highlighting positive perceptions and high usability among young students who interacted with generative AI, and found that the findings of the study included five key aspects: providing inspiration and stimulating creative thinking, enabling iteration and experimentation, supporting accessibility, encouraging collaboration, and facilitating skill development. Li and Sra (2024, p. 929), in their study on the use of artificial intelligence models in the creation of dance choreographies, suggest that generative artificial intelligence models can be utilized in the context of increased efficiency, expanded creative possibilities, and an improved iterative process reporting. Calo and MacLellan (2024, p. 305) found that utilizing AI models as an auxiliary element improves the process of creating intelligent tutoring systems (ITSs) by using generative AI capabilities to help educators create tutor interfaces that meet their needs while adhering to design principles to design effective and engaging tutor interfaces. Ardhianto et al. (2023, p. 15) aimed to save time in creating design alternatives and support the designer's creativity by using generative artificial intelligence models in poster design and found that the results can be used as a basis for the visuals of poster designs and will help designers to explore different design visuals.

Figure 3. *Posters designed with artificial intelligence (Ardhianto et al., 2023).*

Ma and Zhao (2024, p. 72) found that the integration of creative AI-based techniques into computer-aided brand logo design can significantly enhance the creative process and offer designers a wider range of inspiration and flexibility to address various application scenarios.

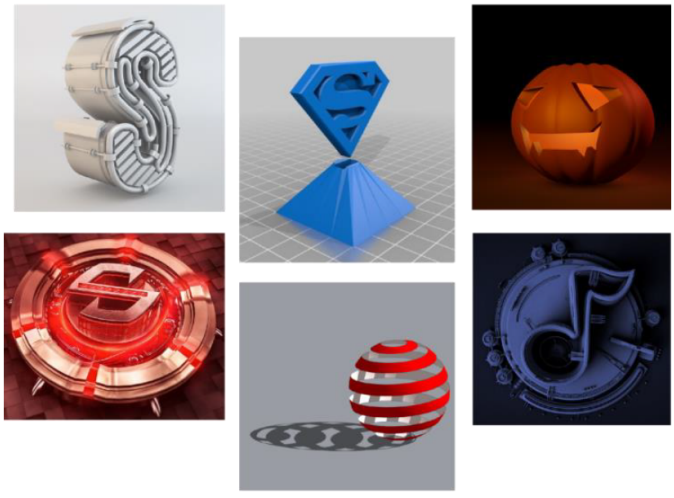


Figure 4. *Logos designed with artificial intelligence (Ma and Zhao, 2024).*

Dehman (2023, p. 36, 45) produced logos with artificial intelligence applications (ChatGPT, DALL-E, and Midjourney) and concluded that such generations can help graphic designers visualize an idea quickly or visualize several different versions of an idea without having to draw these differences, thus making the idea generation parts of the process more efficient.

Figure 5. *Logos designed with artificial intelligence (Dehman, 2023).*

Osadcha and Osadcha (2023, p. 222) examined the capabilities of modern artificial intelligence tools for image and logo production in their research, especially the suitability of using productive artificial intelligence technology in the work of designers for the development of corporate identity elements and the suitability of studying productive artificial intelligence technology in the education of future designers, The study found that AI tools can be used to create corporate identity elements, which is why the majority of experts agree that AI tools for generating images and logos should be used in the process of creating corporate identity elements.

