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Terms of Service: Coming to Terms with AI-Generated Art in the Classroom

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This paper describes the plan and design of a new course, entitled "AI & Art." The course introduces select tools made possible by generative artificial intelligence and large language models (LLMs). Learning theories that inform course development are briefly discussed. Offered as a studio art elective to satisfy the University Curriculum breadth requirement, "AI & Art" was first launched as a seven weeklong Special Topics course at Quinnipiac University. Career readiness competencies identified by the National Association of Colleges and Employers (NACE) are compared to Essential Learning Outcomes and Course Learning Outcomes. Course organization includes a discussion of written responses about select topics, critiques of generated images, followed by practice in writing effective prompts. Students are encouraged to experiment with ChatGPT (OpenAI, 2024a). However, their written responses must pass multiple AI detection tests and be at least 51% "likely to be written by a human!" In accepting the Terms of Service for these AI tools, students are encouraged to exercise the precautionary principle–to critically think about the images they generate and to ask if they (or the AI) are consciously or unconsciously reproducing or reinforcing bias or stereotypes that reifies social inequalities. The results of a student course survey that pertain to engagement are included and discussed along with the pros and cons regarding the adoption of these AI tools.

Introduction

This paper describes the plan and design of a new course, "AI & Art." The course content focuses on introducing students to a selection of the emerging tools made possible by generative artificial intelligence and large language models (LLMs). A primary goal was to deliver a hands-on experience with cutting-edge AI technology thereby preparing students for 21st-century careers.

Due to the pace of developments and the emergence of new AI tools it has been necessary to implement a flexible course design that can readily respond to the rapidly evolving environment. Not only are there a plethora of new LLMs and generative tools, but terms of use, governmental oversight, copyright, legal and ethical concerns are important elements to factor in. Offered as a studio art elective as part of the university curriculum, this course was designed to follow the state mandated breadth requirements for institutions of higher education. The concluding sections of this paper discuss some pros and cons regarding the adoption of generative AI in the classroom.

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"AI & Art" was first introduced as a seven weeklong special topics studio arts class course at Quinnipiac University in the 2023 spring semester. After approval as a University Curriculum Fine Arts course the course was next offered in the spring and fall of 2024.

A straightforward measure of student interest and engagement is course registration. The course was fully enrolled up to the capacity limits for both the spring and fall 2024 semesters. Course design, approval and deployment is additionally predicated on the following assumptions or rather conjectures, that students:

- will engage with the AI software tools
- will engage with artistic challenges/opportunities
- will engage with the issues and controversaries surrounding AI

The end-of-semester student course surveys provide results that reveal insights into these three conjectures which support personal, academic self-development and career readiness. Those results will be discussed in further detail below.

The career readiness competencies as identified by the Career Readiness Initiative launched by the National Association of Colleges and Employers (NACE, 2024a) serve as a backdrop to essential learning outcomes discussed below and inform the articulation of course learning objectives. However, since the release of the Career Readiness Report (NACE, 2022b) there have been dramatic developments of new and powerful AI tools that will likely have far reaching impacts on higher education and career readiness preparation.

Preliminary Considerations

Reviewing the Landscape

In this section I discuss some background factors that played a significant role in the design, structure, pedagogy and content for the course "AI & Art."

Figure 1. *Prompt written by Clara Dhandili: "A Portrait of a Boy Wearing Blue Overalls and a Train Hat Looking at the Sunset; retro photo; soft warm light"*
Source: Generated by Adobe Firefly

Large Language and Diffusion Models

A large language model (LLM) is a type of machine learning model based on neural net architecture that can perform a variety of natural language processing (NLP) tasks such as generating and classifying text, answering questions in a conversational manner (e.g. chatbots), writing code and translating text from one language to another. GPT stands for generative pre-trained transformer– hence, ChatGPT. LLMs are "trained" on vast amounts text data, much of it scraped from the internet and require significant computing power to execute. LLMs have been variously described as next word prediction engines or a form of autocomplete where software merely suggests the next likely word based on the string of words that the user has typed. Writing for the OpenAI Cookbook Ted Sanders explains "Large language models are functions that map text to text. Given an input string of text, a large language model predicts the text that

should come next (Sanders, 2023)." LLMs such as ChatGPT lack understanding or comprehension.

The AI text-to-image generative software adopted for this course–OpenAI's DALL·E 3 (OpenAI, 2024b), Adobe's Firefly (Adobe, 2024a) and Midjourney (Midjourney, n.d.-a) are all based on diffusion models. Diffusion models are initially "trained" and learn from images that have text-based descriptions which are then decomposed into random noise. Diffusion models are so called as this AI generates images from text prompts by starting with random noise and refining it through multiple steps to match the given prompt (Mittal, 2024).

Students used ChatGPT to write prompts for text-to-image AI generation. Students were permitted to use ChatGPT to write short essays that addressed critical issues and topics surrounding the rise of AI.

The primary method of interaction with large language models is through the written prompt where the user types text into the input field on the web page of the LLM. Learning to write prompts is sometimes referred to as prompt engineering. OpenAI's ChatGPT and similar LLMs are designed to be conversational, a kind of iterative back and forth or call and response to achieve desired results. Effective ways to produce output (text) as recommended by OpenAI include (Sanders, 2023):

- Instruction: Tell the model what you want
- Completion: Induce the model to complete the beginning of what you want
- Scenario: Give the model a situation to play out
- Demonstration: Show the model what you want, with either:
- A few examples in the prompt
- Many hundreds or thousands of examples in a fine-tuning training dataset)

When using diffusion models for generating images the input methods and prompting strategies differ. Originally, diffusion models such as Midjourney required the user to type in a text-based prompt beginning with "/imagine a red apple" (Midjourney, n.d.-b). Unlike LLMs, short phrases work best. Midjourney recommends the following prompting tip:

> The Midjourney Bot works best with simple, short phrases that describe what you want to see. Avoid long lists of requests and instructions. Instead of: Show me a picture of lots of blooming California poppies, make them bright, vibrant orange, and draw them in an illustrated style with colored pencils Try: Bright orange California poppies drawn with colored pencils (Midjourney, n.d.-c).

Many diffusion models now support web pages with user interfaces where the user makes selections from drop-down menus, along with inputting text prompts and uploading source images that influence the style or the subject matter of the generated images.

From the Prompt to the Studio

Although the primary engagement for using LLMs and diffusion models is through a web page interface, this course is designed in the spirit of a studio art course. Essential to the studio art course experience is step-by-step exposure to the tools through trial-and-error experimentation. Through this kind of test and iterate process students learn color theory, form, balance, positive and negative space, composition and other objective formal principles. Much like a painter applies a brush stroke and then steps back to assess the slowly emerging work, that process is emulated using the art of the prompt. Students are told to start with a simple phrase and observe the AI-generated image result and then to add a few additional words. This is an intentional process of incremental discovery through testing and iteration mediated by the instructor's guidance.

