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Discourse and Architectural Artifact: An AI powered Comparative Analysis Model

Söylem ve Mimari Ürün: Yapay Zekâ Destekli Karşılaştırmalı Bir Analiz Modeli

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ABSTRACT

The transformation of architectural discourse into tangible design artifacts remains a central concern within architectural theory and design research. Historically, social phenomena have continuously shaped architectural discourse, which in turn has informed the emergence of built forms. However, the nature of the relationship between discourse and artifact remains ambiguous. Typically developed during the preliminary design phase, discourse encapsulates the intangible values of a project, often articulated through textual and visual media. Design cognition research has examined how architectural ideas develop through sketches and iterative processes, emphasizing the interaction between hand and mind. However, such studies are often constrained by limited iteration samples and interpretive subjectivity, making it difficult to capture the full complexity of early-stage design thinking. To address this limitation, the present study investigates the potential of artificial intelligence—specifically, text-to-image generation models—as a tool for evaluating the relationship between architectural discourse and resulting artifacts.By generating multiple visual outputs from a single discursive input, AI offers a novel means of exploring a traditionally qualitative and ambiguous process. Two architecturally significant case studies—Rem Koolhaas's Charette submission for the Museum of Modern Art (MoMA) expansion and Brian Cantley's *Syntaxonome*—were selected for their contrasting discursive and formal characteristics. The discourse from each project was processed through a text-to-image AI model to produce visual interpretations. These outputs were then compared to the original design artifacts. Findings, presented through quantitative metrics and comparative diagrams, offer new insights into the discourse and artifact continuum in architectural research.

Keywords: Architectural discourse, generative AI, human-AI collaboration, text-to-image.

ÖZ

Mimarlık söyleminin somut tasarım ürünlerine dönüşümü, mimarlık kuramı ve tasarım araştırmalarının temel kaygılarından biri olmaya devam etmektedir. Tarihsel olarak, toplumsal olgular mimarlık söylemini sürekli olarak şekillendirmiş; bu söylem ise yapı formlarının ortaya çıkışını etkilemiştir. Ancak söylem ile yapıt arasındaki ilişkinin doğası belirsizliğini korumaktadır. Genellikle ön tasarım aşamasında geliştirilen söylem, bir projenin soyut değerlerini kapsar ve çoğunlukla metinsel ve görsel araçlar aracılığıyla ifade edilir. Tasarım bilişi veya tasarım kavrayışı araştırmaları, mimari fikirlerin eskizler ve yinelemeli süreçler yoluyla nasıl geliştiğini inceleyerek el ile zihin arasındaki etkileşime vurgu yapmıştır. Ancak bu tür çalışmalar, sınırlı yineleme örnekleri ve yorumlayıcı öznelik nedeniyle erken aşama tasarım düşüncesinin tüm karmaşıklığını yakalamakta zorlanmaktadır. Bu sınırlamayı aşmak amacıyla, bu çalışma mimarlık söylemi ile ortaya çıkan yapıt arasındaki ilişkiyi değerlendirmek için yapay zekanın —özellikle metinden görsele üretim modellerinin potansiyelini araştırmaktadır. Yapay zeka, tek bir söylemsel girdiden birden fazla görsel çıktı üreterek, geleneksel olarak nitel ve belirsiz olan bu süreci keşfetmek için yeni bir yöntem sunmaktadır. Mimarlık açısından önemli iki örnek çalışma Rem Koolhaas'ın Modern Sanatlar Müzesi (MoMA) için genişletme projesine yönelik Charette sunumu ve Brian Cantley'nin Syntaxonome adlı mimari tasarım çalışması farklı söylemsel ve biçimsel özellikleri nedeniyle seçilmiştir. Her iki projenin söylemi, bir metinden-görsele yapay zeka modeli aracılığıyla işlenmiş ve görsel yorumlar oluşturulmuştur. Bu çıktılar, orijinal tasarım ürünleri ile karşılaştırılmıştır. Nicel ölçütler ve karşılaştırmalı diyagramlar aracılığıyla sunulan bulgular, söylem-mimari ürün sürekliliğine dair yeni içgörüler sağlamakta ve mimarlık araştırmalarında yapay zekâ destekli yöntemlerin potansiyelini ortaya koymaktadır.

Anahtar Kelimeler: Mimari söylem, üretken YZ araçları, insan-YZ işbirliği, metinden görüntüye.