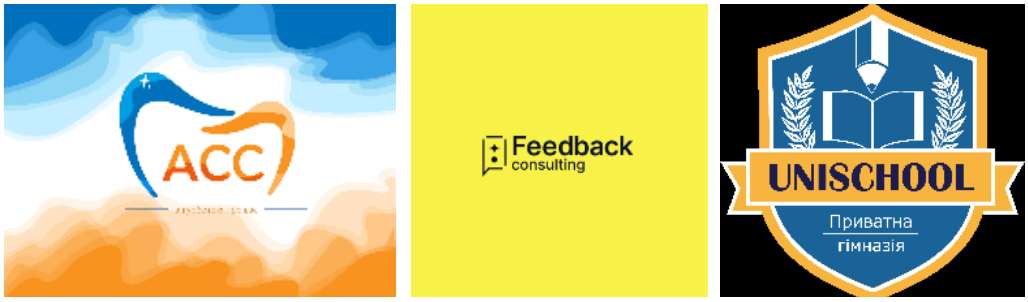


Figure 6. *Logos designed with artificial intelligence (Osadcha and Osadcha, 2023).*

Mikroyannidis et al. (2024, p.2) developed a proof-of-concept tool for use at the UK Open University that can instantly generate introductions and summaries of course materials, automatically generate quizzes and tests, as well as automatically identify, categorize and transform learning activities, a preliminary evaluation with members of course production teams found that in 40% of cases, AI-generated texts of 250-500 words were suitable for use in distance learning materials. Ning et al. (2024, p. 1) argue that the application of generative AI technology in the study mode and analysis of design teaching needs can allocate the implementation of the creative teaching concept of art design, strive to build a high-quality design education system supported by digital technology, promote the implementation of the digital strategy of design education, and help realize modern design education in colleges and universities. Mikkonen (2023, p. 5-6) used Midjourney, a generative AI tool, to create mood and ambiance boards and found that AI tools produced content that designers could not produce in a reasonable amount of time and realized them in high quality. Looking at the studies cited throughout the study, it is emphasized that artificial intelligence tools facilitate the work of designers in the context of giving ideas to designers, shortening and diversifying design processes, but it is underlined that the outputs cannot go beyond an abstract element. According to Bartlett and Camba (2024, p. 57), the images created by designers using artificial intelligence tools are directly transferred to the 3D model. A shoe created by designer Kedar Benjamin

using Dall-E was 3D modeled and turned into a physical entity through 3D printers. The research gap that our study aims to address is the impact of artificial intelligence (AI) technologies in the design world, and in particular its role in the reproduction of prestigious university logos. While research to date has generally focused on examining the general use of AI in design processes and its contributions in aesthetic and creative fields, the ways in which corporate identity elements such as prestigious university logos are reproduced by AI and the effects of this process on the originality, identity and brand value of the design have not been adequately addressed. In this context, the contribution of our study is to examine how prestigious university logos can be reproduced with AI technologies and to discuss the effects of automation and digitalization in design processes through a specific example. Since university logos are not only aesthetic elements but also symbols that carry an institutional identity, how these symbols can be reproduced or transformed by AI is an important question. By providing an in-depth examination of this issue, our study will provide further insights into the growing role of AI in the design world and open new debates on the ethical and aesthetic limits of such technologies. Unlike the limited number of previous examinations of the design processes of AI, this study aims to explore the balance between originality, innovation and the use of technology in corporate identity design, and to develop new perspectives on how original and creative processes can be preserved or transformed by harnessing the potential of AI technologies in design.

2. METHOD

In the study, the logos of the first 15 universities in The Times Higher Education World University Rankings 2023 list were included and 5 logos with only typographic elements in their logos were excluded. Therefore, the logos of Oxford, Harvard, Cambridge, Stanford, Massachusetts Institute of Technology (MIT), Princenton, Columbia, Chicago, Pennsylvania and John Hopkins universities were included in the study. The official logos of these universities were reproduced in 10 generative AI applications, namely Artguru, CoPilot, Design.ai, Gemini Advanced, Genraft, Gettin.ai, Leonardo.ai, Chat CPT 4o, Pixlr and Runwayml. The prompts used for these tools were the same for each application and were not customized. The prompts were derived from information about the logo design on each university's own web page. The symbolic meanings and aesthetic features of each university's logo were taken directly from these web pages and given to the AI tools and the logos were reproduced through these elements. In this context, the prompts were structured to accurately reflect the meanings and design elements of each university's logo. This information was communicated to each AI tool in the same

way, so that each tool was guided by the same underlying data. However, each tool interpreted this data differently and produced different visual outputs according to its own algorithmic characteristics. The prompts entered into the generative AI applications are given in the table below:

