



ARTIFICIAL INTELLIGENCE TECHNOLOGIES AND THEIR ROLE IN FOSTERING CREATIVE THINKING IN DESIGN EDUCATION

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ABSTRACT

The integration of artificial intelligence (AI) into design education has become increasingly relevant, offering transformative opportunities to enhance creative thinking and innovation. While AI presents powerful tools for ideation and skill development, its role in fostering or constraining creativity remains an open question. This research investigates the impact of AI technologies on the creative capabilities of design students, addressing a critical gap in the structured application of AI within design curricula.

This study hypothesizes that AI can significantly enhance creative potential by enabling rapid ideation, expanding conceptual exploration, and automating repetitive design tasks. However, excessive dependence on AI without structured pedagogical guidance may hinder students' critical thinking and originality. By examining AI's dual role—both as a facilitator of innovation and as a potential constraint—this research aims to provide a balanced perspective on AI's implications for design education.

A mixed-methods approach is employed, combining qualitative and quantitative data collection. Surveys and in-depth interviews with students and educators will assess perceptions of AI's influence on creativity. Additionally, experimental case studies will analyze AI-driven design exercises to measure cognitive shifts in problem-solving and ideation. Statistical analysis will be conducted to quantify the extent to which AI enhances or inhibits creative thinking.

Expected findings suggest that AI can catalyze creative growth when integrated with structured educational frameworks, ensuring a synergy between human ingenuity and machine intelligence. The outcomes of this study could inform the development of innovative pedagogical models that harness AI's potential while preserving the fundamental aspects of human-centered creativity.

Keywords:

Artificial Intelligence (AI), Creative Thinking, Design Education, Adaptive Design Thinking, Intellectual Fluency in Design, and Critical Thinking in Design.

Research Terminology

1. AI-Induced False Competence: False awareness resulting from relying on artificial intelligence without acquiring knowledge real.



2. Problem framing: means how to define and define a problem before starting to solve it, rather than focusing only on solutions, these theories seek to understand the issue from multiple angles, analyze its dimensions, and determine the context in which it affects.
3. Sense-Making Theories: Interpret complex information and turn it into clear knowledge that can be used in design, In modern creative environments, valuable and meaningful design decisions are allowed.
4. Brain **rot** :The term "brain rot" resulting from the use of artificial intelligence refers to the deterioration of the intellectual and creative abilities of individuals due to excessive reliance on artificial intelligence tools in thinking, learning, and creativity.

Research problem

The impact of AI on creativity in design education remains unclear. While some studies highlight its role in enhancing idea generation and expanding design solutions, others warn of its potential to hinder critical thinking and independent creativity, the research problem is the following questions:

1. What is the impact of artificial intelligence techniques on the development of creative thinking skills among design students?
2. Can these technologies be a tool to foster creativity or can they lead to a reduction in critical and innovative thinking?
3. What pedagogical strategies can effectively integrate AI into design curricula to maximize creative development?

Research Objective

This research seeks to:

1. Analyze the impact of artificial intelligence techniques on the development of creative thinking among design students.
2. Identify the benefits and challenges facing students when using AI as a design tool.
3. Proposing educational strategies that contribute to achieving effective integration between human creativity and smart technologies in designing curricula for design students.

Importance of research

The importance of this research is highlighted in the following points:

1. This research contributes to a deeper understanding of the role of AI in design education, a topic that still needs further empirical and applied studies.
2. The findings will contribute to the development of design education curricula to include effective strategies for investing in AI technologies while preserving human creativity.
3. The research helps to illustrate how AI can be used as a tool to support creative thinking, by integrating AI into design education programs.

Research limits

1. Objective limits: The research focuses on studying the impact of artificial intelligence on creative thinking in the field of design education.

2. Time limits: Research is based on the latest technologies and research trends in AI and design education until 2025.
3. Physical limits: The research includes a sample of faculty members in academic programs that adopt artificial intelligence as part of their curriculum and a sample of 13 university professors from 13 different design schools from 10 different countries.

Research Methodology

The research is based on the Mixed-Methods Approach, where data was collected through the following methods:

1. Qualitative Approach: For in-depth interviews, experts in the field of design and education were interviewed to provide insights into the impact of AI on creative thinking.
1. Experimental Methodology: An experimental curriculum has been developed for design students in which the skills acquired from the use of artificial intelligence tools are enhanced against the creative skills of students, with the aim of supporting creative thinking and solving design problems, while maintaining the student's creative skills.

Introduction

In the digital age, artificial intelligence (AI) has become a vital tool in many areas, including design, and the rapid development of artificial intelligence technologies has led to the emergence of tools that help designers explore innovative solutions, analyze patterns, and improve creative workflows. Does AI act as a catalyst that fosters creative thinking, or does it lead to passive reliance on technologies, limiting original innovation?

This research aims to explore the role of AI in design education, focusing on how it affects students' creative thinking skills and seeks to provide a balanced analysis on the benefits and challenges involved in integrating AI technologies into design curricula.

First: Theoretical Framework:

Global Code of Ethics for Artificial Intelligence in Higher Education

The United Nations Code of Ethics in the Use of Artificial Intelligence is a global framework to ensure the responsible and transparent use of this technology within higher education institutions, the charter aims to achieve a delicate balance between technological development and the protection of students' rights, ensuring a fair and inclusive educational environment that accommodates all groups, and this charter focuses on promoting innovation in the educational process while taking into account the principles of justice, non-discrimination, and respect for privacy (UNESCO, 2022) .

