Using AI in the Design Curriculum for Ideation, Exploration and Rapid Prototyping

Peggy Bloomer

Department of Art and Design, Central Connecticut State University,New Britain, Connecticut, United States

Abstract

The media is full of claims that the use of artificial intelligence (AI) is threatening the dominance of human creativity in many areas, including authentic original works in literature and the visual arts. The authenticity of creative work produced with the machine has been a controversial topic and explored by Benjamin in his The Work of Art in the Age of Mechanical Reproduction [1]. Generative AI is just another part of this progress and will not replace human creativity but augment it. An AI component was added to several fall design classes. In the fall web and design foundation classes, students used words and terms they would use to describe themselves and user personas to write AI text-to-image prompts. To obtain a satisfactory result, the user must craft a prompt that explains his intent to the bot to deliver "relevant and accurate responses" [2]. Image bots prompt writing requires digital literacy based on clarity of language akin to using a search engine. Exploration and play through the bot and the created image can return results that are unexpected and previously unthought of by the user. Post-assignment surveys were used to track the ease and difficulties of crafting an AI-directed image. Students found AI rapidly created scenes and detailed surroundings that would take them many hours to produce, however, many AI-created images needed additional reworking to work as part of their designs. In the spring semester, AI was added to a digital storytelling class based on Jungian archetypes and Campbell's steps of the hero's journey to create animated characters, a script, and a short 2D animation. Students used ChatGPT, Adobe Firefly, and speech and sound AI generators to aid them in producing the animations. The class found that AI is a great way to ideate and explore ideas and media creation, but that they still needed human execution in these animations and the final projects and their reflection on their projects underscores that generative AI is just another way that humans extend themselves through technologies [3].

Keywords: *ArtificialIIntelligence, Human_Creativity, New_Technologies, AI_in_the_Classroom, crafting_a_prompt, digital_literacy*

1. Overview

In Fall 2023, university professors' mailboxes were flooded with dire warnings that AI bots would be writing student assignments. Almost immediately, using ChatGPT was treated as a form of plagiarism, and software that could analyze if a student had used a platform such as ChatGPT, a large language module or LLM, became the solution to discover when students were using these AI bots. One such solution is GPTzero, which is similar to Turnitin which detects unreferenced sources in student writing [4]. Although caution and oversight are concerns with AI, it is clear that AI is here to stay. Its use will not be stopped, and as teachers, its use can be a teachable moment to share with students. In the Fall '23 classes, text-to-image and other media were plentiful and forever morphing. In Spring '24, AI was often incorporated into industry-standard software and its abilities, potentialities, and benefits are evolving daily. In Graphic Design, there is no question that students are using AI. AI is evolving quickly and students and designers can use it to save time, create artwork for rapid prototyping, and ideate diverse concepts. In this article, Ms. Bloomer reviews the introduction of AI into the Fall '23 design curriculum and looks at the benefits of software using AI provided in various Spring '24 projects.

2. Introducing AI Into the Design Curriculum, Fall 2023 Semester

During the Fall '23 semester, AI-generated images were introduced into design assignments to explore student perceptions regarding this technology and to juxtapose outcomes with conventional graphic design methods. Presented here is a narrative detailing the integration process of generative images into assignments, student responses to this inclusion, showcases of student-created works, and reflections on the integration of generative art within the design curriculum.