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Introduction

In the realm of architectural theory and practice, the intricate relationship between theoretical discourse and architectural representation as an artifact holds immense significance in shaping the built environment (Schumacher, 2011). Architects and theorists' endeavor to bridge the gap between abstract concepts and tangible designs, revealing a mutually influential dynamic. Noteworthy works have explored this relationship, drawing on insightful references and their architectural practice. One of the prior, at the same time up to date, discussion on theoretical discourse and architectural representation revolves around surrealistic discourse and artifacts in architecture (Spiller 2018; Vesely, 1978). The discussion refers to Koolhaas and Tschumi as former architectural theoreticians and practitioners (Koolhaas, 1978; Tschumi, 1981). Then as Dorrian et al. (2022) proposed, it reaches contemporary architecture that includes drawing as a practice in its widened scope. Theoretical discourse of architects evolved to individual and abstract themes from social and concrete themes throughout this discussion. Within the discussion that emerged in the same publication content forty years apart, the theoretical discourse of Koolhaas that contextualizes Manhattan and criticizes the relationship between society and the built environment, and his practice at OMA in relation to the discourse, were former examples of social and concrete themes (Koolhaas, 1978a; Koolhaas, 1978b; Spiller 2018). Subsequently, Cantley's abstract drawings based on his individual observations in architectural design processes and environments can be examples of contemporary themes (Cantley, 2013; 2023; Spiller, 2018).

In summary, Rem Koolhaas is a renowned architect known for his groundbreaking and built architectural designs, while Bryan Cantley is recognized for his contributions to the conceptual and theoretical aspects of architecture, primarily through the medium of drawings and speculative designs. Their design work and genres are fundamentally different, with Koolhaas focusing on large-scale, real-world architecture, and Cantley exploring the imaginative and theoretical realms of the field.

When we consider the architectural representation as a design artifact (Sawyer, 2022); it has been a complex process for the theoretical discourse to shape the design artifact and the artifact to shape the building. Architectural design as a creative domain mostly deals with ill-structured problems, even the ones that architects set for themselves (Goldschmidt, 2014) through ill-structured representations (Goel, 1992). As we navigate the complexities of this interplay, a novel tool takes center stage: Artificial Intelligence (AI).

Most of the research works on AI in architectural design focus on optimization and automation when it deals with complex and unclarified problems in the industry (Seyman-Güray, 2023) yet, there are some potentials of AI collaborating with architects in theory oriented preliminary design phase (Anantrasirichai & Bull, 2021; Joyce, 2021; Steinfield, 2021). Studies emphasize that architecture is a practice that is evolving together with its theory (Schumacher, 2011). In order to communicate their discourses based on the theory, architects traditionally rely on their graphics and manifestos (Somer, 2015). In the literature there are limited studies focusing on transition of ideas to visuals via AI-tools (Karahan et al., 2023), but connection of theoretical discourse and design artifacts at the early stages is fundamental for the design of any architectural project especially when AI tools get involved in most of the workflows in the design domain (Leach, 2018).

This article embarks on a compelling exploration, employing AI as a collaborator to dissect and examine the intricate connection between theoretical discourse and design artifacts. Moreover, the study aims to unveil latent architectural correlations, questions established norms and offers novel insights into the architectural creation as design artifacts and interpretation as theoretical discourse. While the current approaches in the literature are oriented to employ AI for form-finding and optimization of performance in architecture (Castro Pena et al., 2021), the proposed model of this study investigates the applicability of an AI-powered tool as creative collaborator particularly in the preliminary design that has been the least utilized aspect in the literature.

Background of Text-to-Image in Architecture

Architectural representation is defined as a process that conveys ideas, concepts and designs regarding the built environment. Pérez-Gómez and Pelletier (2000) emphasize that it is a sophisticated journey that covers all of the phases in the design process. This section focuses on development of architectural representation from text to image and reviewing the relationship between discourse and artifact in architectural design literature. Subsequently, it covers AI-powered text to image applications and tools in architectural research.

Transition from textual explanations to visual artworks signifies an important point in the historical development of architectural representation (Somer, 2015). In ancient civilizations, architectural representation relied on text-based documentation of architectural designs. These texts served as technical drawings for builders, including detailed descriptions of structures, materials, and construction techniques. The transition to images, which can also be seen in ancient writings, began with primitive sketches and diagrams, but the complexity of architectural drawings and plans did not occur until the Renaissance. Alberti's work (1991) in the 15th century, titled "On the Art of Building," played a role in promoting the use of drawings as architectural representations. His studies emphasized the importance of visual communication in architecture, leading to the development of architectural orthographic projection and perspective drawing techniques. This change allowed architects to effectively convey their ideas, overcome language barriers, and facilitate the global dissemination of architectural knowledge (Evans, 1997). On the other hand, architectural representations are not limited to conveying physical form alone; they also encompass powerful discourses that communicate abstract values and meanings inherent in architectural designs (Pallasmaa, 2005; Perez-Gomez, 2006).

