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ORIGINAL RESEARCH ARTICLE

Content creation or interpolation: AI generative digital art in the classroom

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ABSTRACT

The integration of generative artificial intelligence (AI) tools in art and design has disrupted the traditional creative landscape, leading to debates on the legitimacy of AI-generated art and the emergence of new markets such as non-fungible tokens (NFTs). The US Copyright Office's February 21, 2023, ruling withdrawing copyright protection for AI-generated comic artwork, while protecting the accompanying text and arrangement, highlights the contested nature of AI art and suggests that significant human intervention in the creative process will be required for monetization. Whether considered content interpolation or content creation, AI generative content for the creation of art and design is here with human-AI collaboration. To explore the potential of AI tools in creative practice, this study introduced students in a digital art course to Craiyon and Midjourney generative AI tools, with DALL-E 2 selected as the primary tool due to its varied output. The students were tasked with selecting a preferred prompt from one tool and then reproducing the output from both tools. The results revealed significant variations in replicating the outputs of different AI tools and limited exploration of prompt engineering, leading to restrictions in the iterative process of artmaking. The students agreed that generative AI tools are not a substitute for human creativity and should be used for final projects. The study demonstrates the potential and limitations of integrating AI tools in art and design and suggests the need for further research in developing effective prompt engineering strategies.

Keywords: generative AI; AI art; human-AI collaboration; digital art; art education

1. Introduction

Artificial Intelligence (AI) art generators have dominated news in the artworld since 2022, and continue to spark ethical, legal, and aesthetic debates. With the launch of more and more open-source options like DALLE-2, Dream, and Midjourney, mainstream adoption of AI can be seen everywhere on social media and the news[1]. Not surprisingly, the speed at which such a tool was adopted by the general population led to immediate and resolute rejection from traditionally trained artists and designers over copyright malfeasance and the new genre of AI art touted by dilettantes globally[2–4]. Recent legal developments surrounding the copyright of artwork generated by artificial intelligence (AI) has reignited the debate over the role of

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AI in artistic creation. On February 21, 2023, the U.S. Copyright Office revoked the initial copyright protection granted to Kris Kashtanova's comic book, *Zarya of the Dawn*, which was illustrated using the text-to-image AI program, Midjourney. The revised copyright was limited to the text and arrangement created by the author, explicitly excluding the Midjourney-generated artwork. This ruling marks a milestone in how copyright law applies to algorithmically generated art, which has raised philosophical and practical challenges related to human understanding and creativity[5].

The controversy caused by the maturation and wide availability of generative image-based AI has also led those in the field of higher education to call for an immediate ban as well due to fears of widespread plagiarism[6,7]. There has heretofore been little to no interest demonstrated by the academic community to seriously pursue practical use cases and best practices for the adoption of this new tool. The scholarly community has been instead focused on the theoretical and aesthetic implications of the disruption caused by this emerging technology. An example may be found with Ajani[8], who has noted the two competing definitions for "art" in her study of the role of human authorship in AI-generated content—"Art as an expression of technique, art as a display of sentiment"[8, p. 253]. Thus, conversations have revolved around the ways in which "art" may be viewed and valued for either the ability to capture the human condition or demonstrable use technical prowess [9,10].

The valuation of AI and non-fungible tokens (NFTs) in the artworld continues to be debated[11,12]. Such musings may have their place but overlook the fact that no matter the official acceptance or rejection of AI art, the new tool has already disrupted the creative process of practicing artists[13]. Artists themselves are noting the affordances of AI art generators in allowing exploration of new and innovative solutions in their works[14]. In fact, AI is increasingly used in art, prompting a paradigm shift in the field with artists like Jon Rafman and Mario Klingemann leveraging such technologies as deep learning and artificial neural networks to create their works, arguing that AI will become the "new normal"[15]. From suggesting new color palettes, compositions, arrangements, and spatial understanding to a new inspirational and iterative formative process, AI is a watershed moment for the fine arts. At the same time, these use cases have yet to make their way to higher education and the instruction of studio art in the classroom. This study proposes a compelling case study for the integration of AI-generative art tools within the context of a traditional studio art classroom. Specifically, the study focuses on an intermediate-level digital media course, where students were instructed to engage in an iterative process of utilizing one of three generative art tools—Craiyon, Dall-E 2, and Midjourney-with the goal of creating an initial concept. Once a satisfactory result was achieved using one of the generators, the students were required to apply the same prompt to a second generator of their choosing, which resulted in the production of two distinct final images. Subsequently, the students were tasked with reconstructing one of these images using Adobe Photoshop, while the other was to be further modified according to their creative preferences.

The results of this study highlight a spectrum of possibilities regarding the use of AI in the context of creative processes, ranging from utilizing the technology to merely render a final concept and interjecting minor alterations, to employing AI as an inspirational tool to generate innovative solutions that can be realized in a wholly separate manner, taking only elements from the AI's suggestion. These findings provide a compelling model for art and design departments that are seeking to integrate AI into their curriculum, as the study demonstrates at least three distinct strategies and use cases for doing so.

