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Experience and ethical awareness of using artificial intelligence platforms

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ABSTRACT

This study investigates student experiences at a university with artificial intelligence (AI) image generators, focusing on the next generation. As interest and use of artificial intelligence generators increase worldwide, attention is being paid to them. In this paper, the types of writing and art generators that can be used as artificial intelligence were investigated, and a survey on the perception of both user and experience was conducted accordingly. Additionally, it examines student recognition of the importance of ethical considerations when using AI image generators. The findings indicate that the College of Art, where creativity is essential, is the most frequent user of AI image generators at the university. Moreover, over 70% of students believe it is important to consider ethical aspects when using these tools. However, the study also revealed that 30% of the students lack awareness of the need for ethical consideration. This research is significant because it explores the experiences of students from various colleges in using AI image-generation tools and assesses their awareness of the need for ethical regulations. Nevertheless, it is challenging for users to thoroughly consider the usage methods, scope, and ethical concerns regarding all AI generators, especially because new tools are continuously released. Therefore, this study is limited to examining experiences with AI image-generation tools. Future research could explore how newly developed AI generation tools are ethically used across disciplines . Such studies could assess the usability and creativity of using these tools and suggest directions for future improvement.

Keywords: Artificial intelligence (AI), ethical awareness, education, information security, platform

1. INTRODUCTION

John McCarthy defined artificial intelligence (AI) as the ability of a computer to understand human intelligence and perform tasks when used by humans [1]. The AI level at that time was significantly lower than today. However, recent advancements in AI have greatly surpassed previous levels, enabling computer systems to simulate human-like intelligence and allowing for automation and prediction. In the current era, generative AI combines computers with vast data, learning to make inferences and implementations similar to the human brain. Thus, users can obtain the desired outputs, such as answers to questions, images, and videos, through generative AI tools, such as large language models (LLMs) and text-to-image generators [2].

The generation mechanism in this context creates virtual images based on mathematical pattern rules that incorporate the requirements. Generative adversarial networks operate using a generative model on a discriminative model, automatically creating realistic images, videos, and audio through machine learning. With computer programs, algorithms can be developed to learn from domain-specific data and infer commonalities, creating creative artwork. Additionally, generative AI has become indispensable because it is accessible on personal computers for applications in education, design, art, and productivity tasks. Consequently, its functionality continues to evolve, integrating technology to produce results that appear natural [3]. AI can explain the cause and effect process of problems that humans cannot understand. XAI that can explain this eXplainable Artificial Intelligence technology [4].

The Global Forecast Series conducted a survey from August 2022 to September 2023, analyzing the number of website visits by users interested in AI tools. The results revealed that visits to the chat generative pretrained transformer (ChatGPT) ranked first, with 1.46 billion visits, accounting for 60.2% of all visits in the industry, indicating significant public interest. Character AI ranked second with 380 million visits, followed by QuillBot in third place with 110 million visits, and Midjourney in fourth place with 5.004 million visits. Subsequent

rankings included Hugging Face, Google

Bard, NovelAI, CapCut, JanitorAI, and CivitAI. The survey results indicate high public interest in using generative AI.

2. Generative AI and the Principles of Creation

Because AI helps users easily create art and understand specialized knowledge, it has become a notable tool in numerous fields, such as humanities, art, and education. In humanities and art education, AI chatbots and natural language processing technology are employed to analyze, interpret, and generate input text. These types of technology facilitate researching and understanding classical literature more easily, stimulating creative thinking and enhancing student capabilities [5]. In computer art education, students can select their desired topics and use ChatGPT to provide detailed explanations and obtain results. Based on these results, AI-generated art platforms play a crucial role in visualizing student work.

According to the Global Forecast Series survey, Midjourney is the most widely used image-generation tool among the generative AI tools. Thus, activity levels are increasing for such platforms as DALL·E 2, DeepDream, Jasper, and Stable Diffusion. Educators can use prompts to reflect student preferences and guide them in creating innovative AI-generated artwork. The technology by Midjourney understands and learns from millions of preinput art and painting principles, allowing it to create detailed illustrations. In addition, DALL·E, a version of GPT-3 with 12 billion parameters, combines text and image data to generate images based on textual content. This technology includes diverse functionalities, such as anthropomorphizing animals, plants, and objects and modifying existing images to create new ones [6].

