

Reflections on engaging pragmatically with generative AI to augment research and education practice

Morris Peter^{*}, Michael Connolly
Dundalk Institute of Technology

Abstract

Generative AI tools enable researchers to generate multimedia content, including human-like visuals, voice and text. This novel paper's purpose is to use generative AI to create a short paper, and to critically evaluate the process and implications of the material generated. Firstly, the capabilities of AI to generate multimedia content is summarised with an example of an AI generated professor. Both the opening section, and concluding reflections, are written without the use of AI. Perplexity.ai, an AI tool based on a large language model is used, through a series of prompts, to generate a short paper on AI in the animation industry. The generated paper emerged through a series of prompts written during a 90-minute session. The generated text is presented as is, modified only with minor deletions. In the concluding section, the impact of generative AI tools on researching are reflected upon with some positive and negative insights outlined.

1. Introduction

The Synthetic Professor was an AI generated professor, introducing himself as such, in a video presentation about an array of threshold concepts in various disciplines (Connolly & Morris, 2023). Generative AI was used to create the visuals, the audio and the text. Specifically, an AI generated human professor avatar, in 2D, was generated using getimg.ai (2023), with AI generated animation (D-ID Studio, 2023) and voice dialog using text-to-speech synthesis (ElevenLabs, 2023). The avatar was able to present on topics using text that was generated by ChatGPT (2023). Although there were some issues with the performative nature of the animations, including uncanny valley, limited expressiveness, and the lack of dynamics in tone of voice, the research indicated how easy and viable it was to generate a human-like professor character, delivering educational content, using the available generative AI tools at a low level of cost both in time and money (all tools were free or free trial). The text presented by the professor did include some errors by claiming real-world references that did not exist, written by experts in their field who do exist, demonstrating hallucinations. The authors of this paper presented the Synthetic Professor at EdTech, Dublin, in June 2023. This paper is a continuation of the research, further exploring the latest capabilities of Generative AI and its potential role in, and impact on, education.

^{*} Corresponding author: peter.morris@dkit.ie

The purpose of this paper is to move beyond the Synthetic Professor by focusing on one discipline area, namely digital animation, and to use generative AI to discuss the impact of AI tools, and technology, on the future of the industry, and on approaches to educating future animators. As educators in computing, animation and games, the authors have personal experience and perspective on how these tools are beginning to impact on the industry. Furthermore, as online educators, we are interested in seeing how far generative AI can currently go towards augmenting teaching practice and content creation, alongside production practices in industry.

The next section contains a short paper that was generated in perplexity.ai (Perplexity, 2023), a generative AI tool which utilises large language models to provide answers in threads, and is free to use with some limitations. While the version of perplexity.ai used for this paper was free, there is also a paid version called Perplexity Pro. Besides the prompts, no other default settings were changed when using the tool. Perplexity.ai provides some linked sources in its responses, often with in-text citations. Seven prompts were created in total, with responses to four of these prompts selected for the paper. This highlights a pragmatic approach to this research where the prompts were quickly generated which sometimes excluded key contextual information. The answers, which were evaluated and discussed using a dialogic approach between the two authors, indicated that some prompts were misguided and misdirected away from the research's topic areas – namely education and the animation industry. Follow up prompts were adjusted based on the previous answer, which allowed the researchers to improve and better target responses through “prompt engineering”.

The first prompt began with one element of the researchers' previous research, namely describing the Synthetic Professor's physical description. The aim of this was to create a persona from which perplexity.ai should compose a response, however, this information may have been disregarded by the tool as the prompt did not specify to take on the role of this professor. The prompt continues by specifying that the professor works in animation and is concerned by the impact of AI (Prompt 1):

Prompt 1. Distinguished professor, grey hair, short beard, tweed jacket. Lecturer in Animation, worried about the influence of AI and the future of animation production industry, what the future of animation will look like due to this technology.

Further prompts considered the influence of AI on the future of animation production and impact on skills required; the positives and negatives of AI, or an AI professor, on learners; the programme learning outcomes that could be applied to an animation course taking account of the impact of generative AI on the industry; and a general summary of the thread for the purpose of concluding the paper. Not all seven prompts' responses were used, and responses to the following three prompts (Prompts 3, 5 and 7 from the original thread) make up the rest of the paper (Perplexity, 2023):

Prompt 5. How can the lecturer prepare animation students for a future of AI in the animation industry, skill requirements, working life, and so on. Write these as programme learning outcomes.