2. Literature review

There has been little discussion of the practical application of artificial intelligence (AI) in the studio art classroom. Previous literature instead focus-

es on philosophical or theoretical discussions. For instance, Coeckelbergh[16] offers a conceptual framework for a philosophical discussion of whether machines can create art with three questions: What is meant by "creation?" What is meant by "art?" And what is meant by machines "creating art?" The framing argues for an unstable and objective understanding of creativity. The binary of human versus non-human forms of art are also arbitrary as there should be a collaborative definition where technology assists in the creative process. In fact, discussions on creativity and the status of machines as artistic are moot as the very accepted definition of creativity presupposes a human agent. Coeckelbergh[16] calls for a new "poetic" understanding of the creative process where human-machine hybrid processes can surprise audiences and the artist themselves in novel ways. The belief echoes that of Mazzone and Elgammal[17], who also had developed AI processes for identifying style and detecting large-scale style patterns in art history. The pair advocated for a rethinking of the connection between machine and human creativity "as parallel to but not in conflict with human artists and their emotional and social intentions of art making" (p. 1). Tao[18] refers to this partnership as the "actor network" of art where humans and machines work together as co-agents. The collaborative efforts of both parties could potentially maximize the strength of each.

Other discussions would follow that would likewise question the role of machines in the creative process and a call to see that process itself creative. For example, Ahmed[19] framed the discussion of AI in terms of a design-based praxis out of the disciplines of the arts and humanities. The author argues that the permanent physical manifestations in media museums of AI should be understood not as a design but for design. In reviewing interactive and immersive media installations, Ahmed argues that making "immaterial humanistic characteristics" concrete and physical, which include emotions, experiences, senses, and memories, AI should be reconsidered as more than a mere product or traditional image for a design[19, p. 133]. The interactions and emotions humans have interacting with art generated by AI can be seen as a design element themselves. However, these considerations of AI and art do not address one of the most controversial notions of art-creativity.

The elements of artistic autonomy and creativity often dictate discussions around whether AI-generated art can be considered "art" proper. There have been countless definitions for "creativity" but for this discussion, the model devised by Csikszentmihályi[20] is appropriate and considers three elements that are interrelated-a body of knowledge that is agreed upon; a volitional agent who produces something innovative by changing an element of the field in question; and experts in the field that judge whether the novel production should be accepted into that domain or field. Building on the definition, Jennings[21] further identified three criteria that an "agent" must possess in order to qualify in a system that may be considered volitional and features creative autonomy—the ability to autonomously evaluate without outside or undue opinion; the ability of a system to change autonomously, and then direct variations on a standard without being explicitly directed; and, finally, the ability of a system to avoid randomness. When applied to AI art and "creativity", the author notes that "[...] progress[ing] from a capable apprentice to a creator in its own right, an AI system must be able to both independently apply and independently change the standards it uses. This ideal will be called 'creative autonomy' and represents the system's freedom to pursue a course independent of its programmer's or operator's intentions."[21]. Given that the artist or author is not the only agent in the creative process that ultimately judges the value of the creation, Ajani[8] notes that creativity does not exist independently. On the contrary, "creativity depends on individual capacity, acquisition of information and judgment by experts"[8, p. 258]. Since creativity needs be externally validated, AI has been exonerated from being judged in these terms given in each domain (art and/or design) must "judge" whether the product may be considered "creative" and cannot inherently be so.

3. Methodology

The study conducted a mixed-methods approach to gather data on the use of AI art generators in a digital media course. Multiple sources of data were used, including surveys, artifacts produced by the students, interviews with students, and in-class observations. Pre- and post-surveys were collected along with demographic data. While open-ended comments were collected from students, a more comprehensive qualitative analysis could be conducted in future studies to gain deeper insights into the students' experiences and perceptions. In addition to surveys and artifacts, other sources of data such as interviews with the students and observations of their in-class interactions could also be incorporated into future studies. The study also collected instructor feedback, although it did not analyze the impact that this feedback had on the students' learning outcomes. The results of the study were promising, but future studies are recommended to expand the size of the study population and to include a control group. Overall, the study provides valuable insights into the use of AI art generators in a digital media course and lays a foundation for further research in this area.

Furthermore, the mixed-methods study included data from surveys collected from students, instructor feedback and artifacts (AI-generative content and final project submissions). The sample was collected from a public, four-year, HBCU liberal arts institution in Orangeberg, South Carolina, USA. Participants included all 5 students (who are from the entire class serving one race and ethnicity) enrolled in the course, whose majors were all BA Studio Art with a concentration in Digital Media enrolled in *Digital Media II.* The computer as a drawing, illustration, and painting tool, and the use of color in the unique digital environment. Processes Covered include scanning, digital painting and drawing techniques, and basic color theory and application. The purpose of the project was to assess pedagogical best practices for the use of AI art generators through student perceptions, performance, and feedback coupled with instructor feedback and observations.