Table 1. *Official Logo Meaning*

Logo Meaning
Oxford University: The motto of the University of Oxford is "Dominus illuminatio mea" or "The Lord is my light". This motto is the incipit (or opening words) of Psalm 27: "The LORD is my light and my salvation— whom shall I fear? The LORD is the stronghold of my life— of whom shall I be afraid?"
Harvard University: The Harvard University logo is a shield containing the Latin slogan "VERITAS" ("truth" or "verity") on three books. Harvard adopted the Latin "Veritas Christo et Ecclesiae" motto in 1692, which means "Truth for the Church and Christ." This slogan was placed on a shield and is found on many premises around the main campus, including Memorial Church, Widener Library, and a number of dorms within the Harvard Yard.
Cambridge University: The University of Cambridge was granted its arms in 1573 by Robert Cooke, Clarenceux King of Arms and a graduate of St. John's College, for use by the Chancellor, Masters, Fellows and Scholars as a corporate body. The arms Cooke granted are officially described in heraldic terminology or blazon as follows: Gules on a Cross Ermine between four Lions passant guardant Or a Bible fesswise Gules clasped and garnished Or the clasps in base. This may be rendered into plain English as follows: On a red background, a cross of ermine fur between four gold lions walking but with one fore-leg raised, and facing the observer. These lions must always face the left-hand edge of the page or item on which the arms are displayed (which means they are facing right, heraldically speaking). On the centre of the cross is a closed book with its spine horizontal and with clasps and decoration, the clasps pointing downward

Stanford University: The tree-lined S gate is one of Stanford University's most protective logos. he "Tree," which is a member of the Stanford Band, is representative of El Palo Alto, the Redwood tree which is the logo of the city of Palo Alto. Since Stanford University and Palo Alto are almost inextricably intertwined in interests and location, it is a natural outgrowth of this relationship. The central part of the seal is occupied by the so-called Stanford tree. One of the reasons for choosing this symbol was that trees, especially coast redwood (Sequoia sempervirens) are one of the symbols of Palo Alto, CA, where Stanford is situated.

MIT: The stylized abbreviation MIT, which consists of seven quadrilaterals of different sizes, denotes the innovativeness and technological focus of the educational institution. Each geometric figure resembles an element of a microcircuit. And it is also a symbol of external simplicity, behind which lies a deep meaning.

Princenton University: The emblem consists of a shield and the university’s name located to the right of it. As usual, the first word is bolder, and “university” is written thinner.

The shield is divided into two parts. At the top, on a black background, an element of the historical past is an open Bible with the same inscription as on the first seal of the college. Below the Bible on the shield is a black chevron (rafter) on an orange background. The image symbolizes the federal government, legislative, executive, and judicial branches. The university witnessed the United States’ formation and the Constitution’s signing. His students took part in it. And the image is a reference to the rich historical past of the university. Reinforces the university’s position on the origins of modern America.

Columbia University: The King's Crown is one of the most popular and pervasive symbols of the university, and it is currently used as the school's official logo. It traces its roots back to a copper crown that once surmounted Columbia's first building, and since the early 20th century, it has become a frequent design motif on campus and closely tied to the university's identity.

Chiacago University: The University’s coat of arms bears a phoenix emerging from flames and the Latin motto: Crescat scientia; vita excolatur, or “Let knowledge grow from more to more; and so be human life enriched.”

Pennsylvania University: The Penn coat-of-arms was derived by combining the coat-of-arms of Benjamin Franklin and that of William Penn's family. The dolphin on the red chief was part of Franklin's coat-of-arms and the three silver plates on the blue chevron were part of Penn's. The two were combined on a white shield along with two open volumes representing the University's educational purpose.

