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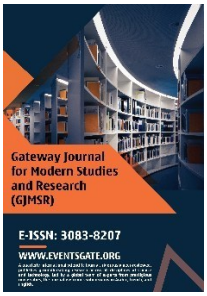

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The Role of AI Technology in Enhancing Student Engagement in Design Studios

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Abstract: AI technology enhances student engagement and communication in art design studios. It provides opportunities for participation, improved academic performance, and increased creativity. Instructors can use interactive learning activities like digital platforms, notebooks, whiteboards, audio files, podcasts, and surveys to enhance collaboration and develop essential skills. Strategies for engaging students include active learning, connecting it to real-world situations, using technology, conducting group activities, creating a positive learning environment, using FAQs, brainstorming, and creating classroom games, visualizations, workshops, exercises, projects, co-curricular activities, competitions, and problem-based learning activities. The research explores how AI can personalize learning experiences and enhance interactive learning through various tools. The study is based on a descriptive-analytical approach, collecting and analyzing data on student engagement in design studios and using different methods and methodologies. Therefore, the study concluded that AI technology has the potential to enhance student engagement and communication, allowing instructors to focus on interacting with students and facilitating discussions. Instructors in the art and design environment should integrate interactive elements into design studios to work with students, especially in design projects and activities.

Keywords: Student Engagement, AI Technology, Learning Environment, Digital Transformation, Design Studios.

1. Introduction

Student engagement refers to attitudes, interpersonal relationships, and dispositions toward learning that involve connection, participation, and academic performance. Engaged students believe their education is relevant to their future and are more willing to learn throughout their life cycle. The study explores the use of AI technology in enhancing student engagement and communication in design studios, highlighting its potential for improved academic performance and persistence. Instructors in design studios can use interactive learning activities that enable interaction with technology to increase student engagement. Integrating AI technology into the learning environment enhances interaction, which deals with the student's participation in discussion activities

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and projects. AI tools and instructors can always be activated and available to provide an environment for on-demand student interaction, which is more convenient than traditional classrooms (Bonde & Science, 2024). AI in education revolutionizes teaching and learning by personalizing experiences, redefining teaching practices, providing real-time feedback, and empowering instructors with advanced tools. This technology addresses gaps in design, architecture, and arts education systems, and generative AI fosters creativity and innovation by creating interactive content tailored to each student's needs (Srivastava, 2024). Student engagement manifests through a feeling of connection and participation in university activities (Questionpro, 2024) (Bernstein, 2022).

AI is revolutionizing the design industry by enabling more creative tasks and reducing repetitive ones in studio design. It equips students with the skills to navigate the intersection of AI and design. AI tools in design reduce repetitive work and allow students to focus on creativity (May, 2023).

AI technology can significantly improve student engagement and communication in design studios. Using AI tools, students can receive personalized learning experiences, real-time feedback, and better instructor communication. This can help address challenges such as balancing theory and practice in the design field and limiting individual attention for each student. The research aims to expand knowledge, solve problems in interior design education, and develop different fields of study. The study assumes AI's potential in university design studios and highlights its impact on design education and student experiences. The instructors should integrate interactive elements into design projects and activities to enhance student engagement and communication. The study combines the strategies for engaging students, including active learning, connecting it to real-world situations, technology, group activities, creating a positive environment, brainstorming, and creating classroom games, visualizations, workshops, exercises, projects, co-curricular activities, competitions, and problem-based learning activities that will enhance students' engagement.

2. Research Problem

AI technology can significantly enhance student engagement and communication in design studios. Using AI tools, design studios can provide personalized learning experiences, real-time feedback, and better communication between students and instructors. The possibilities for AI-powered virtual assistants and customized learning platforms are vast, demonstrating the potential of AI in enhancing student engagement and communication in design studios. The research problem in the challenges of design education in the fields of art and interior design in the classroom:

- **Balancing theory and practice in the design field.**
- **Limited time for individual attention for each student.**

A one-size-fits-all curriculum does not cater to individual learning styles and pace, leading to frustration and disinterest in some students. Theoretical concepts may seem abstract and irrelevant, lacking practical experience and practical relevance to real-world design scenarios.

3. Research Objectives

The research aims to expand knowledge, solve problems in the interior design education environment, especially in design studio environment for practical courses, and develop

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different fields of study. It also aims to integrate new design education methods with artificial intelligence technology instead of traditional education tools.

4. Research Significance

The study contributes to the role of design studios as a dynamic and enriching educational environment that fosters student collaboration, creativity, and critical thinking. This enhances the learning experience and helps develop interpersonal and problem-solving skills essential for success in design. This approach prepares students for careers and contributes to a positive learning environment. Therefore, this creative environment for generating concepts, sketching, and designing needs creative tools in the education environment for the student to foster their skills in designing with enhancing technology in the art and design curriculum.

5. Research Hypotheses

The study assumes AI's potential in university design studios and highlights its impact on design education and student experiences.

6. Research Methodology

The research is based on a descriptive-analytical approach, collecting and analyzing data on student engagement in design studios using different methods. This research examines the impact of AI technology, which has the potential to enhance student engagement and communication, allowing lecturers to focus on interacting with students and facilitating discussions. Instructors in the art and design environment should integrate interactive elements into design studios to work with students, especially in design and drawing projects.

This research employs a comprehensive approach combining multiple methodologies to capture the impact of artificial intelligence on fostering student engagement in the design studio. The study follows a comprehensive strategy that begins with analyzing student engagement to identify studio design needs and requirements in art and design. Then, it studies the concepts of technology and artificial intelligence used to enhance student engagement in the classes. The method used in this paper is qualitative and exploratory design. The qualitative method is an approach to exploring and understanding artificial intelligence technology. The data was collected through direct observations of design requirements for interior design studios. Direct observations are also conducted to determine which artificial intelligence can be applied to students participating in the classes.