Prompt 3. I would like to investigate and discuss both points of view regarding the positive and negative influences of AI or an AI professor has on their learners.

Prompt 7. Taking all of the above threads regarding AI and learning and the animation industry, write a research report of 2300 words.

Each of these prompts are included in the paper under four sub-sections, the titles of which are composed by the authors.

The referenced sources generated by perplexity.ai appeared as numbered links with in-text citations. These sources were manually reviewed and converted into APA-style citations and references by the authors and are presented separately at the end of the generated paper. Generated sources that were not cited within the generated text have been omitted by the authors and do not appear in the list of references presented here.

As can be seen in Prompt 7, some of the generated content summarised or rephrased previous answers. As a result of this duplication in generated responses, the repeated content was removed by the authors. Sometimes, the repeated text included a different citation(s), in which case all references are included while the repeated text is removed. Also, perplexity.ai responses often structure answers including words like “in conclusion”, or ancillary text like “according to the search results”. These structural phrases, when out of place in the paper, were also removed by the authors, without altering the meaning of the content. Otherwise, the text appears as in the original thread generated using perplexity.ai. The full perplexity.ai thread remains available, online, including full text of all prompts and responses.

2. AI Generated Short Report

2.1 Introduction

Prompt: Distinguished professor, grey hair, short beard, tweed jacket. Lecturer in Animation, worried about the influence of AI and the future of animation production industry, what the future of animation will look like due to this technology (Perplexity, 2023).

AI is expected to have a significant impact on the animation industry in the future. AI-based animations can be produced cheaply, quickly, and with far less manpower than traditional hand-drawn or computer-generated animations (Saraev, 2022). AI animation models already exist that can take a static illustration and "imagine" different movements, poses, and frames (Saraev, 2022). However, it is unlikely that AI will replace animators entirely in the near future (Safavinia, 2023). While AI can assist animators in certain tasks, such as rigging characters or generating motion graphics, it cannot replace the creativity and artistry that animators bring to the animation process (Safavinia, 2023). Animators are responsible for bringing characters to life, telling stories, and creating emotional connections with audiences, which requires a deep understanding of storytelling, acting, and animation techniques, as well as the ability to bring a unique vision and perspective to a project (Safavinia, 2023).

AI can automate some of the more repetitive and time-consuming tasks involved in animation, but it cannot replace human creativity (Safavinia, 2023). Animators can focus on developing their unique artistic vision and style and finding ways to express their creativity through their work (Safavinia, 2023). They can also explore new ways to collaborate with AI and use it as a tool to enhance their work (Safavinia, 2023). The animation industry is constantly evolving, and animators need to stay up-to-date with the latest trends and best practices (Safavinia, 2023).

As AI continues to improve, we can expect to see more realistic and detailed animations (CraveFX, 2023). AI algorithms will be trained to become even more advanced, and studios will be able to create smooth videos of any framerate with nothing more than a text prompt (Saraev, 2022). However, it is important for the animation industry to establish clear guidelines and regulations for the use of AI in animation, to ensure that both animators and audiences are protected (CraveFX, 2023). While AI can assist in creating animations more efficiently, it also poses a threat to the quality and uniqueness of the final product (CraveFX, 2023).

AI is expected to have a significant impact on the animation industry in the future, but it is unlikely to replace animators entirely. Animators can focus on developing their unique artistic vision and style and finding ways to collaborate with AI to enhance their work. The animation industry needs to establish clear guidelines and regulations for the use of AI in animation to ensure that both animators and audiences are protected.

2.2 Programme Learning Outcomes

Prompt: How can the lecturer prepare animation students for a future of AI in the animation industry, skill requirements, working life, and so on. Write these as programme learning outcomes (Perplexity, 2023).

To prepare animation students for a future of AI in the animation industry, the lecturer can design a program with the following learning outcomes:

1. Familiarity with AI tools and techniques: Students should be able to identify and use the latest AI tools and techniques in their animation work to stay ahead of the curve and create more innovative and compelling animations.
2. Collaboration with AI: Students should be able to explore new ways to collaborate with AI and use it as a tool to enhance their work. For example, they can use AI to generate rough animations, which they can then refine and tweak to create a final product.
3. Continuous upskilling: Students should be able to stay up-to-date with the latest trends and best practices in AI and animation. This may involve taking online courses, attending workshops and conferences, or seeking out mentors and collaborators.
4. Creativity and storytelling: Students should be able to develop their unique artistic vision and style and find ways to express their creativity through their work. They should also be able to tell stories and create emotional connections with audiences, which requires a deep understanding of storytelling, acting, and animation techniques.
5. Critical thinking and problem-solving: Students should be able to think critically and solve problems creatively, using AI as a tool to enhance their work.
6. Adaptability and flexibility: Students should be able to adapt to new technologies and techniques as they emerge, and be flexible in their approach to animation work.