John Hopkins University: Our logo's iconography is based on the university's official seal. The open book represents knowledge and discovery, the globe signifies the university's worldwide reach and responsibility, and the crest of Lord Baltimore is emblematic of the university's commitment and connection to its community. These elements are framed in a shield that is a shared visual among all our schools and divisions.

Each logo generated by the AI tools was evaluated according to the following three main criteria:

1. Symbolism and Meaning Congruence: The extent to which the AI-generated logo reflects the symbolic meanings of the original logo was analyzed. Accurately conveying the original logo's cultural, historical and organizational meanings is a key criterion for a successful reproduction.

2. Design Accuracy: The extent to which the reproduced logo is faithful to the original design and the similarity of design elements is assessed. This includes the accuracy of the overall structure of the logo, color choice, font and symbols.

3. Detail and Composition: The accuracy and harmony of visual elements such as the color palette, shapes, font and overall arrangement were evaluated. A successful reproduction must be aesthetically strong in visual composition while remaining true to the originality of the design.

Criteria for Successful Reproduction:

- **Symbolism and Harmony of Meaning:** The symbolic meanings of the original logo are accurately reflected and the meaning of the logo is conveyed in harmony with the corporate identity.

- **Design Accuracy:** All key elements of the original design have been accurately and proportionally reproduced. Colors, shapes and font are applied in a similar way.

- **Detail and Composition:** The visual elements successfully reflect the aesthetic structure

and layout of the original logo. The composition is balanced and aesthetically pleasing.

Criteria for Unsuccessful Reproduction:

- **Symbolism and Harmony of Meaning:** The symbolic meanings of the original logo are not adequately reflected or are misunderstood. Incompatibility with the corporate identity can be observed.

- **Design Accuracy:** Key elements of the original design (color, shape, font) are reproduced incorrectly or incompletely. There are significant differences in the design.

- **Detail and Composition:** Visual elements do not accurately reflect the aesthetic and layout characteristics of the original logo. The composition may be incongruous or unbalanced; colors or shapes may have been chosen incorrectly.

In our study, we considered some limitations related to the use of free versions of AI tools. Free versions often provide lower resolution output and restrict access to some advanced features. These limitations can affect the quality of the design and make it difficult to render some details clearly. It was also considered that the output from these versions may be limited in terms of originality and aesthetics. Our criteria for assessing the success of logo reproductions are the aesthetic integrity of the design, whether the symbolic meanings of the original logo are retained, and the extent to which the brand's identity is accurately reflected. A "successful" remake is considered to be one in which the aesthetic and symbolic elements of the original logo are largely preserved, but in which the creative elements offered by AI also contribute to the design. A "unsuccessful" reproduction is one that does not reflect the meaning of the original logo, has significant design deficiencies, or is too far removed from the aesthetic elements of AI.

Table 2. *Logos produced by Artguru.*

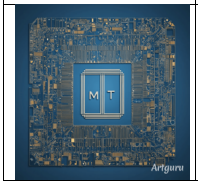
Cambridge University	Chiacago University	Columbia University	Harvard University	John Hopkins University
				
MIT	Oxford	Pennsylvania University	Princeton University	Stanford University
				

Table 3. *Logos produced by CoPilot*

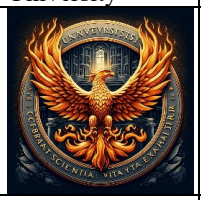
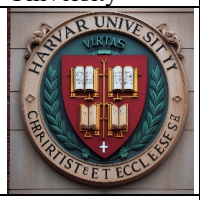
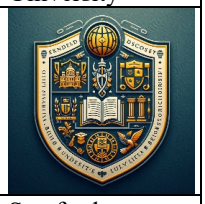
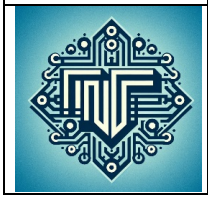
Cambridge University	Chiacago University	Columbia University	Harvard University	John Hopkins University
				