As a first step, the literature was reviewed on the benefits and importance of integrating artificial intelligence and student engagement into the educational environment, mainly interior design. After that, previous case studies and projects on traditional and advanced tools and technological tools in the design classroom were studied. Finally, the results of the analysis of AI technology can improve student engagement and communication, enabling instructors to focus on facilitating discussions. It can be integrated into design studios, reducing manual effort and increasing accessibility.

7. A Theoretical Framework for Research

7.1 Limitations of Traditional Design Studios

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Limited resources and time constraints may constrain the iterative design process, hindering students' exploration of multiple design solutions. Students receive feedback primarily from instructors, which hinders their ability to learn from instructors and explore diverse perspectives. Traditional design studios often rely on lectures and individual critiques, hindering student engagement and active learning. Balancing principal duties, projects, and personal life can be challenging due to limited resource access, difficulty generating innovative ideas, and the delicate feedback process (Figure 3).

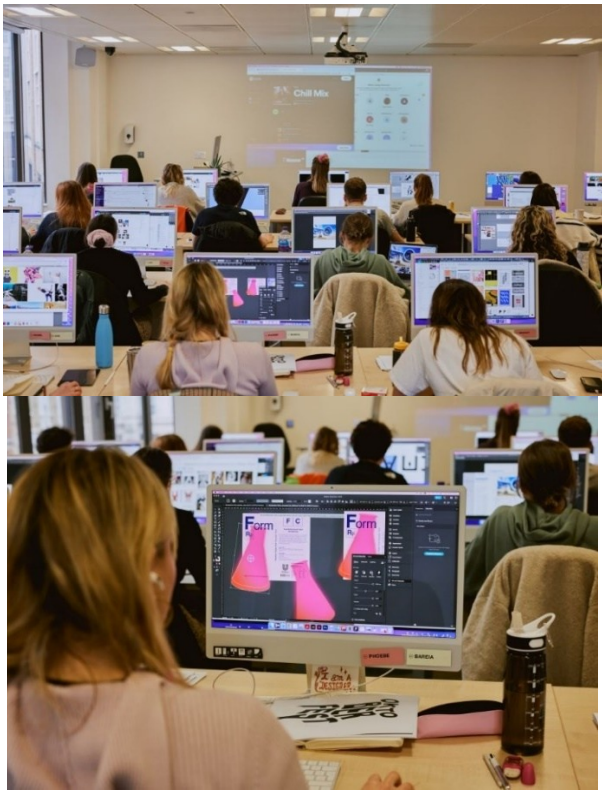

Figure 1,2. Illustrates the interaction between students and technology (May, 2023).

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Figure 3. Illustrates retail interior design projects that present traditional tools in design and presentation in conventional design studios (Author).

7.2 Student Engagement

The digital age has significantly impacted education, with educational technology crucial in maintaining student attention and achieving school goals. Instructors can adapt teaching methodologies and innovative learning activities using technology, such as classroom response systems. Identifying and replicating technology that engages students is essential for the learning process in design studios (Questionpro, 2024) (Bernstein, 2022).

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Figure 4,5. Illustrates retail design projects at Bader University, Applied Art College, Cairo, Egypt (Author).

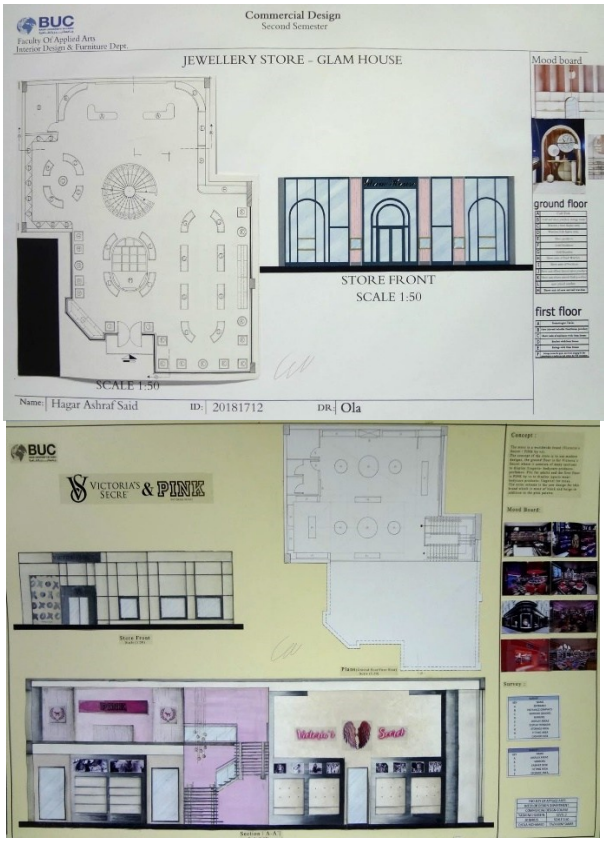

Figure 6,7. Illustrates the basic process of design through students' projects (Author).

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7.2.1 Boosting Student Engagement

AI in education revolutionizes learning and teaching methods, enhancing student engagement with learning materials and redefining how students learn and instructors teach (Srivastava, 2024).