Students' rights to use artificial intelligence (UNESCO, 2022)_

The charter includes a set of basic rights for students, allowing them to benefit from artificial intelligence techniques to enhance their academic and professional growth, while ensuring that these tools are used ethically and responsibly, as shown in Figure (1):



شكل (1) Students' Rights in Using Artificial Intelligence تصميم الباحثة

1. Right to access technology: The Charter guarantees the right of students to have equitable access to and utilization of AI tools to enhance their academic achievement and develop their skills.
2. Personalized and targeted learning: AI provides an interactive learning environment adapted to the needs of each student, enhancing the personalized learning experience and increasing the efficiency of the educational process.
3. Fair and objective assessment: The Charter emphasizes that AI-based assessments should be free from bias, ensuring fairness in measuring students' performance without unfair interventions.
4. Qualifying for the future job market: Integrating AI technologies into the curriculum is an essential step to prepare students for the digital job market, giving them wider opportunities for employment and innovation in their fields.
5. Participation in the development of artificial intelligence technologies: The charter affirms the right of students to contribute to the design and development of artificial intelligence tools used in the educational process, which enhances their creative abilities and qualifies them to be active in this field.

Implications of the Charter on Higher Education Curricula:

With the increasing use of generative artificial intelligence (GenAI) in higher education, challenges arise regarding how to strike a balance between benefiting from these tools and ensuring academic integrity, current research suggests that some students may resort to using artificial intelligence to plagiarize or produce content that exceeds their actual capabilities, creating what is known as "false awareness" – the misconception that they possess knowledge or skills beyond the student's experience.

Hence, adhering to the ethics of using artificial intelligence in higher education contributes to ensuring that these technologies are tools to enhance learning and not a substitute for real academic effort, achieving this requires developing awareness and guidance strategies that ensure the responsible use of artificial intelligence, in a way that enhances students' skills without compromising academic integrity.

The role of artificial intelligence in design education

The field of design is witnessing a profound transformation due to the rapid developments in the field of artificial intelligence (AI), artificial intelligence is no longer just an aid tool for designers, but has become an active partner in the design process, which opens wide horizons for creativity and innovation in various fields of design, from graphic design to product design and user experience design, so this research aims to explore the role of artificial intelligence in design education and analyze its impact on educational practices and creative abilities of students.

Although AI has seen wide and successful applications in higher education institutions, its use was previously limited to large-scale educational activities such as automated assessment and academic management, however, individual and limited applications have started to appear within these institutions recently, especially after the launch of **ChatGPT**, a chatbot developed by **OpenAI** in November 2022. Since then, other open-source AI tools have emerged within a broad category known as "**Generative Artificial Intelligence**" (Dan Sun, 2024) (**GenAI**).

The impact of generative artificial intelligence on academic cognition:

In a previous study designed to measure the extent to which higher education students are aware of GenAI tools,)Abdullahi Yusuf(2024 • The results showed that the vast majority of participants (81.76%) were familiar with these tools, while **the analysis of the use of generative artificial intelligence tools and their impact on academic integrity** The results of the study showed a variation in the participants' attitudes towards the use of generative artificial intelligence (GenAI) tools, as their opinions were distributed as follows:

1. **54.5%** of respondents who have previously used these tools said they are committed not to employing them in future non-academic practices, such as plagiarism.
2. **6.4%** **stated** that they have not previously used these tools in unethical practices, but may consider this in the future after observing the positive results achieved by their colleagues and their impact on their academic averages.
3. **19.9%** of respondents admitted to using these plagiarism tools and confirmed their intention to continue this behavior in the future.
4. **19.2%** **admitted to** having previously used these tools in unethical practices but were willing to stop doing so if they received appropriate academic guidance on the ethical use of these technologies.

These results reflect the urgent need to enhance awareness of the ethics of using generative artificial intelligence, especially in light of **the emergence of the phenomenon of "AI-Induced False Competence"**, which occurs when a student or researcher obtains cognitive or academic

results that exceed his actual capabilities in the absence of academic guidance, which leads to a gap between his real scientific level and the results he achieves using artificial intelligence.

For example, some students may rely on tools such as ChatGPT to produce academic research, then think they are scientific researchers, or use generative AI to create visual content and describe themselves as graphic designers, despite their lack of academic qualification and practical experience, due to the lack of appropriate academic guidance that helps in employing these tools correctly and ethically.

Therefore, it becomes imperative to develop design education strategies to ensure the responsible use of these tools, and to guide students towards employing them as supportive tools for learning, not unethical alternatives to acquiring actual knowledge and experience.

Artificial intelligence as a tool for creativity and innovation in design education:

Most GenAI tools mainly aim to simulate human intelligence, but with recent developments, these tools have gone beyond this traditional role, as they are able to produce new content, such as poems, codes, and written texts, and in the fields of art and design, generative artificial intelligence has made a radical transformation, as it can produce digital artwork, design visual identities, create integrated color systems, in addition to developing three-dimensional and architectural designs based on specific creative standards. It is also used to improve creative experiences by proposing new design patterns, analyzing audience feedback, and creating innovative visual compositions, making it a powerful tool for artists and designers in exploring new possibilities and produce in more efficient and creative ways. (Ziv Epstein, 2023) وقد It has become a powerful tool that promotes creativity, saves time, and opens new horizons for designers and artists, in education, which helps develop curricula, support creators, and improve the learning experience through smart tools, the following are the most prominent roles played by artificial intelligence in design and visual arts education:

1. Enabling creativity and stimulating innovation

Artificial intelligence allows artists and designers to experiment with new methods in drawing, coloring, and design, through tools such as **Deep Dream** and Runway ML, which rely on deep learning to create unique art patterns, these tools help students understand unconventional possibilities in design and unlock their creative abilities. (Ahmed Elgammal, 2017).