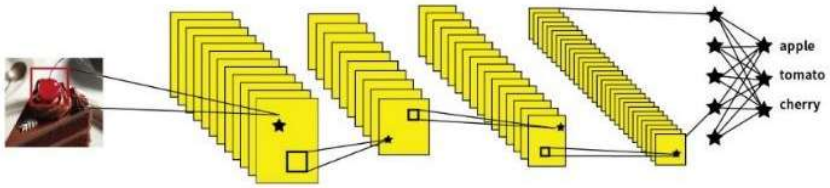

Figure 1. Convolutional neural network structure

Deep neural networks, such as convolutional neural networks, typically include many convolutional layers encompassing millions of parameters [Figure 1] [7]. Convolutional neural networks identify image patterns through a structured process comprising several stages. In the convolutional stage, features are extracted from the image using convolutional layers, followed by the pooling stage, where the dimensions of the feature maps are reduced to consolidate the extracted information. Finally, the features are integrated into the fully connected layer, outputting the results. These stages collectively contribute to the network architecture, facilitating the storage and processing of information [8]. Therefore, generative AI, which applies these principles, can produce results in fusion art and offer valuable assistance in the creative process in the educational field. As the boundaries between art and science continue to blur in the modern era, users have the potential to advance the convergence of art, science, education, and humanities via the effective use of generative AI. However, when educators employ these tools in their teaching, raising student awareness of ethical concerns associated with their use is critical.

3. Generative AI tool examples

Table 1: Types of writing and art generators using artificial intelligence

Artificial intelligence writing				
Chat GPT (Open AI)	Bing Chat (MS)	Wrtn	Gemini	Clova
Artificial intelligence art generators				
Midjourney	DALL·E2	Stable Diffusion	Jasper,	DeepDream
Artbreeder	DeepArt	This Person Does Not Exist	Fotor AI Image Generator	Dream by WOMBO
Leonardo	NightCafe	Playground AI	Stable Diffusion	Bing Image Creator
StarryAI	Copilot			

Generative AI tools encompass a broad range of services beyond those surveyed by the Global Forecast Series. Since the launch of ChatGPT in 2022, countries and companies have continuously developed and released these tools. Table 1 organizes these generative AI tools into two categories to categorize them systematically: those for writing and those for art generation [Table 1].

Developed by the French art collection company Obvious in 2018, Midjourney used generative adversarial networks to create AI-generated artwork. *Edmond de Belamy* was produced by training on 15,000 portraits

painted during the 14th and 15th centuries to generate a virtual portrait of a noble figure. The artwork was auctioned at Christie's for $432,500 [9].

In addition, DALL·E 2 uses inpainting technology to remove unwanted parts of an image and synthesize new content in those areas. This platform allows for changes in perspective and angles [10].

Further, DeepDream applies deep learning to generate images with a distinct, dream-like quality. The images created using DeepDream often have a surreal, hallucinogenic appearance, resembling the visuals one might experience in a dream [11].

Artbreeder allows users to upload images to the platform. The platform generates composite images by blending and modifying the uploaded visuals [12].

DeepArt has an integrated framework to render results in the style of existing visual art masterpieces. This framework learns unique characteristics from datasets of numerous pieces of visual artwork, enabling the creation of high-quality art pieces with simplicity and ease, surpassing traditional methods, such as oil painting or watercolor [13].

This *Person Does Not Exist* is a project presented by the Georgia State University Library as a general guide on their online library platform. It employs StyleGAN, an AI program that generates realistic human faces every 2 s. Users can refresh the web page or click on items to view newly generated human images. This generative AI allows users to input attributes, such as age, gender, and ethnicity, to generate random images of people.

Another AI tool, Fotor, can remove backgrounds and replace them with alternatives to fit various contexts. Fotor can extract colors from photos and analyze pixel ratios to assess various conditions, such as leaf infections [14]. Dream by Wombo is a generative AI based on LLMs. Application users must input precise prompts to generate the desired images because the accuracy of the generated results directly influences the usability and effectiveness of the tool [15].