7.2.2 Methods to Increase Student Engagement

Engaging students in learning involves active learning, real-world situations, technology, feedback, collaboration, group activities, and a positive learning environment. Strategies include building positive teacher-student relationships, creating personalized environments, meaningful pre-work, democratizing the classroom, and conducting friendly competitions. Maintaining student attention is crucial for academic performance and achieving university goals. Educational technology, which provides information and communication resources, processes, and tools, has revolutionized education and is essential for enhancing its value (Questionpro, 2024) (Bernstein, 2022).

7.2.3 The Student's Benefits of Engagement

Student engagement solves demotivation and low performance, and instructors can enhance it by implementing measures and tools tailored to students' needs(Questionpro, 2024) (Bernstein, 2022). Instructors' tools depend on their objectives through a particular activity, teaching style, and student characteristics.

7.2.4 The Importance of Student Engagement

Higher education institutions must prepare students for 21st-century industries impacted by AI, ensuring critical engagement with industry practices and keeping instructors informed about AI's theory, pedagogy, and practical applications (Lee et al., 2024).

7.3 Student Engagement in Design Studios

Engaged students are more likely to receive personalized attention and feedback tailored to their needs and interests. Engagement facilitates stronger connections between students, faculty, and the program, creating a supportive learning community. It also aims to discover engaging techniques that inspire creativity, critical thinking, and a deeper appreciation for design principles in the design studio environment.

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Figure 8,9. Illustrates the design studio environment at MSA University, Faculty of Arts and Design, Interior Design Department, Cairo, Egypt.

7.3.1 Incorporating Active Learning Strategies in Design Studios

The students practice many design projects in the design studio, from drawing, sketching, drafting, designing, painting, gratinating concepts, discussion, presentations, and brainstorming with instructors. Therefore, these activities enhance active learning strategies and foster student engagement.

A. Group Discussions	B. Hands-on Activities	C. Student Presentations
Facilitating small group discussions encourages students to actively engage with the material and share their perspectives.	**The integration of design projects and practical exercises allows students to apply their knowledge and enhance their practical skills.**	**Engaging students in class presentations and work can significantly enhance their public speaking and critical thinking skills.**

Figure 10. Illustrates some of the active learning strategies in design studios.

7.3.2 Encouraging Collaborative Projects

Instructors can encourage students to work on design projects, promoting collaboration, communication, and problem-solving skills. They can also involve diverse students from different backgrounds, cultures, and styles, encourage knowledge sharing, and provide platforms for student showcases and their concepts.

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7.3.3 Hands-on Learning Experiences

Instructors can foster an inclusive learning environment by addressing barriers, providing creative assistance, academic support, workshops, projects, exercises, training, Model Making, mock-ups, prototyping, and utilizing learning tools, all influenced by the digital age.

A. Model Making	B. Sketching Workshops	C. Mock-ups and Prototyping
Students engage in hands-on activities like creating scale models to enhance their understanding of spatial design and foster creativity.	Interactive drawing sessions enable students to enhance their technical drawing skills and explore various styles and techniques.	Students gain hands-on experience by creating prototypes and physical models, which help them translate their designs into tangible objects.

Figure 11. Illustrates hands-on learning Experiences in design studios (Modelmakers, 2024) (Just-sketch., 2024) (Dienamics, 2022).

7.3.4 Creative Tasks in Design Curriculum for Enhancing Student Engagement

Instructors identified creative tasks like designing, drawing, and painting to enhance students' skills in idea generation, connection-making, communication, and evaluation of innovative outcomes (Kim, Lee, Cho, & Technologies, 2022). The study is based on how AI technology is applied in creativity and design education to improve design vision, teaching methods, and students' productivity. The study aims to integrate new design education methods with AI technology instead of traditional design education.

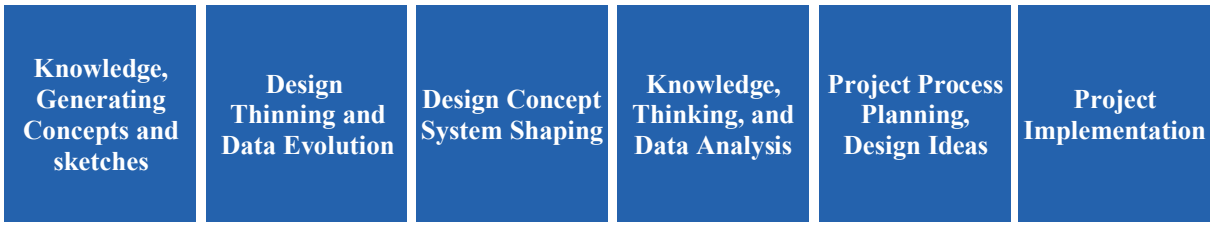

Figure 12. Illustrates design project process in the interior design field (Tang, Li, & Tang, 2022).

7.4 Technology in the Design Studio for Student Engagement

Technology in design studios can promote collaboration, develop essential skills, and reduce distractions. In addition, instructors must adapt to incorporate technology effectively to engage students and maintain a balance between academic and professional processes (Questionpro, 2024) (Bernstein, 2022) .Learning tools like techniques or study

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plans allow students to develop and perform better. The field of design plays a vital role in the industry and the market, and its primary goal is to communicate a specific message by applying creative ideas. Technological developments and the design process continue to be noticeable as artificial intelligence applications inevitably enter the design industry, providing students with new tools and opportunities.

Over the years, artificial intelligence has seen significant development in its application. Artificial intelligence in design has begun; its potential dominance in creative work and its impact on art and design. On the other hand, the demand for innovation in the creative economy has led to adopting design thinking and methodologies in various fields. Moreover, artificial intelligence has become a powerful tool that has significantly changed the methods of learning in design in the current era (Gallardo, León, Arias, & Jimenez).