2.1 Assignments Incorporating AI in the Design Foundation Class

The Design Foundations Class introduces new students to the principles and elements of design using design thinking. Two Fall 23 Design Foundations assignments used AI image generation. The first assignment asks students to create a silhouetted portrait of themselves by filling or outlining the shape of their head with keywords describing who they are. This assignment was loosely inspired by an MIT Twitter data portrait where the human form was used "as a frame for the visualization, but not as a carrier of information." [5] This assignment introduces students to thinking about the role of data, visualization, and artistic representation. The student is asked to play with the artistic genre, using the principles and elements of design, to create a data portrait of his/her/their individuality for the project. As Donath observes, "There is a trade-off between expressivity and accuracy: the artist's vision, which can render the subject distinctly and vividly, [but] also distorts the portrayal." [6]

Just how realistic or distorted this self-representation is, becomes evident in the second part of this assignment; using the portrait characteristics and the keywords in the data portrait, students use the keywords and prompts to recreate an AI image that resembles them "in real life". In the survey comments, students remarked that they needed to add a lot of descriptive phrases to get images that resembled them, using racial, gender, age, and even hair characteristics. There is a sort of perfection in the generated portraits which shows the limitations of current AI technology regarding creating images that resemble the majority of humans. Students are not physically perfect. Unlike them, no AI student image is fat, has pimples, or has unsymmetrical facial features. Even when one asks for imperfections, the results are hardly different. These representations lack the flawed and unique characters of the actual students. They remain stereotypes, not individuals.
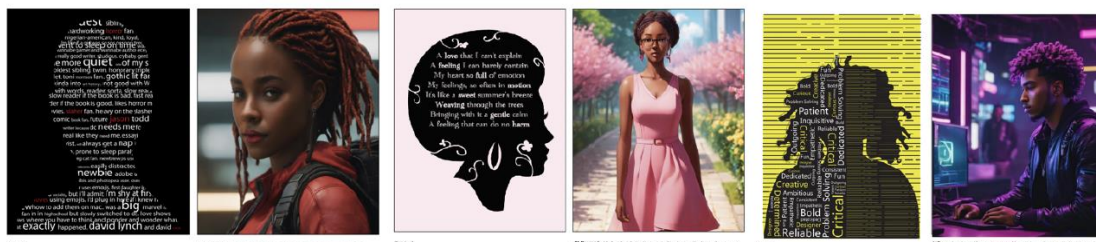
Fig. 1. Student Work for the Data Portrait Assignment: Left is a portrait made up of keywords and right is keywords and text-to-image prompts used to recreate semi-realistic portraits.

The second assignment, implemented as the final project for the Design Foundations Class, had students identify a contemporary designer whose work resonated with their individual concept of identity, encompassing factors such as race, ethnicity, gender, or neurodiversity. They then conducted research and compiled an annotated bibliography comprising a minimum of five scholarly references. Additionally, students prepared a pre-recorded, six-minute PechaKucha presentation discussing the chosen designer's utilization of design elements and principles in their creations.

Subsequently, each student created an original design project inspired by the chosen designer's style. Finally, leveraging the parameters of the selected designer's approach, students formulated a prompt for an AI bot to generate a version of their original project. Comparisons between the students' original work and the generative output were made, highlighting the potential successful integration of generative techniques into their assignments. Utilizing Midjourney, students employed generative methods to produce works reflecting the style of their "In the Style of" completed projects.

Fig. 2. Student Work for the "In The Style of" Assignment: Student work is to the left and AI image-to-text generation is to the right

2.2 Assignments Incorporating AI in the Design Web I Class

Another assignment that generates word prompts with a visual representation is the creation of UX personas. In this assignment, students created stereotypical users with imaginary names, characteristics, goals, and pain points. The first version of these personas used illustrations or royalty-free images to give shape to the persona. Using the language that described each persona, students then created a prompt to generate "photorealistic" AI-generated characters. Once again, there is a clear relationship between the two versions. However, one can notice that the backgrounds tend to be richer in the AI-generated versions.


Fig. 3. Student created personas from the stereotypes of their UI/UX personas using those words to create AI-generated personas. The backgrounds in the AI version are always much richer than royalty-free photos

Another assignment in the beginning web class uses poems and images to create a simple one-page responsive web page. Several students generated images instead of seeking royalty-free images. One prompt for these simple one-page websites centers around a Halloween poem with image backgrounds and featured images pulled from the text as inspiration. Several of these results are shown here:

Fig. 4. Using the words in Halloween-themed poems, bots helped to make images that enhance the poems.