2. Personalize the learning experience and teach adaptive design

Artificial intelligence allows the creation of customized learning plans for each student, based on their level of design and individual skills, using performance analysis algorithms, for example, platforms such as **Adobe Sensei** can automatically analyze a student's work and suggest improvements, to help enhance their skills.. (Idelbi, 2024) It also helps in evaluating students' work and providing useful feedback by analyzing students' designs and providing suggestions for improvement, which helps students develop their skills and improve the quality of their work, and also helps students develop their design skills by providing interactive exercises and activities, as artificial intelligence tools can help students learn design principles and apply them to realistic projects, thus enhancing deep understanding and developing practical abilities.

3. Support design processes with generative AI

Generative AI technologies help designers quickly create new ideas, such as **DALL· E** and **MidJourney**, which generate text-inspired images, and architects are using artificial intelligence to create innovative designs in ways that were not possible before (Yıldırım, 2022).

4. Enhance design tools and save time

AI provides tools that help designers automate repetitive tasks, such as image enhancement, color editing, and logo design using algorithms such as **GANs (Generative Adversarial Networks)**, allowing artists to focus on the creative aspects.

5. Develop interactive learning environments using AI

Virtual reality (VR) and **augmented reality (AR)** in design education, allowing students to interact with the artwork in a three-dimensional way, such as exploring virtual museums or experimenting with colors and compositions in interactive environments (Hsiu-Mei Huang, 2010). Figure (2) about the experience of the researcher in cooperation with the company Tottera to make educational tours on the history of the Egyptian civilization in the city of Metatot on the metaverse, accompanied by the establishment of an art exhibition at the city museum on the metaverse has participated in the experience 125 visitors from 46 different countries to learn about the history of Pharaonic Egypt.



Figure (2) A picture of an experiment carried out by the researcher in cooperation with the company Tottera Tours of the temple of Hatshepsut and the pyramid on the metaverse

6. Analyze and understand artistic and historical styles

Deep learning algorithms can analyze thousands of artworks, helping students understand different styles and techniques, and suggest new ways to develop their own. (Gjorgji Strezoski, 2017) ‘As in Figure (3) to compare Arabic fonts on the walls of Islamic mosques and the lines created simulating them with artificial



Figure (3) Comparison between Arabic fonts on the walls of historical mosques on the right and between the lines created with artificial intelligence on the left

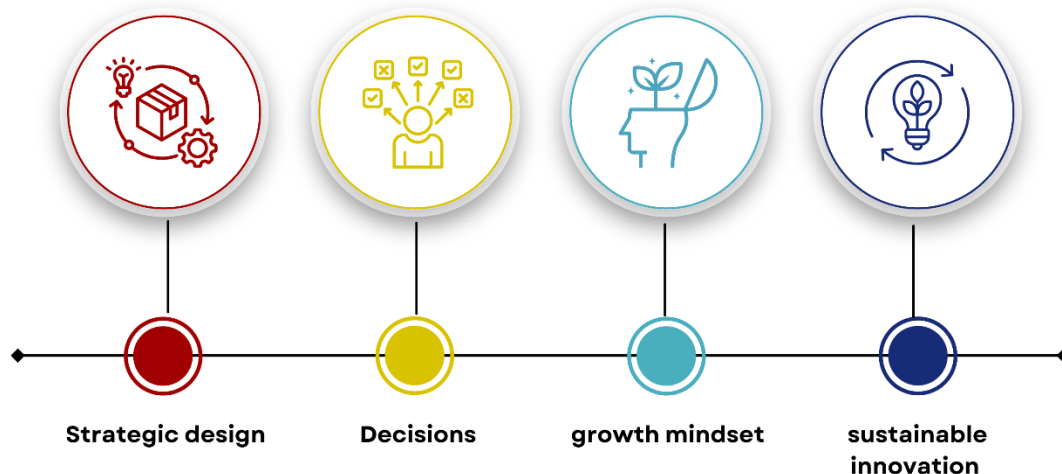
intelligence tools.

Artificial intelligence as a tool for applying design education curricula:

Artificial intelligence and design theories: The spread of artificial intelligence has reshaped the orientations of design theories, design was seen as a process to solve creative problems, but with artificial intelligence taking over problem-solving tasks, the role of designers has shifted to formulating and giving meaning to problems, so in AI-based manufacturing environments, designers need the ability to identify problems worth addressing, which enhances the importance of strategic thinking in design. Future design thinking developments are expected to focus more on problem framing theories and sense-making theories, linking design more closely to leadership and decision-making.) Roberto Verganti(2020 ‘.

How to become a designer in the center of leadership and decision-making in dealing with artificial intelligence:

1. **Strategic design as a leadership tool:** As design shifts from problem-solving to **problem identification and reformulation**, designers become more involved in strategic decision-making processes, bringing them closer to leadership roles.
2. **Make data- and knowledge-based decisions:** AI helps analyze vast amounts of data, but the human brain is still needed to interpret this data in a way that is in line with the needs of humans, the market, and society.
3. **Adopt a growth mindset:** The designer must adopt a growth mindset, be willing to learn and constantly evolve, must have a curiosity for knowledge, and have a desire to explore everything new in the field of artificial intelligence and design.
- 4.
5. **Design as a sustainable innovation process:** **Design-leading** designers rely on design thinking to formulate visions for the future and solve complex challenges in areas such as urban planning, sustainability, and institutional innovation.