7.4.1 Creating Smart Content and Digital Lessons in Design Studio

The design studio for student engagement has many technological tools and strategies. AI-infused education utilizes games, personalized software, and other features to enhance learning, requiring designers to stay updated with the latest developments to stay competitive (Mortazavi, 2023). Currently, classrooms have various technological tools, including innovative content and digital lessons in the design studio.

Figure 13. Illustrates innovative content and digital lessons in the design studio.

Engaged students view their education in the design field as relevant to their future and are willing to learn and contribute to their well-being. Engagement is crucial for academic performance, persistence, and permanence in the educational process (Questionpro, 2024) (Bernstein, 2022).

7.4.2 Incorporating Technological Tools in the Classroom

Instructors should actively engage students in the learning process through interactive elements like interactive polls. This can significantly improve performance and make working with students more enjoyable. Proper organization and tools are essential for maintaining class quality and fostering appropriate learning systems. Without these tools, students may experience a hostile class environment and poor classroom experience.

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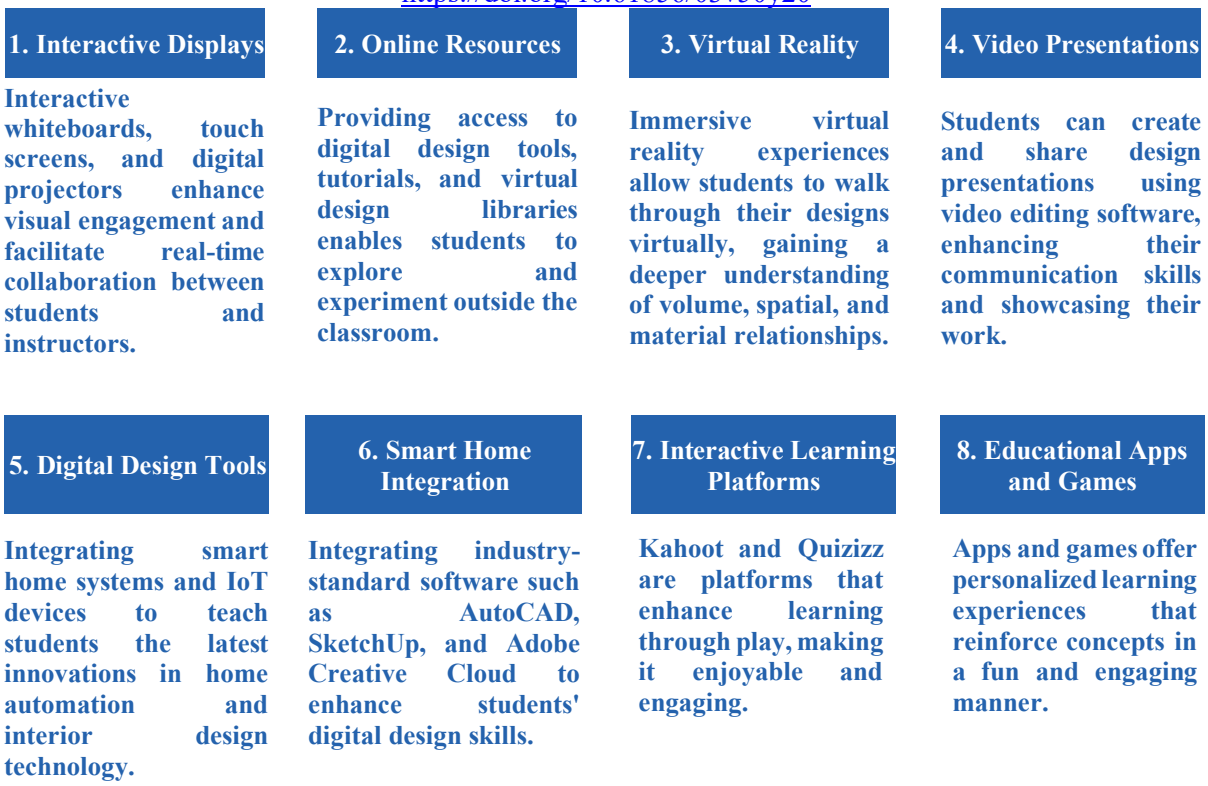

Figure 14. Illustrates the use of technological tools in the design classroom.

7.5 Artificial Intelligence in Education and Student Engagement

Artificial intelligence is a computer system capable of performing tasks like thinking, understanding languages, problem-solving, diagnosing medical conditions, driving cars, playing chess, and painting impressionistic paintings (Ilkka, 2018). Students can adapt to knowledge in the design studio by working on their projects. The traditional learning system needs personalized learning for each unique student (Srivastava, 2024).

Students must know and understand how to use these tools from the beginning of their design careers and assignments. As the practice of art and design changes, education is also expected to adapt, increasing the demand for its general skills and knowledge bases more than the design career paths of previous years. This will enhance the adaptation of curricula to emerging technological tools, including AI.

7.5.1 Integrating AI with Design Pedagogy

AI is essential in preparing a sustainable education system in a world increasingly driven by technology and AI. The successful integration of AI into educational practices requires adequate training that allows instructors to understand the basic concepts of AI, become familiar with relevant tools and applications, and develop the skills needed to use it effectively in the educational environment (Gallardo et. al).