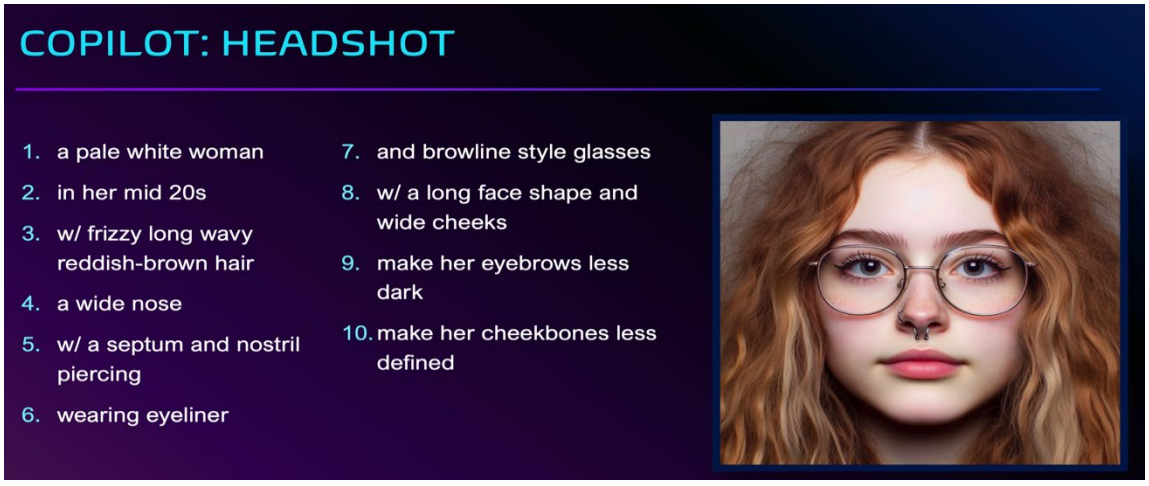

Figure 2. *Prompts written by Amber Hill. Prompt Testing and Iteration*
Source: Generated by Copilot (DALL·E 3)

Vygotsky's Zone of Proximal Development (ZPD) offers a helpful construct to envision this incremental learning process. With little assistance students can start using a text-to-image AI generator such as Microsoft's Copilot (Microsoft, n.d.) powered by OpenAI's LLM ChatGPT and DALL·E 3 the OpenAI text-to-image generator. Instructor guidance serves as Vygotsky's "more knowledgeable other (MKO)" and is needed (Shabani et al., 2010) to introduce methods incrementally for writing effective prompts. This is necessarily a constructivist approach that implies a well thought out scaffolding plan for instruction.

Gen Ed

Course design in education integrates various learning theories to inform the development and effectiveness of the instruction. Prominent influences from the extensive literature on learning theory are those such as Bruner's theory of cognitive development (1966), Gardner's theory of multiple intelligences (1983), Sternberg's

triarchic theory of intelligence (1985), Dweck's theory of mindset (2006), along with the theory of emotional intelligence of Salovey and Mayer (1990). While a more in-depth discussion will need to be done elsewhere some of the salient observations from those theories follow.

Alan Kay (1990), who contributed to the design of the graphical user interface of the Apple Computer coined the phrase "Doing with images, makes symbols." was directly inspired by Bruner's identification of three mentalities based on the earlier work of Piaget: the enactive, the iconic and the symbolic. Kay summarized this realization with:

> Bruner convinced me that learning takes place best environmentally and roughly in stage order–it is best to learn something kinesthetically, then iconically, and finally the intuitive knowledge will be in place that will allow the more powerful but less vivid symbolic processes to work at their strongest.

Learning how to effectively use an AI text-to-image generator mirrors this stage order of learning. The kinesthetic begins with the act of typing the prompt. The iconic is the resulting image. While these first two stages can take place in seconds, the third stage–the symbolic takes place over a period of months as students begin to internalize artistic concepts, terminology, and aesthetic goals through trial and error. Bruner's idea of the spiral of learning is also helpful in thinking about teaching strategies and scaffolding. That spiral is evident when learners return to previous attempts and employ increasing complex and sophisticated prompts.

Howard Gardiner's controversial theory of multiple intelligences, despite the criticisms (Waterhouse, 2023) alerts instructors to be attentive to differences in aptitudes among students. Such difference driven in part by interest and curiosity can map to the 'intelligences' that Gardiner identified such as linguistic, logical-mathematical, visual-spatial, musical, intra- and interpersonal.

These latter two intelligences intersect with Salovey and Mayer's theory of emotional intelligence which highlights emotional awareness and regulation of the self.

Sternberg is critical of traditional ideas of intelligence and testing. He defines intelligence as "purposive adaptation to, selection and shaping of real-world environments relevant to one's life (Sternberg, 1985, 45)." His 'triarchic' theory of human intelligence emphasizes the role of the 'componential' or the analytic, the experiential and creative intelligence and the practical and contextual intelligence that "deals with the mental activity involved in attaining fit to context (Sternberg, 1985, 45)." Each of these aspects are implicated in learning to write prompts with LLMs as well as for writing prompts for text-to-image generators.

Dweck's theory of mindset distinguishes between a fixed and a growth mindset. She argues for the benefits of shifting learners from focusing on outcomes (either

failure or success) to an optimistic attitude of growing beyond limitations which is inherently prosocial. "When people...change to a growth mindset, they change from a judge-and-be-judged framework to a learn-and-help-learn framework. Their commitment is to growth, and growth takes plenty of time, effort, and mutual support (Dweck, 2006, 244)."

A growth mindset is essential to learning how to effective prompts for both LLMs and for AI text-to-image. Rarely does one get the desired result in 'single shot' prompting. LLMs require a back-and-forth conversational style of interaction. Image generators, as previously discussed, require a test and iterate approach involving multiple attempts. A growth mindset welcomes these approaches.

Most academics and teachers will be mindful of Bloom's taxonomy (Bloom, 1956) and its revisions (Anderson et al., 2001). Mapping educational objectives to remembering, understanding, applying, analyzing, evaluating and creating provide helpful ways to plan instruction. A provisional reordering relevant to this course design guided by the idea of test and iterate might be: creating, evaluating, analyzing, understanding, remembering, applying, and creating – a kind of virtuous loop.

Maslow's (1943) hierarchy of needs is a reminder that students' basic needs must be met. In today's classroom there is the general consensus that effective learning takes place in an environment of safety and security, with the acceptance of difference (belonging), fostering positive self-esteem all which contribute to the overall achievement of self-actualization (a continuing work-in-progress).

In higher education, there has been a growing emphasis on accommodating neurodiversity among students (Shmulsky, 2022). This requires recognizing and supporting the different needs and the diverse ways students with different capacities learn. Inclusive educational practices may explore alternatives to conventional grading practices in order to create less stressful learning environments (Garvey, 2023). Among the different pedagogical approaches, 'specification' or 'contract grading' and 'ungrading' practices are being adopted (Derek Bok Center, 2024). By integrating these theories and approaches, course design aims to create a more inclusive and effective educational environment that meets the diverse needs of all learners.

Contract grading establishes at the start of a term, a written contract between the student and the instructor for the work to be done and the corresponding grade. "AI & Art" uses a type of 'specification' grading. There is a fixed number of low-stakes assignments students must satisfactorily complete. For example, students must generate at least four images per class, where each image is worth 1 point. Either the work is done, and a point is earned or not. Short writing assignments are graded in a similar fashion but on a 3-point scale allowing for more nuanced assessment of exceeding, meeting or not meeting expectations.

Prompting Critical Thinking

With their first attempts at writing a prompt for text-to-image generation a student must first have a concept in mind and then must be able to express that concept clearly in words. This changes how students engage in the task of writing each prompt. They must pause and think (however briefly) critically. Critical thinking can be elicited through careful design of assignments.

Initially students can be encouraged to begin with just a few words, followed by encouraging students to address different subject matter or art genres (e.g. still life, portrait, landscape, cityscapes etc.). The articulation of visual ideas through writing effective prompts takes on a greater importance along with learning the technical limitations and guidelines for prompting and image generation.

Figure 3. *Prompt written by Vincent Barone. "Create a photo of a medieval castle with a bridge that covers the water with the sun rising just beyond the castle reflecting in the water*
Source: Generated by Copilot (DALL·E 3)

The need for critical thinking can be seen in the following tips for writing DALL·E 3 prompts posted by Paul Bellow on the OpenAI Developer Forum (Bellow, 2023).