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Challenges to using artificial intelligence in design:

After conducting personal interviews with 13 design professors from 13 different universities, from 10 different countries (Egypt, Iraq, Poland, Japan, South Korea, China, Indonesia, Mexico, Pakistan, Russia), consisting of 5 main departments:

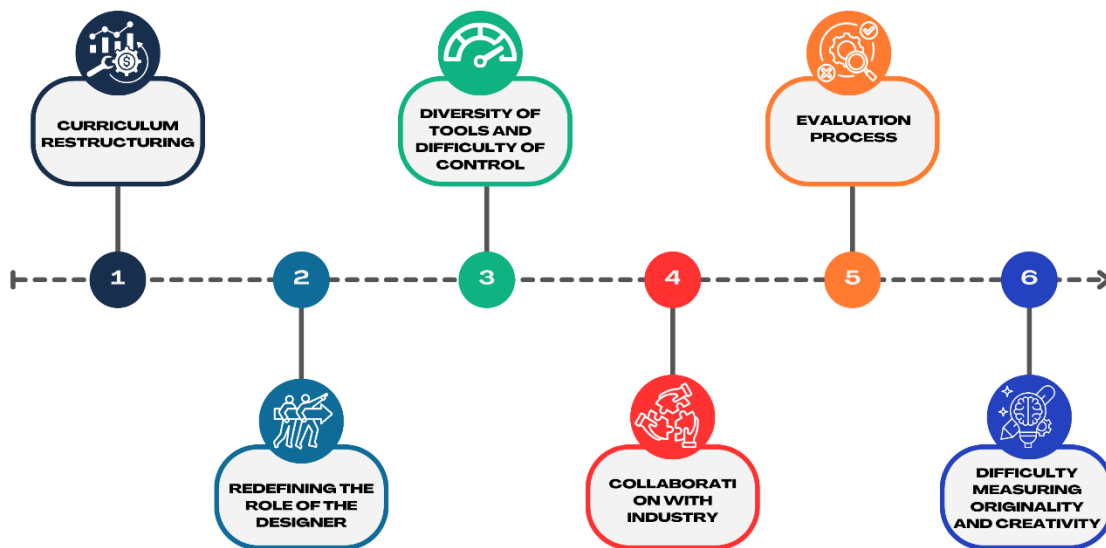
1. Academic background and experience with artificial intelligence.
2. The impact of artificial intelligence on creativity and design thinking.
3. Academic and ethical challenges.
4. Opportunities and curriculum development.
5. Future visions in design.

The results of the interviews identified the challenges facing professors and students, which are as follows:

Challenges for professors:

1. **Curriculum restructuring:** Traditional curricula do not keep pace with the development of smart tools, which calls for integrating artificial intelligence techniques in systematic ways without losing the essence of design thinking.
2. **Redefining the role of the designer:** With the ability of artificial intelligence to perform many design tasks, the role of the designer is evolving from a mere executor to a strategic thinker capable of intelligently employing smart tools.
3. **Diversity of tools and difficulty of control:** There are a large number of artificial intelligence tools, each of which has its advantages and characteristics, it is difficult for professors to familiarize themselves with all these tools, and to follow the continuous developments in this field, this may lead to the inability of professors to evaluate students' use of these tools effectively, and reduce their ability to guide them.
4. **Collaboration with industry:** Design curriculum professors must collaborate with industry to identify labor market needs and develop curricula that meet these needs.
5. **Evaluation Process:** The use of artificial intelligence (AI) tools in the field of design is a major challenge for design professors when evaluating their students, these tools, which have become an integral part of the creative process, have changed the nature of design work and required a reconsideration of traditional evaluation methods.

6. **Difficulty measuring originality and creativity:** It is difficult to determine the originality of the ideas put forward by students, as artificial intelligence tools generate innovative designs that are sometimes difficult to distinguish from students' creativity, which leads to an inaccurate assessment of student's creative abilities, and reduces their motivation to develop their skills.

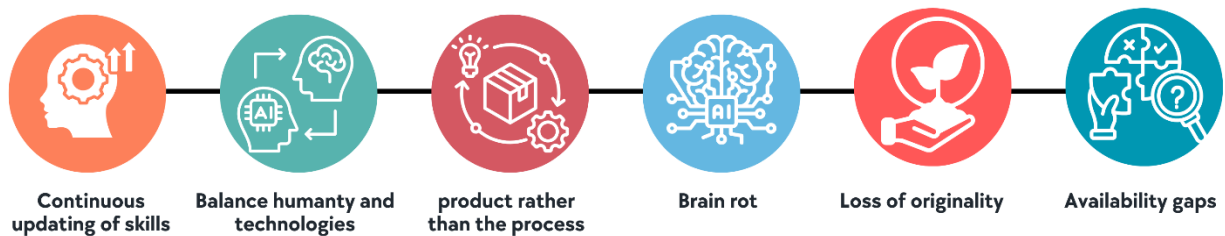


form (5) Challenges for professors

Challenges for students:

1. **Continuous updating of skills:** Design students must be up to date with the latest AI tools available, and learn how to use them effectively, this requires them to devote significant time and effort to follow technological developments, and attend specialized workshops and training courses.
2. **Balance between human creativity and smart technologies:** The fear of AI dominating the creative process limits designers' boldness in using it in innovative ways.
3. **Focus on the final product rather than the process:** Students tend to focus on using AI tools to produce a dazzling final design, without caring about the creative process behind it.
4. **Brain rot:** Overreliance on artificial intelligence tools leads to poor critical thinking in students, as they rely excessively on ready-made solutions proposed by systems.
5. **Loss of originality:** Repeated use of the same tools leads to the similarity of the final designs among students, reducing artistic diversity in the works (Shulman, November 16, 2023).