MIT	Oxford	Pennsylvania University	Princeton University	Stanford University
				

Table 4. *Logos produced by Design.ai.*

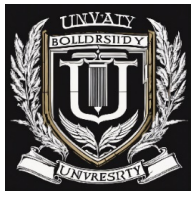
Cambridge University	Chiacago University	Columbia University	Harvard University	John Hopkins University
				
MIT	Oxford	Pennsylvania University	Princeton University	Stanford University
				

Table 5. *Logos produced by Gemini Advanced*

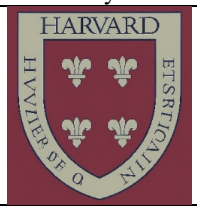
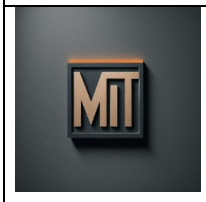
Cambridge University	Chiacago University	Columbia University	Harvard University	John Hopkins University
				
MIT	Oxford	Pennsylvania University	Princeton University	Stanford University
				

Table 6. *Logos produced by Gencraft*

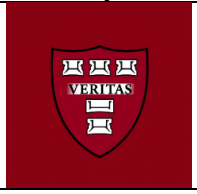
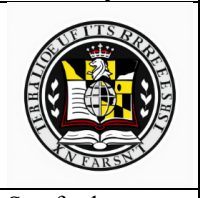
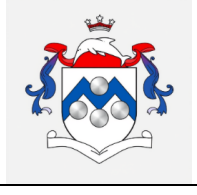
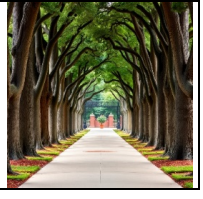
Cambridge University	Chiacago University	Columbia University	Harvard University	John Hopkins University
				
MIT	Oxford	Pennsylvania University	Princeton University	Stanford University
				

Table 7. *Logos produced by Gettimg.ai*

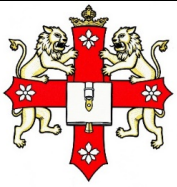
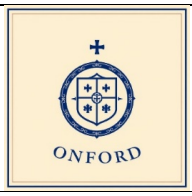
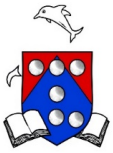
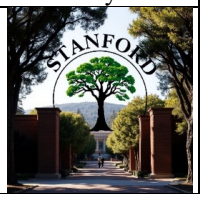
Cambridge University	Chiacago University	Columbia University	Harvard University	John Hopkins University
				
MIT	Oxford	Pennsylvania University	Princeton University	Stanford University
				

Table 8. *Logos produced by Leonardo.ai*

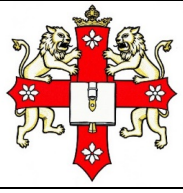
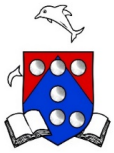
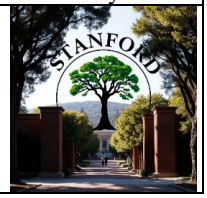
Cambridge University	Chiacago University	Columbia University	Harvard University	John Hopkins University
				
MIT	Oxford	Pennsylvania University	Princeton University	Stanford University
				

Table 9. *Logos produced by Chat GPT 4o*

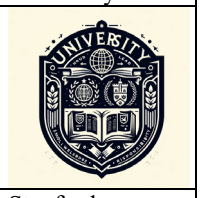
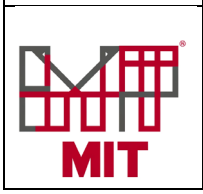
Cambridge University	Chiacago University	Columbia University	Harvard University	John Hopkins University
				