1. Be Specific and Detailed: The more specific your prompt, the better the image quality. Include details like the setting, objects, colors, mood, and any specific elements you want in the image.
2. Mood and Atmosphere: Describe the mood or atmosphere you want to convey. Words like "serene," "chaotic," "mystical," or "futuristic" can guide the AI in setting the right tone.
3. Use Descriptive Adjectives: Adjectives help in refining the image. For example, instead of saying "a dog," say "a fluffy, small, brown dog."
4. Consider Perspective and Composition: Mention if you want a close-up, a wide shot, a bird's-eye view, or a specific angle. This helps in framing the scene correctly.
5. Specify Lighting and Time of Day: Lighting can dramatically change the mood of an image. Specify if it's day or night, sunny or cloudy, or if there's a specific light source like candlelight or neon lights.
6. Incorporate Action or Movement: If you want a dynamic image, describe actions or movements. For instance, "a cat jumping over a fence" is more dynamic than just "a cat."
7. Avoid Overloading the Prompt: While details are good, too many can confuse the AI. Try to strike a balance between being descriptive and being concise.
8. Use Analogies or Comparisons: Sometimes it helps to compare what you want with something well-known, like "in the style of Van Gogh" or "resembling a scene from a fantasy novel."
9. Specify Desired Styles or Themes: If you have a particular artistic style or theme in mind, mention it. For example, "cyberpunk," "art deco," or "minimalist."
10. Iterative Approach: Sometimes, you may not get the perfect image on the first try. Use the results to refine your prompt and try again.

Each of these prompt suggestions require an initial thought process of introspection and reflection (What do I want to see?); comparison and analysis of word choice (What nouns and adjectives do I use?); research (What art style? What technical photographic terms do I use?); creative choices (compositional devices such as rule of thirds? mood, time of day) and other choices for words that support the desired effect.

In the social setting of the classroom (or the virtual Zoom classroom) students can share and adopt prompt writing tips. This approach expands the zone of proximal development from the individual to the shared experimentation of the group under the guidance of Vygotskian "more knowledgeable other (MKO)" i.e.

the instructor. In this way a natural scaffold is put in place to encourage growth from a short-sighted personal viewpoint to that of an open mindset fostering an engaged socio-cultural perspective shared by the class.

Figure 4. *Prompt written by Amber Hill: adding a Style Specification "in Pixar Animation Style Animation"*
Source: Generated by Copilot (DALL·E 3)

Objections

The use of Large Language Models such as ChatGPT in the classroom remain controversial. Olivia Stowell of the University of Michigan in Ann Arbor prohibits the use of ChatGPT "or any other AI platform or tool to generate either ideas or written content (not including spell check), or to produce any other material…" (Stowell, 2024). Her policy prioritizes learning how to write so students "experience writing as a process, foregrounding the iterative development of your own ideas. Using AI generators shortcuts this process." Use of ChatGPT raises academic integrity issues. LLMs are prone to hallucinations and are built

upon the exploitation of workers from the global south paid low wages to scrape data from the internet. LLMs have significant environment impacts. Professor Stowell reminds her students that education is a privilege, an opportunity that remains out of reach for a vast majority of the world's population.

LLMs, Linguistic & Visual Justice, and the MLA

In his presentation "Practicing Linguistic Justice with Large Language Models," Dr. Antonio Byrd of the University of Missouri-Kansas City argues that LLMs generate predominately standard English at the cost of suppressing other linguistic forms thereby leading a kind of injustice. LLMs privilege "standard" white English as the proper and correct way to think and write (Swearingen, 2024). Byrd offers an alternative approach he describes as "a partnership for discovering". Students are encouraged to draw upon their personal linguistic heritage which both dignifies and legitimizes their lived experience. A "partnership for discovering" mirrors Vygotsky's assertion that learning is inherently a social activity.

Dr. Byrd is also part of the joint task force on writing and AI. Sponsored by the Modern Language Association and the Conference on College Composition and Communication, the task force provides a variety of resources, articles, references and professional standards for adoption and use of LLMs to teach writing. The task force has developed a "Quickstart Guide to Writing and AI (MLA-CCCC Joint Task Force on Writing and AI, 2023)."

Byrd's argument for "linguistic justice" which pertains to the use of LLMs sets a high bar for generative AI. The use of AI text-to-image generators also display limitations and bias. The hope and expectation for what might be called visual justice may today, could still be guided by the following quote from an address entitled "Pictures and Progress" given by Frederick Douglas in Boston in 1861:

> Poets, prophets, and reformers are all picture-makers, and this ability is the secret of their power and of their achievements. They see what ought to be by the reflection of what is, and endeavor to remove the contradiction (Frederick Douglas Papers Project, n.d.).

This is a call to recognize the present-day realities and limitations of society but to then envision a better future and work toward the transformation and betterment of society.

Using LLMs (Large Language Models) as a Tutor

LLMs can be used as an aid for learning and understanding. For my introductory programming course, "Creativity and Computation" I include the following guidelines in the Syllabus:

> A large language model (LLM) is a type of machine learning model that can perform a variety of natural language processing (NLP) tasks such as generating and classifying text, answering questions in a conversational manner, writing code and translating text from one language to another. The smart way to use these tools is as a tutor to help you understand the code you write.
>
> *Consider if you want to learn how to cook, but rely on Door Dash, you will not learn how to cook!*

Pros and Cons

"AI & Art" embraces the use of LLMs and text-to-image AI generators. Indeed, it is the raison d'être for the course. Students need to know how to use LLMs and how to write prompts effectively to create desired images. The broad claim is to provide a hands-on experience with cutting-edge AI technology thereby preparing students for 21st-century careers. For a freshman writing course, LLMs are inappropriate as the use can impede and undermine the acquisition of basic writing skills. For disciplines such as computer science, math and other sciences an appropriate use case may be to use an LLM as a personal tutor with the necessary guardrails. In the end it should be at the discretion of the teacher to determine the usage policy.

Community Standards & Guard Rails

Most of the popular AI text-to-image generators now restrict the generation of deepfakes or images of well-known political figures or pornographic materials. In order to create a welcoming and appropriate academic environment the choice of which AI text-to-image generator matters not only for its technical virtuosity but also how it polices potential misuse. This relieves the instructor from having to worry about the generation of offensive images.

When asked about restrictions on the generation of images Microsoft's Copilot (Microsoft, n.d.) responded by listing the following policies from Canva (n.d.) and OpenAI (2023b). Copilot provided the citations in parentheses as active links.

When generating images, there are several important restrictions and guidelines to follow. Here are some key points:

- Prohibited Content: You cannot generate images that include nudity, obscene gestures, bodily fluids, or other profane subjects (Canva). Additionally, content that is harmful, abusive, or illegal is strictly prohibited (OpenAI).
- Misleading Content: It is not allowed to create images that mislead others into thinking they are human-generated when they are not (Canva).
- Political Content: Creating images for political content, including for electoral campaigns, is restricted (Canva).

One of the leading AI text-to-image generators, Midjourney displays the following restrictions when it detected an offending prompt.

