The effectiveness of artificial intelligence in enhancing the design of digital advertising campaigns for environmental awareness

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Abstract:

Artificial intelligence (AI) is one of the most significant technological breakthroughs the world is currently experiencing. Its powerful technologies have made a significant impact across various fields, with serious efforts underway to integrate AI into all areas and harness its advanced capabilities, which mimic the human mind in performing a wide range of tasks efficiently.

One of the clearest examples of AI's potential can be seen in the field of advertising. With its ability to analyze vast amounts of data, make predictions, and generate images, videos, and content, AI technologies are rapidly spreading. Designers are making determined efforts to leverage AI in creating various types of advertisements.

However, using AI effectively in planning and designing advertising campaigns still requires more research to fully understand its capabilities in this area. This research specifically explores how effective AI can be in enhancing the design of digital advertising campaigns, particularly those aimed at raising environmental awareness.

The core issue addressed by this study is identifying the role AI can play in designing digital advertising campaigns in a way that enriches both the visual and conceptual content, strengthens the messaging, and ultimately supports raising awareness about environmental issues.

The research aims to highlight AI's capabilities and the importance of using them in designing digital environmental awareness campaigns. It also seeks to identify the specific design needs within these campaigns where AI technologies can offer meaningful improvements.

Key findings of the study include the idea that the successful use of both predictive and generative AI in digital advertising design depends on a combination of creative and visual thinking skills from designers, working alongside AI technologies. The quality of the visual outputs generated by AI also heavily depends on the design team's understanding of the tools and technologies available, selecting the most appropriate ones, coordinating between them effectively, and mastering prompt engineering, knowing how to communicate with AI to get the best visual solutions.

The study recommends integrating the human creative abilities of designers with AI's capabilities to achieve the best results and most compelling visual solutions. It also stresses the importance of using AI in predicting future environmental challenges, helping create innovative and engaging visual awareness experiences, and addressing these issues before they arise—ultimately contributing to environmental sustainability.

Keywords

Artificial Intelligence (AI), Generative Artificial Intelligence (GAI), Predictive Artificial Intelligence (Predictive AI), Digital Advertising Campaigns, Ad Personalization.

الملخــــــص:

يعتبر الذكاء الاصطناعي أحد الطفرات التكنولوجية غير المسبوقة التي يشهدها العالم الآن، حيث طغت تقنياته بقوة على جميع المجالات، في محاولات جادة لدمجه في جميع المجالات والاستفادة من إمكانياته المتطورة والتي تحاكي العقل البشري في قدرته على تنفيذ المهام المختلفة بكفاءة عالية. ويعد الإعلان من المجالات التي يتضح فيها إمكانيات الذكاء الاصطناعي. فمن خلال قدرته على تحليل البيانات الضخمة والتنبؤات، وقدرته على توليد الصور والفيديوهات وتوليد المحتوي بدأت تقنياته في الانتشار بقوة في محاولات جادة من المصممين للاستفادة منه في تصميم الإعلان بأشكاله المختلفة، إلا أن الاستفادة منه في التخطيط والتصميم للحملات الإعلانية يحتاج إلى المزيد من البحث لتحديد إمكانياته المتاحة في هذا الجانب، لذا يناقش هذا البحث فعالية الذكاء الاصطناعي في تعزيز تصميم الحملات الإعلانية الرقمية وتحديداً الحملات الإعلانية الرقمية للتوعية البيئية، حيث تتلخص مشكلة البحث في تحديد الدور الذي يمكن أن يقوم بها الذكاء الاصطناعي في تصميم الحملات الإعلانية الرقمية بما يسهم في تطوير وإثراء المحتوي البصري والمضمون والرسائل الإعلانية للحملة، وبما يعزز الوعي بالقضايا البيئية، ويهدف البحث إلى ، توضيح إمكانيات الذكاء الاصطناعي وأهمية الاستفادة منها في تصميم الحملات الإعلانية الرقمية للتوعية البيئية، وتحديد الاحتياجات التصميمية للحملات الإعلانية الرقمية والتي يمكن أن تتدخل فيها تقنيات الذكاء الاصطناعي للتطوير والتحسين. ومن أهم نتائج البحث ما يلي: يعتمد نجاح توظيف الذكاء الاصطناعي التنبئي والتوليدي في مجال تصميم الحملات الإعلانية الرقمية على الدمج بين المهارات الإبداعية ومهارات التفكير البصري للمصممين وتقنيات الذكاء الاصطناعي معاً وبالتوازي للحصول على أفضل النتائج، كما تعتمد فعالية المخرجات البصرية للذكاء الاصطناعي التوليدي على إلمام فريق التصميم بإمكانيات تقنياته وأدواته المختلفة في مجال التصميم واختيار الأنسب منها، والقدرة على التنسيق بين أدواته المختلفة أثناء الاستخدام، وكذلك إتقان هندسة الأوامر للحصول على أفضل الحلول البصرية الممكنة. ويوصى البحث بضرورة الدمج بين القدرات الإبداعية البشرية للمصمم وإمكانيات الذكاء الاصطناعي للحصول على أفضل النتائج والحلول البصرية، وضرورة الاستعانة بالذكاء الاصطناعي في التوقعات المستقبلية للمشكلات البيئية، للمساهمة في إنتاج تجارب توعوية بصرية غير تقليدية، والتصدي لها والتوعية بها قبل حدوثها لتحقيق الاستدامة البيئية.

الكلمات المفتاحية:

الذكاء الاصطناعي، الذكاء الاصطناعي التوليدي، الذكاء الاصطناعي التنبئي، الحملات الإعلانية الرقمية، تخصيص الإعلانات.