In the Spring 2023 term, a cohort of intermediate-level digital media students were tasked with utilizing three distinct generative art tools, namely Craiyon, Dall-E 2, and Midjourney, to produce iterative initial concepts. These tools were deliberately chosen for their individual features, strengths, and limitations, which led to the production of highly varied outputs. The students were first given ample time to engage in a period of play and experimentation with each generator, which enabled them to acquire a deeper understanding of the nuances of input, language, and limitations inherent to each tool **(Figures 1 and 3)**.

Figure 1. Rainbow Noodles, MidJourney, 2023.

Figure 2. Rainbow Noodles Midjourney Image Modified by Student, Adobe Illustrator, 2023.

Figure 3. Rainbow Noodles, DALLE-2, 2023.

Figure 4. Rainbow Noodles DALLE-2 Image Modified by Student, Adobe Illustrator, 2023.

After arriving at a satisfactory output in one of the generators, the same prompt was to be applied to a second generator of their choosing. This resulted in the production of two distinct images **(Figures 1, 2, 3 and 4)**. One of these images was to be reconstructed using Adobe Photoshop or Illustrator, while the other was to be further modified based on the student's preferences **(Figures 2 and 4)**. In order to gain greater insights into the students' existing expectations regarding AI generative art, a pre-assignment survey was administered, and then compared with a post-assignment survey. This allowed for an analysis of the data collected, which was instrumental in obtaining a deeper understanding of the impact of this innovative pedagogical approach on the students' learning outcomes.

In order to assess the usefulness of such tools in the context of a digital art classroom, the project utilized a mixed-methods approach to gather data, including qualitative (open-ended comments) and thematic (quantitative) results from an online survey. The survey instrument focused on the different methods for use of AI art generators in digital art courses, in order to inform the pedagogical considerations of future use of the emerging technology. The survey was conducted in Spring of 2023. Data collected afterwards gauged student demographics, feedback on the experience of using AI for image gathering and inspirational purposes, asked for student preference for use cases of integrating AI-generative content in their artmaking processes, and how the technology would best be utilized in the future. Students were then asked an open-ended question regarding their experience and what they felt AI was pedagogically best suited to accomplish. Students were contacted either through the University course management system or were emailed with links to online surveys. The survey was available for approximately one week at the outset of the eight-week term and one week at the end and all data was collected using Qualtrics to ensure privacy and anonymity of responses. These results were sorted based on demographics (such as gender identity, major, age, etc.) and data were exported from the survey system. Descriptive statistics were calculated and used for comparisons between groups. The final artifacts students produced were evaluated along with the results of the surveys to glean more information on learning outcomes and more extensive feedback on the experiences.

4. Result

This study sought to investigate the perceptions and experiences of a small sample of college students as they engaged with generative text-to-image AI tools in their artmaking process. The participants were predominantly Black or African American, male, and non-first-generation college students, with a mix of sophomores and juniors. Most of them were residential students and took face-to-face or hybrid courses as part of their major requirements.

The study included five participants, with 40% of participants being sophomores and 60% being juniors. All participants were between the ages of 18–24 and identified as Black or African American. In terms of gender identity, 20% identified as female, and 80% as male. Furthermore, only 20% of participants identified as first-generation college students. When it comes to their academic status, 20% of participants were commuter students, and 80% were residential. In terms of class format, 60% of students reported taking coursework face-to-face, while 40% reported taking hybrid courses. All students were taking the class as part of their major requirements.

4.1 Pre-assignment survey

The pre-assignment survey revealed that students had varying levels of comfort with technology and limited prior experience with AI in their artmaking process. Their initial feelings towards AI in art creation were mostly neutral, with a focus on its potential usefulness in idea generation and creative problem-solving. The majority of students were open to the idea of using AI tools in their artmaking process, with none being opposed to it.

Prior to the introduction of AI tools in the course, a survey was conducted to determine students' perceptions and previous experiences with generative AI for image creation. The survey results revealed that 40% of students reported being extremely comfortable with technology, while 20% were somewhat comfortable, 20% were somewhat uncomfortable, and 20% were extremely uncomfortable (**Figure 5**). Regarding previous use of AI in their artmaking process, 80% of the students stated that they had not used AI before, while only 20% reported having used it.

Students were also asked about their perceptions of AI and its potential usefulness in the artmaking process. When asked about their feelings towards the use of AI in the creation of art in general, 60% of the students reported being neutral, while 20% were somewhat positive and 20% were somewhat negative (**Figure 6**). Furthermore, students were asked to rank how AI may be useful in the creative process, with 60% of the participants selecting assistance in creating new ideas as the most useful, followed by 20% who chose help in organizing existing ideas, and 20% who selected suggesting creative solutions (**Figure 7**). No students ranked providing a scientific approach to artmaking, understanding AI in general, or understanding how to leverage emerging technologies in art as useful.

