Does Artificial Intelligence have the Possibility of Taking Over Designers' Jobs in the Future?

Farhana Hoque

Abstract:

Technological advances in tools such as artificial intelligence have made it easier for architects, planners, interior designers and urban designers to visualize their designs easily and save time. Today, AI (Artificial Intelligence) is integrated into many different professions, and the design sector is no exception. Also, new design technologies, for example, OpenAI, ChatGPT, Dall-E 2, and Mid Journey, quickly dissolve the lines between what humans do at work and what machines and algorithms do. Despite the fact that design is a highly creative discipline that calls for a special blend of technical expertise, aesthetic judgment, and user empathy, AI systems are currently unable to fully recreate these skills. They only provide output in accordance with system input. They are unable to independently innovate new things. And indeed, we discovered that AI fundamentally alters the practice of design. Traditional problem-solving tasks performed by designers are increasingly computerized into unrestricted volume and speed learning loops. This situation raises the question of whether artificial intelligence will replace the job of designers in the future. This essay would attempt to give an explanation of two factors, first, how AI technology would mitigate designers' duties, and second, the reasons why it would not be able to replace designers and architects in the near future. The article seeks to do a discourse, summarizing the studies on the effects of AI on the professional activity of designers and projecting where future designers will stand in their respective fields. Furthermore, this paper discusses the implications of artificial intelligence on the profession of designers, such as job displacement, job redefinition, and changes in the skill set required to be successful in the profession. Finally, the outcome of the essay is to understand the revolutionary impact of AI tools in design sectors in the future.

Keywords: *Artificial Intelligence, Design, Evolution, Future, Impact, Replace.*

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Introduction
With the rapid progress of Machine Learning (ML) and Artificial Intelligence(AI) in recent years, their applications have become more advanced (Zhu et al., 2018). The implementation of artificial intelligence has gotten a lot of attention across nearly every sector. Human labor and management are being removed from the key path in the execution of many critical operating operations as businesses develop AI-centric operating models (Verganti et al., 2020). The topic that generates the most discussion today is the issue of technology-driven employment loss and job creation. Mashelkar (2016), amongst many others, has written about the difficulties posed by the rise in unemployment caused by technology. Although automation reduces employment, it boosts production. This then spurs economic expansion and job growth (Mashelkar, 2018).

In the mainstream literature, AI is frequently seen as serving two purposes: to usurp humans in routine or simple works (commonly known as "automation") and to assist humans in more convoluted works (commonly known as "augmentation") (Einola & Khoreva, 2023). There have been many prognostications about jobs taking over because of AI. Research suggests that technology may replace humans in up to one-third of all responsibility (Chelliah, 2017). Additionally, an article from the Brookings Institution cited AI specialists as saying that automation might eliminate 40% of jobs globally in as little as 15 years (Elhouar et al., 2020). However, the likelihood of creative professions like graphic design being overtaken by technology in the next two decades could be as low as 39% (Irbite & Strode, 2021). Besides, according to the analysis of data from computerization research by two Oxford professors, U.S. architects' occupations will be automated in the next ten to fifteen years by barely 1.8% (Lubell, 2018).

Thus, the existence of AI may significantly transform the environment in which design is performed. The purpose of this essay is to analyze two issues: 1) how AI technology will lessen designers' responsibilities, and 2) why it would not be able to replace creative designers like architects, planners, graphic designers, interior designers, and urban designers in the near future. The essay intends to engage readers in a conversation on the influence of AI on designers' professional activities and speculate on the future positions of designers in their various professions.

Methodology of the Work
The total write-up was mainly based on secondary and primary data. This paper reviewed current research on the user experience of artificial intelligence in the design process, such as how it helped to create custom designs and how it could be used to increase the efficiency of the design process. Moreover, the predictions of future designers were made by analyzing the technological impact on history and future predictions through secondary data such as journal articles and news articles. On the other hand, the primary data was collected through questionnaires (Appendix-A) and interviews. Since the subject of discussion is designers' futures, the participants were merely from design backgrounds. More specifically, architects, graphic designers, interior designers, planners, and urban designers contributed to the survey. The survey happened mainly online using Google Forms from May to July 2023. Additionally, the author reached out to individuals with designer backgrounds via emails and WhatsApp messaging, as well as social networking sites such as Facebook and LinkedIn. In addition, the questions were designed to analyze user experiences and the efficiency of the AI tool. Furthermore, participants' opinions on the coming times of job replacement had also been taken.