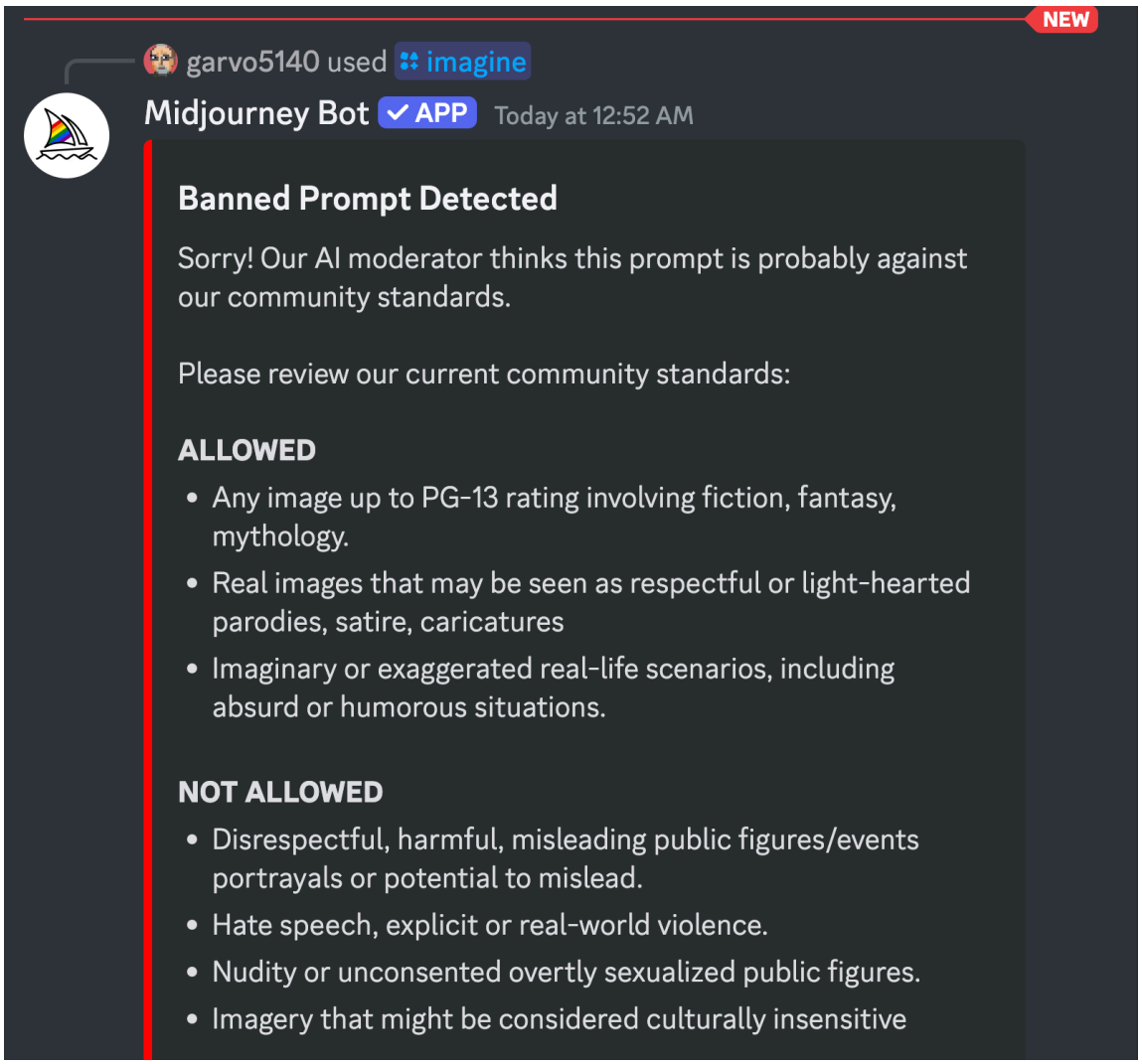

Figure 5. *Banned Prompt Detected Message*
Source: Midjourney Bot on Discord, screenshot by author

This message above was displayed when typing the prompt "/imagine Biden and Trump." Midjourney boils their guidelines down into these straightforward terms:

The Midjourney Code of Conduct (Midjourney, n.d.):

- Don't be a jerk.
- Don't use our tools to make images that could inflame, upset, or cause drama. That includes gore and adult content.
- Be respectful to other people and the team.

Terms of Use

Other considerations include the uncertain terrain of cloud-based services and the creator's rights and ownership of work. On June 6th of this year (2024), Adobe updated their terms of use with this unilateral declaration:

> Solely for the purposes of operating or improving the Services and Software, you grant us a non-exclusive, worldwide, royalty-free sublicensable, license, to use, reproduce, publicly display, distribute, modify, create derivative works based on, publicly perform, and translate the Content.

Due to the immediate cascade of cancellations of subscriptions and protests by a broad segment of the professional creator community Adobe quickly took down the terms quoted above and released a clarification of their Terms of Use on June 10th (Adobe, 2024b). To allay concerns of violations of copyright Adobe added:

> Adobe does not train Firefly Gen AI models on customer content.

Most importantly to their community of professionals Adobe specifically added:

> Adobe will never assume ownership of a customer's work.

OpenAI's Terms of Use (OpenAI 2024) covers both ChatGPT and DALL·E as well as "OpenAI's other services for individuals, along with any associated software applications and websites (all together, 'Services')." These terms also assert if you use these services, "you agree to these Terms." Under the heading "Using Our Service" OpenAI indicates "What you can do" and "What you cannot do." Users must agree not "to use our Services for any illegal, harmful, or abusive activity." These terms list several examples of prohibited usage including:

- Use our Services in a way that infringes, misappropriates or violates anyone's rights.
- Modify, copy, lease, sell or distribute any of our Services.
- Attempt to or assist anyone to reverse engineer, decompile or discover the source code or underlying components of our Services, including our models, algorithms, or systems (except to the extent this restriction is prohibited by applicable law).
- Automatically or programmatically extract data or Output (defined below).
- Represent that Output was human-generated when it was not.
- Interfere with or disrupt our Services, including circumvent any rate limits or restrictions or bypass any protective measures or safety mitigations we put on our Services.
- Use Output to develop models that compete with OpenAI.

While the first and the fifth specify violations of rights and potential social harms, the majority of the listed items read like a non-compete agreement where the primary concern is protection of the business model.

Reasons for termination or suspension of use of OpenAI's service include:

- You breached these Terms or our Usage Policies.
- We must do so to comply with the law.
- Your use of our Services could cause risk or harm to OpenAI, our users, or anyone else.

A section on Copyright Complaints provides an address or an online form to submit a written claim of copyright infringement. This claim must include among other items the following:

- A description of the copyrighted work that you claim has been infringed upon
- A description of where the allegedly infringing material is located on our site so we can find it

Given the methods of how LLMs like ChatGPT have been trained and the manner in which data is represented and stored, these requirements listed in OpenAI's terms set an impossibly high bar for proving infringement.

LLMs like OpenAI's ChatGPT and AI image generators are trained on vast amount of data available across the internet. Much of the training or 'scraping' was done by low wage workers without the knowledge or consent of the creators of the 'data'. While these training practices are ethically questionable, the resulting AI outputs have been alleged to have infringed on copyrights.

A high-profile lawsuit was filed by the New York Times on December 27th, 2023 (Grynbaum, Mac, 2023). In their lawsuit against OpenAI and Microsoft, the New York Times alleges copyright infringement of their published and copyright-protected content. Gesmer (2024) comments that this case and similar ones defy "conventional legal analysis" when attempting to apply "traditional copyright law to a revolutionary technology: Large Language Models (LLMs)."

Creatives in the visual arts, design, fashion industry, the music industry and writers represented by the Author's Guild have filed a number of lawsuits against Open AI, Anthropic, Meta Platforms Inc., Stability AI, Midjourney, and Deviant Art. These lawsuits allege that the output from AI text or image generators infringe on the creator's copyrights. One lawsuit includes a civil Racketeer Influenced and Corrupt Organizations Act claim (Saber, 2024).

In August of 2024, a class action lawsuit was filed against Anthropic, another leading AI company (Field, 2024). Separately, Google won a temporary victory when a judge dismissed a lawsuit alleging privacy and copyright infringement due

to AI training. However, the plaintiffs were permitted to refile their complaint (Weber, 2024).

The EU AI Act

While the United States currently lacks legislation that addresses these disputes over copyright infringement both in the training and in the output of AI-generated content, the European Parliament has been proactive and recently adopted the EU Artificial Intelligence Act ("AI Act"). This landmark legislation enforces through fines of transparency requirements on AI providers regarding the content used to train their models so rightsholders can protect their intellectual property (SIDLEY, 2024).

The Human Touch

A significant ruling determined that artists could not claim copyright for an AI computer generated work. On August 21, 2023, a federal judge ruled on behalf of the United States Copyright Office that copyright protection requires "human involvement". The judge noted: "Thaler (the AI artist submitting for copyright protection) must either provide evidence that the Work is the product of human authorship or convince the Office to depart from a century of copyright jurisprudence. He has done neither," – US Copyright Office (Solomon, 2023).

Over the next few years these contentious issues will be litigated, task forces will issue guidelines, legislative bodies will pass laws that govern big tech, data gathering and output. All these developments will impact those who make their living from creative (and even not so creative pursuits). The ALLKNOWINGPERSON (2023) makes the following sanguine and cynical pronouncement: "You won't lose your job to AI… You will lose your job to someone who uses AI to make work tasks easier, better, and quicker in your workplace."