In its initial model, Stable Diffusion reduced the token count by 60%. This platform allows users to input text prompts and generate high-quality images quickly [16]. The official website of Leonardo outlines the following features of the generative AI service. Leonardo offers image-generation capabilities through its advanced model training, allowing users to create images based on their specific requirements. Additionally, it includes editing features that enable detailed modifications of generated images.

According to its official website, Night Café is characterized by its foundation on LLMs and its integration with Stable Diffusion and DALL·E to generate results. Another option, Playground AI, was developed as an open-source tool based on the Unreal Engine, generating and labeling image data. With LLM technology, Playground AI easily creates high-resolution images and supports image editing capabilities [17]. In addition, Copilot integrates with DALL·E 3 upon logging in with a Microsoft account, enabling several applications.

Based on LLMs, StarryAI is a platform that facilitates image generation [18]. According to the official website, users can generate up to 25 high-resolution images per day for commercial purposes free of charge.

4. AI platform ethical issues and creative copyright

Additionally, numerous companies have been developing generative AI technology to integrate user needs, incorporating advancements beyond those of the existing services. However, artwork created using AI platforms has become a subject of considerable debate among educators, academics, and artists. The controversy arises from the complex and challenging problems intersecting human creativity and emerging technology.

Specifically, concerns have been raised about the ethical responsibility and reliability of creators when using AI platforms to produce generative work and the potential effect on creativity. The process involves human users inputting prompts into the platform, which assigns the task to the AI to generate results. Thus, the ambiguity surrounding the primary agent of creation—human or AI—necessitates a clear definition and feasible solutions. This problem is a topic of global debate. Consequently, due to the ambiguity regarding the primary agent of creation between humans and AI (currently under global debate), clear definitions and practical solutions are urgently needed.

The controversy began in 2018 when Dr. Steven Thaler developed an AI algorithm called DABUS, which generated the artwork *A Recent Entrance to Paradise* [Figure 2] [19]. Thaler sought copyright registration for the AI-generated work. However, on February 14, 2022, the United States Patent and Trademark Office ruled that under current law, copyright protection cannot be granted to algorithms or processes created by AI, affirming that copyright law must remain applicable only to human authors [19].

Figure 2. A Recent Entrance to Paradise by Steven Thaler

Théâtre d'Opera Spatial is a piece of artwork created by Game Chief Executive Officer Jason Allen using Midjourney in 2022 [Figure 3]. The work won first place in the manipulated photography category at the Colorado State Fair's digital art competition. Despite disclosing that the piece was created using the generative AI Midjourney, it sparked considerable controversy [20]. Among the ten categories, the Digitally Manipulated Photography section of the digital art competition allows for various creation methods. The guidelines permit using digital technology to edit artwork digitally [21]. In February 2023, a lawsuit disputed the copyright between Getty Images and Stability AI, which is still ongoing. This legal conflict arises due to the current US copyright law, which was established without considering the advanced state of future technology [22].

Figure 3. Theatre d'Opera by Jason Allen

At this time, AI represents the pinnacle of human technological achievement. However, whether the output created using AI should be considered human creation remains a significant and unresolved question [23]. The creation scope, AI platform, and prompt details must be clearly specified and legislated when examining these concerns. Without resolving these ethical concerns, more significant problems could arise as users continue to employ these tools. As AI platforms are expected to proliferate across diverse fields, measures must be prepared for disputes. Generative AI technology relies on user-provided prompts to produce the desired output. In addition, AI systems learn from all content previously created and uploaded online by individuals to generate the results. Therefore, tracing the origin of generated content and the information about its creators is challenging, making it difficult to obtain permission from the original authors [24].

5. METHODS

Interest in AI generators has spread across industries, including information technology, design, medicine, and education. The education sector is grappling with effectively using AI generators while instilling ethical awareness in students to prevent indiscriminate usage. Additionally, researching which AI generators are most effective for educational purposes is crucial. This study was conducted to identify which AI generators students have used by selecting case studies and administering surveys to address this question. The aim was also to understand how students perceive the ethical aspects of using AI generators, given their global prominence in the critical debate.