The process of the research work followed some steps. The methodology of the research work is shown on the flowchart below (Figure 1):
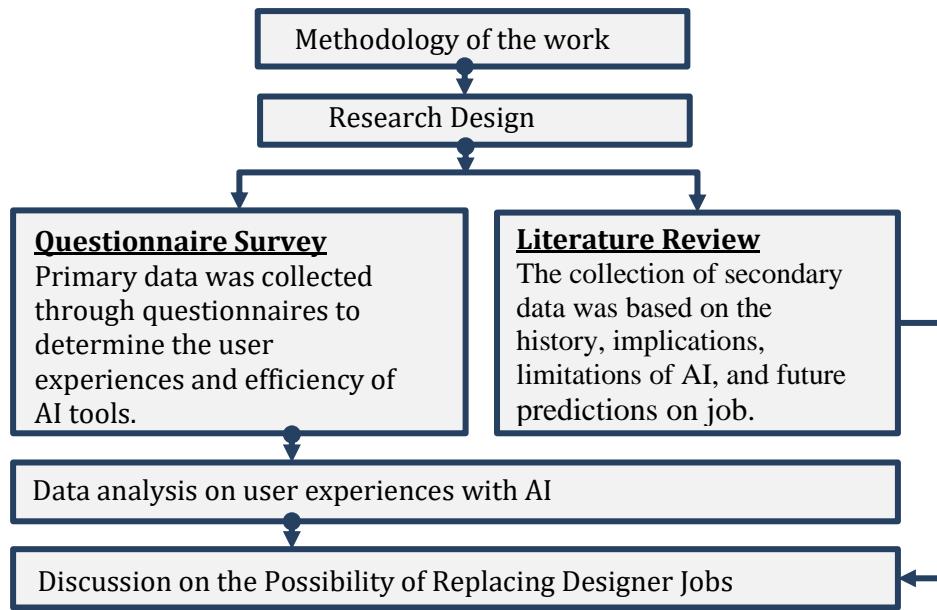
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│ questionnaires to│ │ history,         │
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│ experiences and  │ │ AI, and future   │
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Figure 1: Flowchart on Methodology of the research work. *[Source: Generated by Author]*

AI
Definitions

The ability of an artificial individual to use its own intelligence to resolve difficult tasks is referred as artificial intelligence. Generally, AI is combined with physiology and Computer science. It is concerned with making computers behave more like humans while taking a small fraction of the time. Artificial intelligence refers to the mixture of machine learning, deep learning, computer vision and cognitive computing (Figure 2). In the working processes, Artificial intelligence (AI) systems conduct sophisticated searches through enormous amounts of data that people produce, understanding both text and images to recognize patterns in complex data and taking suitable measures in response to their results (Singh & Haju, 2022).
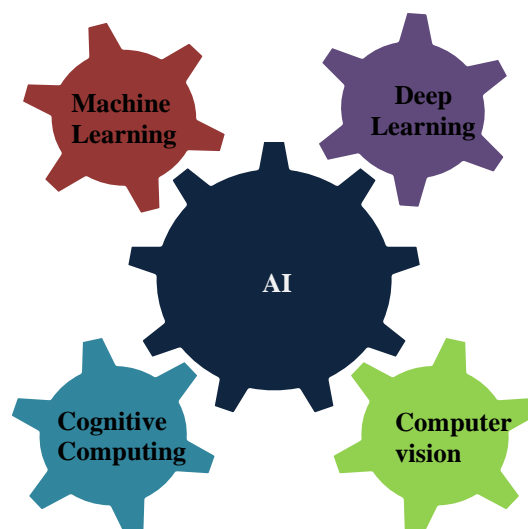
Figure 2: Working of AI. *[Source: Generated by Author from* (Singh & Haju, 2022)*]*

Overall, AI is adaptable, flexible, and human-like. It is able to take over tasks, generate its own analyses and solutions by applying general knowledge to particular situations, make predictions and judgments, and interact with its surroundings. Additionally, its solutions are specific to the task and are captured by algorithms that are specified and programmed by humans in a language that AI can comprehend and follow (Einola & Khoreva, 2023).

History
The concept of using software other than human intelligence is not new. Even some experts credit Greek mythology as the inspiration. The main discipline in computer science is artificial intelligence (Elhouar et al., 2020).