Introduction:

The world is currently witnessing a rapid leap in technological and digital development, with artificial intelligence being the most prominent of all. Its applications have spread widely, along with attempts to integrate and exploit the capabilities of its tools in all fields. It is considered one of the most significant scientific and technological advances, especially in terms of machine learning, due to its ability to simulate the human mind and perform many tasks in an advanced manner. This has contributed to the development of various fields such as medicine and engineering, particularly in the field of advertising and marketing. This results from the ability of artificial intelligence to make predictions and conduct extensive data analysis, as well as its ability to segment and target audiences, even to the extent of determining the most suitable advertising media for them through computational and algorithmic processes equivalent to the human mind. Its impact has become especially evident in the field of advertising design, particularly with the spread of generative artificial intelligence and its enormous capabilities in generating images, videos, content, and other tasks. This has added a modern, more exciting, and personalized visual

character to advertisement design, especially in the field of digital advertising design. Its role is also evident in digital advertising campaigns related to environmental awareness, which are considered vital and important topics, particularly on various social media platforms.

Artificial intelligence can contribute to these campaigns in several ways, such as: developing the visual content of the campaign, personalizing advertising messages to align with the targeted digital audience, supporting and assisting the design team in developing written content suitable for digital users and influencing them, analyzing their emotions toward the advertisement with predictions to identify them and accurately determine their needs to enhance their engagement, and enabling the customization of more beneficial and interactive advertising experiences. These contributions can effectively support environmental awareness efforts and elevate the public's cultural and environmental awareness. From here, the importance of research becomes clear.

Research Importance:

Highlighting one of the vital capabilities of artificial intelligence in the field of advertising design, which is its role in designing digital advertising campaigns, and how it can be relied upon and utilized in this aspect to enhance the design of digital advertising campaigns in the field of environmental awareness.

Research Problem:

The problem of this research can be summarized in determining the role of artificial intelligence in the design of digital advertising campaigns in a way that enhances the design and contributes to the development and enrichment of visual content, subtext, and advertising messages, thereby enhancing awareness of environmental issues.

Research Goals:

1.Clarifying the importance of utilizing artificial intelligence and its capabilities in designing digital advertising campaigns, especially digital advertising campaigns for environmental awareness.

2.Clarifying the capabilities of artificial intelligence and the importance of utilizing them in designing digital advertising campaigns for environmental awareness.

3.Identifying the design needs of digital advertising campaigns in which artificial intelligence technologies can intervene for development and improvement.

Research Hypotheses:

1.The contribution of artificial intelligence in the stages of designing a digital advertising campaign enhances its impact on the digital audience.

2.Designing digital advertising campaigns based on data analysis and predictions using artificial intelligence will be more accurate in targeting the audience, analyzing their attitudes toward the campaign, precisely identifying their needs to heighten their engagement, and in advertising planning reflecting on the campaign's concept and visual representation.

3.Integrating the capabilities of generative artificial intelligence with the design thinking of the design team for advertising campaigns will have a significant impact on producing unconventional visual content for the advertising campaign.

Research Methodology:

The research follows descriptive analytical methodology.

− Data was collected through the theoretical framework related to the research topic, as well as by analyzing a selected sample of digital advertising campaigns in the field of environmental awareness. The selection criterion was based on their reliance on artificial intelligence capabilities during various stages of their design, to identify the forms of support that AI can provide in this context.

− Following that, a design experiment was conducted for a digital advertising campaign focused on environmental awareness to determine the design needs of digital advertising campaigns where AI technologies could contribute to development and improvement. The campaign was designed based on a set of criteria.

Theoretical Framework:

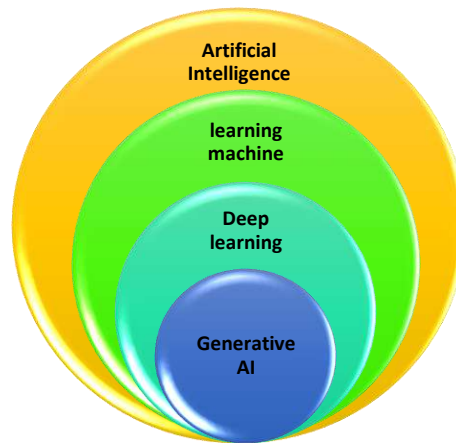**definition: Artificial intelligence (AI)**

Artificial intelligence is considered a branch of Computer science and is defined as the technology that enables computers and machines to simulate human intelligence (Giang, N. T., 2025). AI focuses on developing systems capable of adapting, making autonomous decisions, and performing tasks that humans typically do better, such as learning, reasoning, self-improvement, and problem-solving (Isem, 2025). Although the topic of AI may seem relatively new and futuristic, the concept of artificial intelligence dates back several decades. The first steps toward AI were taken in 1950 by (Alan Turing) one of the most influential figures in modern computing (Kivistö, 2024).

The development in AI happens almost in a daily course considering the massive amount of data available on internet, which is part of Big Data, in addition to the enormous capabilities of computer power, Broadband communication, and Cloud Computing. AI developed significantly, progressing from machine learning to deep learning, and later to generative AI, thanks to major advancements in neural networks and natural language processing (NLP) in the 21st century. These developments have propelled AI to take quantum leaps forward, primarily due to enhanced computing capabilities.

Machine Learning (ML): A subfield of AI concerned with learning patterns from the available data to make predictions and decisions based on new data without explicit programming, such as predicting customer behavior based on the historical data gathered from similar individuals.

Deep Learning (DL): a subfield of machine learning uses several layers hidden in the neural network to solve complex problems by identifying the most essential features of input data.

Generative Artificial Intelligence: a subfield of deep learning that uses deep neural network technologies to simulate the human ability to create new data or genuine and innovative content. It is characterized by its versatility due to its ability to perform many creative tasks, such as generating images, text, and sounds alongside data.

"Figure (1) shows the relationship between generative artificial intelligence and artificial intelligence with its subfields." (SDAIA 2025)

AI in Advertising:

The integration of artificial intelligence (AI) into advertising represents a significant development, particularly following the digitization of advertisements and their increased reliance on data. Data analysis, machine learning, and deep learning significantly improve predictive measures that help forecast consumer behavior and reactions to ads. This enables personalized ad content and tailored advertising methods for target audiences.