MIT	Oxford	Pennsylvania University	Princeton University	Stanford University
				

Table 10. *Logos produced by Pixlr*

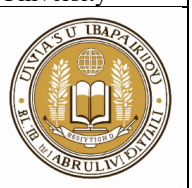
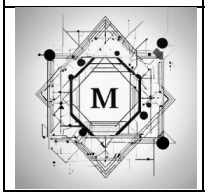
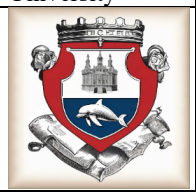
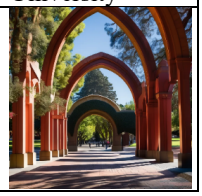
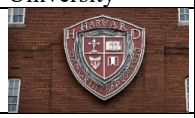
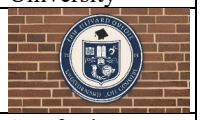
Cambridge University	Chiacago University	Columbia University	Harvard University	John Hopkins University
				
MIT	Oxford	Pennsylvania University	Princeton University	Stanford University
				

Table 11. *Logos produced by Runwaynl*

Cambridge University	Chiacago University	Columbia University	Harvard University	John Hopkins University
				
MIT	Oxford	Pennsylvania University	Princeton University	Stanford University
				

3. CONCLUSION

The study evaluates the strengths and weaknesses of each AI tool in the process of reproducing university logos. This evaluation provides important insights into the performance of the tools by addressing the aesthetic harmony of the logos, their success in reflecting institutional identities, and the originality issues that arise in the design.

Table 12. *Artificial Intelligence Tools Comparison*

Tools	Strengths	Weaknesses
Artguru	Detailed and artistic approaches, aesthetic harmony in Cambridge and Columbia logos	Too abstract approach in some logos (Stanford, MIT) does not emphasize the corporate identity sufficiently
CoPilot	Minimalist and clean design, modern lines in MIT and Harvard logos	Lack of originality in the Cambridge and Columbia logos, over-simplification in some logos.
Design.ai	Strong details in the Cambridge, Columbia and Harvard logos, minimalism in the Chicago logo	The Stanford and Pennsylvania logos lack complexity, and the Oxford and MIT logos lack color harmony.
Gemini Advanced	Modern design techniques in the Columbia, Harvard and MIT logos are impressive	Loss of detail in the Cambridge and Oxford logos, and the Pennsylvania logo is lacking in striking elements.
Gencraft	Modern approaches in Columbia, Princeton and Harvard logos, clean lines in Stanford and MIT logos	Lack of character in the Chicago logo, oversimplification in the Pennsylvania logos.
Getting.ai	Preserving traditional elements in the Cambridge and Harvard logos by modernizing them	Over-simplification in Stanford and John Hopkins logos, lack of originality in Pennsylvania.
Leonardo.ai	Detailed and aesthetic design of Cambridge, Columbia and Harvard logos	Complexity in the Princeton and MIT logos, a commercial look in the Oxford and Cambridge logos.

ChatGPT 4.o	Balanced and unique designs in Cambridge, Columbia and Harvard logos	Oversimplification in the Pennsylvania and Stanford logos, lack of creativity in the John Hopkins logo.
Pixlr	Minimal and elegant design in Chicago and Princeton logos	Cambridge and Harvard logos lack detail, Columbia logos lack originality.
RunwayML	Preserving historical fidelity and detail in the Cambridge, Columbia and Harvard logos	Over-simplification in MIT and Princeton logos, distractions in John Hopkins logos.