In 1950, the first attempt at AI was undertaken.   In a journal, Alan Turing   experimented to determine whether machine behavior could be distinguished from human behavior (Grzymski, 2022). Then, few years later, the MIT Artificial Intelligence Project was established in 1957. Following the prosperous summer conference at Dartmouth in 1956, two assistant professors named Marvin Minsky and John McCarthy started this audacious project. In 1997, a conference named IJCAI-97 took place in Nagoya. The conference was an exceptional series of invited talks that gave good examples of how far AI has come as well as accounts of some of its most significant successes and difficulties (Bobrow & Brady, 1998). Looking into the limited overview of the history of AI, it is clear that the initiative of invention has obviously happened at an early stage. Also, the area of artificial intelligence has evolved significantly in recent decades.

Current Role of AI in Design and its Implications
AI today has played a significant role in the design industry. The latest advancements in technology have led to the invention of a variety of AI design tools to serve specific purposes (Table 1). For instance, AI-powered solutions may greatly simplify the process of recovering pictures, visualizing space, easily eliminating background, and automating many regular design chores, such as resizing images, producing color palettes, and even designing basic designs from scratch. AI is also capable of data analysis to find trends and insights that can guide design choices. AI, for example, can examine social media data to spot new design trends. Moreover, AI can generate realistic images and videos of products that do not yet exist (McLean, 2023).

Table 1 : Different AI design tools for the specific user. *[Source: Generated by Author]*

AI Design Tools	User
OpenAI, ChatGPT, Dall-E 2, Mid Journey, BlueWillow. Al Let's Enhance, Khroma, AutoDraw, Adobe Firefly, Adobe sensei, remove.bg, Adobe Photoshop Generative Al	Architect, Graphic designer, Interior designer, Planners
Spacemaker, Autodesk forma	Urban designer
Plan finder	Architect
REimagine your space, Interior AI, room GPT, Planner 5D	Interior designer

AI algorithms have also produced design solutions for particular subjects. Here are a few instances of very disparate approaches. In urban design, contextual analysis is essential, and AI-generated solutions such as noise reduction and sun exposure can help to understand the context. A Ph.D. student named; Stanislas Chaillou has created an algorithm that generates residential floorplans with furniture following the top-down method. The program creates the footprints of buildings, divides flats, and places furnishings. The designer can be involved at every stage to offer suggestions and select the best design for the following one. AI not only produces plans within a short period but also provides the designers with options. Since

generation algorithms may swiftly provide a large number of alternatives, the designer has the possibility of having a wide variety of choices. By extrapolating the outcomes of prior simulation cases onto new, comparable ones, AI has also made it possible to significantly reduce the number of real-time simulations. Therefore, prediction for decision-making has been introduced (Elhouar et al., 2020).

AI versus Human Creativity or AI with Human Creativity

"Machine intelligence is the last invention that humanity will ever need to make." ---- Nick Bostrom, Philosopher (Grzymski, 2022).

Human work has shifted more toward thinking tasks, such as processing, analyzing, and evaluating data or information, as routine human tasks have been largely replaced by machines. Human workers tend to concentrate on the tasks that AI cannot do better, whereas machines take over more of the tasks that were previously performed by them. In the past ten years, AI has developed quickly to have more mental capacity. However, popular opinion continues to believe that employment and thinking jobs will be protected from job displacement (Huang et al., 2019). As technology advances, more and more 'human' jobs, such as sensitive judgments, complicated analyses, and innovative problem solving, are being performed by computers. When interacting with a machine, we will be able to do so in the same way that we would with a coworker. The advantages will be immediate information access, a significant improvement in decision-making speed and quality, and ultimately better performance (Mashelkar, 2018). However, humans can solve any kind of task (physical, emotional, and cognitive) and handle any complex situation with their creative minds. While AI has fundamental limitations, it can create many alternatives using algorithms, but human intervention is necessary when unfortunate situations occur (Rai et al., 2019). Therefore, AI can assist humans in improving their performance.

User Experience with AI through the Survey

A questionnaire survey and a few interviews (total respondents: 10) had taken place to understand the user experience and their opinion regarding artificial intelligence. The survey lasted from May to July 2023.

To conduct the survey, a questionnaire (Appendix A) following the literature review and internet information was designed. The data collection was conducted both online and offline. The study population number was 56, and the age range of the respondents was between 18 and 50. They participated voluntarily. The respondents were from different fields of design (Interior designers, Architects, planners, Urban designers, and graphic designers), and among them, some were involved in multiple design fields in parallel. Figure 3 (a) shows that a significant percentage of people, roughly 65.5%, do not apply AI technologies in their design process. The user percentage of 34.5% can provide a reliable assessment of their experience.