Architectural discourse encompasses the cultural, social, and ideological dimensions that reflect the values of the society to which the architectural work belongs and the desires of its architects. Somer (2015) highlights it through evolving discourses of Las Meninas as an artistic artifact. Similarly, architectural representations can encompass the narrative and historical aspects of a structure. Outputs that emerge during the development process from architectural ideas to built works can be considered as architectural representations that convey all dimensions, both physical and conceptual, of architecture (Perez-Gomez & Pelletier, 1997). The evaluation of space and time within the framework of relativity since the 20th century has created a crisis in spatial representation (Perez-Gomez, 2016). According to Somer (2015), utopias and futurist manifestos were the first developments of that architectural representation crisis

in the 20th century. These texts are representations of architectures that were never built or will never be built. In the late 20th century, architects such as Hadid, Gehry, Koolhaas, Libeskind, Tschumi were developing not only discourses but also their own visual representation genres as design artifacts. In addition to producing images with unique techniques, they also represented the abstract qualities of architectural products through texts. For example, Tschumi presented his transcripts as novel design artifacts in relation to his deconstructive discourse (Tschumi, 1981). In the contemporary era, it is possible to say that visual representations, especially architectural drawings, have become independent of construction and turned into an architectural practice (Dorrian et al., 2022). It can be observed that architects such as Kulper, Cantley, Murray continue their practices in this direction.

Cognition studies that are involved in the creation and interpretation of architecture reveal that architectural representations are actually design artifacts (Sawyer, 2022). This perspective utilizes cognitive science, psychology, and design theory to understand how architects conceive, communicate, and develop their ideas through representations. Architectural representations are not only static artifacts but also dynamic media for thinking and problem-solving because they assist architects in visualizing spatial relationships, testing design hypotheses, and developing concepts (Goldschmidt, 2019). Cognitive studies related to sketches, particularly, aim to uncover the mental processes that underlie these activities, such as the seeing-drawing-seeing cycle which is related by current studies (Karahan et al., 2023) to the writing-seeing-writing cycle powered by AI-tools.

AI-powered Text-to-Image in Architecture

Artificial Intelligence (AI) as an actor of Industry 4.0, contributes to various domains of design including building and construction (Baduge et al., 2022). Focusing on text-based image generation methods, AI-powered tools are employed to visualize and test the ideas in early phases of the architectural design process (Joyce, 2021). Not only from early-phases, but also to the construction, AI as a complementary of architects ensures the most optimized outcome of the design process (Chaillou, 2022). In the literature, utilizing AI (Baduge et al., 2022) in the phases of schematic design (Ko et al., 2023), design development (Sherkat et al., 2023), construction (Amer et al., 2023) and post-occupancy (Pantoja-Rosero et al., 2023; Kim et al., 2023) is a current research topic. However, the preliminary design phase that is the most discursive one has not been studied comprehensively due to mistrust on AI as a creative agent (Kirkpatrick, 2023; Oppenlaender, 2022). In the preliminary design phase, on one hand, architects aim to visualize intangible values of their design idea through visual expressions. On the other hand, they use text that is explaining immaterial values of their design idea to convey their discourse on why and how the building should be built in the proposed way by them (Somer, 2015). This phase is the basis of any architectural design project (Schumacher, 2011). It is the phase that architects envision the possibilities of a design problem (Goldschmidt, 2019).

As an AI contributor in the preliminary design phase, conditional generative adversarial networks (cGANs) are proposed to visualize architectural sketches that are a part of iterations in cognitive process by Chan and Spaeth (2020). Still, this was a sketch-to-image approach that enhances the cognitive iterations. AI-powered tools can produce novel content via generative AI models that are reviewed by Gozalo-Brizuela and Garrido-Merchan (2023). AI-powered tools can also collaborate to the preliminary design phase to produce accompanying visual expressions based on textual expressions on architectural concepts and the context (Joyce, 2021; Karahan et al., 2023). In the study of Karahan et al. (2023), they reinterpreted text-to-image process of AI-powered tools as an iterative process and specifically discussed the semantics of architectural scenery as AI-generated images through the textual inputs by emphasizing the decision-maker is the human designer, not the AI in the collaborative process. Paananen et al. (2023) found that DALL·E-based tools support design ideation but may lack precision in architectural detailing. Midjourney, as shown by Thampanichwat et al. (2025), excels in generating emotionally engaging and stylistically rich imagery, though with limited spatial accuracy. Bing Image Creator offers accessibility and integration with Microsoft platforms. While DALL·E is better suited for functional clarity, Midjourney is favored for speculative and conceptual expression. Each tool offers distinct advantages, and their effective use depends on the balance between visual appeal and architectural accuracy.

Unlike previous studies, this study reviewed and presented the alternative AI-powered tools to be employed to generate brand new and consistent images with designers' discourse rather than changing the discourse or textual input according to limited image results of AI-tools based on training algorithms that affects properties of the generated images (Table 1). Main features of AI-powered tools which can generate preliminary images based on given descriptions is listed in Table 1. These visualizations can be customized by architects to express and document their preliminary design phase. Architects can empower their insights about not only limitations and opportunities in the context through an analysis on climate, topography and history but also their intellectual position and interests contributing to their discourse that is assisted by AI (Chaillou, 2022; Leach, 2022).

Table 1.
Summary obtained from authors' experiment on text-to-image generation features of AI-powered tools.