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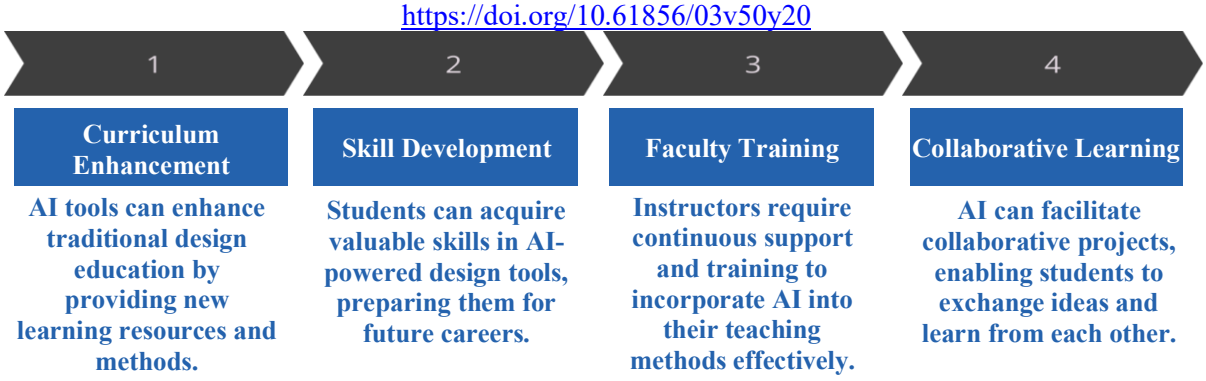

Figure 15. Illustrates integrating AI with design pedagogy.

7.5.2 Integrating AI into the Curriculum of Design

This practical teaching is essential for instructors to be competent and for students to understand and use AI effectively in the classroom. The growing importance of AI in learning is highlighted, demonstrating its effectiveness in improving tasks and generating creative solutions, which benefits design professionals and students. Regarding the application of AI in design education, the study plan within its curriculum framework must be adapted to reflect AI's creative potential (Gallardo et. al).

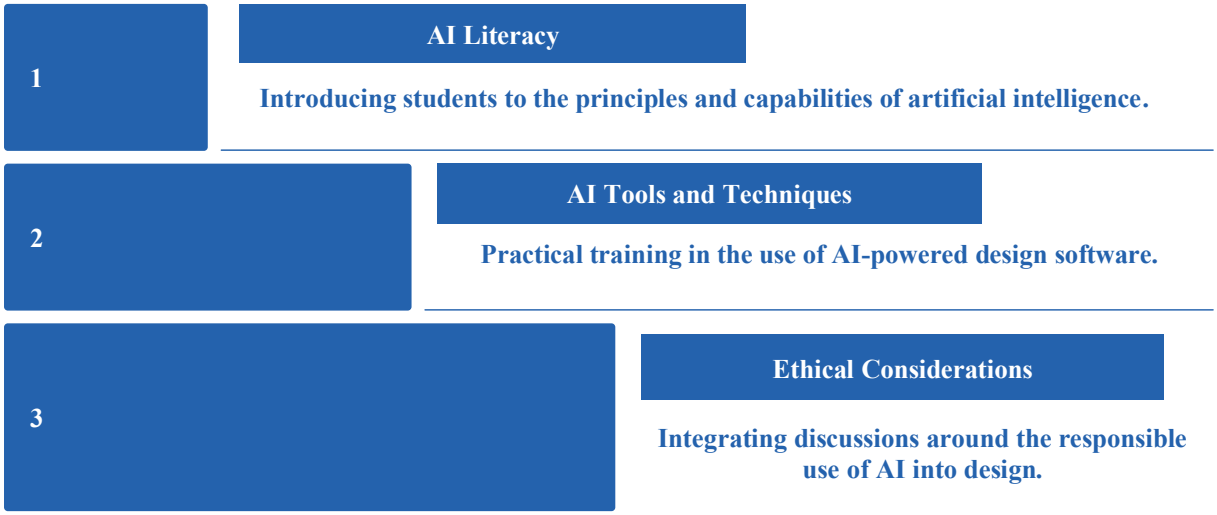

Figure 16. Illustrates Integrating AI into the design curriculum.

7.5.3 Leveraging AI to Foster Student Engagement

AI can empower students to take ownership of their learning, enhancing the design studio experience to be more engaging and interactive. By integrating AI tools, instructors can personalize learning paths, provide real-time feedback, generate creative solutions, and unlock new levels of student engagement. AI is a valuable tool for creating an immersive learning environment. It helps students engage with course material more effectively, improving grades and overall satisfaction with their education. AI enables universities to give students increased access to the resources they need to succeed (Xevensolutions, 2023).

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A. Design Exploration

AI tools can analyze design trends, generate design concepts, and provide inspiration for brainstorming.

B. Concept Generation

AI algorithms can generate different variations of design elements and suggest combinations based on user input.

Figure 17. Illustrates AI tools in generating design concepts (Vecteezy, 2024).

7.6 AI Technology for Communication in Design Studios

AI-powered collaboration platforms aim to improve student engagement by offering personalized recommendations, facilitating group discussions, providing automated feedback, and enabling interactive learning experiences (Kamalov, Santandreu Calonge, & Gurrib, 2023). Speech recognition and language processing tools are essential in design studios for effective communication. These tools enable seamless interaction and collaboration among team members, allowing for more explicit expressions of ideas and efficient feedback exchange. Utilizing these technologies lets design professionals streamline their workflow and ensure their creative vision is communicated and understood. AI technology can significantly improve student engagement and communication in design studios. It can create personalized learning experiences, facilitate communication between students and professors, and provide valuable feedback on design projects. By leveraging AI, design studios can enhance student engagement, foster collaboration, and improve the learning experience for everyone involved. Overall, AI can significantly impact student engagement and communication in design studios. AI can analyze and optimize designs based on various criteria, such as material use, strength, and aesthetics. For example, the University of California, Berkeley, has integrated AI-powered design tools into its curriculum, allowing students to explore various design possibilities and receive personalized feedback. In addition, the Rhode Island School of Design has implemented an AI-powered tutoring system that provides students with customized support and guidance.