Furthermore, AI algorithms have automated numerous aspects of advertising, ranging from innovative ad content creation to user response analysis and campaign evaluation. This automation facilitates precise audience targeting and optimized ad spending to maximize effectiveness (Giang, 2025). "Consequently, marketers now plan and design advertising campaigns utilizing predictive and generative AI throughout all strategic phases. Particular emphasis is placed on the design stage, due to the wide array of available generative tools and applications."

Artificial Intelligence and Digital Awareness Campaigns:

In today's increasingly digital society and information-driven era, digital culture – shaped by the pervasive integration of the internet into daily life through news platforms and social media – has become a powerful force in molding public perceptions and attitudes. This cultural transformation plays a pivotal role in raising awareness and influencing behavior regarding critical issues, particularly environmental challenges such as climate change, biodiversity conservation, water preservation, and sustainability.

Recognizing this impact, institutions and organizations are increasingly leveraging digital platforms to launch environmental awareness campaigns. These initiatives employ informational, educational, and advocacy-based approaches across social media channels to engage audiences effectively.

Within this context, artificial intelligence (AI) offers transformative potential for enhancing digital awareness campaigns. Predictive AI enables organizations to anticipate audience behaviors, preferences, and communication channels, facilitating data-driven targeting and strategic planning. Meanwhile, generative AI empowers the creation of compelling visual and

multimedia content, streamlining production processes while maximizing audience engagement.

1- Aspects of Applying Predictive AI in Digital Advertising Campaign:

AI relies on algorithms to process information and make decisions. Algorithms guide AI through many different decisions, step by step, based on input data and a set of rules about how the algorithm will work in different scenarios. These kinds of AI algorithms are used in advertising campaigns, targeting, and segmenting (Kivistö, 2024), that can be divided according to the purpose it is used for in the Campaigns as follows (Huang & Rust, 2020):

Types of AI in digital marketing campaigns

| Mechanical AI | Thinking AI | Feeling AI |
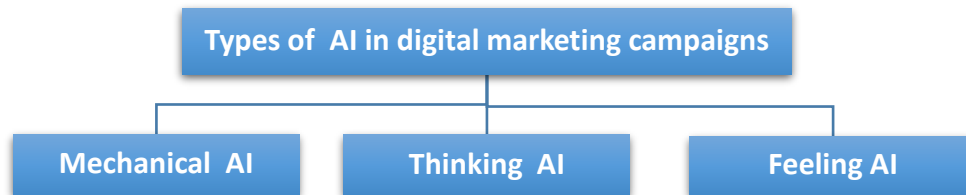
"Figer 2 Types of AI in digital marketing campaigns"

Mechanical AI: it provides a solution for complex tasks such as gathering data about audience and competitors, Mechanical AI can also be used in automating different kinds of manual operations in promotional campaigns such as quotations and retail.

Thinking AI: it is very useful in identifying the insights and directions according to market data and competitors' analysis, it is also utilized in identifying the cons and pros, points of deficiency and weakness if any, in addition to the customized offers that are based on audience's preferences and trends.

Feeling AI: it can be utilized to understand the current and potential needs and desires of customers, which in turn will help the marketing agents and advertisers to know the feelings, preferences, and attitudes of the audience. The insights gathered through Feeling AI can also be used to manage the brand image and customize the emotional messages conveyed to the audience.

The role of these predictions can be summarized as follows:

• Predictive Analytics for Consumer Behavior: the ability of AI to process massive amounts of consumer data is a very essential and necessary function to predict behaviors. By recognizing the patterns and trends, AI can help companies in predicting the needs and preferences of the customers which in turn will improve audience satisfaction (Khazaei, 2024).

• Predictive Analytics for Future Issues and Challenges: predictive analytics have a pivotal role in understanding the public feeling towards certain issues such as environmental issues, by using Natural Language Processing (NLP). This enables institutions to concentrate their efforts and strategies to address these challenges more effectively.

• The use of Predictive Analytics has a great impact on resource allocation, particularly in the case of non-profit organizations operating on limited budgets and need to ensure that resources are invested in the most efficient strategies.

• The use of predictive analytics in segmenting the audience and customizing the message to enhance audience engagement.

• The predictive analytics help in determining the potential impediments that hinder the campaigns such as misconceptions about environmental issues, any other awareness problem, or doubts about

the effectiveness of individual actions. By comprehending these problems campaigners will be able to formulate stories addressing public concerns.

2- Aspects of Applying Generative AI in Digital Advertising Campaigns:

GAI is one of the most prominent modern evolutions in the field of artificial intelligence. It aims at producing systems and software that can create autonomous or innovative content. This type of AI depends on advanced deep learning technologies and requires a wide range of data for training and learning.

It is a transitional stage in the creative and innovative world of advertising as it has not only the ability to generate texts and images, but also the ability to convert them into videos and generate music based on the precise preferences of the target audience and consumer data analysis. GAI can create customized advertising content according to the way through which the brands interact with consumers which will enhance engagement and posting rates among the audience.

GAI Outputs in Digital Advertising Campaigns:

1. **Generate 2D or 3D images**, design new products, edit image content and improve their resolution.

2. **Generate Audio**: generate voices, convert text into audio, and convert text into music.

3. **Generate Content:** GAI formulates unique narrations and visuals that communicate with consumers at an emotional level based on the comments on the real time to preserve the sustainability of relevancy and appropriateness of the advertisements.

4. **Generate Videos:** edit videos and their content.

All the foregoing make GAI very cost-effective in terms of reducing the costs of producing all types of advertising content. Usually, the conventional ways require extensive and costly human effort to create advertising content, including the creative development, manuscripts writing and designing, while GAI saves a lot of efforts and reduces the need of large innovative teams and reduces the needed time to produce the content, besides focusing on the strategy and improvement in less time and more productivity, in addition to the ability to customize the design according to the required advertising medium.