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Upon completion of the ranking, students were asked if they would want to use an AI tool to help them in their artmaking processes, with 40% stating that they would and 60% stating that they may be interested. It is noteworthy that none of the participants responded negatively. Free responses were also gathered, which asked students to elaborate on how the AI tools may be helpful or not. Students reiterated their selections of assistance with idea generation and innovative solutions. For example, one student stated that “These tools could be a great use to artists who have hit the point where they don’t have ideas”. Another student echoed this sentiment by discussing the iterative process of creativity, stating that “It could just be another way for us as artists to really dig deep into our minds ourselves, which I believe is the best part of art”.

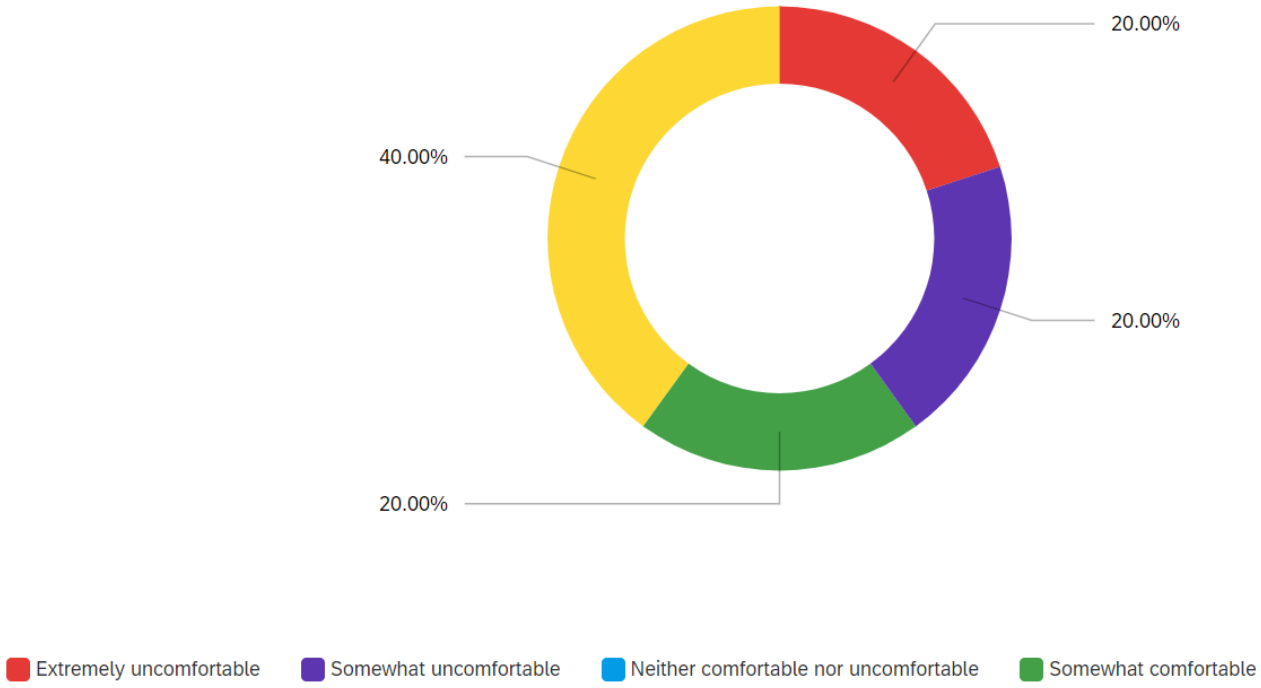

Figure 5. Level of comfort with technology in general.