Figure 3 (b) illustrates that a maximum percentage of 69.1 users need to make changes after getting the output. They use it to visualize their imagination, search for different options, or get an idea in the conceptual phase. A subscription is required for many AI tools. The majority of users preferred programs that have a trial version or don't require membership because of this.
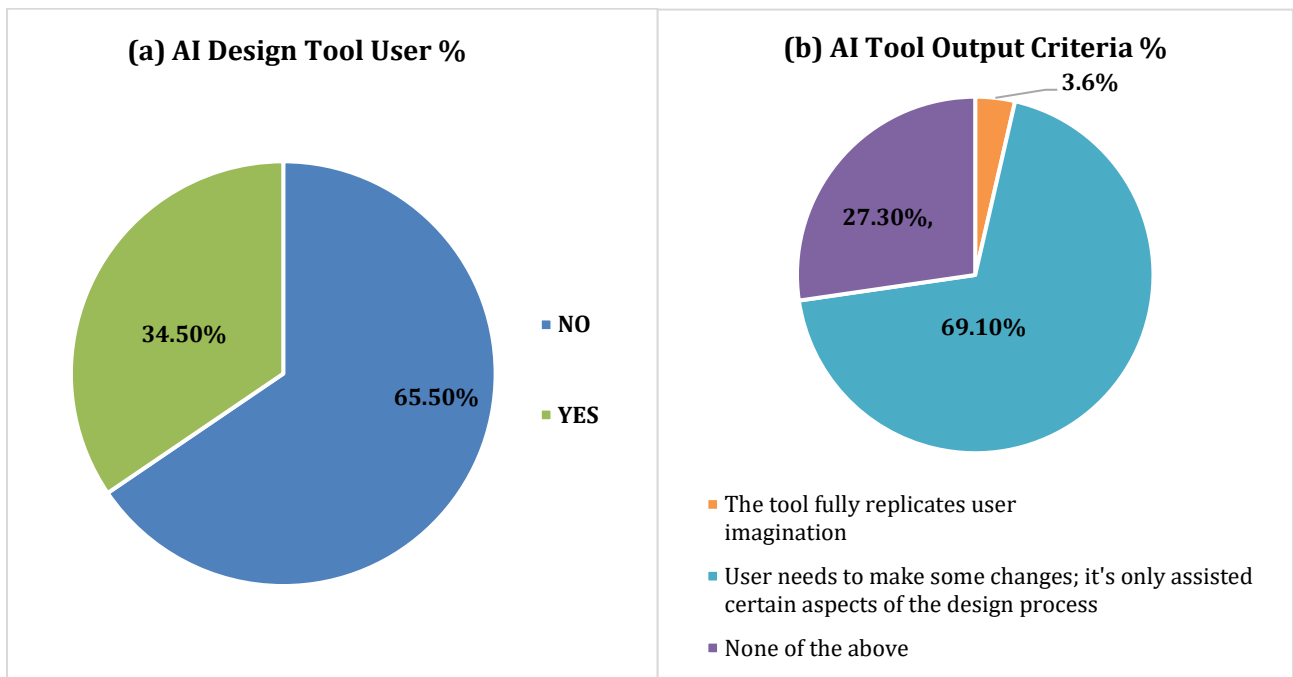
Figure 3: (a) AI design tool user percentage, (b) AI tool output criteria percentage. Respondents no: 56 *[Source: Author]*