The Spirit of a Liberal Education

The AAC&U Mandate

As with many liberal arts colleges and universities, course development at Quinnipiac University is guided by the same general principles as recommended by the Association of American Colleges and Universities (AAC&U). The AAC&U advocates for a liberal education that (Adelphi University, 2014):

> …empowers individuals and prepares them to deal with complexity, diversity, and change. Provides a broad knowledge of the wider world (e.g., science, culture, and society) as well as in-depth study in a specific area of interest. Fosters a sense of social

> responsibility, as well as strong and transferable intellectual and practical skills e.g. communication, analytical and problem-solving skills, and a demonstrated ability to apply knowledge and skills in real-world settings.

The AAC&U argues that liberal education has "specific learning outcomes that are essential for work, citizenship, and life (AAC&U, 2024a)."

The State Mandate

The State of Connecticut Department of Higher Education mandates breadth and depth general education requirements that "shall include a balanced distribution of required courses or restricted electives in the humanities, arts, natural and physical sciences, mathematics, and social sciences (CT.gov, 1986)." "AI & Art" is designed to satisfy one three credit general education Fine Arts breadth requirement, as a part of the University Curriculum.

The University Curriculum Mission Statement

The University Curriculum Mission statement articulates the expectations of the breadth component for inclusion into the curriculum for any course from any discipline. Course design should satisfy the spirit and intent of the AAC&U's ideal of a liberal education as well as the State of Connecticut's mandate for higher education. The following excerpt from the Quinnipiac University Curriculum Mission Statement (Quinnipiac University, 2024–2025a) discusses the relationship between general education and the overall goals of a college or university education:

> Through the University Curriculum, intentional learning is fostered by studying human cultures, artistic and literary expressions, the physical and natural worlds, and the forces that have shaped and continue to shape our world. Students develop a flexible and open mind, the capacity to learn from others, effective communication skills and the ability to influence potential solutions to global problems.

Essential Learning Outcomes (ELOs)

In addition, each University Curriculum course should deliver some or all of the Essential Learning Outcomes (ELOs) that define the skills, knowledge and wisdom imbued by a liberal education that are expected for graduates of Quinnipiac University. Quinnipiac's ELOs are based on those Essential Learning Outcomes championed by AAC&U (2024b). As approved by the Faculty Senate, ELOs should achieve the following as part of the broad elements of a Quinnipiac University education (Quinnipiac University, 2024–2025b):

> Quinnipiac graduates … have a sufficient command of key forms of literacy, as well as the requisite intellectual, social, and personal skills and understanding, to

> identify and respond effectively to contemporary problems. Quinnipiac graduates demonstrate a number of key outcomes essential to the life and practice of a responsible, educated citizen, consciously and decisively. Graduates acquire these Essential Learning Outcomes (ELOs) through a purposeful integration of the University Curriculum, requirements within one's major, and co-curricular experiences.
>
> The University Curriculum Essential Learning Outcomes (ELOs) include:
>
> - Disciplinary Knowledge
> - Effective Communication
> - Recognition of Differences and Equity
> - Higher-Order Thinking
> - Creative Thinking
> - Inquiry and Analysis
> - Social and Emotional Intelligence

Career Readiness Competencies

The National Association of Colleges and Employers has identified eight career readiness competencies (NACE 2024a). For higher education these "provides a framework for addressing career-related goals and outcomes of curricular and extracurricular activities, regardless of the student's field of study." For employers, career readiness assists in sourcing talent and provides "a means of identifying key skills and abilities across all job functions; similarly, career readiness offers employers a framework for developing talent through internships and other experiential education programs."

These eight competencies are:

- *Career and Self-Development*
- *Communication*
- *Critical Thinking*
- *Equity & Inclusion*
- *Leadership*
- *Professionalism*
- *Teamwork*
- *Technology*

There is an overlap between the NACE career readiness competencies with Essential Learning Outcomes (e.g. communication/effective communication; critical thinking/inquiry and analysis; equity & inclusion/recognition of differences and equity). Competencies like leadership, professionalism, teamwork implicate social and emotional intelligence and critical thinking arguably may recruit higher-order

and creative thinking. ELOs lay claim to career readiness and self-development. Technology as a competency may be realized through disciplinary knowledge.

Course Specific ELOs

"AI & Art" touches on multiple outcomes but especially promotes the following outcomes: critical and creative thinking, inquiry and analysis, and effective communication. The course also aims to foster additional competencies that are implied by the ELOs such as knowledge and literacies, social and emotional intelligence, and intercultural citizenship. NACE (2022b) competencies such as career and self-development as well as "Technology" as a competency are part of the raison d'être for "AI & Art." The overall intent of the course design is to foster acquisition of the ELOs and career readiness through a purposeful integration of the University Curriculum.

AR 271 "AI & Art" is offered through the Department of Visual & Performing Arts housed in the College of Arts and Sciences. A recently updated vision statement for the College now includes (Renfro, 2024):

> Known for our inclusive teaching, faculty mentorship, and high-impact experiences, our programs integrate career planning and skill development into a comprehensive liberal education tailored to meet the needs and challenges of the twenty-first century.

The College of Arts and Sciences has further identified the following educational goals which are an additional expectation for course design and delivery (Renfro, 2024):

- Offer a distinctive education that positions the college and our students as leaders
- Incorporate artificial intelligence and other emerging technologies into pedagogy, courses, and programs
- *Foster intellectual, personal, and professional growth*

These goals are woven into the fabric of "AI & Art."

Diversity, Inclusion and Essential Learning Outcomes

Essential Learning Outcomes (ELOs) such as social, emotional, and intercultural intelligence foster a spirit of diversity and inclusion where different voices and individual aesthetics are welcomed and encouraged to participate. All courses must be aligned with the University's commitment to Inclusive Excellence (Quinnipiac University, 2024–2025b):

> Acknowledging that we live in a pluralistic society, we have a genuine desire to ensure that all Quinnipiac community members feel empowered to express their own individuality. These principles underscore our central mission of teaching and learning

> and are vital to achieving national prominence and excellence in education. They also serve as the foundation for promoting our community's economic, social and cultural well-being.

The Office of Inclusive Excellence (OIE) seeks to "foster an inclusive campus culture that embraces the diversity of identities, ideas and values."

Results

Course Deployment

AR 250 "AI & Art" was added to the Fine Arts Curriculum and the University Curriculum as AR 271*DA (designating online delivery), launching in spring 2024 and running again in the fall semester 2024. As part of the breadth and depth requirements for higher education as mandated by the State of Connecticut, Department of Higher Education, this course satisfies one three credit, University Curriculum Fine Arts Course requirement. Each semester the course was offered (Spring 2024 and Fall 2024), it was fully enrolled to capacity.

The Course Catalog Description

Included in the University Curriculum, this course, as discussed above, fosters essential learning outcomes: e.g. critical thinking, creativity, aesthetics, social & emotional intelligence. The Catalog course description is as follows:

> Artificial Intelligence text-to-image generators have recently exploded in popularity. In this course, you will learn about and use some of these new and powerful tools to create novel AI-assisted art. We will take a look under the hood at the AI that makes it all possible and discuss the implications of this technology concerning artistic originality, ethics, copyright and the emergence of deepfakes.

Course Learning Objectives

In addition to embedding ELOs, University Curriculum courses offer specific Course Learning Objectives (CLOs). For "AI & Art" these include:

- Students will learn how to use AI text-to-image generation
- Students will learn the very recent history of generative art
- Students engage in effective communication by making use of their writing, and critical thinking skills for reading responses and learning how to express their ideas clearly and succinctly to write effective prompts
- Student will learn artistic principles, terms, aesthetics and techniques

- Students will learn how to effectively use AI text generation while maintaining their own "human" voice
- Learn about the underlying technologies of neural nets, machine learning, image generation, diffusion models and LLMs

Course Organization

During each class meeting, students discuss the written reading responses, critique one another's work, share and experiment with different prompts to generate images. During these discussions the class addresses stylistic issues, genres and aesthetics. Each class meeting concludes by reviewing upcoming assignments and the next topic for written responses.