6. **Availability gaps:** Some educational institutions may suffer from a lack of financial and technological resources to provide AI technologies, creating a gap between institutions. Accordingly, a curriculum in the applied framework has been designed to provide solutions to these different challenges.



form (6) Challenges for students

Second: Applied Framework:

Develop a strategy for the curriculum of teaching visual identity design using artificial intelligence while developing creativity skills Design students:

- **Design the study using a mixed approach (quantitative and qualitative).**

Contrary to the widespread belief that AI may hinder creativity, it can stimulate innovation by eliminating routine and time-consuming tasks, allowing designers and strategic planners to focus on solving creative problems. Furthermore, AI can provide real-time feedback and simulate users' interactions with prototypes, allowing for iterative improvement during the idea generation phase, including:

1. **Automate routine tasks:** AI takes over data-driven tasks, simplifying workflows.
2. **Enhance exploration:** AI offers a wider range of possibilities for creative thinking.
3. **Interactive feedback:** AI simulates users' interactions and predicts their reactions to prototypes.
4. **Iterative learning:** AI learns from every interaction, continuously improving the design process.

By understanding the potential of AI in design thinking, managers, executives, and consultants can leverage these technologies to create user-centric products and services, promote business innovation, and integrate AI into design students' design thinking methodology while maintaining their creative skills (Roberto Verganti, 2020).

Therefore, the following steps are suggested for the process of integrating artificial intelligence into design thinking to preserve the student's creative skills:

1. **Empathize – analyze user data and identify their needs**

Table 1 Empathy

Data Source	Artificial Intelligence Application	Benefit of consolidation
Social Media	Sentiment analysis	Track user sentiment in real-time
Customer Reviews	Natural Language Processing (NLP)	Deep insights into user needs
Behavior statements	Machine Learning	Predictive behavior patterns and Personalization targeting

2. Problem Identification (Define) – Formulating Design Challenges

Table 2 Define

Artificial Intelligence Tool	function	User insights obtained
AI chatbots	Collect interactive feedback	Direct user needs and preferences
Machine learning algorithms	Usage pattern analysis	Implicit user challenges

Data Source	Artificial Intelligence Application	Benefits of Integration
User surveys	Text analysis	Monitor key user concerns and required features
Usability Tests	Behavioral analysis	Understand common usage challenges you've faced
Market Data	Trend prediction	Emerging user needs and market opportunities for the product

Basic human skills for the integration process:

- Analyze the problem from a personal and creative perspective away from models of artificial intelligence.
- Interpret problems in creative ways that take into account emotional and cultural factors that AI cannot accurately assess.
- Use critical thinking to relate the problem to the target societal context.

3. Idea Generation – Creativity in Finding Solutions

Table 3 Idea Generation

Artificial Intelligence Technology	function	Benefits of Integration
Machine Learning	Analyzes trends and predicts viable design solutions	Increase efficiency and generate new ideas
Natural Language Processing	Interprets user feedback and suggests improvements	Better understanding of consumer needs
Generative Design	Produces multiple design options based on specific constraints	Accelerating creativity and innovation

Basic human skills for the integration process:

- Selecting ideas that carry a unique and innovative character based on the student's creative vision, and the process of excluding incompatible ideas.
- Develop a design concept that carries a personal identity and goes beyond stereotypical suggestions of artificial intelligence.

- Reformulate ideas in a way that reflects the emotional and cultural understanding of the human side.

4. Prototype – transforming ideas into concrete models

Table 4 Prototype

Process step	Traditional way	AI-enhanced method
Prototype	Several hours to days	Minutes to hours
Iteration	days	Hours
Comment integration	Weeks	days

Basic human skills for the integration process:

- Add creative touches and fine details that reflect the designer's thinking and visual experience.
- Improving the visual composition and aesthetic elements that depend on personal taste and artistic sense.
- Ensure that the design expresses a clear message and not just machine-generated outputs without a specific goal.

5. Test – Design Evaluation and Improvement

Table 5 Test

Test side	Traditional approach	AI-enhanced approach
Predict user behavior	Limited by sample size	Extensive and scalable
A/B Test	Sequential and time-consuming	Parallel and efficient
Data Analysis	Manual and error-prone	Automatic and accurate

Type of comments	AI analysis capability	Predictive task	interest
Survey responses	Sentiment analysis	User adoption rates	Estimating Market Response
User interaction data	Recognize behavioral patterns	Solution longevity	Product Life Assessment
Social Media Comments	Discover trends and aggregate responses	Points of error and failure	Preventive improvement measures

Balancing AI and Human Creativity

Although AI can enhance the design thinking process by dealing with repetitive tasks and analyzing data at scale, it is critical to maintain a balance with human creativity, AI excels in efficiency, but it does not possess the inherent human ability to think abstractly or understand emotional nuances, and from the following table the points of complementarity between them are clear:

Table 6 Balancing AI and Human Creativity

Comparison	Human Creativity	AI Efficiency
nature	Abstract and intuitive	Logical and data-driven
Strengths	Empathy and emotional intelligence	Speed and accuracy in data processing
vulnerabilities	Prone to biases and slow processing	Lack of understanding of human experiences

To capitalize on their respective strengths, it is important to create a collaborative environment where AI tools enhance human capabilities, for example, while AI can propose patterns and solutions based on data, human designers are required to interpret these suggestions and understand their real-world implications.