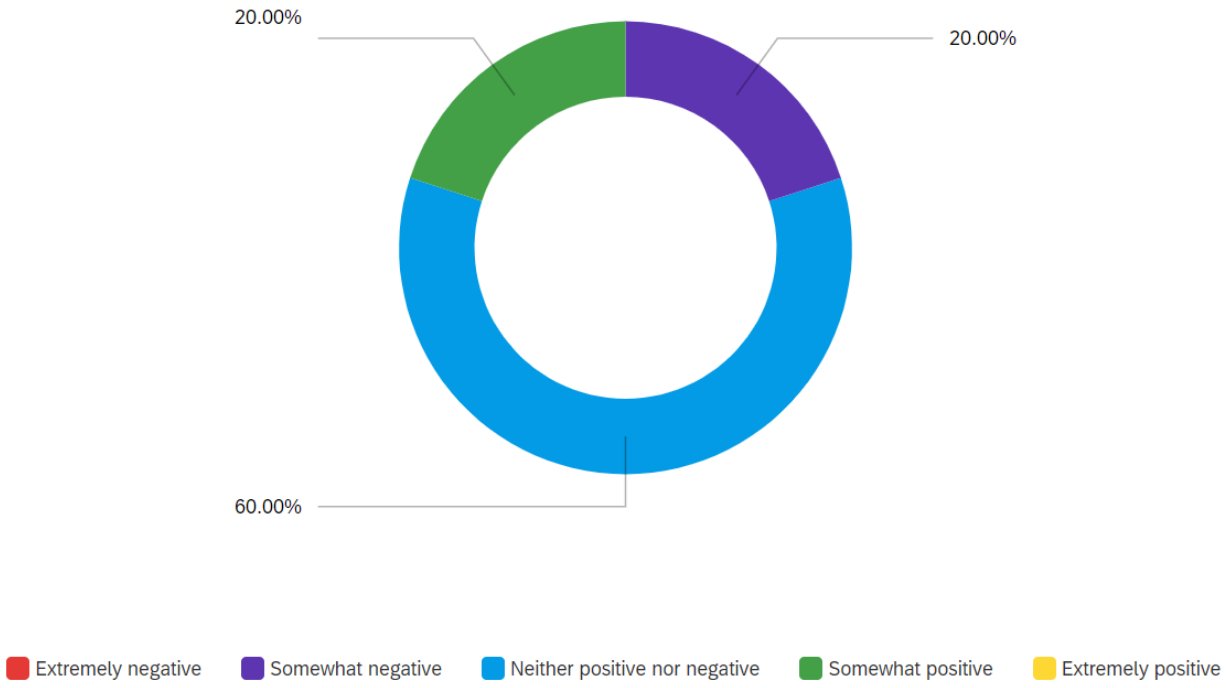

Figure 6. General perception of artificial intelligence (AI).

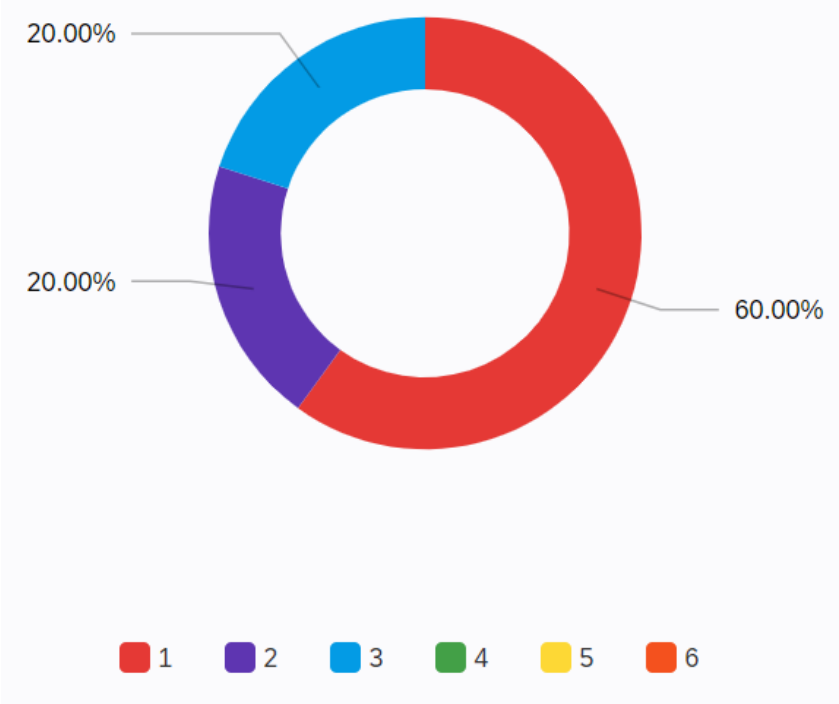

Figure 7. Perceived usefulness of AI in artmaking process prior to use: 1) suggesting creative solutions, 2) providing scientific approach to artmaking, 3) assisting in creating new ideas, 4) helping in organizing ideas, 5) better understanding AI in general, 6) understanding how to leverage emerging technologies in art.

Therefore, results from the pre-assignment data collected provides valuable insights into the perceptions and experiences of a small sample of college students as they engaged with generative text-to-image AI tools in their artmaking process. The participants in this study were predominantly Black or African American, male, and non-first-generation college students, with a mix of sophomores and juniors. These demographic details are critical in understanding the context in which the study was conducted, as they could potentially affect the students' attitudes towards technology and their willingness to adopt AI tools in their artmaking process. The pre-assignment survey revealed that students had varying levels of comfort with technology and limited prior experience with AI in their artmaking process. However, the majority of students were open to the idea of using AI tools in their artmaking process, with none being opposed to it. Furthermore, the survey results indicated that students believed AI tools would be most useful in generating new ideas and suggesting innovative solutions. It is important to note that these insights were gathered through a variety of sources, including surveys, interviews, and in-class interactions, providing a more comprehensive view of the students' perceptions and experiences.