Text-To-Image Generation Software

"AI & Art" employed the following AI text-to-image generators:

- OpenAI's DALL·E 3 available through Microsoft's Copilot
- Adobe Express Firefly (Firefly is available in multiple Adobe Applications)
- Midjourney
- Flux.AI (added Fall 2024

Because of the rapid development and release of new AI image generation tools, brief introductions and demonstrations were given with the following software:

- Stable Diffusion online (https://stablediffusionweb.com/)
- Playground.ai (https://playground.com/)
- DAVINCI https://davinci.ai/
- Nightcafe (https://creator.nightcafe.studio/)
- Blue Willow (https://www.bluewillow.ai/)

Course Deliverables

Students have the following deliverables as assignments and requirements:

- Attendance
- Homework consisting of: Image Generation (at least 8 images per week)
- Written Responses to weekly topics and assigned readings
- Prompt Sharing (blog posting)
- Portfolio PowerPoint and Final Presentation to the class

Figure 6. *Prompt written by Brian Stefanski: "a photo of a bright red rose in high detail, but everything is in grayscale/black and white, taken on a 50mm f1.8 lens"*
Source: Generated by Midjourney

Homework

Image generation homework is due each class. Students explore how to write different text prompts to generate "conventional" image genres such as self-portraits, portraits, figure poses, still life, landscapes, cityscapes, illustrative or photographic images of plants, animals, insects, alien life forms and fantasy creatures.

Students are encouraged to further explore different rendering styles or stylistic approaches such as: photorealistic, animé, silk-screen, painterly, watercolor, woodcut, etching, impressionistic and/or expressionistic, historical periods and different genres such as children's book illustrations, steam punk, surreal, Sci-Fi, etc.

Specific terms and references are introduced from filmmaking and photography such as depth-of-field, focal length of lenses, grainy or color film, wide angle etc. Careful use of terms contributes significantly to the resulting look of the image. Midjourney and other diffusion models also incorporate parameters–simple codes using special characters that change how a resulting image renders.

Figure 7. *Prompt written by Brian Stefanski: "Macro Green Leaf with Crystal Clear Water Droplets showing its Perfections with Central and Lateral Ribbing, with Little Ants Crawling away creating a Beautiful Reflection"*
Source: Generated by Adobe Firefly

Additional prompting techniques include referring to well-known artists (proceed with caution!), using both positive and negative prompts (e.g. red apple, no leaves) and additional techniques like background removal, in-painting (selecting

an area to be replaced by an AI-generated content) or out painting (expanding an image a vertically or horizontally with AI-generated imagery).

Weekly written Responses

Students are given short writing response assignments, essentially short essays on topics covered each week. Students must adhere to the following instructions:

- The postings should be a thoughtful, reasoned response to the current topic
- The response should include citations as appropriate
- Show evidence that the student has done the reading through citations
- It should be a least 1000 characters in length (required for AI Detection)

Figure 8. *Prompt written by Caroline Godbout: "A Calico cat wearing a Sweater, Raining, in the Style of E.H. Shepard --s 500 --ar 1:1"*
Source: Generated by Midjourney

Topics

Students are to write responses to the following topic prompts which are based on supplementary readings. In past semesters topics have included:

- "What is art?"
- "What is the role of art in society?"
- "What is creativity?" and "Can AI be creative?"
- "How can you tell if an artwork is AI-generated?"
- "How to critique AI-generated art?"
- "How does text-to-image AI work?"
- "Should artists be afraid of AI-generated art?"
- "Does AI increase the value or devalue traditional art?"
- "Is AI unethical? Does it violate Intellectual Property and Copyright?"
- "Deep Fakes: what are the social and political implications?"
- "The Precession of the Simulacrum" - "images precede reality (Baudrillard, 1994)"
- "Is there gender or racial bias in AI image generated art?"
- "What is the future of AI?"

Using ChatGPT

Students are permitted to use ChatGPT to compose their written responses to the topics currently under consideration. This is considered an important part of the course. Students are required to generate at least two or more paragraphs consisting of at least 1000 characters on the current topic under consideration. Students always have the option to write their response entirely by themselves. Guidelines include:

- Repeat as necessary using a new prompt to improve results as needed
- Use Quillbot or Grammarly (or both) for revisions
- Students then do a final revision "in their own voice"
- Students should add citations and sources as appropriate
- Use an AI Detector to make sure that their text is at least "51% likely to be written by a human."

ChatGPT and AI Detection Software

Student essays were checked with the following AI detection tools:

- Originality.ai (https://originality.ai/)
- The OpenAI Text Classifier (discontinued)
- GPTZero (https://gptzero.me/)

AI detectors are used for spot checks. Postings should be at least 51% 'likely' to have been written by a human, with a low probability of being AI-generated. Threshold of failure is determined when two or more AI detection reports indicate the text is likely written by AI. In that case students are required to rewrite and resubmit their assignment.

Assessment

The following summarizes the percentage weighting given to each assignment:

Table 1. *Assignments and weighted percentages*

Deliverables/Requirements	% of Grade
Attendance and Participation	14%
Writing Responses	16%
Image Generation	30%
Prompt Sharing	15%
Portfolio Project & Presentation	25%
Total	100%

Discussion

False Positives

There were several instances of 'false positives' where AI detection software made false accusations of text having been written by AI. In such cases students came forward to contest the determination. This created an obviously difficult situation. It was appropriate to defer to the student's word, given uncertainty of AI's methodologies and the 'untamed' tendency to hallucinate.

Another issue arose early in the semester when students initially did not revise or edit the text generated by ChatGPT. They needed reminders and grading penalties to encourage revision.

Diversity, Equity & Inclusion

It is important to establish from the first day of the semester that a diversity of opinions and full participation of all students is welcomed, especially during critiques. The challenge is to foster an environment in which all members feel comfortable enough to contribute to discussions and feel fairly represented. This means creating a space where students are at ease discussing topics, particularly controversial ones, with civility and open-mindedness. As with the Midjourney guidelines students are reminded to create images that are respectful of others.

The following excerpts from the course syllabus, promotes these values along with the University's commitment to Inclusive Excellence described earlier:

> We are committed to maintaining an environment in which all members are treated equitably, feel fairly represented, and are comfortable discussing topics, particularly controversial ones, with civility and open-mindedness.
>
> We ask all members of the community to think about the work they are producing and ask themselves if they are consciously or unconsciously reproducing or reinforcing stereotypes, bias, or other elements that reinforce systemic racism, sexism, bigotry or other inequalities. Technology can change the world; let's make sure we are changing it in a positive way.

For "AI & Art" it is necessary to reinforce these principles because of the potential for AI-generated images to be offensive to individuals or groups. The following statement is also included in the syllabus:

> RESPECT FOR OTHERS or WOULD YOU SHOW IT YOUR MOTHER?

Students are encouraged to "Exercise the pre-cautionary principle and create a safe space for sharing our work. Do not share or post work that may be considered offensive or images that may be interpreted as being disrespectful to any members of our community. If you have any doubts don't show or post the image." I also restate the Midjourney Code of Conduct listed earlier in this paper. These statements also help to create a positive environment that welcomes difference and neurodiversity as discussed above.

Throughout the course students are challenged to think critically about the images they generate. As students engage with each they are encouraged to consider if they (or the AI) are consciously or unconsciously reproducing or reinforcing bias, or stereotypes that reifies or reinforces systemic racism, sexism, bigotry or other inequalities.

Keep the Customer satisfied?

At different times the "more knowledgeable other" (Vygotsky's MKO–i.e. the instructor) needs to intervene to challenge students to reflect critically on their images including their written responses to the topic prompts. This sometimes means carefully challenging students to rethink their prompts, regenerate their images or rewrite their submissions.

Through his teaching at Duke University, New York Times columnist Frank Bruni (2023), reminds his readers that: "…learning means occasionally being provoked, frequently being unsettled and regularly being yanked outside of your comfort zone." This literally means challenging students to consciously expand their personal Vygotskian proximal zone of development through intentional

reflection and higher order thinking. Bruni adds, "I've found that most students can handle that dislocation–if they're properly prepped for it."