As students learned more complex coding such as Flexbox, they generated images that effectively complemented their respective subjects. This indicates the feasibility of integrating generated images into a design workflow to augment conventional imagery and typography. Within the Flexbox website assignments, students merge generative background images with photographs and screen captures featuring various typographic elements.
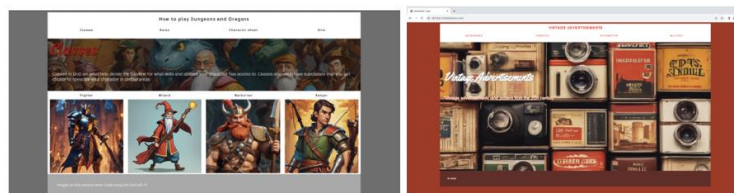
Fig. 5. AI images combine easily with other content on this site.

2.3 Student Reactions to AI

To record student's reactions to AI, they filled out a survey about this experience. Here is a sampling of their reactions. (*n=23)*

Question 3: Have you used AI before? 44% of students have used AI before. This result includes text generation, including "ChatGBT"

Question 4: Were you pleased with your result? 78% of students were pleased with the results of their completed work using AI text-to-image generation.

Question 6: Did you revise your work or recreate it to get a better result? 61% of students revised their work to get a better result that worked well for the project parameters.

Question 10: What were the disadvantages of using AI to create your work?

- The disadvantage is that the AI doesn't always generate images that are believable, accurate to the human's anatomy, or can have multiple contradicting traits added to the image. Along with this, AI could be using already copyrighted images into their generated images, which could result in issues later down the road as a Graphic Designer.
- Disadvantages are it can be difficult to get exactly what you are looking for and the technology is imperfect resulting in some weirdly distorted images that look uncanny.
- The disadvantages were the times AI got it wrong; it takes a bit of tweaking in the prompt to get your images just right which can take a little extra time.
- The disadvantages of AI are that the user has be careful with their words, they can cause it to change the image more than the user might like. For instance, I wrote college senior, and it created an image of an old man in college.
- It is not always precise with what you want. You have to be careful choosing the right words.

Question 12: Creating this project what did you learn about AI?

- I learned that there's still many limitations with this technology despite it being so widely considered to be a major threat to creation and artist in today's climate.
- I learned that while AI is fun, it is very temperamental and requires a bit of patience.
- What I like about AI is I can use it to help me brainstorm for another project where I can't put the images in my head together.
- I learned that AI is rapidly growing every day and changing the way we do our work. I learned that the closer to the beginning of the prompt the more important it is to the AI. I also learned that the more you type and more specific you are the closer to your desired outcome you will be. Kind of contradictory but hey that's just how it is.

3. AI Integration into the Design Curriculum, Spring 2024 Semester

3.1 Student Acceptance and Exploration of AI Programs

During this semester, a group of local High School Students visited the university campus to tour and create posters with guidance from the design students on the topic of "What Does Social Justice" look like? Participants were free to pick a topic, a person, or any concept that related to social justice. University students helped the visiting High School students use the Adobe Creative Suite. Adobe has produced its own AI image-to-text generator, "Firefly," and "Firefly" is free to subscribers of the Creative Suite. In addition, Adobe has incorporated AI generation into Photoshop and Illustrator and that ease of accessibility escalated during Spring '24. Many of the resulting posters used text-to-image AI generating as shown below:

Fig. 6. Students quickly use text-to-images to conceptualize their prompt

3.2 AI Incorporation in Narrative Digital Illustration Class

In the spring semester, Ms. Bloomer had a new class scheduled focusing on the development of characters, script writing, and storyboarding for animation. The inspiration for this class stemmed from her experiences in creating a short animation during a course at the New Centre for Social Research and Practice, titled "Prompt-Writing Workshop: Hybrid Intelligence, Generative AI & Human Creativity." Throughout the course, the author utilized various software tools such as MidJourney, PikaLabs, Wonderware, ChatGPT, and Speechify. While prototypes of characters were easily created, maintaining consistency throughout production proved challenging. The resulting animations in PikaLab were a mere three seconds long, while the Speechify narrations, although simple to generate, occasionally sounded AI-generated. Despite these flaws, the author found their production to be intriguing. Notably, the most successful projects in the class leaned towards futuristic themes rather than those that were character-driven. The author rooted the class curriculum in Jungian archetypes and Campbell's steps of the hero's journey, offering students a choice between using Procreate's Dreams or Adobe Animate for animation creation.

3.3 AI Character Pose Sheets

Ms. Bloomer had created a few character pose sheets in the aforementioned class which she created in Midjourney. She suggested to students that this automated character creation was a possibility for the class using Adobe's Firefly because it is part of the Creative Suite and would not require a subscription as the Creative Suite is installed on classroom computers. Several students successfully created AI-generated characters with posing as shown below:
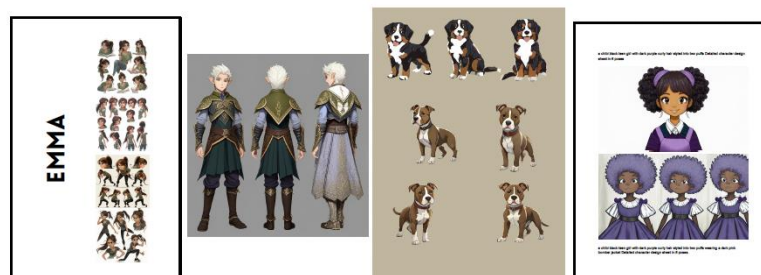

Fig. 7. AI-generated character with poses.

Unfortunately, Firefly was not working well the week of this assignment. This is a pitfall of using online, developing software. AI is growing exponentially, but at times its speed and reliability are not present while updates are made to the software.

3.4 AI Incorporation into Software vs. Stand-Alone Applications

As previously mentioned, AI is integrated into the Creative Suite and students are not charged extra to use it. This differs from many other programs, where limited free access is augmented with subscriptions to ensure fast processing and reliable access. These costs can accumulate, with the extended version of ChatGPT priced at $20/month, MidJourney/$10 to $30 a month, and Runway ranging from free to $135/month. Boords, a program useful in generating storyboards, costs between

$12 to $127/month. The key takeaway is that while AI may not be inexpensive, it has proven to be an effective, time-saving, and productive way to prototype complex design projects.

3.5 Student Experience with AI

The class took an exit poll about their experience using AI in the classroom. Asked about previous AI usage students had used both Large Language Models (ChatGPT) and image-to-text generators equally with 69% (*n=18*) having experience using both. Prior use of AI had grown from 40% to 70% in one semester. Yet some students elected not to use the image-to-text in their characters or animations.

Here is how students responded about when they used AI in this class:

- I used ChatGPT to help come up with ideas for a plot and to write a script. I used BOORDS to create the storyboards. I created the characters myself and used references online for the poses.
- I did use it for Boords and my final animation
- No, I did not rely on AI at all in any aspect of my work.
- Yes, I used AI when it came to creating my storyboards, and I also used it to get ideas for some of my characters, and facial expressions that I couldn't necessarily find
- I used AI to help with some of the script and the storyboard
- I used AI to help with some of the writing and storyboards although neither were really implemented in the final animation.
- I did use AI in creating my script and storyboards.
- I did use AI to guide me and give me a general plot, although I went in and tweaked some of it myself to make the language sound more humanlike.
- Not really I only used it for generating some ideas of what the plot for my characters should be. The storyboard, script, and characters I used were my own.