4.2 Post-assignment survey

Following the completion of assignments involving AI tools, the post-assignment survey showed that students found value in using AI for structuring and visualizing their ideas, but remained undecided about future use. Limitations they encountered were mainly technical constraints and a belief in the superiority of human creativity. Students acknowledged that AI could not provide emotional depth or unique imaginative details in their artwork, indicating that AI tools should be used as supplementary resources rather than replacements for human creativity.

Upon completing assignments that incorporated generative text-to-image AI tools, a survey was conducted to assess students' perceptions of the outcomes and any changes in their views since initially using the AI generators. The survey featured a range of questions, including their enjoyment of AI exercises in the artmaking process, the impact of AI tools on their final works, and the limitations they

encountered while employing AI art generators.

A majority of students expressed positive feedback regarding the AI exercises' inclusion in the artmaking process (75%), and they perceived that the AI art generating applications enhanced their final works by providing a foundational structure and increased accuracy in visualizing their ideas. Nevertheless, most students were undecided about incorporating similar AI tools in their future artistic endeavors. When asked if students felt the AI tools improved their final works, 75% agreed that they had with 25% disagreeing. However, when asked if they saw themselves using the tool in the future the reporting inverted with 75% stating maybe and only 25% stating that they would.

When inquired about the limitations they discovered while working with AI art generators, two primary themes emerged: technical constraints and a belief in human creativity's superiority over machines. Moreover, the use of AI tools did not considerably alter students' views on AI's capacity to generate art comparable to human-created pieces. However, they acknowledged that AI could not imbue a work of art with emotion or generate imaginative details exclusive to human creation. The sentiment is reflected in the survey responses where asked if they initially believed that AI art generated applications had the potential to create art on par with humans, the class was split with half stating that they did and the other that they did not. After using the tools, the same question was asked and half still stated that they did not believe AI could create on par with a human with 25% believing that the tools could and 25% unsure (**Figure 8**).

In evaluating the usefulness of AI in the artmaking process, students ranked the ability to propose creative solutions the highest, followed by providing a scientific approach to artmaking, better understanding of AI and understanding how to leverage emerging technologies in art (**Figure 9**). They expressed a desire for additional features, such as improved text prompting and the capability to incorporate words into generated images. The majority agreed that AI tools should not be compared to digital imaging tools like Adobe Photoshop. Still, they concurred that AI tools could be valuable for assisting with ideation and formative stages in the artmaking process. Finally, a student pointed out that AI art generators, while useful, are "haunted" because they lack human creativity and emotion. This statement reflects the primary hesitation most students have towards using AI art tools in art and design classes.

Therefore, based on the post-assignment survey data collected, it appears that students found value in using AI for structuring and visualizing their ideas, but remained undecided about incorporating similar AI tools in their future artistic endeavors. One of the primary reasons for this indecision was the belief in human creativity's superiority over machines. While AI tools could assist with ideation and formative stages in the artmaking process, students did not view them as replacements for human creativity.

Despite the limitations encountered by students while using AI art generators, including technical constraints and the inability of AI to imbue a work of art with emotion or generate imaginative details exclusive to human creation, most students expressed positive feedback regarding the AI exercises' inclusion in the artmaking process. They perceived that the AI art generating applications enhanced their final works by providing a foundational structure and increased accuracy in visualizing their ideas. Moreover, students ranked the ability of AI tools to propose creative solutions the highest in terms of their usefulness in the artmaking process. They also expressed a desire for additional features, such as improved text prompting and the capability to incorporate words into generated images. As such, while students acknowledged the potential benefits of using AI tools in the artmaking process, they also recognized their limitations and the importance of human creativity in creating truly unique and emotionally resonant artwork. As such, AI tools should be viewed as supplementary resources rather than replacements for human creativity in art and

design classes.

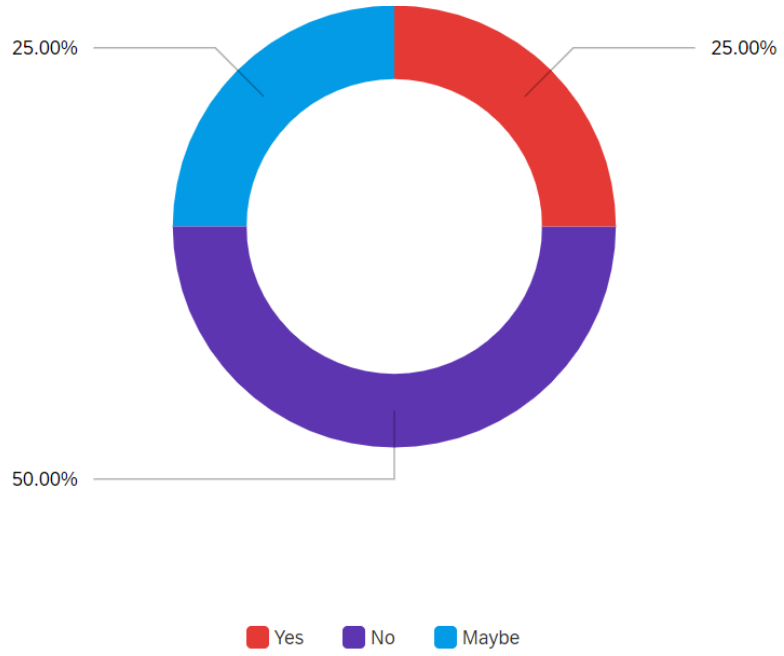

Figure 8. Belief after use of tools as to the ability of AI to create on par with humans.