The Artguru tool shows a strong performance in providing aesthetic harmony, especially in Cambridge and Columbia logos. This tool, which attracts attention with its detailed and artistic approach, successfully reflects the symbolic meanings of the university logos aesthetically. However, in the case of the Stanford and MIT logos, it takes a very abstract approach and does not emphasize the institutional identities sufficiently, resulting in some of the logos not being successful. The CoPilot tool, on the other hand, stands out with its minimalist and clean design approach and has produced successful results by using modern lines, especially in the MIT and Harvard logos. However, the Cambridge and Columbia logos lacked originality and were overly simplified, which resulted in some logos not being sufficiently differentiated from the original designs. Design. ai achieved strong detail, particularly in the Cambridge, Columbia and Harvard logos, and minimalism in the Chicago logo. However, the Stanford and Pennsylvania logos are cluttered, and the Oxford and MIT logos lack color harmony. The Gemini Advanced tool impressively applies modern design techniques to the Columbia, Harvard and MIT logos. However, there is a loss of detail in the Cambridge and Oxford logos, and the Pennsylvania logo in particular lacks striking elements. Gencraft has produced positive results by offering modern approaches in the Columbia, Princeton and Harvard logos. However, the simple lines in the Stanford and MIT logos led to a design deficiency, and the Chicago logo lacked character. Getting.ai successfully preserves traditional elements in the Cambridge and Harvard logos by modernizing them. However, the over-simplification of the Stanford and John Hopkins logos and the lack of originality in the Pennsylvania logo render the tool inadequate for some logos. Leonardo.ai produced detailed and aesthetic designs in the Cambridge, Columbia, and Harvard logos, but complexity in the Princeton and MIT logos, and a commercial look in the Oxford and Cambridge logos, resulting in some originality issues. ChatGPT 4o provided balanced and original designs for the Cambridge, Columbia and Harvard logos, while the Pennsylvania and Stanford logos were oversimplified and the John Hopkins logo lacked creativity. Pixlr

offers minimal and elegant designs for the Chicago and Princeton logos, but shows weaknesses such as a lack of detail in the Cambridge and Harvard logos and a lack of originality in the Columbia logo. Finally, RunwayML successfully maintains historical fidelity and detail in the Cambridge, Columbia and Harvard logos, while MIT and Princeton logos suffer from over-simplification and John Hopkins logos suffer from distractions. Each AI tool has its own strengths and weaknesses. While some tools successfully reflect aesthetic harmony and detail, others deviate from authenticity and corporate identity by presenting minimalist or simplified designs. The weaknesses of these tools are particularly evident in complex designs and in accurately conveying symbolic elements. The shortcomings of the outputs produced by generative artificial intelligence tools are itemized and listed below, together with their reasons:

1. Lack of Abstraction and Emphasis on Corporate Identity

Many AI tools have adopted an abstract approach, especially in the logos of universities such as Stanford, MIT and John Hopkins, which has resulted in underemphasizing the identity of the institutions. Such tools sometimes offer minimalist designs and abstract shapes that fail to reflect the symbolic meanings of the original logo. For example, tools such as Artguru and Gencraft used too abstract and modern elements in the Stanford and MIT logos, which detracted from the traditional prestige and corporate identity of the institutions. This is because AI tools sometimes do not process customized prompts correctly and do not always fully analyze the right symbolic elements.

2. Lack of Detail and Color Matching

Some tools, particularly the MIT and Oxford logos, lacked color matching. Tools such as Design.ai and Gemini Advanced were unable to accurately reproduce the color palette of the MIT logo. Using the right shades of colors in the reproduction of such logos is critical for the preservation of corporate identity. The logos of universities such as Oxford and MIT often contain distinctive colors and details. AI tools struggle to accurately reflect these color palettes and details. This is because some tools are unable to fully render visual details and colors are not chosen correctly. Universities like Stanford have sometimes taken a minimalist approach, which has resulted in the loss of important details in their logos.

3. Lack of Originality and Excessive Simplification

Some tools, particularly when reproducing the logos of universities such as Columbia, Princeton and Pennsylvania, suffered from a lack of originality and over-simplification. For example, tools such as CoPilot and Pixlr struggled to reproduce symbolic elements such as the crown in the Columbia logo and the books in the Princeton logo in

a sufficiently authentic way, resulting in more minimalist and simplified designs. This made it difficult for the logos to align with their institutional identity and prevented them from accurately reflecting important symbols. The Gettin.ai tool demonstrates this in the John Hopkins and Stanford logos, where over-simplification has led to the loss of the institutions' unique images.