About 50% of students used AI for character development and 50% did not. Here are some reasons why students did not use AI:

- I did not use AI to design the characters because I enjoy drawing characters and wanted to draw the characters in my style.
- As an artist, I wanted complete control over my work, and AI would not give that to me. I also have some concerns with the ethicality of generative AI, so I prefer to stay away from it.
- It was an easy decision to make because I was able to visualize my own ideas and felt that there are still some concerns with AI and where it sources its combined, generated images from. Therefore, I do not feel great about using it, ethically speaking. Along with this, the images may depict distorted figures, unbelievable/unrealistic visuals, and nothing that can be claimed as their own hard work by the prompt writer.
- At the time that I didn't use AI in the course, I made that decision because I wouldn't generate certain characters I was looking to use, or there would even be copyright issues with the characters I was looking for being in an actual movie. I also didn't use AI when I hand created my characters for the trailer. I did this because I wanted to expand my creativity and skill level with drawing digitally.

Students had many of the same criticisms about AI image-to-text generators in both semesters. While AI is rapidly becoming more mainstream there are still many issues in its rendering of prompts and humans:

- It sometimes would not do exactly what I wanted it to do, such as creating a treasure room full of coins scattered on the ground with a spell book on a stand towards the back. AI would make the book or coins too big and bring the spell book closer than I wanted it to be. It took some time playing around with the script to get an image that was close to what I wanted.
- Images didn't always turn out how I imagined. And prompts did not alwyas work
- I couldn't get some of the images that I wanted because it wouldn't take to my keyword properly.

- AI feels very cold and is usually easy to spot. It also devalues your work greatly if AI was relied on in my opinion.
- Sometimes when I was using FireFly to create the backgrounds it just was not listening to my prompts at all. Very specific things I did not want in there, it would add or something that I really wanted to highlight in a scene I felt like it wasn't giving me what I wanted.
- The obvious limitations are messed up faces, hands, blending or adding ligments into areas they don't belong in. Another limitation is AI especially when creating characters, sometimes doesn't add what you typed into the program.
- Some of the pictures aren't as perfect as you would want them to be and even with ChatGPT writing up the script it's not like all the language is natural and flows like it would from a human being
- It's limitations was how strong and smart the AI system was. AI can be a hit or miss and sometimes it will warp and morph images. In addition, AI can be too generic and cliche sometimes making the story very bland.

3.4 The Clear Advantages of Storyboarding with AI

From the perspective of a teacher, I can see a clear advantage when students use a program to produce planning aids. The storyboards were more complete and professional-looking than those that students previously used in the class. Sharing these storyboards with stakeholders and a team is a more polished option than the hand-drawn versions. Actions, camera angles, and shots are much easier to follow. The fact that characters are not portrayed consistently is not as important in these storyboards. In addition, printing multiple copies to share with others involved in the production is easy.
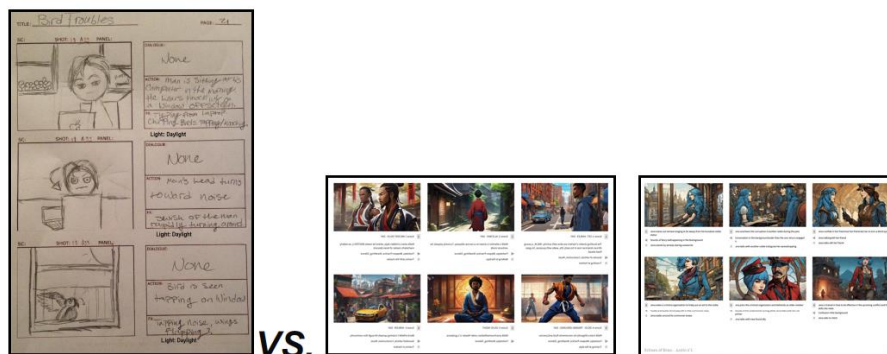

Fig. 8. The AI generated storyboard is easier to distribute and read than the hand-drawn storyboard