5.1. *Research questions*

This study surveyed students in the second semester of 2023 to investigate their awareness and use of AI

generative tools. A total of 354 participants participated in the survey. After excluding 26 responses deemed unsuitable for the research, 326 were applied for the analysis. The survey comprised 11 items, focusing on whether participants had experience using AI art generators:

Q1. I have used DeepDream.

Q2. I have used Midjourney.

Q3. I have used Artbreeder.

Q4. I have used Jasper Art.

Q5. I have used DALL.E 2.

Q6. I have used Stability AI.

Q7. I have used NightCafe.

Q8. I have used DeepAI.

Q9. I have used the NFT creation app Fotor.

Q10. I have used the NFT creation app StarryAI.

Q11. I have used the NFT creation app WOMBO Dream.

5.2. *User experience data analysis*

lists the most-used generators from first to fourth regarding student experience using the 11 AI generators selected as examples [Table 2] . The results of the survey items on student perceptions and experiences of using AI generators were organized by number of people and percentages. The analysis found that, among all AI generators, DeepDream had the most usage experience when analyzed comprehensively by department. The analysis revealed that Midjourney was the second most popular platform. DALL·E 2 and DeepAI were confirmed as AI generators that students experienced. However, although 354 people participated in the survey for this study, those who repeatedly selected or did not select each question were excluded. The student experience in each department reveals that students have the most experience in the following order: College of Arts, College of Social Sciences, Global College of Humanities and Area Studies. The College of Arts, comprising departments requiring creativity, has considerable experience using AI. Accordingly, interest in AI art generators has continuously increased but has not yet spread throughout the educational world. Based on this, it will likely be needed in departments that require creativity. However, as experience using AI image generators continues to increase, integration into department-tailored education methods is expected to be helpful in all departments in the future.

Table 2: User experience and survey of AI generative tools (number of subsamples *n* (%))

Tool	Experience	No experience	Total
DeepDream	73 (22%)	262 (78%)	326 (100%)
Midjourney	59 (18%)	272 (82%)	326 (100%)
DALL.E 2	31 (9.5%)	295 (95.5%)	326 (100%)
DeepAI	31 (9.5%)	295 (95.5%)	326 (100%)

Due to the increased interest and use of AI generators, they have become a global concern. Accordingly, a survey was conducted on the necessity of ethical considerations and improvements for students using these tools. The survey was conducted during the first semester of 2024, and 874 participants participated. After excluding 46 responses deemed unsuitable, 828 responses were assessed as the data for this study. Item 1, Artificial intelligence platforms will require future enhancements of ethical and legal regulations, was rated on a scale of 1 to 5 [Table 3].

Table 3: Survey results on the perceptions of ethical aspects of artificial intelligence platforms

5-point Likert scale	Number of responses (*n*)	Percentage (%)
1	13	2
2	26	3
3	176	20
4	279	32
5	334	38
No response	46	8
Total	874	100
Valid data	828	

6. RESULTS AND DISCUSSION

Answers related to the item on the survey were investigated using a 5-point Likert scale. The response rate for the combined scores of 4 and 5 were 70% of the total valid data, indicating that 613 participants believe enhancements are necessary in the ethical aspects of AI. However, 30% of the participants scored the item as 3 or below, suggesting a need for further education on ethical awareness regarding AI platforms. Legislation is created and implemented based on ethical principles; thus, ethics and legislation are inseparable.

7. CONCLUSION

This study investigated the usage experience of students regarding AI image generators. When comprehensively analyzed by the entire department, the most experienced order of use on the AI platform was Deep Dream, Midjourney DALL·E2, and DeepAI. The results indicate that, although not all students from the university had experience with these tools, students from the College of Art, which requires creativity, were the most frequent users. Many students recognize the importance of considering ethical aspects when using AI generators. However, the study also revealed that many students do not acknowledge the need for improvements in ethical considerations, highlighting the need for further guidance in this area. Various institutions and companies related to AI are continuously conducting research and development to expand these applications across diverse fields. Nonetheless, users face difficulties in fully understanding and applying the methods, scope, and ethical concerns associated with AI generators. Therefore, this study focused on the usage experience of students regarding AI image-generation tools, which is limited in focus. Future research could explore how students from various departments use newly developed AI tools more concretely than before. This research could provide insight into usability, creativity, and improvement directions for AI generation tools used by students from diverse fields.

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