Figure 9. *Prompt written by Kayla Finkle: "Frida Kahlo Style Painting of a Steamship at Sunset"*
Source: Generated by Midjourney

A Teachable Moment

Figure 9 depicts an AI-generated image where the student includes the name of the artist. Adding a well-known artist's name to prompt often results in the generation of images that are rendered in the style of the artist, using the artist's typical subject matter and sometimes a reasonable facsimile of the artist style.

However, in the case, the prompt "a steamship at sunset" is a subject that the well-known Mexican painter Frida Kahlo, would likely never been painted. It appears to be rendered in a style similar to either a woodblock or screen print. Married to the Mexican muralist Diego Rivera. Frida Kahlo had a difficult marriage and lived her life in pain due to a tragic vehicle accident as a young girl. Her body of work focuses on her personal hardships, often painted in a surrealist style rich with symbolism.

When this student presented this work, it offered a perfect opportunity to critique the AI-generated image and to guide the student to research and gain a deeper appreciation of the work of Frida Kahlo. The reader can view Kahlo's artwork and a timeline of the significant events in her life here: https://www.museofridakahlo.org.mx/frida/

Critiques

Vygotsky's zone of proximal development applies to how to conduct in class critiques of student work. Students initially are reluctant to volunteer to participate and engage in critiques. This is in part due to peer pressure, a fear of offending others, being perceived as a 'jerk' and then being ostracized. The instructor's role is to demonstrate how to talk about a work of art without criticizing the creator.

AI-generated imagery offers an immediate tactic to deflect from the student who wrote the prompt to discuss how well the AI tool executed the written prompt. The first prompt written often produces unwanted results and it takes repeated tries and modifications (test and iterate) of the prompt to generate the desired result. So initially critiques focus on prompts and how a prompt can be edited to be more effective.

The next step to aid students in critiquing their own work and the work of others is to direct them to describe one element that works, and then to suggest a change to another element in the image. Students are instructed to avoid saying whether an element is bad or wrong or if they like or dislike something in the image.

Rather they are encouraged to identify and articulate the objective elements of an image such as color properties, form, contrast, proportions, composition, theme, mood and how each of these elements support the other and achieve the overall outcome. A pedagogical goal is to provide students with the vocabulary needed to have this discussion. This requires thinking about thinking, in other words metacognition and higher order thinking.

Survey Results

Student Course Survey Responses

At the end of each semester (Spring 2024, Fall 2024), an online survey was conducted to gather students' responses and feedback that can inform course redesign, organization, and content. Some questions focus solely on course management and issues like costs of subscriptions for access to AI software. Other questions are more substantive. Although the Response rate was low (Fall 2024: n =7; Spring 2024: n=13), none-the-less the survey provided useful insights into answering the three conjectures raised at the beginning of this paper restated as questions:

- Will students engage with AI software tools?
- Will students engage with artistic challenges/opportunities?
- Will students engage with the issues and controversaries surrounding AI?

The following excerpts from the survey support the conclusion that students were engaged with the AI software tools.

*We started with Dalle*3 followed by Adobe Firefly/Adobe Express, Midjourney and then Flux1.ai. Now that you have had the chance to use and experiment with all four, do you think this course plan works well?*

Fall 2024 100% of respondents answered yes.
(The Fall 2024 survey was updated to reflect inclusion of Flux.AI whereas the Spring 2024 survey did not reference Flux.AI)

Spring 2023 92.3% answered yes, 7.7% answered no.

Select student comments:

- *It gives each one enough time for students to get comfortable with them and learn from each one differently.* (Fall 2024)
- *I think this course plan worked 100%, we always went in and learned about it in class and then our following session we would go through our work and then get critiqued on our use of the program.* (Fall 2024)
- *I liked how we got to explore the different versions of AI. I never knew there were this many options to choose from.* (Fall 2024)
- *2 weeks each was really good because it was enough time for us to play around with the different platforms, get comfortable with the way each platform works…* (Spring 2024)
- *I liked seeing the differences between each image generator.* (Spring 2024)

The following two questions were the same for the Fall and Spring 2024 surveys. These indicate not only engagement with the use of the software and growing mastery of the 'art of the prompt' but also are indicative of a commitment to the aesthetic and artistic outcomes. Effective prompts are tightly linked to aesthetic intentions and artistic visual outcomes.

Did you find it helpful to share prompts?
Fall 2024 100 % answered yes.
Spring 2024 61.5% answered yes and 38.5% answered no

Select comments:

- *Prompt writing is the most important part of generating photos, and it was smart to dedicate more time to this.* (Spring 2024)

One respondent from Spring 2024 who did not find it helpful to share prompts commented:

- *i never looked at peoples prompts to think of what to generate. i used my brain to think of what to generate. using ideas for other people can be repetitive and not creative.* (Spring 2024)

The following question reveals engagement with artistic critiques and discussions of effective prompt engineering. However, the Fall 2024 result indicates that a significant number of students would like to spend more time in this activity.

> *We used "Speed Runs" to briefly view at least one homework image along with its prompt submitted by each student in the course. From your perspective was this....*

Too little time – to- Just the right amount of time (Likert Scale 1 to 3)

Fall 2024 42.9% answered 2 and 57.1% answered 3
Spring 2024 7.7% answered 2 and 92.3% answered 3

Supporting student comments:

- *Everyone had the opportunity to speak, and we got to see everything everyone generated with the right amount of time. (Fall 2024)*
- *I liked that we were able to share our images with the class because it allowed for me and everyone else in the class to share our ai images and give our different perspectives in terms of ai art. (Fall 2024)*
- *I liked the image sharing the most. (Spring 2024)*

These next results demonstrate engagement with the issues and controversies surrounding AI.

> *Did the written responses help you think about both the positives and negatives associated with AI text-to-image generators?*

Fall 2024 71.4% answered yes and 28.6% answered no.
Spring 2024 84.6% answered yes and 15.4% answered no

Student comments supporting these percentages:

- *It was nice to reflect on real issues that are happening in the world today.* (Spring 2024)
- *I liked the discussions we had revolving around the ethical use of AI.* (Spring 2024)
- *I liked exploring articles about the ways in which AI is affecting our society.* (Spring 2024)

The increase of 13.2% answering no in Fall 2024 was complemented by student suggestions such as:

- *I liked the written responses, and the time that they were due. I do think though if we had to have elaborated on them a bit more and not as often the outcome could have been better. (Fall 2024)*

The following student comments are a further indication of engagement:

- *I really liked actually using AI for image generation since before this class I wasn't that interested in it but throughout the semester I have been using it more for mockups for other class projects and just for fun. (Fall 2024)*
- *this course was awesome. it opens a part of creativity in someone's mind and i think creativity is huge is any workforce for generating ideas. (Spring 2024)*
- *I enjoyed being on the front end of everything ai during this semester. (Spring 2024)*
- *I just enjoyed the freedom to create nearly whatever I wanted with AI. (Spring 2024)*

Implications for Course Re-design

"AI & Art" has been offered as an accelerated seven-week online course. In the results reported above from the survey, students suggested allowing for more time to write longer written responses:

> *I do think though if we had to have elaborated on them a bit more and not as often the outcome could have been better.* (Fall 2024)

The Fall 2024 student course survey included the following new question that implicates pedagogical changes:

> *Should AR271 AI & Art be offered as a regular 15-week course?*

71.4% responded yes and 28.6%. with the following comment supporting this change:

- *It can help dive into each AI website more and give students more time to learn them.*

Extending "AI & Art" to run as a 15-week course would make it feasible to assign the writing responses every two weeks with added requirements for length. This pedagogical change would enrich intellectual engagement and foster developing competencies of critical thinking along with learning outcomes of inquiry and analysis, and higher order thinking.

Current developments in AI image generation are paralleled by dramatic advances in AI video generation software. A follow-up course to "AI & Art" tentatively titled "AI and the Moving Image" is currently under development. "AI & Art" would be a prerequisite to "AI and the Moving Image." In fact, many AI video generators, in addition to a text-to-video capability also feature an image-to-video generation feature. An emerging workflow is to use a LLM to generate a prompt, which is in turn used to generate a still image. That image is then used to generate video.