To prepare animation students for a future of AI in the animation industry, the lecturer can design a program that focuses on developing skills in working with AI-based animation

platforms and tools, collaboration with AI, continuous upskilling, creativity and storytelling, critical thinking and problem-solving, and adaptability and flexibility.

2.3 Positives and Negatives of AI as a teacher

Prompt: I would like to investigate and discuss both points of view regarding the positive and negative influences of AI or an AI professor has on their learners (Perplexity, 2023).

Positive influences of AI on the future of animation industry and animators working life:

- Increased efficiency: AI can automate repetitive tasks, such as rigging characters or generating motion graphics, which can free up animators' time for more creative work (Toonz Academy, 2022) (Business of Animation, 2023) (Pigeon Studio, 2023) (Business of Animation, 2022).
- Improved quality: AI can create more realistic and lifelike characters and landscapes, improving the audience's engagement with animation (Business of Animation, 2023) (Delgado, 2022) (Business of Animation, 2022) (Yadav, 2023).
- Cost savings: AI can reduce the need for extensive human labor, leading to substantial monetary savings (Toonz Academy, 2022) (Pigeon Studio, 2023).
- Innovation: AI can generate new concepts and ideas that animators may not have thought of before, leading to unexpected creative outcomes (Cook, 2023).

Negative influences of AI on the future of animation industry and animators working life:

- Reduced creativity: AI-based animation platforms could hinder animators' critical thinking skills and reduce human interaction, which is an essential aspect of the creative process (Cook, 2023) (Delgado, 2022) (Yadav, 2023).
- Risk of job loss: AI can replace some of the tasks traditionally performed by animators, leading to layoffs in big studios (Cook, 2023) (Aron, 2023) (arup02, 2022).
- Risk of bias: AI algorithms may not take into account the risk of data bias or algorithmic bias, which can be perceived by audiences as discriminatory (Business of Animation, 2023) (Business of Animation, 2022).
- Lack of emotional intelligence: AI technology cannot replace the creativity and artistry that animators bring to the animation process, such as storytelling, acting, and animation techniques (Cook, 2023).

Impact on the skills requirement in the animation industry:

- Animators will need to develop skills in working with AI-based animation platforms and tools (Toonz Academy, 2022) (Business of Animation, 2023) (Pigeon Studio, 2023) (Business of Animation, 2022).
- Animators will need to focus on developing their unique artistic vision and style and finding ways to collaborate with AI to enhance their work (Cook, 2023).
- Animators will need to stay up-to-date with the latest trends and best practices in AI and animation (Cook, 2023).

AI has both positive and negative influences on the future of the animation industry and animators' working life. Positive influences include increased efficiency, improved quality, cost savings, and innovation. Negative influences include reduced creativity, risk of job loss, risk of bias, and lack of emotional intelligence. Animators will need to develop skills in working with AI-based animation platforms and tools, focus on developing their unique

artistic vision and style, and stay up-to-date with the latest trends and best practices in AI and animation.

2.4 Conclusion

Prompt: Taking all of the above threads regarding AI and learning and the animation industry, write a research report of 2300 words (Perplexity, 2023).

Artificial Intelligence (AI) is rapidly changing the animation industry, and it has the potential to be even more transformative than ever before. AI-based animation platforms can automate repetitive tasks, such as rigging characters or generating motion graphics, which can free up animators' time for more creative work. However, AI can also pose a threat to the quality and uniqueness of the final product, and it may replace some of the tasks traditionally performed by animators, leading to layoffs in big studios. In this research report, we will investigate and discuss both points of view regarding the positive and negative influences of AI on the future of the animation industry and the impact on the skills requirement in this industry and animators' working life.

In conclusion, AI has both positive and negative influences on the future of the animation industry and animators' working life. Positive influences include increased efficiency, improved quality, cost savings, and innovation. Negative influences include reduced creativity, risk of job loss, risk of bias, and lack of emotional intelligence. Animators will need to develop skills in working with AI-based animation platforms and tools, focus on developing their unique artistic vision and style, and stay up-to-date with the latest trends and best practices in AI and animation. It is important to strike a balance between the benefits and challenges of AI in animation to ensure that learners receive the best possible educational experience.