In light of the above, the relationship between artificial intelligence and generative AI in enhancing the design of advertising campaigns can be illustrated through the following schematic diagram."
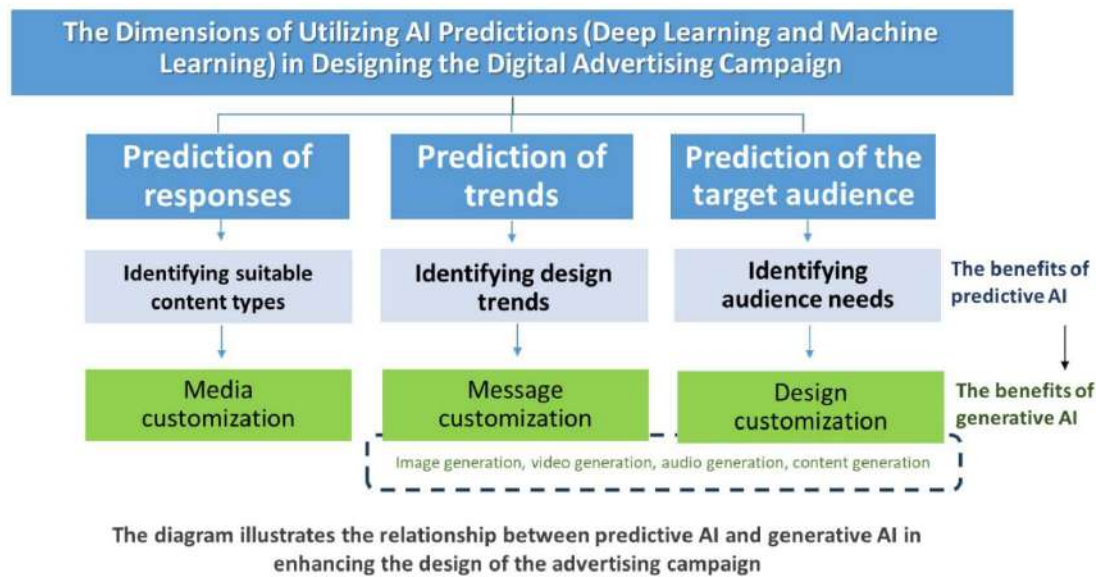
"Figer (3) diagram illustrates the relationship between predictive AI and generative AI in enhancing advertising campaign design"- **By researchers**

Analytical models to apply the potential of predictive and generative AI in the design of Digital advertising campaigns for environmental awareness:

In the light of illustrating the role of predictive and generative AI in the design of Digital advertising campaigns for environmental awareness, two models of environmental awareness advertising campaigns were selected to show the extent of integration and coordination utilized by the campaign design team to maximize benefiting from AI potentials and capabilities in all campaign stages from choosing the concept through the campaign planning stages, to developing the visual concept of the campaign, designing advertisements, and finally the evaluation and follow-up process. It aims at identifying the design needs for the digital advertising campaigns in which the AI can be used to achieve development and improvement.

‒ **First Model of** (WWF) **AI campaign (world without nature):**

It is an organization concerned with defending endangered species and the environment. The Animal Welfare Fund benefited from AI technologies and machine learning in successfully addressing the cost and purpose issues. It also benefited from GAI in designing a creative digital advertising campaign on social media with the hashtag "#worldwithoutnature" in conjunction with the annual celebration of world wildlife fund.

The main purpose of the campaign: increase awareness among the audience and encourage them to protect the environment and appreciate its role.

1- Aspects of Applying Predictive AI in the Campaign:

Through using machine learning derived by AI, WWF gathered offline data that supported its printed campaigns and conjoined it with the online data.

The organization leveraged Predictive AI and data analytics where a group of companied and organizations that have an animal or any natural element that represents wildlife in their brand logos were invited, regardless of the activity of this organization -services, sports or medical... and they were asked to remove the natural elements from their brand logos and place the logo in this form

on social media platforms for followers, along with writing textual content that expresses their solidarity with the campaign.

2- Aspects of Applying Generative AI in the Campaign:

the Organization wanted to expand the extent of benefiting from GAI, as it invited about 5000 designers of GAI creators to depict a world devoid of nature and use AI tools to imagine what a world without nature might look like through images showing Impoverished landscapes, protective gas masks, and "ghostly" images of animals on the brink of extinction. This imaginary design produced by AI aimed to prevent these terrible images of coming true and real to shed the light on the ""massive loss of global biodiversity".

Campaign Result's: the free campaign moved from the concept stage to the actual execution stage within 7 days only on LinkedIn, Instagram, and Twitter by leveraging this community composed of 5000 members, and achieved more than 12,000 membership shares, 2000 comments, and 750 shares without any advertising budget.

	Pic1, Message: We can't survive in a world without nature. We've removed the Swan from our badge for 24 hours to show how empty would be without nature **#WorldWithoutNature**
	Pic2, Message: Our world, just like our crest, is nothing without nature. That's why we've joined **WWF** to show just how vital nature is in every aspect of our life**#htafc #WorldWithoutNature**
	Pic3, Message: Nature is our lifeline. To safeguard our future, we need to protect it. Today, we join **#WWFZambia** highlight a **#WorldWithoutNature** by removing altering our logo. Because – like our logo – our world doesn't work without nature. We must protect it. **#WorldWildlifeDay**
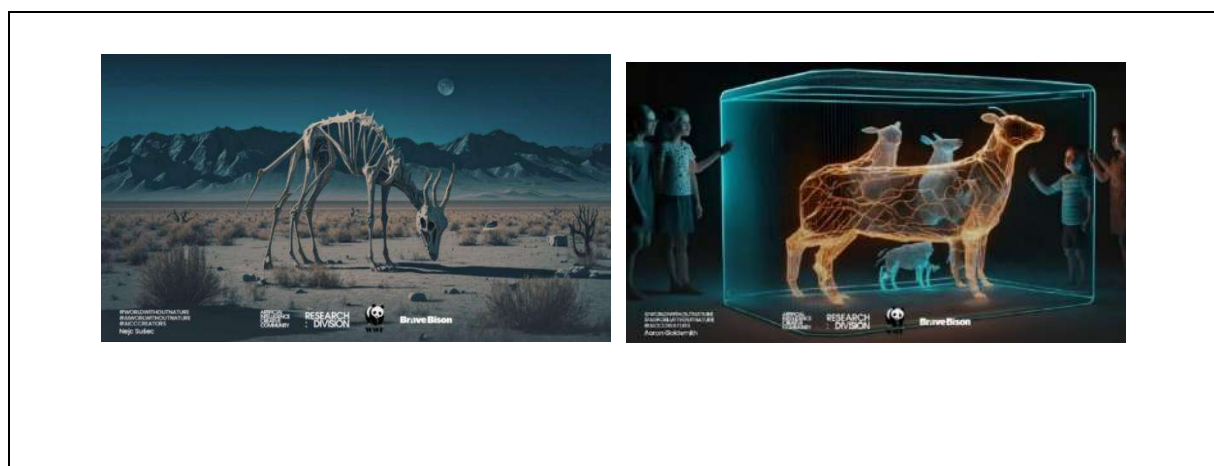
Pic 4:9 AI digital campaign ads (#worldwithoutnature)