The participants made assumptions about how AI might eventually replace designers' jobs in the future. The occupation that has the largest chance of changing due to AI is graphics design, with 46.1%. In contrast, Urban designers' chances are only 2.25%. The percentages for architects, planners and, interior designers are 8.9%, 13.5%, and 17.9%, respectively (Figure 4).
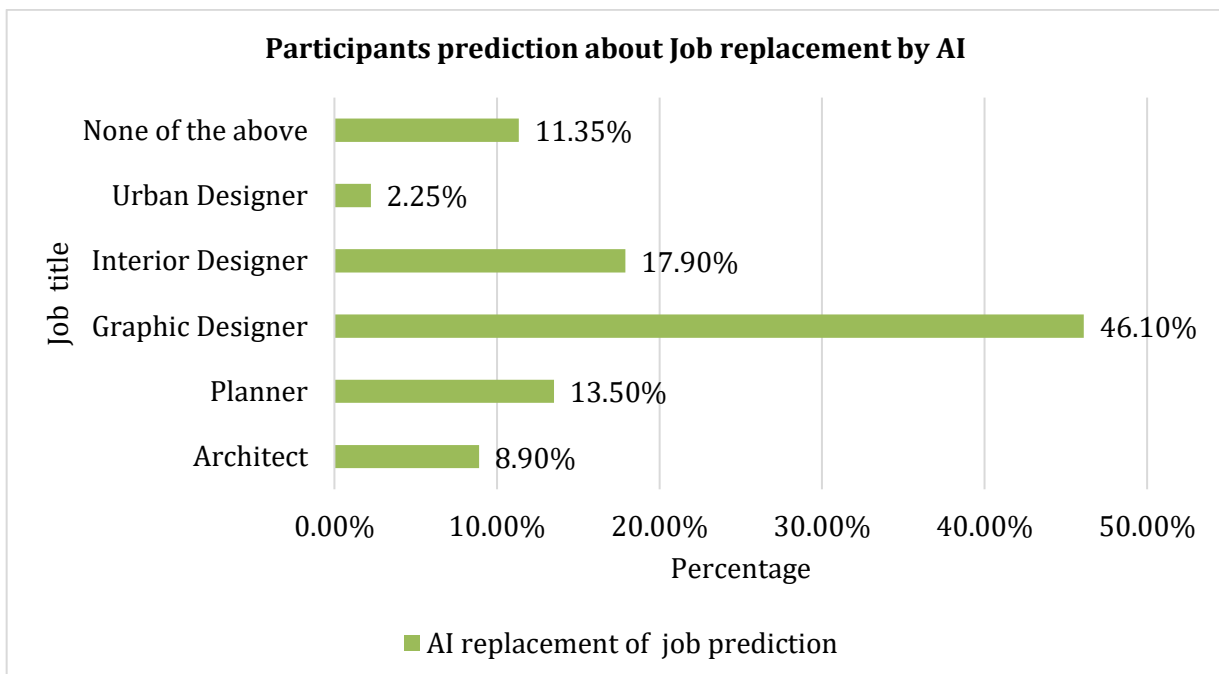

Figure 4: Participants prediction about Job replacement by AI. Respondents no: 56 *[Source: Author]*

All the participants were asked to express their views on the advantages and disadvantages of AI. Their opinions are summarized in the Table 2 below.

Table 2: The benefits and the demerits of AI design tools. Respondents no=56. *[Source: Author]*

Topic	1	2	3	4	5	6
Benefits of AI Design Tools	It can reduce time, make it easy to work with less effort, and give many alternates within a few minutes.	AI works like an assistant to help you get faster results and decrease your workload.	It helps to visualize any idea. Those ideas provide guidelines for carrying out the design.	It can reduce stress by giving an accurate idea about something that the user doesn't know.	Manual laborious work and repetitive tasks, which humans take a lot of time to complete, could be easily completed by AI without any mistakes.	Simulation software can predict future events before they happen.
Demerits of AI Design Tools	A number of people can become jobless. AI might even end up taking jobs that require years of education, practice and experience.	The evaluation of a person's basic skills and creativity could be questionable in the presence of such programs.	The more people start using AI, the less creative work will be paid for. Additionally, people will stop consulting with professionals.	It will create a boundary between brainstorming. To control the misuse, it could need supervision.	Clients can create obstacles as they complete their work with the help of AI in the future.	If designers use AI tools for a long time or students at the initial stage of their student life, they will become dependent on them, and after that, they won't be able to generate good ideas without taking help from AI.

Among the participants, 75% felt secure that their job would not be taken over by an AI tool. From the survey data, it is clear that a small number of designers have used AI-based programs in recent times in Bangladesh.

Limitations of AI Design Tools

AI tools are not without limits. One of the main limitations is AI doesn't have the human touch. Even though AI-based technologies can automate operations and generate designs, they might not be able to fully replicate the artistic touch and inventiveness of human designers (Mustafa, 2023). While the statistics can offer valuable insights, they are unable to convey the intimate tales and personal memories that only human experiences can (Kenney, 2023). In addition, the issue is that AI lacks emotional maturity because it cannot distinguish between different emotions and mentalities to create distinct profiles or data points. Consequently, AI is unable to make decisions that are ethical and advantageous to humanity (Sultan, 2021). Moreover, AI follows preprogrammed parameters, which makes it challenging to produce distinctive, original creations. Therefore, AI may provide homogenous data and similar biases if it gains control of design agencies (Wernersson & Persson, 2023). Furthermore, it is frequently challenging to have a genuine understanding of the problem and the nature of the remedy when employing AI-based search techniques to solve a problem. As a result, it provides no optimal solution (Chowdhury & Sadek, 2012). Lastly, AI is discriminatory in many ways since those who create AI technologies do not constitute a representative sample of the general population. In the past, over 90% of AI engineers have been men, and most have been white (Zippia, 2023).