2.6 AI-Generated Sources (manually formatted)

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3. Critical Reflection

Working with Generative AI is a creative process. The mode of prompt and response involves the creation of unexpected results. The dialogic approach where prompts are used to pursue, focus or redirect the thread encourages creative decisions to be made which can speed up the design process. Within a thread, ideas are being pursued and content is being generated simultaneously. The nature of the follow-up prompt is to sample (or to direct away from) those ideas generated and, in turn, more content is created from a simple prompt. However, the output from Generative AI is often generic by its nature, and also needs to be prompted creatively.

In this example, the paper was generated with a series of 7 prompts over a period of approximately 90 minutes. If this research was produced using traditional methods, it could take a period of days reading and referring to articles and publications before the write up stage. The sources are available within the body of the responses, and all linked to valid publications. There is a range of quality from (a small number of) research papers available from open online journals to (the majority) online articles, blogs, chats and one practitioner video. Most of the sources were relevant, although there were some which were not cited in-text and did not appear to relate to the generated text. For example, in the prompt for

“programme learning outcomes”, the sources included “Personalized education and Artificial Intelligence in the United States, China, and India: A systematic review using a Human-In-The-Loop model” (Bhutoria, 2022) which would be an appropriate reference, however the body of the generated response did not cite it in the body of the text. In other generated responses, sources that were cited in the body of the text would be useful for background knowledge but may not be considered authoritative enough to be used as a citation in a peer-reviewed journal article.

The process of interacting with a Generative AI chat to get meaningful answers requires practice in writing prompts. There is a tendency for the responses to be generic and non-specific, especially if the prompt is too generic and non-specific. When a specific context is included in the prompt this narrows the range of responses and makes the response more relevant. Perplexity.ai, for example, did not carry the context, of focus on the animation industry, from the first prompt to the second, which looked at positive and negative influences (of AI in the animation industry, context implied). The response appeared to determine its own contexts of teacher-student relationship and parental relationships.

The paper was deliberately written through a series of prompts to enable the development of the ideas. Also, there are limitations on the output, and it would be difficult to ensure that all the details are contained in a single response with the required word count for the short paper, with all the progression of arguments and variety of points to be included. Perhaps a limitation of the selected generative AI tool, but even when prompted to “write a research report of 2300 words”, the response lasted just 516 words. Prompts can be used to inject arguments into the response, and by working with shorter responses, more of variety and nuance of argument can be injected into the generated text by the prompt author.

For animation practitioners, generative AI tools such as perplexity.ai have demonstrated their ability to provide creative responses which can be incorporated in to the creative development process. The critical dialogic approach that has been taken in writing this paper, reflects the approach that is needed by any practitioner using these tools. Specifically, the quality of the responses must be critically evaluated and discussed. The artist or author must be fully engaged.

To summarise, the authors reflected on pros and cons in completing this exercise when working with Generative AI. The following could be considered positive outcomes from completing a research paper using Generative AI tools:

- Supported a dialogic approach to developing research ideas and content for discussion between the authors.
- Enabled the authors, who took control by directing the prompts, to make faster decisions, in a creative way, during the research process.
- The “writing” of the paper happened in parallel with idea generation and choice of research areas being discussed.
- Paper is well composed and appears balanced.
- The sources cited are useful and often worth reading beyond the text response from Generative AI.

On the negative side, there are more points to consider:

- Although appearing to be balanced, the generated text may contain unobserved biases.

- Speed of content generation, and prompt-response time, has an inverse relationship to the time spent by researchers reflecting, making research-lead decisions and allowing for research themes to emerge from the generated content.
- Quality of citations being presented in the generated text as sources for the research naturally reduces the impact of the text generated when being considered as research, especially for a peer-reviewed journal.
- It is unclear whether the detail and findings of the research sources are being incorporated into the responses. Even if they are, relying on a machine to select the key points from the research is not necessarily the best approach for future research.

In conclusion, the question could be posed: how much information is retained by the researcher who generates research using generative AI? As the authors, who generated this short paper, we learned very little about the topics contained in the responses. However, in discussing the role of generative AI during the process of producing this paper, in making arguments regarding the generative AI's capabilities, and, in reflecting on our own learning, we realised that not much of the information generated so quickly, and so easily, is retained. Had we submitted the paper without considering these broader implications, we would have to question both our role as researchers, and the future of learning through reading, synthesising and building on the research of others (who are hopefully also human!).

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