- **Second Model of** (WWF) **AI campaign "Future of Nature":**

In April 2023, the World Wildlife Fund (WWF) launched an innovative digital advertising campaign that utilized artificial intelligence to envision a possible future for nature. The campaign was presented as a digital art exhibition titled "Future of Nature," portraying two contrasting environmental scenarios:

• One bright and optimistic,

• And the other dark and pessimistic.

Exhibition Details:

• The campaign used romantic art, mixing historical and futuristic styles.

• It used the widely known AI image-generation tool Midjourney to create visual content.

• A total of 20 digital artworks were produced:

o 10 artworks depicted scenes of environmental destruction, such as the piece titled "Highland Wildfires," which illustrated a scorched ancient forest.

o The remaining 10 artworks imagined a hopeful, more sustainable future for nature.

o Each image included a fictional future date for the envisioned scenario.

Environmental Background in the UK:

• The UK ranks among the top 10% of countries globally in terms of nature depletion.

• Over the past fifty years, around 38 million birds have vanished from British skies.

• A quarter of the native mammal species are at risk of extinction.

• Since the 1930s, 97% of wildflower meadows—vital breeding grounds for insects—have been lost.

Campaign Results:

• The campaign integrated AI and machine learning techniques to personalize its content.

• Messages were crafted in an interactive and engaging format, tailored specifically for younger audiences.

• The content was designed based on the target audience's interests and digital behavior, enhancing message relevance and encouraging deeper environmental engagement.

Pic10,Highland Wildfires 2034, WWF, the expectation

Pic11,Spring in Ingleborough, 2023 (Picture: WWF)

Pic12, Turbines, 2075 (Picture: WWF)

Pic13, Innocents, 2023 (Picture: WWF)

Pic14, Hunger, 2105 (Picture: WWF)

Applied Study

Within the theoretical framework of the research, this applied study represents the researchers' attempt to explore the functional capabilities of artificial intelligence (both generative and predictive) in designing a digital environmental awareness campaign. The study focused on analyzing the role of AI across various campaign design stages through the practical implementation of a digital awareness campaign about carbon footprint targeting youth.

1. Campaign Focus

• Designing advertising messages encouraging carbon footprint reduction.

• Aimed to enhance awareness of environmental sustainability.

• Choosing social media as the main digital platform due to its widespread use and effectiveness with the target audience.

2. Campaign Planning Framework

• Developed comprehensive planning and design proposal.

• Identified specific intervention points for AI integration.

• Combining artificial intelligence with human creativity to achieve optimal innovative outcomes.

3. Campaign Scope Implementation

o Determined the overall direction of the campaign.

o Used available generative AI tools (e.g., ChatGPT) to:

▪ Define primary and secondary campaign objectives.

▪ Develop advertising messages and campaign.

▪ Shape the creative strategy.

▪ Determine design styles and visual approaches.

▪ Select suitable color schemes and visual elements.

▪ Generate customized, targeted ads designs.

▪ Awareness Messaging and slogans with English and Arabic (reduce your carbon footprint, small steps today for brighter tomorrow, protect ozone layer, قلل بصمتك الكربونية)

4. Design Experimentation

• Two groups of ad campaigns were designed using generative AI technologies:

o Group 1: included both static and animated ad formats.

o Group 2: included only animated ads models.

• Both groups delivered awareness messages about carbon footprint reduction.

• Various AI tools were tested to generate ad designs for each group.

• The outputs were evaluated to identify the most suitable tools in terms of quality and effectiveness.

• Visual and thematic consistency was maintained across all campaign materials.

5. Technology Selection

• Leonardo AI and Runway AI were selected as the primary design tools due to:

o Alignment with the campaign's strategic design goals.

o Compatibility with the campaign's visual requirements.

6. Evaluation via Questionnaire

• A questionnaire was conducted to evaluate the design of the applied campaign.

• The questionnaire targeted a representative sample of the campaign's audience, specifically youth aged 18–35 interested in environmental issues and active on social media.

• Only one campaign model (applied model 1)—which included both static and video ads—was selected for evaluation.

• The questionnaire covered four key areas:

1.Design standards of the campaign

2.Content quality related to the environmental theme

3.Campaign effectiveness on audience response

4.Effectiveness of AI tools in campaign design

• The goal was to gather participants' feedback on:

o Visual appeal of the designs

o Clarity of the messages

o Effectiveness of visual communication (relevance, simplicity, memorability, and clarity of concept)

o The overall impact of the visual content on their engagement with the campaign topic

• The findings aimed to identify design needs for future improvement and assess the perceived effectiveness of AI in creating digital environmental awareness campaigns.

• Only one campaign was selected for the questionnaire, namely Model 1, which included both static and animated advertisements, to serve as a model for conducting the survey and measuring the results.

• The questionnaire included 4 sections:

– 1ST Design Standards of the Campaign,

– 2ed Content Quality Related to the Environmental Theme,

– 3rd Campaign Effectiveness on Audience Response,

– 4th Effectiveness of AI Tools in Campaign Design

• The aim was to gather their opinions on the campaign advertisement designs in terms of visual appeal, clarity of advertising messages, effectiveness of visual perception (such as the relevance of visual elements to the campaign theme, ease of recall, simplicity, and ability to express the idea), clarity of the campaign idea, and the visual impact of the advertisements on their response to the campaign topic.