Factor Tool	Sub-scription Required	User-friendly Interface Design	High-Quality Images as Output	Various Images as Output	Relevant Images as Output
Dall-e	Yes	Yes	Yes	Yes	Yes
Midjourney	Yes	No	Yes	Yes	Yes
Microsoft Bing	No	Yes	No	Yes	Yes
Adobe Firefly	No	Yes	No	Yes	No
Leonardo	No	Yes	Yes	Yes	No
Stable Diffusi.	No	Yes	No	Yes	No
Openart	No	Yes	No	Yes	No

AI-powered tools offer automation in the phases of the architectural design process. The preliminary design phase which is not satisfyingly studied within the scope of using AI tools is the

focus of this study. While the generative and experimental nature of AI tools, the automation and iterations in large quantities they offered were advantageous, architects should be aware of bias and design ethics when they use AI tools in the preliminary design phase. As seen in Table 1, the algorithms can recommend biased image options that can be irrelevant based on their training data. Integrating those tools into their preliminary design workflow requires time and experimentation in order to obtain satisfying and relevant results. According to Anantrasirichai and Bull (2021) AI should complement, not replace, the creative and critical thinking of the architects in order to make design decisions based on their discourse and corresponding design artifacts. Therefore, this study aims to test this approach by proposing a model that is employing AI-powered tools. Table.1 summarizes the practice of authors via AI-powered tools. Within the practice, it has been obtained how satisfying the outputs if similar texts are prompted to Dall-e (URL-1), Midjourney (URL-2), Microsoft Bing (URL-3), Adobe Firefly (URL-4), Leonardo (URL-5), Stable Diffusion (URL-6) and Openart (URL-7) tools. Satisfaction factors are subscription required, user-friendly interface design, high-quality, various and relevant images as outputs. In order to reproduce this study by other researchers or novice users, Microsoft Bing was selected for the model to be proposed. Non-requirement of subscription, user-friendly interface design, variety and relevancy of images as outputs were satisfying even if it has not a high-quality image option. Although Dall-e and Midjourney offered more satisfying outputs, they were not preferred because of their requirement of subscription. Subscription obstructs reproducibility of the model to be proposed by this study. Adobe Firefly, Leonardo, Stable Diffusion and Openart have a major issue in providing relevant images as outputs. It was detected that those tools offer image options based on their algorithm without effectively processing the text that is prompted by users except some limited keywords in the text. In the end, Microsoft Bing as an optimized tool is selected for the model to be proposed by this study. Current utilizations of AI-powered tools and their possible use in text-to-image generation as preliminary design artifacts were reviewed in this title. A model employing AI-powered text-to-image generation and results from its tested use will be illustrated in following titles of this study.

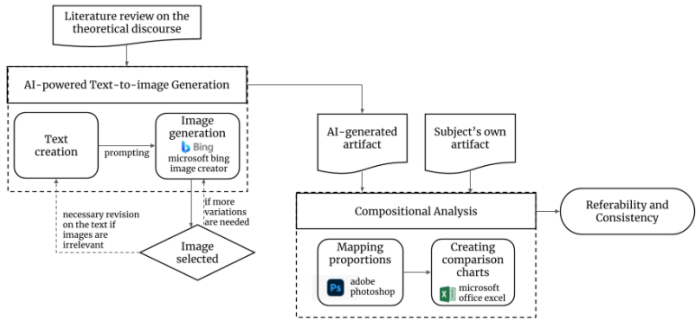
Material and Method

Mixed methods were adopted involving a model development based on an extensive literature review and testing of the model respectively. As seen in the Figure.1, the model consists of AI powered text-to-image generation and compositional analysis of AI-generated images compared with design artifacts of selected subjects.

The subjects were selected based on their significant contributions to the existing literature, particularly in the areas of discourse analysis and artifact studies. Emphasis was placed on ensuring a comprehensive representation of diverse perspectives by including works that address a wide range of genres and formats. This selection strategy aimed to capture the multifaceted nature of the discourse and the variety of artifact types relevant to the research questions, thereby enriching the analytical depth and broadening the scope of the investigation. By incorporating this diversity, the study benefits from a robust and nuanced understanding of the interplay between discourse and material culture across different contexts and disciplines.

Theoretical discourse of each subject is planned to be an input for the text creation in the AI powered text-to-image generation stage. The created text is prompted for image generation via AI-powered tool; Microsoft Bing Image Creator.

Figure 1.
The proposed AI powered text to image model (developed by the authors)



The images generated by AI are the rearticulations of an architects' artifacts that have been selected as subjects. Since Bing generates a minimum of four images at a time, the most relevant images are selected for each subject. In case of generation of irrelevance of all images, the text can be revised to express the discourse effectively.

Next stage is the comparison of the AI generated artifact and the subject's own artifacts of the subject. To do the necessary comparison, an image mapping technique is applied by using Adobe Photoshop in the model. Thus, the data obtained from mapping is transformed to a chart in Microsoft Excel. In the end, comparison charts are achieved to evaluate the referability and consistency of AI image and architect's artifact based on the discourse of each subject.