A strategy to apply the integration of artificial intelligence in design education curricula (NEUMEIER, 2003)

A curriculum to teach visual identity design for brands using artificial intelligence while maintaining creative skills (Alina Wheeler, 2024)

General Objective:

Provide design students with the knowledge and skills to create distinctive visual identities for brands using artificial intelligence tools while maintaining and developing their creative abilities.

Target group:

Advanced Design Students (Bachelor's or Master's)

Duration of study:

Full semester (16 weeks)

Curriculum Content:

Week 1-2: Introduction to Branding and Visual Identity

1. **Basic concepts:** brand definition, importance of visual identity, visual identity elements (logo, colors, fonts, images, icons, etc.)
2. **Brand Analysis:** Study and analyze successful brands, identify elements of distinctive visual identity, understand the target audience.
3. **Workshop:** Visual identity analysis of a local brand, identification of strengths and weaknesses.

Week 3-4: AI in Design

1. **Introduction to Artificial Intelligence:** Definition of Artificial Intelligence, its types, and applications in design.
2. **AI tools for design:** review the available tools, explain how they work, and their applications in visual identity design (such as generating ideas, designing logos, choosing colors and fonts, creating images).
3. **Workshop:** Try some AI tools to generate ideas and design simple visual elements.

Week 5-6: Visual Identity Design Process

1. **Stages of visual identity design:** identifying the target audience, defining brand values, creating a brand vision and mission, and designing visual identity elements.
2. **The role of AI at each stage:** Use AI tools at every stage of design, with a focus on how they can improve and accelerate the design process.
3. **Workshop:** Applying the stages of visual identity design to a virtual brand, using artificial intelligence tools at each stage.

Week 7-8: Logo Design with AI



1. **Basics of logo design:** types of logos, principles of good logo design, the importance of logo in visual identity.
2. **Using AI to design a logo:** Review AI tools for logo design, explain how they can be used to generate ideas, create different designs, and choose the best among them.
3. **Workshop:** Designing a logo for a virtual brand using artificial intelligence tools, with a focus on creativity and innovation in design.

Week 9-10: Choose colors and fonts using AI

1. **Color theory:** color characteristics, their psychological impact, how to choose the right colors for the brand.
2. **Fontology:** types of fonts, their characteristics, how to choose the right fonts for the brand.
3. **Using AI to choose colors and fonts:** Review AI tools that help choose the right colors and fonts, and explain how they can be used to analyze the brand and target audience.
4. **Workshop:** Choosing the right colors and fonts for a virtual brand using artificial intelligence tools, taking into account the values of the brand and the target audience.

Week 11-12: Design other visual identity elements using AI

1. **Image and icon design:** Use artificial intelligence tools to create distinctive images and icons for the brand, using creative code.
2. **Design marketing materials:** Using artificial intelligence tools to design various marketing materials (such as brochures, posters, advertisements, brand presentation on different product models, creating photo sessions by choosing the angle of lighting and the shot shot).
3. **Workshop:** Design other visual identity elements (images, icons, marketing materials) for a virtual brand using artificial intelligence tools.

Week 13-14: Building a visual identity guide

1. **The importance of visual identity proof:** standardize the use of visual identity elements, ensuring consistency in all marketing materials.
2. **Visual identity guide content:** logo, colors, fonts, images, icons, and rules for using visual identity elements.
3. **Workshop:** Create a comprehensive visual identity guide for a virtual brand, using the right tools.

Week 15-16: Project Presentation and Evaluation

1. **Student presentation of their projects:** Students present their projects (designing a complete visual identity for a virtual brand).
2. **Project Evaluation:** Evaluation of projects by a jury (composed of design professors and experts in the field of branding).
3. **Provide feedback:** Provide feedback to students to improve their projects and develop their skills.

Study plan: when to use artificial intelligence and when to use creative skills

Table 7 Study plan: When to use AI and when to use creative skills

Stage	Tasks	Artificial Intelligence	Human creative skills
Brand Analysis	Competitor analysis, target audience identification	Data Analysis, Idea Generation	Critical thinking, strategic analysis
Logo Design	Generate ideas, create different designs	Idea proposals, creating preliminary designs	Creativity, Innovation, Design Thinking
Choice of colors and fonts	Suggest appropriate colors and fonts	Brand analysis, suggestion of colors and fonts	Artistic taste, knowledge of color science and fonts
Design other visual identity elements	Create images and icons, design marketing materials	Create preliminary designs, propose ideas for presentation	Creativity, Innovation, Design Thinking
Building a visual identity guide	Unify the use of visual identity elements	Organize information, create templates	Precision, organization, attention to detail

Evaluation of outcomes and curriculum outcomes:

- To get a sound assessment, professors should focus on evaluating the creative process that students follow, rather than focusing only on the final product, this is done by following the stages of project development, providing continuous feedback to students, and assessing their ability to think critically, solve problems, and make design decisions..

A detailed proposal for evaluating students and designs in the curriculum "Designing Visual Identity for Brands Using Artificial Intelligence while Maintaining Creative Skills"

First: General Evaluation Methodology

The evaluation is based on a balanced approach between technical capabilities in the use of artificial intelligence and creative capabilities in developing an integrated visual identity, so the evaluation process is carried out through:

- Continuous assessment (40%)** – includes activities, assignments and workshops.
- Final project (50%)** – designing an integrated visual identity for a virtual brand.
- Self-assessment and group evaluation (10%)** – based on constructive criticism and classroom discussions.