• The goal was to identify their design needs for further development and improvement of the campaign, and to understand their opinions on the effectiveness of artificial intelligence in designing digital advertising campaigns for environmental awareness.

Applied model 1 : Step 1 Generated Design with Ai

Design AI prompt: (Leonardo ai)

A clean and simple digital poster targeting digital teenagers, featuring a stylized globe at its center, surrounded by minimal yet impactful visuals conveying the importance of reducing carbon footprint for a clear and pure world, with a dominant color scheme of calming blues and whites, accented by soft greens, evoking feelings of serenity and hope, the globe itself depicted in a subtle, gradient blue tone, with faint, elegant lines tracing the continents, set against a pure white background, with bold, modern, sans-serif font used for the title and tagline, such as "Reducing Our Carbon Footprint, One Step at a Time" or "Breathe Easy, Live Pure", in a circular formation around the globe, guiding the viewer's attention to the core message, the overall design balancing simplicity with visual interest, making the poster easily readable and shareable on digital platforms

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Step 2: Editing photoshop, Illustrator, runway ai

scan to view vidoe

Applied model 2 : Step 1 Generated Design with Ai

Design AI prompt: (Leonardo ai)

a bold and visually striking awareness ad targeting youth aged 18–35 about carbon footprint, under the campaign slogan 'Reduce Your Footprint'. Use vibrant colors like neon green, black, and white. Keep the design minimalistic and modern, with a creative visual twist—such as a fingerprint transforming into a tree, or a fingerprint melting ice. Use clean, legible fonts, and include a short, punchy message like: 'Your Print Matters', 'Every Step Counts', or 'Choose Green'. Add the campaign logo in a corner and leave space for the Ministry of Environment or sponsor's logo."

Step 2 Editing photoshop, runway ai

scan to view video videa

scan to view

Step 3: "The Questionnaire Form": there is a sample of Questionnaire form which designed by office365 and sending for targeting audience with English language

"The Questionnaire Form"

The effectiveness of artificial intelligence in enhancing the design of digital advertising campaigns for environmental awareness

Thank you for taking part in this academic research study. This survey aims to assess the effectiveness of digital advertising campaigns designed using artificial intelligence (AI), particularly those focused on **carbon footprint awareness**. Your answers will help improve the design of future environmental awareness campaigns.

The survey takes about **2 minutes** to complete. Please answer based on your honest opinion after reviewing the campaign materials and click **"Submit"** when you're finished. We appreciate your valuable contribution.

1. NAME:..........................

2. Gender: ☐ Male ☐ Female

3. Age Group: ☐ 18–25 ☐ 25–35

4. Are you interested in following advertising activities related to environmental issues?
☐ Yes ☐ No

5. Have you ever seen environmental advertising campaigns on social media?
☐ Yes ☐ No

6. Do you have sufficient knowledge about the carbon footprint and how to reduce it?
☐ Yes ☐ No

Based on the sample ads shown to you (designed using AI and targeting environmental awareness of carbon footprint), please answer the following:

Section 1: Design Standards of the Campaign

7. The campaign ads are visually clear and attractive.

☐ Strongly Agree ☐ Agree ☐ Somewhat Agree ☐ Disagree ☐ Strongly Disagree

8. The colors used in the campaign ads are appropriate to the topic of carbon footprint.

☐ Strongly Agree ☐ Agree ☐ Somewhat Agree ☐ Disagree ☐ Strongly Disagree

9. The images and visual elements used in the campaign ads express the theme of the carbon footprint.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

10. There is harmony and integration between visuals and text in the campaign ads.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

11. The overall visual content of the campaign ads is attention-grabbing.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

12. The campaign ads have unified visual consistency and balance.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

13. The motion elements added visual appeal to the ads.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

Section 2: Content Quality Related to the Environmental Theme

14. The campaign ads clearly convey environmental information about the carbon footprint.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

15. Visual symbols used in the campaign effectively express the campaign's message.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

16. The advertising messages and environmental information are clear and expressive of the carbon footprint topic.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

17. There is consistency between the visual content and advertising messages in the different campaign ads.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

Section 3: Campaign Effectiveness on Audience Response

18. The ads contain contact details or interactive features that allow engagement.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

19. The campaign ads contain clear information about the campaign topic.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

20. The information presented in the campaign ads provides sufficient awareness about the carbon footprint.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

21. The campaign ads are memorable, and their information is easy to recall.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

Section 4: Effectiveness of AI Tools in Campaign Design

22. The campaign designs generated using AI tools succeeded in achieving visual appeal and wow-factor.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

23. The ad campaign effectively expressed the topic of carbon footprint awareness using AI.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

24. The campaign designs generated by AI are visually realistic and acceptable.

☐ Strongly Agree   ☐ Agree   ☐ Somewhat Agree   ☐ Disagree   ☐ Strongly Disagree

25. Please write your suggestions for improving and developing the campaign designs (if any):

....

Thank you very much for your participation and responses.

– This questionnaire is intended to survey opinions about an advertising campaign designed with generative artificial intelligence

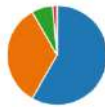## Section 1: Design Standards of the Campaign

9. Campaign ads are clear and visually appealing:

I agree	42
Totally OK	76
Somewhat OK	14
Disagree	0
Disagree at all	0

12. There is harmony between shapes and graffiti (integration between images and writing) in campaign ads:

I agree	38
Totally OK	21
Somewhat OK	14
Disagree	0
Disagree at all	0

10. The colors used in campaign ads are relevant to the carbon footprint theme:

I agree	42
Totally OK	24
Somewhat OK	5
Disagree	1
Disagree at all	0

13. The overall visual content of campaign ads is attention-grabbing:

I agree	34
Totally OK	23
Somewhat OK	12
Disagree	2
Disagree at all	1

11. The images and visuals used in the campaign ads are expressive of the carbon footprint theme:

I agree	41
Totally OK	25
Somewhat OK	11
Disagree	0
Disagree at all	0

14. There is a unified visual coherence and balance between campaign ads:

I agree	34
Totally OK	27
Somewhat OK	12
Disagree	0
Disagree at all	0

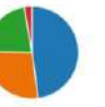## Section 2: Content Quality Related to the Environmental Theme