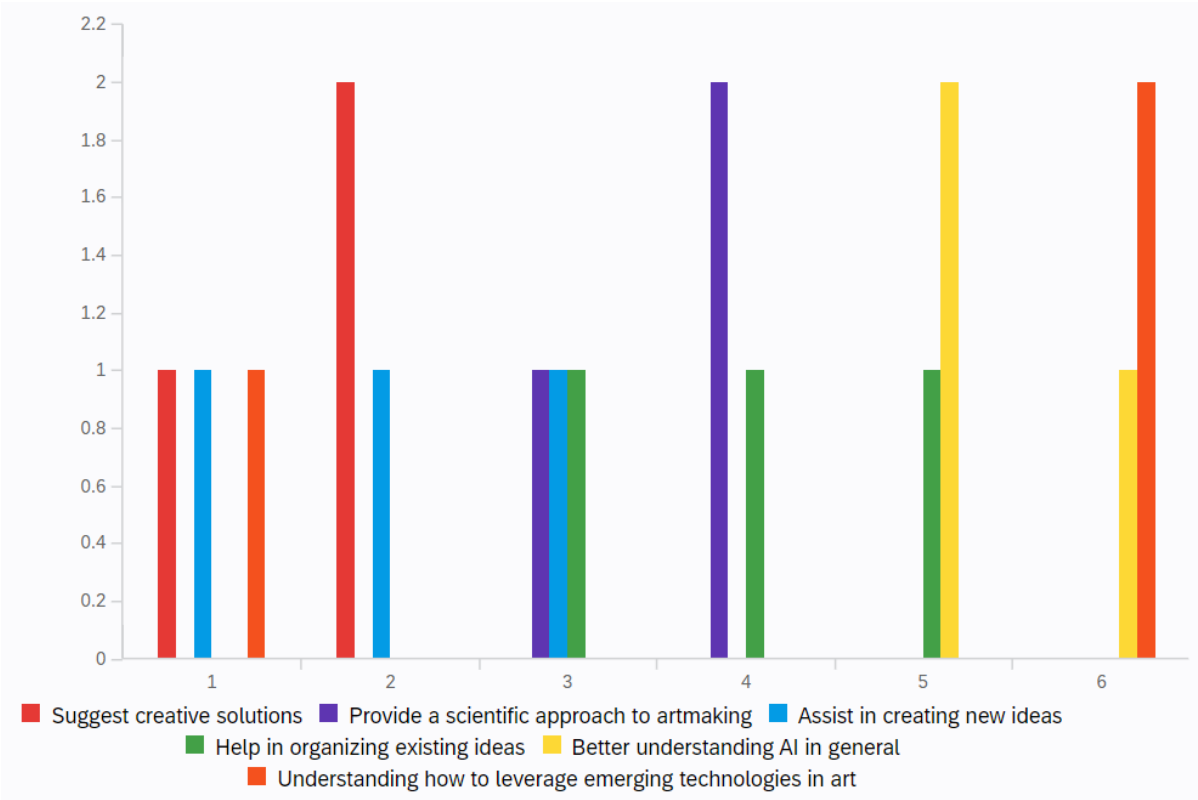

Figure 9. Perceived usefulness of AI in artmaking process after use.

4.3 Instructor observations and artifacts

In instructor delivering the course oversaw students in a digital art course as they engaged with generative AI tools for art creation. Initially, most students were unaware of such AI tools but demonstrated an openness to the concept and swiftly adapted to utilizing them. Throughout the project, the students experienced a consistent emotional trajectory, beginning with initial skepticism towards the unfamiliar and perplexing tools. This was followed by a period of rapid exploration and eagerness to create as they familiarized themselves with the AI tools.

However, as students encountered the limitations of their desired outcomes versus the generated outputs, they experienced heightened frustration. This led them to either delve deeper into the tools or explore alternative ideas. Ultimately, students exhibited apathy and boredom due to the limitations and repetitiveness of the AI tools' outputs. They remained skeptical about AI tools supplanting human creativity and found the images to possess a postcard-like quality that constrained their potential.