Global changes in education necessitate continuously enhancing educators' capabilities to deliver high-quality learning experiences, fostering student embracing technology, innovative teaching strategies, and diverse demands. The rapid advancement of technology has made AI a valuable resource within educational settings, requiring educators to prepare students for the increased use of AI tools. These tools have the potential to enhance productivity. Technology is at the heart of this educational transformation, making learning digital, personalized, and dynamic. While there are

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many practical approaches, some important ones to consider are (Wrench & Elmoudden, 2024):

- Instructors must be prepared to use digital tools to enrich the learning environment effectively. Instructors' awareness of their academic support system is vital to effectively harnessing digital tools and personalized learning.

- Technological tools will enhance student's communication and engagement, allowing students to achieve the required skills and competencies. Many tools to encourage engagement and increase interaction might include creating a virtual environment for live sessions, 3D learning tools to promote interactive visualization, implementing chatbots for AI-powered language learning, or creating AI-generated informative videos.

- There are endless possibilities, so instructors need to explore all your options to create an engaging environment. Instructors should encourage students to use AI and educate them about the potential ethical concerns that may lead to its inappropriate use. They must be prepared to share the correct way to use AI so that students can succeed. This can help students become responsible digital citizens who navigate the challenges and opportunities of the digital age (Wrench & Elmoudden, 2024).

7.6.1 AI-driven Feedback and Assessment Systems

AI can provide personalized feedback on student work, reducing bias and ensuring fairness by consistently providing objective assessments.

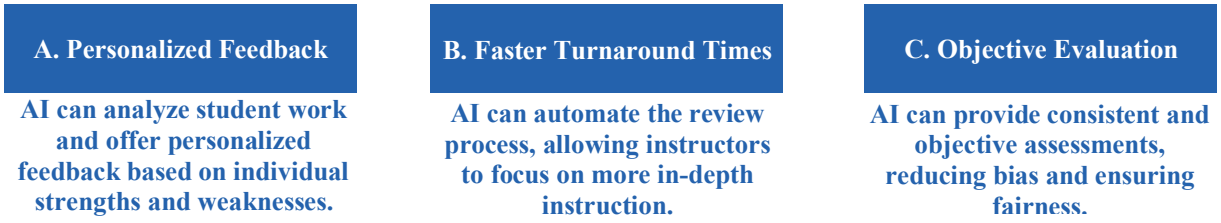

Figure 18. Illustrates AI-driven feedback and assessment systems.

7.6.2 Real-World Applications of AI Application in Design Studios

7.6.2.1 Education and Research

Instructors and researchers can develop interactive models to enhance learning and visually represent complex concepts. AI integration in 3D modeling is expected to improve realism, customize models based on user preferences, and integrate with other technologies like AR, VR, and 3D printing. Students should experiment with different inputs, use community resources, and start with the free AI 3D model generator to get started. Joining forums and discussions can also help students learn from each other (Maisie, 2024).

7.6.2.2 Student Projects Generated by AI

Traditional knowledge-based intelligent tutoring systems have struggled to create student models (Ilkka, 2018). AI has become ubiquitous in modern, advanced societies. It is a significant factor in marketing, design, and entertainment and is increasingly present in higher education (Lee et al., 2024).

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A. Exploration and Innovation

AI tools enable the creation of numerous design variations based on user input and constraints, thereby broadening the range of design possibilities beyond conventional methods.

B. Iterative Design

Students can quickly iterate design ideas, exploring different configurations and styles without drawing and hand rendering constraints.

Figure 19. Illustrates automated generation of design alternatives.

7.6.2.3 AI-Generated Design Inspirations and Project Management

AI tools streamline project management, facilitate collaboration, and provide real-time feedback, freeing design students to focus on creative problem-solving and ideation.

A. Personalized Recommendations

AI can analyze student preferences and provide personalized design suggestions.

B. Visual Exploration

AI-powered mood boards offer a comprehensive visual exploration of various design styles and concepts.

C. Creative Exploration

AI has the capability to generate creative ideas by suggesting unconventional color palettes and material combinations.

Figure 20. Illustrates AI-generated design Inspirations and Project Management.

7.6.2.4 Idea Generation and Brainstorming with AI

AI tools can assist in the design process's initial idea generation and brainstorming stages. They can generate a wide range of design concepts based on user input, helping to overcome creative barriers and explore new possibilities. Generative design algorithms can create innovative product designs that cater to specific functional needs and aesthetic preferences. Artificial Intelligence (AI) interior design software has seen a significant increase in use over the past two years, with homeowners undertaking DIY projects and interior designers noticing their proliferation in their working lives.

Interior designers are seeing the impact of AI on their profession and industry at large, with some predicting it could become an expected skill in interior design studios. However, the sector's downside is the loss of entry-level jobs, particularly for young designers. There are two types of AI interior design software: stable diffusion and generative AI.

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Figure 21,22 illustrates Midjourney's tropical vacation home interior, designed using AI-generated technology and AI App online software (Artedit, 2024).

AI interior design software is primarily used in the initial concept phase and design process (Artedit, 2024).

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Figures 23, 24. illustrates how artificial intelligence tools are revolutionizing interior design with AI App online software (Thenewblack, 2024).