Discussion on the Possibility of Replacing Designers Jobs

In the developing world as opposed to the developed world, technology will have a much bigger impact on jobs, according to the 2016 report "Technology At Work v2.0" (Mashelkar, 2018). However, this industry will generate new job roles. Human intervention will still be necessary

for jobs requiring emotional and interpersonal skills, creativity, synthesizing, problem-solving, and intelligent interpretation, although at a lesser level. If we are talking about architecture, then client requirements, environmental solutions, contextual analysis, design knowledge, policies assigned by the regulatory bodies and many other knowledge are necessary. Moreover, occupations in the service sector that demand greater interaction between humans, such as service designers and urban planners, will remain in the hands of people for a considerably longer period of time (Grzymski, 2022). On top of that, to operate different AI design tools, human involvement is needed. In contrast, the designer who will not be able to upgrade himself with modern AI inventions will suffer. Furthermore, there is a chance that freelance occupations in visualization and logo design will be displaced as a result of the availability of numerous AI-based websites.

Conclusion

The design sector is huge, with many creative disciplines. Those disciplines are complex and demand a multidimensional approach for their outcomes. Also, to use any specific AI to complete their tasks, one needs to have knowledge about the subject as well as how to operate AI. From the above discussion, it can be predicted that in the future, applicable methods and techniques will be rather refined and expanded than replaced. Yet, we cannot deny the fact that AI inventions will create a paradigm shift in the job field. It can be assumed that development will continue and bring about change. Therefore, the designer needs to be cautious about their position in the time ahead and learn to use AI tools to strive in the competitive field.

Nevertheless, from the advent of evolution to today's fast-paced world, people always face difficulties after any new invention. In the initial stage of development, any challenges become arduous for people, but with time, people get comfortable and accustomed to surviving the situation. In the same manner, AI will eventually merge with the regular activities of designers. The positive effects of AI are already beginning. For instance, AI in today's world opens doors for enhancing design quality. Hence, if things keep going this way, AI will create opportunities for better design that considers the environment and makes the planet a better place for everyone to live. To recapitulate, the study is an approach to highlighting the efficiency of AI tools so that users can utilize their advantages while at the same time being aware of their disadvantages. Besides, there is scope to compare the potency of AI tools with human creativity by providing practical implications for further study.

Limitation of the Work

The study has some restrictions. Firstly, the questionnaire's sample size is small. Secondly, all of the respondents are from the same country. The author is aware that a large survey sample size is required. Therefore, more micro-level research using a multidimensional approach is required to obtain future projections.

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Appendix-A

AI (Artificial Intelligence) Research Questionnaire for Designers

(The survey work is conducted for academic purpose on the topic **"Does Artificial Intelligence have the Possibility of Taking Over Designers' Jobs in the Future?"** This questionnaire will be kept confidential, complete the questionnaire by giving your views)

User Demography

- i.   Date:
- ii.   Participant name:
- iii.   Location with country:

     iv.   Profession (Architect, Planner, Graphic Designer, Interior Designer, Urban Designer, Student, etc.)
     v.   Gender
- o   Male
- o   Female
- o   Others

Questionnaire

1. Do you use any kind of AI tool while designing?
   - o   Yes
   - o   No
2. If yes, what kind of AI tool, do you mostly use?
3. Do you familiarize yourself with the AI tool given below? (You can choose more than one.)
   - ChatGPT
   - Midjourney
   - Dall-E 2
   - PlanFinder
   - Adobe Photoshop Generative Al
   - BlueWillow.Al
   - None of the above
4. What do you feel about AI tool output?
   - o   The tool fully replicates your imagination.
   - o   You need to make some changes; it's only assisted certain aspects of the design process.
   - o   None of the above
5. In which sectors will AI replace jobs? (You can choose more than one.)
   - Architect
   - Planner
   - Graphic Designer
   - Interior Designer
   - Urban Designer
   - None of the above
6. Write down some advantages that you get from AI tools.
7. Do you believe AI will create problems in the future? If yes, mention your reasons.
8. Do you feel a threat that AI will take over your current job in the future?

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