4. Complexity and Loss of Detail

The logos of universities such as Stanford, Pennsylvania and Oxford have sometimes been reproduced in AI tools with complexity and loss of detail. Tools such as Gemini Advanced and RunwayML were unable to fully render the details in the complexity of these logos, and deviations from the original designs occurred. Symbols prominent in the Oxford logo, such as the state coat of arms or Stanford's head, were not rendered clearly and accurately enough. AI tools have sometimes oversimplified or misinterpreted complex elements, resulting in simpler and more uniform results.

5. Distractions

Some tools produced distracting elements, especially in the John Hopkins and Princeton logos. Tools like RunwayML weakened the original meaning of the design by adding too much detail or using the wrong color tones, especially in the John Hopkins logo. Such errors relate to the difficulty of AI tools to strike the right balance between visual elements and faithfully reflect the original designs. Some tools over-interpreted the information provided in the prompt, leading to a disruption of the aesthetic and symbolic balance in the original logo.

Although the outputs produced by generative AI tools can be used as a stand-alone final production, the positive approach advocated by Schetinger et al. (2023) that AI tools produce impressive outputs, as well as the positive and negative values they carry, when evaluated in the context of studies in the literature, show that they cannot be used as a final production alone. Jaruga-Rozdolska (2022) draws attention to the potential of artificial intelligence tools in design, and the outputs produced within the scope of the study have features that confirm this potential. Ma and Zhao (2024), Dehman (2023) underline that artificial intelligence applications will facilitate designers to visualize their ideas quickly and alternatively by providing inspiration and flexibility to designers, and it is thought that the visuals produced within the scope of the study support this argument. Especially if the prompts are differentiated and their content is improved, it is seen that it is possible to improve the production produced by artificial intelligence, which can be described as sketches. This feature overlaps with Barut and Türker's (2024) claim that artificial intelligence tools are capable of textual analysis. For this reason, as Osadcha and

Osadcha (2023) argue, although designers agree on its use in logo creation, the positive and negative elements carried by the outputs produced within the scope of the study, Huang et al, (2023), Ardhianto et al. (2023), Gürdal Pamuklu and Bahar Fındıkçı (2023), Furtado et al. (2024), Li et al. (2024) revealed that it was not enough to completely eliminate the human influence in the context of accelerating the design processes, automating tedious tasks and facilitating creativity, but it is undeniable that its use as a good auxiliary element has become undeniable. In other words, generative AI is not a harbinger of the death of art, but rather a new tool with its own unique possibilities (Epstein et al., 2023).

Ultimately, the weaknesses of AI tools in reproducing logos are often due to abstraction, loss of detail, lack of originality, color matching problems, and lack of visual balance. The limitations of these tools are exacerbated by the inability to accurately process prompts and convey corporate identities. In this context, it is concluded that the visual analysis capacity and text processing algorithms of AI tools need to be improved in order to create more accurate and original designs. The success of AI tools varies depending on the design approach used, the details and the correct processing of symbolic elements. Further research and development to improve the performance of these tools in the future will enable more successful reproduction of university logos. In order to shed light on future studies, it can be considered as a suggestion to evaluate the results that will emerge by reproducing the same university logos with the same artificial intelligence tools and to reveal the difference between paid and free versions. In addition, the scope of the study can be further expanded, in other words, the number of university logos to be produced can be further increased and the performance of productive artificial intelligence tools can be evaluated. Again, by giving the prompts to be entered into artificial intelligence to human designers and asking them to create alternative logos, they can be compared with the designs created by artificial intelligence application and the idea that artificial intelligence tools, which emerged as the focus of many studies cited in the study, should support human creators in their design processes instead of being an independent producer can be provided.

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