Impact on General Education and the Fine Arts

In an ideal world, students would first gain hands-on experience with traditional media of drawing, painting, printmaking, photography, design, typography and filmmaking. Exposure to the varied histories of image creation, compositional strategies and different cultural traditions would further inform knowledgeable creation. This would be appropriate to a Fine Arts major but is not workable as requisites for courses that are designed to satisfy breadth requirements built into the University Curriculum.

Further research might determine the broader impact on arts education by determining a difference in outcomes between students who have had wide exposure to traditional art making and media versus those students who have had little exposure or none.

In general, these survey results show that the course design aligns with student interests and aspirations. Student comments show that they engaged with the course in multiple dimensions, acquiring confidence in their newly acquired competencies in the use of the technology (e.g. LLMs) for writing and prompt engineering. With exposure to prompting techniques and terminology comes a growing knowledge of concepts, a command of vocabulary, and the ability to clearly communicate ideas. When addressing the implications of AI, critical thinking abilities are engaged by the written response assignments. Students discover and develop a personal aesthetic and gain confidence in their ability to create impressive artistic outcomes that will serve them in their future endeavors thereby paving the way for further self-development and career readiness.

An important subtext of this course is the awareness and sensitivity behind the precautionary principle to pause and consider the impact of AI-generated images. Being respectful to others and avoiding the creation of hurtful or harmful images directly implicates related learning outcomes, specifically the recognition of differences and equity, and social and emotional intelligence. These essential learning outcomes play an important role in the pursuit of the following career readiness competencies:

- *Equity & Inclusion*
- *Leadership*
- *Professionalism*
- *Teamwork*

Further Considerations and Conclusions

At the time of the writing of this paper the following issues persist:

- Copyright Infringement lawsuit resolutions
- No copyright protection (US)
- An overwhelming number of newly released and competing AI tools
- Dramatic advances in text-to-image and text-to-video generation
- Advances in voice generation and simulation
- Increasing regulation (EU and US Congress)
- Deep Fakes (Influencers, News Personalities, Politicians)
- Proliferation of Deep Fake Porn

AI ART: Beyond Text-to-image Generation

Long before the advent of text-to-image AI-generated art, artists explored generating images through programming code. The Victoria and Albert Museum in 2009 mounted the "Digital Pioneers" exhibit (Dodds, 2009) which exhibited many of the landmark computer-generated algorithmic works originally created as early as the 1950's. The largest portion of that modest exhibit was devoted to seminal works from the sixties through the seventies. In the early seventies, Harold Cohen developed an AI robot dubbed Aaron who became his partner in creating images algorithmically (Wikipedia, 2024). The Processing Foundation (Processing, n.d.) is dedicated to making programming to create digital art accessible and widely available.

The nearly year-long exhibit of *Unsupervised — Machine Hallucinations* at the Museum of Modern Art in New York helped establish Rafik Anadol as one of the leading artists in the world who uses AI (MOMA, 2024). Anadol has developed his own proprietary software and does not rely on the publicly available diffusion models of the well-known AI text-to-image software.

Co-intelligence (is all you need!)

Technologists, AI enthusiasts, the public at large, select artists and designers endorse the use and development of AI image generation. Notably, AI text-to-image generation software makes it possible for someone with little or no training in fine arts or in photography to easily and quickly create stunning images filled with detail. This ease of use and accessibility is to be welcomed especially by those who have some bodily limitation or disability.

The best examples are created by those fully immersed and knowledgeable in the visual language of art, photography and cinematography. The most effective prompts 'artfully' use precise descriptions, invoke names of artists, reference history, specify lenses, film type, time-of-day, lighting and cinematic effects to achieve outcomes.

For established artists who embrace the technology, AI text-to-image software avoids time-consuming, labor-intensive work, fosters the creation of highly detailed and realistic work and can enhances workflow, the production pipeline, and assist in the creative process by generating many variations than what is humanly possible. Ethan Mollick (2024) speaks to the surprising capabilities of AI text-to-image generators: "We didn't expect them to be as good at creativity, but they can generate ideas better than most humans can!"

The Downside

A major effect is the devaluation of traditional fine arts skills and knowledge acquired through many years of experience. Hard-won skills that represent the legacy of millennia of human cultural acquisition are at risk of being lost. For many artists and designers, this means the loss of job opportunities especially for those "gig workers" who do free-lance and work-for-hire with little or no benefit protections.

The tech giants have built this AI text-to-image generation technology on scraping the internet (in other words on the theft of intellectual property), effectively violating the intent and spirit of copyright. The Zuckerberg's motto "move fast and break things" is basically unethical and outmoded (Taneja 2019). Almost all the leading players have adopted the tactics of bait (free access) and switch monetization through tiered subscriptions.

LLMs and diffusion models require huge computing and data resources. New 'virgin' data is increasingly a scarce resource. AIs are now being trained on their own output. This negative feedback loop can lead to a decline in quality. Another problem is this technology is environmentally unfriendly, requiring as much electricity as a small country.

Effective prompts can be copied without an appreciation or understanding of the word usage or the underlying technology. As seen with Figure 9, the uninformed can misuse an artist's name without familiarity with their style or body of work. The ease of image generation without critical thought and the sheer volume of generated images contributes to declining ability to make critical discriminations and assessment of quality.

Does a course like this 'train' future creators of deepfakes? As the technology of AI generation spreads will we increasingly see abuses such deepfake images of celebrities and politicians, with the proliferation of virtual pornography and revenge porn?

A more recent but seemingly benign trend is the creation of AI-generated virtual influencers and AI girlfriends. The proliferation of these avatars may create unrealistic expectations for real human beings. For the vulnerable such virtual substitutions may lead some to avoid interaction with other human beings thereby contributing to social isolation and alienation.

Figure 9. *Prompt written by Connor Kozyra: "A Western Barn surrounded by Fields; Black and White Photo"*
Source: Generated by Adobe Firefly

The photorealistic AI-generated image has undermined the authority of the photographic image as a stand in for objective fact. Will this lead to the breakdown of claims to objective facts or a shared consensus of reality? Are we entering a period of continual cognitive dissonance and a permanent dissociation from reality?

The Future is now?

Mollick (2024) projects three possible scenarios in the near future for the development of AI.

- As good as it gets (the worst AI you will ever use)
- Slow growth (Linear and the jagged edge)
- Exponential Growth
- Narrow AI vs. AGI/ASI

Given the pace of development yesterday's AI tool was the worst you will ever use and in turn will soon be deprecated. AI may improve incrementally with sudden and dramatic spurts of innovation, or the growth curve could match Ray Kurzweil's exponential expectations of the singularity (Kurzweil, 2005). Will big tech focus only on perfecting narrow AI, or will the competing AI companies continue the quest for the holy grail of Artificial General Intelligence (AGI) or pursue the potential apocalypse driven by the rise of Artificial Super Intelligence (ASI)?

Figure 10. *Prompt written by Anonymous: "Someone Painting a Picture of their family Dog"*
Source: Generated by Copilot (DALL·E 3)

Conclusions and Future Implications

An education in art history, traditional fine arts, photography, and now filmmaking is critical to understanding how to make effective use of generative AI. With the advent of these new powerful image-creation tools leading to the proliferation of millions of images are we amidst a new renaissance? Does the sheer volume of output of generated artwork 'in the age of AI reproduction' (cf. Benjamin, 1968) lead to the collapse of the value and authority of these visual artifacts? Is AI elevating kitsch to be the triumphant artistic style or are we witnessing emergence of a new aesthetic that is beyond pastiche, kitsch, low or high? Whether said by Darth Vader, the Borg in Star Trek or the Vogons in the Hitchhiker's Guide to the Galaxy (Adams, 1979), the Sci-Fi trope that "Resistance is futile" applies.

Postscript

"If truth is that which lasts, then art proved truer than any other human endeavor."

–Jeannette Winterson (2010)

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