7.6.2.5 Manufacturing and Prototyping

Students can expedite prototyping by converting 2D images into 3D models, reducing the market time (Maisie, 2024).

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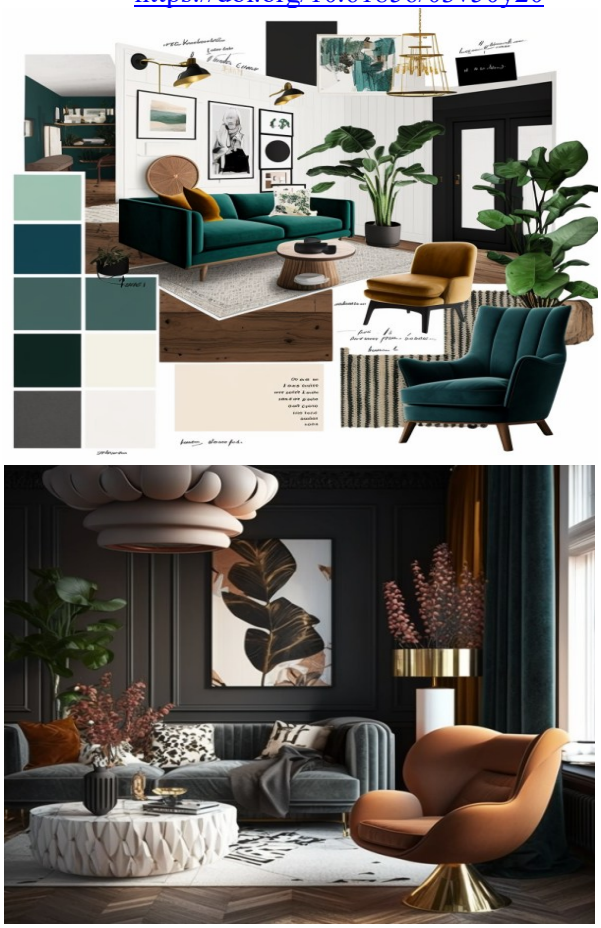

Figure 25,26. Illustrates designing with AI tools in interior design with AI App online software (Hommes, 2023).

7.6.2.6 Art and Design

AI-generated 3D art provides artists with novel creative possibilities, broadening the boundaries of digital creativity (Maisie, 2024).

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Figures 27,28. Illustrates that artificial intelligence tools are utilized in interior design to improve space optimization and create more efficient layouts through Coohom App design that uses AI tools (Hommes, 2023).

7.6.2.7 AI and Generative Design

Generative AI tools revolutionize education by creating human-like content, enhancing skills, and fostering creativity. Research explores their potential in higher education, transforming teaching methods and focusing on the learner (Wrench & Elmoudden, 2024).

Figure 29. Illustrates AI tools in design.

AI can improve learning experiences and practical assessment, presenting new

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challenges to traditional educational dynamics (Kamalov et. al, 2023).

Figure 30,31. Illustrates interior design with AI App online software (Designwanted, 2024).

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Figure 32,33. Illustrates the impressive interior design with AI App online software (Designwanted, 2024).

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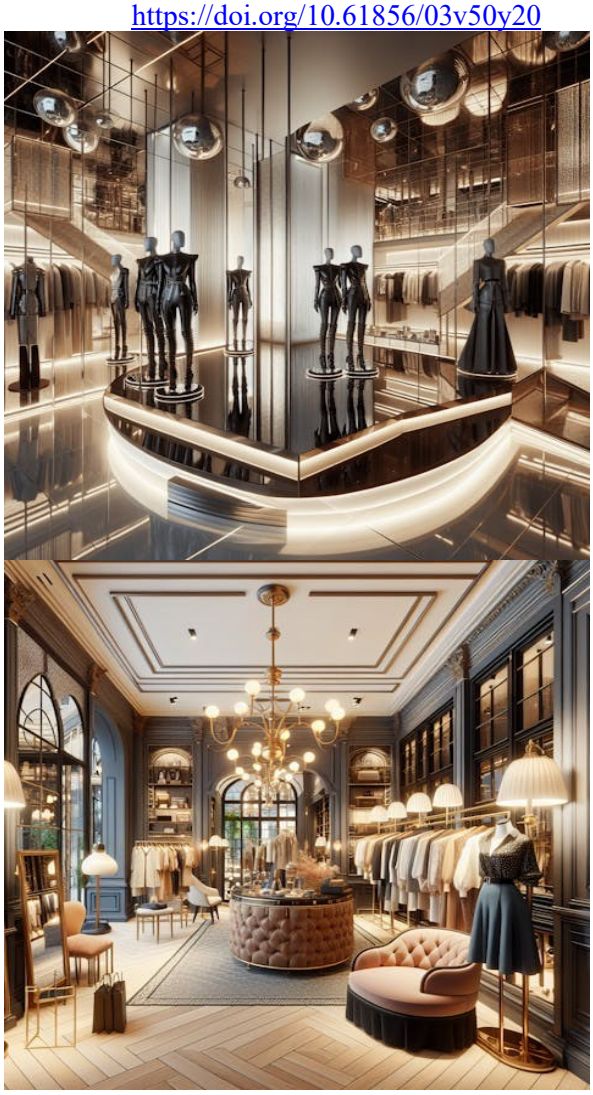

Figure 34,35. Illustrates retail interior design with AI App online software (Thenewblack, 2024).

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Figure 36. Illustrates the effect of artificial intelligence in interior design on creating dynamic spaces with AI App online software (Designwanted, 2024) (Hommes, 2023).