To test the proposed model, firstly an extensive literature review was conducted to select the subjects. Architectural Design (AD) journal that is one of the esteemed publications which has been publishing almost a hundred years about architectural theory and research was reviewed. The journal publishes the contributions of academicians and professional practitioners from the field and technological advancements and current issues in architecture can be traced in the journal (URL-8). Regarding architectural works developing through representations as design artifacts in relation to theoretical discourses, works of esteemed architects with diverse genres such as Rem Koolhaas and Bryan Cantley have been featured 40 years apart under the same title "Surrealism in Architecture" (Spiller, 2018; Vesely, 1978).

Rem Koolhaas was selected as Subject. 1 architect, and his work Charette Submission for MOMA Expansion as Subject.1 artifact. Rem Koolhaas constitutes his discourse with notions of surrealism, postmodernism, urbanism, fiction, technology. Medium of his artifact is a scenery collage in general. Bryan Cantley was selected as Subject 2 architect, and his work Sytaxonome as Subject 2 artifact. Cantley creates his discourse with concepts of surrealism, extended reality applications, involving communication technologies. Medium of his artifact is layered drawings in general.

Text creation which consists of description of the graphical genre, media used by the subject architects and discourse & themes adopted by them is the stage following selection of subjects (Figure 2). The graphical genre of Koolhaas is two-dimensional conceptual representations while the graphical genre of Cantley is a map as a machine typology. Media that have been used are fragmented scenes, drawings, photographs assembled on

paper by Koolhaas and drawing, graphic surfaces, juxtapositions, objects, explorations, various forms by Cantley. The discourse & themes that have been adopted are New York City, Manhattan, including the themes urbanism, modernization, fiction, technology, postmodernism, surrealism by Koolhaas and relationship between the real and virtual worlds, the potentials of augmented reality, thirdspace by Cantley (Figure 2).

Figure 2.
Subject 1-Rem Koolhaas own artifact and AI-generated artifact and mapping for the comparison (developed by the authors)

Text 1 for Subject 1 and Text 2 for Subject 2 was prompted to generate images via Bing as an AI powered tool in the image generation stage. Bing generates four alternative images for each prompt. Satisfactory image for each subject was selected after necessary iterations of prompting.

Comparison stage consists of mapping of images and comparison analysis. Mapping stage adopted the rule of thirds for composing visuals and Adobe Photoshop was used as a main tool. Rule of thirds involves superposing a 3x3 grid on the image. White areas were showing the contextual part such as city buildings or paper as a ground of figure. Black areas indicated referable parts as elements that can take place in the design proposal such as architectural surfaces as walls, floors or mechanical elements. Gray areas illustrated non-referable parts consisting of blending features and a mix of design and contextual elements such as background patterns or random textures. Afterwards, percentages of compositional values were calculated by considering the density ratio of black, white and gray areas.

Percentage of compositional values were inputs for creating line charts by using Microsoft Excel. These charts illustrated the result of consistency of image and artifact based on the same discourse for each subject.

Results

Findings show if the proposed model is tested, outcomes are sufficient for a discussion. In this section, the findings of the test are presented through the charts of AI-generated images and selected subjects' own artifacts. The lines in the chart express the trend of compositional values considering the ratios resulting by mapping.

Straight line illustrates the artifacts, while dashed line shows AI-generated images for the same discourse of each subject. Comparison of angles of dashed line and the straight line gives the consistency.

Results of Subject 1 are presented as Figure 2 together with comparison analysis illustrated by Figure 3. Additionally, Table.2 summarizes the findings of the tested model for Subject.1; Rem Koolhaas - Charette Submission for MOMA Expansion. Straight line with a positive tangent value shows that artifacts of Subject.1 are composed of mostly referable elements.

Similar to the straight line, the dashed line has a positive tangent value which means AI-generated images, too, majorly consist of referable elements. There is a slight difference between positive angles of horizontal axis with dashed line and straight line (α) which points out a quite good consistency.

Figure 3.
Subject 1 own artifact and AI-generated artifact comparison chart based on the same discourse by Koolhaas. (developed by the authors)