Second: Evaluation criteria for each stage of the curriculum

1. Brand analysis (10%)

Target Skills:

- Ability to analyze an existing visual identity.
- Ability to extract core values and target audience.
- The ability to benefit from the available data, analyze it, and derive from it.
- The use of artificial intelligence in data analysis and comparison between brands.

Evaluation methods:

Submit an analytical report (written or presentation).

Use an artificial intelligence tool to analyze visual identity and discuss results.

Evaluation according to criteria (accuracy of analysis, understanding of the target audience, effective use of technical tools)

2. Logo design (20%)

Required Skills:

1. Generate creative ideas using artificial intelligence.
2. Develop manual initial ideas (sketching).
3. Improving the design according to art criticism.
1. Designer leadership skills and AI management as a team

Evaluation methods:

Provide 3-5 initial logo ideas, using AI tools and hand-design.

Submit the final logo with justifications for the design choices.

Evaluation according to criteria (originality and creativity, balance between smart technologies and human creativity, application of design principles, clarity of the idea and its visual vision).

3. Choice of colors and fonts (15%)

Required Skills:

1. Understand the impact of colors and fonts on visual identity.
2. Using artificial intelligence to suggest and analyze colors and fonts.
3. Achieve visual consistency that reflects the brand's personality.
4. Realize the designer's vision and the ability to build his own style.

Evaluation methods:

Provide a suggested color palette and fonts with justifications for selection.

A comparison between student selection and AI tool choices.

Evaluation according to the criteria: (harmony between colors and fonts, proportion with brand identity, creativity, and excellence).

4. Design of visual identity elements (15%)

Required Skills:

1. Design of integrated icons, images, marketing materials.
2. Use AI tools to create designs with manual adjustment.
3. Apply appropriate design principles for each element.

Evaluation methods:

Provide integrated designs that include icons, images and marketing elements.

Evaluation according to the criteria: (visual consistency with identity, quality of artistic implementation, extent of creativity and innovation).

5. Building a visual identity guide (15%)

Required Skills:

1. Organize and coordinate information consistently.
2. Use artificial intelligence to create templates and analyze.
3. Provide a comprehensive guide containing all elements of visual identity.

Evaluation Methods:

Provide a visual identity guide in integrated PDF format.

Make a presentation explaining the guide.

Evaluation according to criteria: (clarity of directives and standards, visual consistency between elements, professionalism in presentation and organization, persuasion skills, and style of leading the creative process).

6. Final Project (50%)

Required Skills:

1. Apply all the skills acquired during the semester.
2. Design an integrated visual identity for a virtual brand.
3. Strike a balance between the use of artificial intelligence and personal creativity.

Evaluation methods:

Presenting an integrated project that includes all elements of visual identity.

Presentation in front of a jury of design professors and brand experts.

Evaluation according to the criteria of: (integration of all elements of visual identity, achieving visual consistency and innovation, good use of artificial intelligence to support the creative process, quality of presentation, and clarity of ideas, taking into account the values of the brand and the target audience, the extent of the appearance of the designer's personality and personal identity).

Third: Self-evaluation and group evaluation (10%)

Assessment Methods:

Provide a critical report on the student's experience in using artificial intelligence in design.

Participate in group criticism sessions to exchange constructive views and comments.

Evaluation according to the criteria of: (the ability to analyze and critique the artwork, the quality of interaction, and participation in group discussions).

Fourth: Assessment Tools Used

Project files – All designs are delivered in a digital file containing all outputs.

Presentations – Students present their projects in front of a jury.

Analysis and documentation reports – Student reports that justify their design decisions are evaluated.

Self-assessment questionnaires – Each student assesses their experience with AI and traditional design.

This assessment aims to :

1. Strike a balance between the use of artificial intelligence and students' creative abilities.
2. Focus on developing their critical and analytical skills.
3. Ensure the graduation of designers capable of adapting to the latest technologies while maintaining the original creative dimension in design.

Results:

1. The study found that students who integrate AI into design projects generate more diverse ideas than those who do not, highlighting AI's role in expanding creativity and accelerating idea generation.

2. The study also pointed to a possible downside: students who rely heavily on AI during the design process without academic guidance **may have lower** critical thinking skills compared to those who used AI in moderation, showing that AI can be an aid to creativity, but overreliance on it may hinder the development of students' independent analysis skills.
3. Students who use AI as a supportive tool, rather than a primary driver, achieve the best balance between creativity and critical thinking. This underscores the need for educational strategies that integrate AI while fostering intellectual independence.
4. The results generally emphasize the potential of AI as a revolutionary tool in design education, as it can enrich students' creative processes and enhance critical assessment skills when combined with thoughtful educational practices, indicating a promising path to develop educational curricula that leverage AI to foster innovation and critical thinking in design students.
5. The study found that the designer's role has evolved from problem-solving to leadership in creativity. Results highlight the need for students to develop leadership skills in AI use, enabling them to direct AI tools consciously and creatively, ensuring they lead the creative process rather than AI.

Research recommendations:

1. AI should be integrated into design education as a supportive tool, enhancing rather than replacing creativity. Curricula must teach critical AI use, fostering innovation while maintaining independent creative and critical thinking.
2. Educational institutions should offer ongoing AI training for students and faculty, covering technical skills, ethics, and critical thinking. Mentorship programs can help balance AI-driven creativity with human intuition, fostering well-rounded designers.
3. Academic institutions should partner with design firms and AI developers to offer hands-on experiences. Joint projects help students apply AI in real-world scenarios, enhancing problem-solving skills and understanding technology's role in design innovation.
4. Regular assessments should be conducted to evaluate AI's impact on students' creativity and critical thinking, ensuring curricula remain aligned with technological advancements and effectively support balanced creative development.
5. Classroom discussions on AI's ethical, creative, and technical aspects enhance students' critical engagement, fostering analysis of its impact on creativity. This helps them develop an integrated vision and make informed design decisions.
6. Integrating theoretical learning with practical application through graduation projects that require students to utilize AI in idea generation while independently refining their concepts. This ensures a balance between self-innovation and technological support, fostering critical thinking and creative originality.