7.7 Augmented Intelligence in Curriculum of Interior Design

Augmented, Mixed, and Virtual Reality in education enhances learning experiences significantly (Cardona, Rodríguez, & Ishmael, 2023).

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Figures 37,38 illustrate interior design through AI tools to visualize interior spaces with AI App online software (Hommes, 2023).

AI enhances teaching art and design in the classroom and introduces new systems in research, technology development, and instructional design (Kamalov et al., 2023) (Heysia, 2024) (Chukwuere & Handoko, 2024) (ROSAK-SZYROCKA & Zarzadzanie, 2024). Technology can enhance student satisfaction and success but should not replace effective teaching and personal interaction (Pandita & Kiran, 2023).

7.7.1 Tools for Interactive and Adaptive Learning for Student Engagement

Interactive tools in interior design studios enhance student engagement by utilizing educational strategies to create active learning experiences and increase participation in their learning journey.

7.7.2 AI-powered design prototyping and simulation

A. Virtual Wind Tunnel

AI can simulate wind resistance and aerodynamic performance, optimizing vehicle design for fuel efficiency.

B. Structural Analysis

AI-powered simulations help engineers analyze building structures for strength and resilience under different loads.

C. VR/AR Prototyping

AI-powered virtual reality and augmented reality simulations allow designers to experience and test their creations in a realistic virtual environment.

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Figure 39. Illustrates -powered design prototyping and simulation tools.

7.7.3 Integrating Traditional Design Tools with AI in Interior Design

AI algorithms simplify 3D modeling by automating tasks, offering a vast library of materials, optimizing models for 3D printing, and promoting accessibility and engagement in online communities (Maisie, 2024) (Finch, 2024).

Table (1) AI 3D modeling techniques are a powerful tool for creating realistic 3D models.	
Text-to-3D Models	Create 3D models, use concise, straightforward text in the text box, avoiding abstract descriptive words, to achieve desired results (Team, 2024).
Image-to-3D Models	The tech industry frequently employs uploading flat 2D images and allowing AI to convert pixels into polygons (Team, 2024).
Video-to-3D Models	Enhance 3D model extraction success by uploading videos with clearly visible objects (Team, 2024).

7.8 Risks of Using AI in Education

Generative AI can introduce biases, potentially harming marginalized student groups in higher education. Examining ethical risks and discriminatory biases is crucial as AI usage increases (Wrench & Elmoudden, 2024).

7.9 The Changing Environment of Education Future

AI technologies' rapid and relentless advancement is one of the most transformative forces shaping today's educational landscape. This dynamic landscape requires adaptation and a fundamental reimagining of the roles and strategies of those who lead education. The research explores the potential of generative AI to enhance learning, creativity, and information processing in design environments. As AI continues to evolve and permeate nearly every aspect of our society, it contributes to students' critical thinking and communication skills, which are indispensable in an AI-driven world. AI is seen as a powerful learning tool in the field of design. AI is a technological innovation and a driving force in how information is disseminated, interpreted, and communicated (Wrench & Elmoudden, 2024). AI tools are making universities rethink their operations, which have implications for core aspects of university life: teaching, research, administration, and community engagement (Xevensolutions, 2023).

8. Results and Discussion

Technology is at the heart of this educational transformation, making learning digital, personalized, and dynamic. AI is seen as a powerful learning tool in the field of design. Technological tools can enhance student communication and engagement, allowing students to achieve the required skills and competencies. AI has the potential to boost student engagement and communication in design studios by personalizing learning experiences, providing instant feedback, and enhancing the efficiency of educational

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processes. AI can improve the educational experience by leveraging technology to engage students better and facilitate communication. By creating interactive and adaptive learning environments, AI can help Instructors dedicate more time to interacting with students and providing mentorship. The study focuses on using AI technology in design studios to improve student engagement and communication, potentially leading to improved academic performance and persistence. It aims to integrate AI technology into traditional design education methods, fostering interest in interior design and art. The study discovers innovative techniques that inspire creativity, critical thinking, and appreciation for design principles in the design studio environment. The study concluded that AI technology has the potential to enhance student engagement and communication, allowing instructors to focus on interacting with students and facilitating discussions. Instructors in the art and design environment should integrate interactive elements into design studios to work with students, especially in design and drawing projects. They enable students in design studios to convert images and text descriptions into 3D models, reducing manual effort and increasing accessibility.

9. Conclusions

Artificial intelligence has become a powerful tool that has significantly changed the methods of learning in design in the current era. AI tools can enhance traditional design education by providing new learning resources and strategies. A wide variety of teaching approaches allows for adapting to students' ever-changing needs and enhancing goal achievement. AI technology can strengthen communication engagement, allowing lecturers to focus on interacting with and facilitating discussions. Instructors in an environment that integrates interactive elements in design studios must work with students, especially on design and drawing projects. AI is transforming design education, providing students with new tools and opportunities. The design field is changing and is driven by technological advances through AI. Instructors must adapt to incorporate technology effectively to engage students and maintain a balance between academic and professional processes. Students can acquire valuable skills in AI-powered design tools, preparing them for future careers. Instructors require continuous support and training to incorporate AI into their teaching methods effectively. AI can facilitate collaborative projects, enabling students to exchange ideas and learn from each other. By integrating AI tools, instructors can personalize learning paths, provide real-time feedback, generate creative solutions, and unlock new levels of student’s engagement. Finally, AI is a valuable tool for creating an immersive learning environment. Many tools to encourage engagement and increase interaction include creating a virtual environment for live sessions, 3D learning tools to promote interactive visualization, implementing chatbots for AI-powered language learning, or creating AI-generated informative videos in the design studio.

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