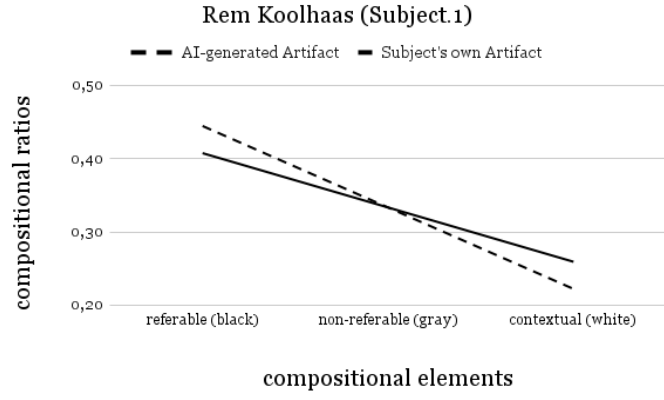
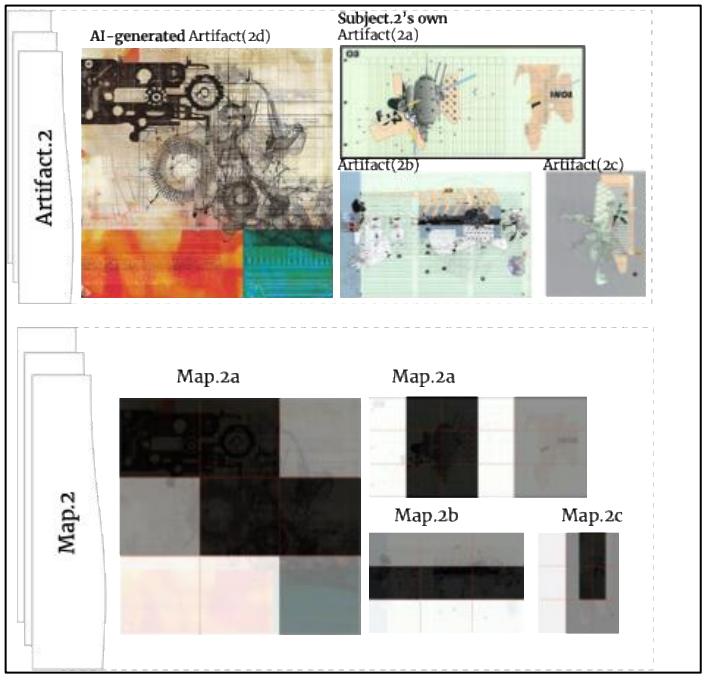


Table 2.
Subject 1's own artifact and AI-generated artifact compositional values based on the same discourse by Koolhaas

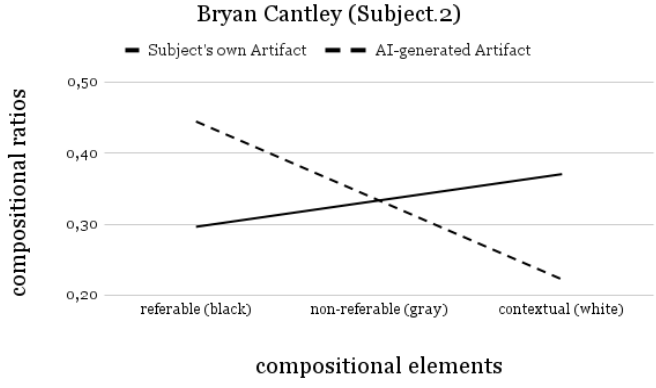
Rem Koolhaas Subject.1	Artifact .1a	Artifact .1b	Artifact. 1c	Subject's own Artifact	SD	AI-generated Artifact
Referable (black)	0.33	0.33	0.56	0.41	0.13	0.44
Non-referable (gray)	0.44	0.33	0.22	0.33	0.11	0.33
Contextual (white)	0.22	0.33	0.22	0.26	0.06	0.22

Figure 4.
Subject 2 Brian Cantley's own artifact and AI generated artifact and mapping for the comparison (developed by the authors)



Results of Subject 2 are presented as Figure 2 involving artifact and the related mapping. Figure 3 illustrates the comparison between Subject 2s artifact and AI generated artifact. Additionally, Table.3 summarizes the findings of the tested model for Subject 2; Bryan Cantley - Syntaxonme. Straight line with a negative tangent value shows that artifacts of Subject.2 are composed of mostly contextual elements. Different from the straight line, dashed line has a positive tangent value which illustrates AI-generated images majorly consist of referable elements. There is a significant difference between positive angles of horizontal axis with dashed line and straight line (β) which points out a poor consistency.

Figure 5.
Subject 2 own artifact and AI generated artifact comparison chart based on the same discourse by Cantley. (developed by the authors)



As a comparison of Subject 1 and Subject 2 findings; Figure 3 and Figure 5 were reviewed in relation to each other. As seen in the Figure 3 and Figure 5, AI-generated images and artifacts of Subject 1 are more consistent with each other than the ones belonging to Subject 2 since the difference between positive angles of horizontal axis with dashed line and straight line is smaller (α < β). The straight line of Subject 1 has a positive tangent value while the straight line of Subject 2 has a negative tangent value. Thus, the composition of artifacts belonging to Subject 1 includes majorly referable elements while the ones belonging to Subject 2 includes majorly contextual ones. Subject 1's own artifact has relatively higher standard deviations (SD). This points out that Subject 1 composes more diverse elements in his design artifacts than Subject 2. It is deduced that on one hand, Subject 2's own design artifacts have explanatory characteristics because they consist of mostly contextual elements with lower value of SD. On the other hand, Subject 1's own design artifacts have exploratory characteristics since they consist of mostly referable elements with higher value of SD. The dashed lines of Subject 1 and Subject 2 have the same tangent value. Hence, the AI-generated images consist of almost the same compositional distribution regarding referable, non-referable and contextual elements.