15. Please go to the following link https://2u.pw/b0SI6to view the ad and answer the following question:
The element of movement added visual appeal to the ad:

I agree	31
Totally OK	34
Somewhat OK	8
Disagree	0
Disagree at all	0

17. Expressive and successful visual symbols were used to express the content of the campaign:

I agree	36
Totally OK	34
Somewhat OK	11
Disagree	0
Disagree at all	0

16. Campaign ads have clear environmental information about the carbon footprint:

|	
I agree	35
Totally OK	20
Somewhat OK	16
Disagree	2
Disagree at all	0

18. The advertising messages and environmental information in the ads are clear and expressive of the carbon footprint:

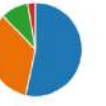|	
I agree	40
Totally OK	25
Somewhat OK	8
Disagree	0
Disagree at all	0

Section 3: Campaign Effectiveness on Audience Response

19. There is compatibility between visual content and advertising messages in different campaign ads:

I agree	42
Totally OK	24
Somewhat OK	6
Disagree	1
Disagree at all	0
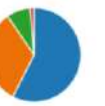
21. Campaign ads include clear information about the campaign theme:

I agree	39
Totally OK	25
Somewhat OK	7
Disagree	2
Option 5	0

20. There are data, means of communication and methods that allow interaction with campaign ads:

I agree	30
Totally OK	25
Somewhat OK	13
Disagree	5
Disagree at all	0

22. The information included in the campaign ads allows for adequate awareness of the carbon footprint:

I agree	55
Totally OK	25
Somewhat OK	11
Disagree	5
Disagree at all	1
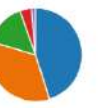
Section 4: Effectiveness of AI Tools in Campaign Design

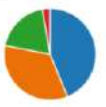23. Campaign ads have the ability to easily remember and recall their information:

I agree	39
Totally OK	25
Somewhat OK	8
Disagree	1
Disagree at all	0
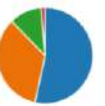
25. The design of the advertising campaign succeeded in expressing the theme of carbon footprint awareness using artificial intelligence:

I agree	38
Totally OK	21
Somewhat OK	13
Disagree	1
Disagree at all	0

24. Campaign designs generated using artificial intelligence tools succeeded in achieving dazzling and visual appeal:

I agree	38
Totally OK	22
Somewhat OK	11
Disagree	2
Disagree at all	0
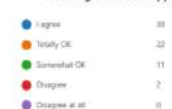
26. AI campaign designs, realistic and visually acceptable:

I agree	32
Totally OK	25
Somewhat OK	14
Disagree	2
Disagree at all	0

Summary of the General Indicators for the Questionnaire Axes:

A sample of 73 individuals, both male and female, participated in the questionnaire. The percentage of male participants was 23%, compared to 75% for females. All participants were within the age group of 18 to 35 years. Among them, 75% were aged between 18 and 25 years, while 25% were in the age group of 25 to 35 years. Their educational backgrounds and degrees varied, with 2.6% holding a bachelor's degree, 0% holding a Licentiate degree, 0% holding a Postgraduate Diploma, 13.6% holding a master's degree, and 1.4% holding a Doctorate degree. Additionally, students aged between 18 and 25 represented approximately 47.9% of the total sample.

85% of the total sample answered "Yes," which is a percentage that exceeds more than half of the participating sample. This is a positive indicator of the high level of awareness and interest in following activities related to various environmental issues, while approximately 15% answered "No".

The indicators of overall acceptance, strong approval, and total rejection for the questions are as shown in the following table.

	Question	Overall Acceptance	Strong Agree	Rejection
	Section 1: Design Standards of the Campaign			
9	The campaign ads are clear and visually appealing.	100%	22%	0%
10	The colors used in the campaign ads are appropriate to the carbon footprint theme.	98%	33%	1.4%
11	The images and visual elements in the campaign ads reflect the carbon footprint theme.	100%	27%	0%
12	There is harmony and integration between visuals and texts in the campaign ads.	100%	29%	0%
13	The overall visual content of the campaign ads is attention-grabbing.	94.5%	32%	0%
14	There is visual consistency and balance across the campaign ads.	100%	37%	0%
15	The use of motion elements added visual appeal to the ads.	100%	47%	0%
	Section 2: Content Quality Related to the Environmental Theme (Quality of Campaign Content)			
16	The campaign ads clearly communicate environmental information about the carbon footprint.	97.3%	27%	2.7%
17	Effective and expressive visual symbols were used in conveying the campaign's message.	100%	33%	0%
18	The messages and environmental info in the ads are clear and expressive of the carbon theme.	100%	34%	0%
19	There is alignment between visual content and advertising messages across campaign ads.	98.6%	33%	1.4%
	Section 3: Campaign Effectiveness on Audience Response			
20	The campaign includes contact data and interactive methods with the ads.	93.2%	34%	6.8%
21	The campaign ads provide clear information about the campaign's topic.	97.3%	34%	2.7%
22	The campaign ads sufficiently raise awareness about the carbon footprint.	94.5%	34%	5.5%
23	The campaign ads are memorable and their content is easy to recall.	98.6%	34%	1.4%
	Section 4: Effectiveness of AI Tools in Campaign Design			
24	AI-generated campaign designs achieved visual appeal and impressiveness.	97.3%	30%	2.7%
25	The campaign design effectively conveyed the carbon footprint awareness using AI.	98.6%	29%	1.4%
26	AI-generated campaign designs are realistic and visually acceptable.	97.3%	34%	2.7%

Section 1: Design Standards of the Campaign– Questions (9–15)

• The overall acceptance rate (Agree + Strongly Agree + Somewhat Agree) ranges between 94.5% and 100%.