References

1. Abdullahi Yusuf, N. P.-G. (2024). Generative AI and the future of higher education: a threat to academic integrity or reformation? Evidence from multicultural perspectives. *International Journal of Educational Technology in Higher Education*, Springer.
2. Ahmed Elgammal, B. L. (2017, June 23). CAN: Creative Adversarial Networks, Generating "Art" by Learning About Styles and Deviating from Style Norms. *the eighth International Conference on Computational Creativity (ICCC)*.
3. Alina Wheeler, R. M. (2024). *Designing brand identity: A comprehensive guide to the world of brands and branding*. Canada: John Wiley & Sons.
4. Bahakim, P. T. (2024, 11 13- 11:05). Dean of the Faculty of Art and Design, MSA University, Egypt. (A. a. challenges, Interviewer)
5. BULUT, Ş. (2024, 11 20- 12:40:40). Assist. Prof. PhD, Sivas Cumhuriyet University, Türkiye. (T. i. thinking., Interviewer)
6. Dan Sun, A. B. (2024, February 22). Would ChatGPT-facilitated programming mode impact college students' programming behaviors, performances, and perceptions? An empirical study. *International Journal of Educational Technology in Higher Education* 21.
7. Devishhev, I. (2024 , 12 16- 13:11:57). Honored Artist of the Russian Federation. Docent, Sochi State University, Russia. (O. a. development, Interviewer)
8. Díaz, J. G. (2024, 11 20- 5:50:26). Master in science and arts for design, Technological University of Durango, México. (A. a. challenges., Interviewer)
9. Fedawy, H. (2024, 11 12-8:53). Professor of Design, Faculty of Fine Arts, Alexandria University, Egypt. (F. v. design, Interviewer)
10. Gjorgji Strezoski, M. W. (2017, August). OmniArt: Multi-task Deep Learning for Artistic Data Analysis. *ResearchGate*, pp. file:///C:/Users/hasan/Downloads/OmniArt_Multi-task_Deep_Learning_for_Artistic_Data.pdf.
11. Hsiu-Mei Huang, U. R.-S. (2010, November). Investigating learners' attitudes toward virtual reality learning environments: Based on a constructivist approach. *Computers & Education ,Volume 55, Issue 3*, pp. Pages 1171-1182.
12. Idelbi, Y. (2024, September 24). Artificial Intelligence Role in Advancing the Design Education Process. *Research Square*.
13. Manjarrez, C. G. (2024 , 11 25- 8:58:35). CG Design Director, Professor at Creative Studies Faculty, Universidad Anáhuac. Campus Querétaro , México. (A. b. intelligence, Interviewer)
14. Miura, H. (2024, 11 20- 7:49:47). Visiting Associate Professor ,Daido University, Japan. (T. i. thinking, Interviewer)
15. Myung, K.-s. (2024 , 11 26- 13:04:59). Emeritus Professor , Konkuk University , South Korea . (F. v. design, Interviewer)
16. Najmuldeen, R. S. (2024, 11 19, 16:59:26). University of Baghdad, Iraq. (A. b. intelligence, Interviewer)
17. NEUMEIER, M. (2003). *HOW TO BRIDGE THE DISTANCE BETWEEN BUSINESS STRATEGY AND DESIGN*. New York, United States: THE AMERICAN INSTITUTE OF GRAPHIC ARTS.
18. Roberto Verganti, L. V. (2020). Design in the Age of Artificial Intelligence. *Harvard Business School*, pp. 1-36.
19. Salah, E. (2024, 12 21- 23:33:01). Doctor at the Higher Institute of Applied Art, Helwan University, EGYPT. (A. a. challenges, Interviewer)
20. Saleem, M. (2024, 11 20- 14:03:25). Lecturer, SABS University of Art, Design and Heritages Jamshoro, Pakistan. (F. v. design, Interviewer)
21. Shulman, K. (November 16, 2023). The Creative Future of Generative AI. *MIT panel charts how art and design will be impacted by Artificial Intelligence*. Bartos Theater: Massachusetts Institute of Technology.



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22. Tołłoczko, Z. (2024, 11 20-2:03). Professor of Art Criticism, University of Karakow, Poland. (A. b. intelligence, Interviewer)
 23. UNESCO. (2022). *Recommendation on the Ethics of Artificial Intelligence*. the United Nations Educational, Scientific and Cultural Organization, .
 24. Ung, N. U. (2024, 11 19- 17:34:41). Head of Visual Communication Design Program ,Binus University Semarang Campus, Indonesia. (F. v. design, Interviewer)
 25. Yıldırım, E. (2022, December). *Art and Architecture: Theory, Practice and Experience,Chapter: 8 -Text-to-Image Generation A.I. in Architecture,(pp.97-120) Edition: 1*. Lyon, France: Livre de Lyon.
 26. Ziv Epstein, A. H. (2023, Jun 7). Art and the science of generative AI: A deeper dive. *Cornell university, Computer Science - Artificial Intelligence,Vol 380, Issue 6650*, pp. pp. 1110-1111.