Table 3.
Subject 2's own artifact and AI-generated artifact compositional values based on the same discourse by Cantley

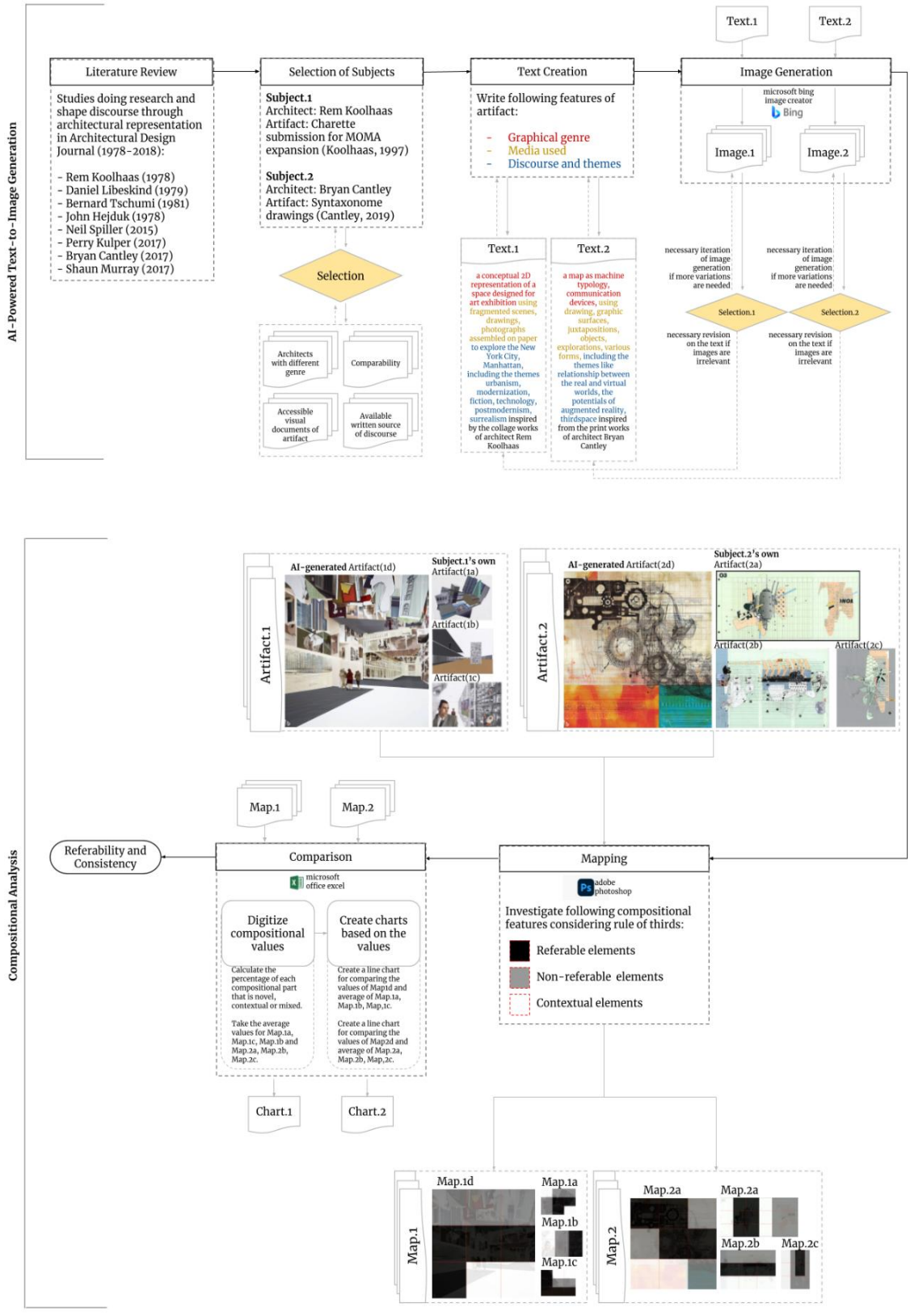
Bryan Cantley Subject.2	Artifact. 2a	Artifact. 2b	Artifact. 2c	Subject's own Artifact	SD	AI-generated Artifact
Referable (black)	0.33	0.33	0.22	0.30	0.06	0.44
Non-referable (gray)	0.33	0.33	0.33	0.33	0	0.33
Contextual (white)	0.33	0.33	0.44	0.37	0.06	0.22

Discussion

The most theory-based stage of the architectural design process is preliminary design which is a transitive process from discourse to design artifact, in other words, text to image. The discourse is mostly developed through research in verbal or textual media in the preliminary design phase and then the first visual media as design artifacts is developed as a start for conceptualization that defines intangible values of a building. In this regard, this study addressed the question that whether an AI powered tool has potential to contribute to the preliminary design phase with its text-to-image feature and provide an evaluation method for the questionable nature of interrelation of discourse and artifact. Moreover, the study assessed utilizing the various AI powered tools and proposed a method of making comparisons efficiently. The findings of this study offer a novel perspective to investigate consistency of discourse and artifact in a measurable way.