• The general rejection rate (Disagree + Strongly Disagree) ranges between 0% and 1.4%.

•The full approval rate (Strongly Agree) ranges between 22% and 47%.

"Therefore, the overall positive indicator reflects a high level of satisfaction among the sample members regarding the appeal and clarity of the campaign advertisements, including the colors, motion elements, slogan, and other visual components presented in the questionnaire."

Section 2: Content Quality Related to the Environmental Theme -Questions (16–19)

• The overall acceptance rate (Agree + Strongly Agree + Somewhat Agree) ranges between 97.3% and 100%.

• The general rejection rate (Disagree + Strongly Disagree) ranges between 0% and 2.7%.

• The full approval rate (Strongly Agree) ranges between 27% and 43%.

Therefore, there is a general positive indicator among the sample members and a consensus on the presence of consistency between the visual content and the advertising messages in all the campaign advertisements, thus achieving the Unity criterion in the campaign design.

Section 3: Campaign Effectiveness on Audience Response- Questions (20–23)

• The overall acceptance rate (Agree + Strongly Agree + Somewhat Agree) ranges between 93.2% and 98.6%.

• The general rejection rate (Disagree + Strongly Disagree) ranges between 1.4% and 6.8%.

 •The full approval rate (Strongly Agree) is 43%.

"Therefore, there is a general positive indicator among the sample members reflecting their agreement on the availability of data, means of communication, and methods that help them interact with the campaign advertisements".

Section 4: Effectiveness of AI Tools in Campaign Design– Questions (24–26)

• The overall acceptance rate (Agree + Strongly Agree + Somewhat Agree) ranges between 97.3% and 98.6%.

• The general rejection rate (Disagree + Strongly Disagree) ranges between 1.4% and 2.7%.

 •The full approval rate (Strongly Agree) ranges between 29% and 34%.

"Therefore, there is a general positive indicator among the sample members, acknowledging that the campaign designs generated using artificial intelligence are realistic, visually acceptable, and succeed in achieving visual appeal and impressiveness."

– In response to this open-ended question, the comments and suggestions of the sample members were as follows:

• Some suggested that the color tones could be bright and light.

• Simplify the design elements to avoid overcrowding in the campaign advertisements.

• Simplify the campaign advertisement designs.

• The campaign advertisements should include more information about carbon footprints and its harm.

• Use more artificial intelligence tools in the design.

• Employ typography more effectively.

• AI-generated designs need more realism and clearer explanation of the advertising message.

• Transform the campaign from mere awareness to effective community participation.

• Vary the poster styles and include some realistic images.

• Improve the typography in terms of readability from left to right only.

• Include an introduction about the carbon footprint, ways to reduce it, and provide means of communication with the campaign.

 •Present ideas or designs that attract the general public and are memorable, and avoid placing too many elements in the advertisement designs to prevent clutter.

Survey results discussion

Through analyzing the previous questionnaire results, it is evident that the responses of the sample members to all the questionnaire axes were positive in favor of the advertising campaign presented to them for evaluation, as the general acceptance rate exceeded 95% for all questions. Additionally, based on their suggestions for improvement and development in the open-ended question,

It is also clear that the design needs of the recipients of digital advertising campaigns designed using artificial intelligence must be considered. Meeting these needs requires further experimentation using

various AI tools, as well as continuous follow-up with a sample representing the actual target audience of the campaign, to ensure obtaining the best results and visual solutions.

It is also necessary to include interactive methods in the design of digital campaigns to allow interaction with them.

There is a need not rely entirely on AI-generated outputs, but to ensure continuous intervention by designers and the digital campaign design team for improvement and development, to guarantee that these outputs meet the design and visual needs of the target audiences.

Discussion

1.By comparing the different design groups, it becomes evident that generative artificial intelligence has the capability to achieve visual impressiveness in design, provided it is directed professionally using prompt engineering.

2.In designing digital advertising campaigns using AI, to ensure proper layout and achieve the principle of unity in the generated designs, it is essential to define the campaign concept and design style, with the presence of a design team specialist to review and refine the prompt engineering for generating campaign visuals.

3.AI-generated designs are not considered final campaign outputs; rather, they require evaluation to ensure their consistency with the campaign's content and visual message. Additionally, written text within these designs often requires editing and revision.

4.Design teams face challenges in editing (modifying) static AI-generated designs, compared to video or interactive digital advertisements, whether in terms of visual elements or written content. Although some AI tools allow for editing, these capabilities remain limited in scope.

5.Generating campaign designs using AI requires the integration of the design team's creative abilities with AI creativity to maximize effectiveness. This underscores the importance of involving AI in the generative process, where comparisons can be made between designs generated using only keywords and those based on preliminary hand-drawn sketches by designers.

6.In digital advertising campaign design, it is important to involve a sample of the target audience in evaluating AI-generated designs to ensure they meet their design expectations and achieve the intended impact.

The Research Results:

1.Artificial intelligence is a highly efficient technology that can be effectively used in designing digital advertising campaigns to raise awareness of the environment.

2.Predictive AI can help the creative team design advertising campaigns anticipate future environmental issues before they occur and begin planning and designing awareness campaigns before they arise.

3.The success in applying Predictive and Generative AI in designing digital advertising campaigns depends on combining the creative and visual thinking skills of designers with AI technologies working together in parallel to achieve the best results.

4.The effectiveness of the visual visions of GAI outputs depends on the design team's knowledge and familiarity with its technologies and select the one that fits better, in addition to

mastering Command Engineering (the way to address AI techs) to get the best possible visual solutions.

Recommendations:

1.The necessity to spread awareness of AI and its potential in advertising design and include it in the design curriculum in Art Faculties.

2.The necessity to combine human innovative skills of the designer with the AI abilities to get the best results and visual solutions.

3.The necessity to pay attention to the results of digital advertising campaigns based on AI in different design stages and to study the literature through scientific research to review the learned lessons in this regard.

4.AI can be utilized in predicting future environmental problems to contribute to producing unconventional visual awareness experiences and standing up to these problems and raising awareness before their occurrence (achieving environmental sustainability).

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