DALL-E 2 was generally the most favored tool among students, as it produced more successful results compared to Craiyon and was less consistently fantastical than Midjourney, which often surpassed the students' skill level. The study's findings indicate that generative AI tools hold significant potential to transform the art and design fields, but it is essential to recognize their limitations. Students' emotional responses to AI tools evolved from initial skepticism and confusion to rapid experimentation, eventually culminating in frustration and boredom.

A critical constraint of the AI tools was their incapacity to consistently generate captivating and unique images. Although initially intriguing and innovative, students soon perceived the AI-generated images as having a similar, postcard-like quality that hindered their artistic potential. This implies that AI tools can serve as valuable sources of inspiration and guidance for artists but cannot substitute human creativity. Furthermore, the study revealed a preference for DALL-E 2 over Craiyon and Midjourney. This preference likely stemmed from DALL-E 2's capacity to generate more successful and diverse outcomes, enabling students to investigate a broader spectrum of creative possibilities. Nevertheless, even this AI tool had limitations, with students frequently confronting barriers when attempting to exceed the tool's capabilities.

Overall, the instructor's observations and artifacts provide a more in-depth understanding of the students' experiences with the AI tools, particularly their emotional journey throughout the project. The initial skepticism and confusion demonstrated by students is a common response when encountering new technologies, particularly those that challenge traditional notions of art creation. However, the students' willingness to adapt and experiment with the AI tools indicates a level of openness to innovation and exploration, which are essential qualities for future success in the art and design fields.

As the students became more familiar with the AI tools, they experienced a period of rapid exploration and eagerness to create. This is a promising sign, as it suggests that the AI tools can serve as valuable sources of inspiration and guidance for artists, particularly during the formative stages of the artmaking process. However, as the students encountered the limitations of the AI tools and their inability to consistently generate captivating and unique images, they experienced heightened frustration. This highlights a critical constraint of the AI tools, which is their inability to fully substitute human creativity. It also underscores the importance of recognizing and understanding the limitations of AI tools to effectively integrate them into the art and design fields.

The students' preference for DALL-E 2 over Craiyon and Midjourney suggests that AI tools' success in the art and design fields will be heavily dependent on their ability to generate diverse and successful outcomes. AI tools that can produce more varied and high-quality results are likely to be more

successful in aiding artists' ideation and formative stages in the artmaking process. Additionally, it is essential to recognize that even the most successful AI tool has limitations, and artists will inevitably confront barriers when attempting to exceed the tool's capabilities. In the end, the instructor's observations and artifacts provide valuable insight into the students' experiences with generative AI tools in the art and design fields. While the AI tools hold significant potential for transforming these fields, it is essential to recognize their limitations and ensure that they are used as supplementary resources rather than replacements for human creativity.

5. Conclusions

The study highlights the inevitable disruption of traditional art and design curricula due to the emergence of AI tools and demonstrates students' openness to employing such tools during the formative stages of the creative process. Although initial skepticism and frustration were present, students quickly adapted and embraced the exploration and creation process using AI tools. The perceived inability of AI to generate art on par with human-made pieces may be attributed to the limitations of the specific AI tools used in the study. However, as the field of AI continues to advance rapidly, these limitations are likely to be addressed, making AI tools more accessible and effective for students in the visual arts.

AI tools offer students novel sources of inspiration and innovative solutions to a range of fine art and design challenges. Future research should aim to adapt art and design curricula to emphasize the conceptual aspects of creativity rather than solely focusing on technical construction. For example, courses could be developed around the effective use of text prompts for AI-generated art, enabling students to better understand and predict desired outcomes in various ideation processes. As the lines between art and science increasingly blur, the algorithms underpinning generative functionality will not only be the domain of computer scientists but also artists. Educators must embrace the incorporation of AI tools into the creative process and modify their teaching methods to prepare students for a future in which AI plays an increasingly pivotal role in the visual arts domain.

To further investigate the effectiveness of AI tools in art and design education, future research could use a larger sample size and a control group. A larger sample size would increase the reliability and validity of the study's findings, while a control group would allow for the comparison of AI-assisted art creation with traditional art creation methods. Additionally, research could explore the impact of AI tools on student engagement, motivation, and learning outcomes. By comparing the effectiveness of AI-assisted art creation with traditional methods, educators can develop evidence-based approaches to integrate AI tools into art and design curricula.

Furthermore, as the use of AI in the creative process becomes more prevalent, it is essential to consider the ethical implications of using AI in art creation. Educators must also ensure that students develop a critical understanding of the societal, cultural, and ethical implications of using AI in art and design. Students must be prepared to consider issues such as ownership, authorship, and intellectual property rights in the context of AI-generated art. Therefore, future research could investigate the ethical and social implications of using AI tools in art and design education. While AI tools offer significant potential to transform art and design education, their limitations and ethical implications must also be considered. Future research should aim to further explore the effectiveness of AI tools in art and design education and develop evidence-based approaches for integrating AI into curricula while addressing ethical and social considerations.

Conflict of interest

The authors declare no conflict of interest.

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