There were previous attempts to reinterpret works of art in the literature, such as the study of Somer (2015) examined the reinterpretations of Las Meninas by several artists with distinct genres from different time periods. However, leveraging AI in this manner is relatively a new topic. There are some studies on machine learning and shape grammar theory adaptation to reproduce artwork with different genres (Kirsch & Kirsch, 1988). Even though AI implementations in arts and design date back to earlier times contrary to popular belief, this study is one the first focusing evaluation of architectural artifact and discourse interrelation in preliminary design by utilizing generative AI. Additionally, Karahan et al. (2023) investigated the visualization

Figure 6.
Implementation of Subject.1 and Subject.2 in the model (developed by the authors)



of verbal inputs of participants by using Midjourney as an AI-powered tool. Without focusing on the theoretical background and discourse, they experiment on architectural sceneries that were generated through texts based on opinions of participants. This study focused on theoretical discourses of architects' own and their novel graphical expressions as design artifacts. In this regard, the study obtained objective results.

In the study, Subject 1 was Rem Koolhaas and his Charette Submission for MOMA Expansion (1997). In the case of Subject.1, the study obtained results that are like previous studies (Koolhaas, 1978a; Spiller, 2018; Vesely, 1978) regarding the consistency of discourse and artifacts. Design artifacts of Rem Koolhaas are related to his discourse that was developed in his manifesto, Delirious New York (1978), already mentioned in most of the qualitative studies. Some researchers have shown higher consistency while others mentioned higher irrelevance regarding his theoretical discourse and built design artifacts. In this mixed study, a similar approach was adapted by using notions in terms of discourse and themes based on Delirious New York together with graphical genre and media used in his visual expressions as design artifacts. This study provides a new approach for numerical assessment that finds high consistency between his discourse and artifact. In other words, the AI-generated artifact and the artifact of Rem Koolhaas own have similar compositional elements and ratios for the same text referring to the discourse.

According to the results of testing the proposed model, the design artifacts that were rearticulated by AI-generated images are quite consistent with the theoretical discourse of the architect. Considering the position of Rem Koolhaas, his theoretical discourse was focusing on social aspects and the relationship between society and the urban built environment. Moreover, his educational background of cinematography together with his discourse induced more concrete and scenic visual expressions as design artifacts. It should be underlined here that the attribution of concrete to his design artifacts does not mean inert expressions. The expressions consist of his use of diverse compositional elements that can be seen in the Table.2. The compositional ratios of elements have higher values of standard deviation, so diversity of them can be also detected in this way.

The study obtained different results for Subject 2 that was Bryan Cantley and his Syntaxonome drawings (2017) compared to Subject 1. The discourse and artifact of Subject.2 are not consistent according to results. This inconsistency should be discussed not as an irrelavancy, but as a gap to be investigated and covered by the interpretations of the designer himself. Bryan Cantley developed his discourse on more individualistic and abstract themes in his theoretical work (Cantley, 2013; 2023; Spiller, 2018). The genre of his visual expressions is also abstract in relation to themes that they were represented. On one hand, this situation encourages diverse visual expressions and interpretations such as Spiller's (2018) third space conceptualization for Cantley's design artifacts. On the other hand, Cantley's use of similar compositional elements that are mostly contextual ones, and ratios points out that his Syntaxonome drawings are in fact more likely to be documentational and consist of evident typologies such as machines. While their abstraction level leads to diverse interpretations, their documentational character and evident typology guide the human eye to make decisions among alternative results of AI-generated images. The discourse and artifacts of Cantley are complementary to each other rather than consistent.

Conclusion and Recommendations

This study developed and tested a model investigating the utilization of generative AI-powered text-to-image tools to evaluate the consistency of discourse and the artifact in the preliminary design phase in architecture. This model can increase the efficiency of the preliminary design phase. Additionally, it can be beneficial for architectural theory-based research studies. Furthermore, it would provide an effective communication environment specifically for the early phases for design studios in architecture education. Ultimately the proposed model will be helpful for architects to shape the clients' needs which are articulated only verbally as a brief in general. The proposed model in this study can find an area of use in architecture competitions for supporting or testing the decisions of awarded projects. The new dimensions of architectural representation ushered by the digital age such as building information modeling (BIM) can adapt a preliminary design layer by taking advantage of the proposed model in this study.

The study contributes a novel approach in architectural theory by presenting an overview of AI-powered tools and proposing a model integrating generative AI. As a limitation of this study, the only AI-powered tool that has been utilized was Microsoft Bing Image Creator. There is an opportunity to integrate other tools in future research.

The development of a proper enhancement via AI-tools in preparing text for image generation was required particularly for the architecture field in future. Research on architectural theory remains more traditional, but neither discourse, nor design artifacts are constant in the lifetime of an architect. Finally, the study has the potential to give insights for theoretical architecture discussions about fundamentally distinct approaches in future studies.

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