3.5 Student Comments About Using AI in the Future

In general, students found AI to help with some tasks and to distract them from achieving positive outcomes in more creative parts of their projects. Here is what they said about using AI in their future work:

- I could see myself using ChatGPT to generate ideas or to help start off writing something such as a pitch for a design. I can also see myself potentially using Adobe Firefly to generate images to incorporate in a design. I have already done this in my Graphic Design 3 class. When designing a coffee package, I used Adobe Firefly to create an image for each flavor. For example, I asked the program to create a red and white peppermint with a slight glow to it in the digital art style for the peppermint flavor. I wanted to make the peppermint feel like it came from a video game to go with the theme of the coffee package and I feel as though AI helped me achieve that look.
- Possibly, maybe for scripts.
- Honestly, no. I feel as though I am capable of visualizing my own ideas.
- I do because I will need it in the Graphic Design field. I plan to use it as a tool to base my drawings off of.

- Yes, I could see myself using AI for projects in the future. There are many ways I could decide to use it but I find it to be really helpful when you need to use AI voice overs or even create a storyline. I want to stay original and creative but will definitely use AI when I think it is helping in my favor.
- I think AI can be a great tool for stock photos. Less headaches giving credit and you won't have to pay for them depending on the AI model, of course. Otherwise, I mostly see it as a tool for inspiration, not a replacement.
- Yes but only as a reference. AI doesn't have much "soul" or creativity, so I only use it for templates or references.
- Yes I can see myself using AI in projects in the future. While I want to keep my projects original and unique, I feel as if AI could not only help me generate ideas but also emphasize my skills/designs.
- I can definitely see myself using AI in the future and in my projects. I see myself using AI to create images for a poster, for videos, booklets/magazines, brochure, logos. Also, using AI to aide in my graphic design work.
- Yes. Probably to help streamline a lot of the more tedious work like creating the artwork or creating the words or lettering or text allowing me to work around with typography placement grid layouts essentially the bare bones aspects rather than having to create everything from scratch

4. In Conclusion

The dire warning about AI eliminating human creativity are unsupported by my this exploration of using AI in design courses. The paywalls and the integration of AI into larger software applications, guarantee that it has a place in the workflow in graphic design. Just like search engines, spell check, and other tools, AI will not replace original work but help designers work through tedious and time-consuming tasks. Well-crafted prompt writing can generate imaginative images and delight and inspire humans.

Notes
[1] Benjamin, W. (2008).
[2] Groys, B. (n.d.).
[3] McLuhan, M., & Fiore, Q. (1989).
[4] Gregg-Harrison, W. (2023).
[5] Groys, B. (n.d.).
[6] Donath, J. (2020).

REFERENCES

[1] Benjamin, W. (2008). *The work of art in the age of mechanical reproduction* (J. A. Underwood, Trans.). Penguin Books.

[2] Groys, B. (n.d.). *AI as zeitgeist-machine - notes - e-flux.* E-flux.com. Retrieved September 19, 2023, from https://www.e-flux.com/notes/553214/from-writing-to-prompting-ai-as-zeitgeist-machine

[3] McLuhan, M., & Fiore, Q. (1989). *The medium is the massage* (11th ed.). Pocket Books.

[4] Gegg-Harrison, W. (2023, February 27). *Against the use of GPTZero and other LLM-detection tools on student writing.* Medium. https://writerethink.medium.com/against-the-use-of-gptzero-and-other-llm-detection-tools-on-student-writing-b876b9d1b587

[5] Groys, B. (n.d.). From Writing to Prompting: AI as Zeitgeist-Machine (notes, e-flux). E-flux.com. Retrieved September 19, 2023, from https://www.e-flux.com/notes/553214/from-writing-to-prompting-ai-as-zeitgeist-machine

[6] Donath, J. (2020). 8. Data Portraits. In *The Social Machine.* PubPub.