

Examining Early Professionals' use of Generative AI in the Game Development Process

Josiah Boucher¹, Gillian Smith^{1*} and Yunus Telli^{1*}

¹ Worcester Polytechnic Institute (WPI), 100 Institute Rd, Worcester MA, 01609

Abstract

This paper describes an in-progress research study that examines the perceptions and usability of generative AI (GAI) in the Summer Innovation Program (SIP)— a professional development program where teams of interns create mobile games in the Unity game engine over an 11-week period. GAI applications are being deployed across industries worldwide, but the impacts of using this technology in particular fields are relatively unexplored. The goal of this research study is to identify the potential harms and benefits of GAI in the games industry, with particular focus on how it impacts the creative processes.

Keywords

Generative AI, Games Industry, Professional Development

1. Introduction

The potential of Generative Artificial Intelligence (GAI) to automate previously un-automated processes is disrupting work across a range of industries. This has resulted in a need for research to better understand the contextualization of this technology in specific workplaces. Yet, much of the existing research on GAI focuses on its general impacts. Given that different contexts shape the way in which humans use (and do not use) GAI, a deeper exploration of specific workplace cultures is necessary.

This paper draws on the ongoing study of the impact of GAI on the games industry. As games sit at the intersection of tech design, media, and arts, many aspects of game development are both vulnerable to potential changes associated with GAI and an ideal domain for applying and exploring generative AI techniques [9]. Indeed, GAI is generally used to automate office work and creative jobs, both of which heavily comprise the games industry. For this reason, this industry offers a valuable site for investigating the potential harms and benefits of GAI.

For this study, we focus on MassDigi's Summer Innovation Program (SIP). SIP is a long running professional development program that trains around 25 interns within a period of 12 weeks. Because of its exclusive focus on professional development, SIP offers a fruitful ground to explore the reception of GAI in the games industry—especially among the younger generation of game developers. Every summer, SIP hires rigorously selected, promising interns seeking to enter the games industry. Participants of the program form teams and create mobile games from initial concept to publishing on an app store using the Unity

game engine. These interns come from a variety of educational and experiential backgrounds from game development to music production to philosophy. Regardless of previous experience making games, they are expected to overcome challenges and gain the skills necessary to accomplish this task with a hands-on approach—rather than by direct technical guidance. SIP has an extensive track record of teams launching fully developed games, with links to previously launched titles available on MassDigi's website [11]. Foreseeing GAI's potential disruption to the games industry in the near future, the directors of the program encouraged the 2023 SIP interns to use generative AI. As a professional development program for young soon-to-be-professionals, this encouragement, of course, aligns with SIP's mission and philosophy.

2. Related Work

AI for game development has a long history of use, both for systems within games and for tools in the development of games. Some motivations for studying AI in games include reduction of labor costs, enabling business models, developing new capabilities, creating new game genres, and increasing access to playing or developing games [3]. AI has been used in games to answer difficult problems, such as cheat detection in competitive games [8] or improving common processes such as playtesting, bug reporting, and other aspects of quality assurance [15, 5]. Procedural content generation (PCG) is often used in games to automatically generate large amounts of content and increase variety of content [18]. PCG is also used for

AIIDE Workshop on Experimental Artificial Intelligence in Games, October 08, 2023, University of Utah, Utah, USA

*These authors contributed equally.

jdboucher@wpi.edu (J. Boucher); gmsmith@wpi.edu (G. Smith); ydtelliel@wpi.edu (Y. Telli)



Copyright © 2023 for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

CEUR Workshop Proceedings (CEUR-WS.org)

co-creativity tools to assist with tasks such as level creation [10], and support tools have emerged to make these systems easier to understand [2]. Generative AI offers potential to expand the type of content that can be generated, such as more complex generative audio and music used to increase variety and interactivity of game music compared to non-generative methods [17].

While using AI for game development is widely used and offers great potential for improving games and game development processes, this practice is not without its challenges. [12] identifies ethical challenges that AI faces in videogame development, such as the ethical boundaries of artificially induced emotions, the trade-off between privacy and safe gaming spaces, transparency, and ownership. [16] discusses the challenges that prevent the most modern AI practices from seeing widespread implementation in games and game developer workflows and offers guidelines for increases AI usability in game development. [1] acknowledges the challenges of designing effective user interfaces for AI-infused systems, as well as the tradeoff between generality and specialization. [7] identified challenges of using machine learning to create agents in games, such as design, implementation, and evaluation.

Literature also reveals the theme of games as an industry historically contributing to harmful technological advancements. [4] discusses the historical connection of games and the military industrial complex, urging AI games researchers to avoid and resist the continuation of that connection. [12] warns that, in the event of the creation of artificial general intelligence, games may have played a critical role in that development.

3. Research Study

3.1. Methodology

The primary purpose of this study is to identify GAI's potential impact on the 'workflow' and challenges of integrating GAI into creative processes. We also focused on the interns' general perspectives on GAI and its ethical implications for the games industry. The focus of this research is on the developers themselves and their creative processes. Our research questions include:

- What are some of the dominant assumptions about GAI in game development?
- What are the SIP interns' general perceptions of GAI (e.g., the impact on the industry, the work of game development, job opportunities, future careers, and game development education)?
- How is GAI being used in practice?
- Where do GAI tools appear in the interns' creative process? What does incorporating GAI into the development workflow look like?

In order to answer these questions, qualitative data was collected through a combination of semi-structured interviews and observation of the program's day-to-day activities. The fieldwork this paper draws on is from our research activities in May, June, and July 2023.

Interviews were conducted with approval from WPI's Institutional Review Board and informed interviewee consent. Individual and group interviews with the interns and program leaders were recorded using a voice recording app on a mobile device. Recordings were then transcribed using the Descript app and edited to verify accuracy of the transcription. Beyond the interviews, the research team was given access to the Ryver communication server that has been used by SIP 2023 to make announcements, team discussions, and other day-to-day text-based communication activities. Additionally, the research team was given permission to do participant observation at the program's on-site work location on a daily basis, as well as any game-showcase or professional networking events that are organized by the program's organization. The field notes have informed the analysis of the interview data.

Thematic coding was used to conduct qualitative Data analysis on interviews and field notes. Relevant quotes were identified from the interview transcriptions and categorized by theme.

The focus of all recorded data was on professional activities from a public-facing organization, and therefore the collection of this data was expected to pose minimal to no risk to the research participants. However, given the particular identity of the intern participants had no significant impact on the research findings, we still decided to keep the identity of quoted interns anonymous. Records of all collected data have been stored on secure servers.

Interviews with SIP participants and observation of the program were the most effective research method due to the highly contextual nature of the games industry. Development practices vary widely from workplace to workplace, and the workflows of individual developers are difficult to be meaningfully quantified for a comparison. The qualitative data gathered through interviewing and participant observation methods offers insights into our primary concern in this study: how do game developers perceive, respond to, and utilize GAI as part of their workflow and creative processes?

3.2. Results

We have interviewed 26 of the interns from SIP 2023. All of them participated in group interviews, and 9 of them were also interviewed individually. We did not have any difficulty initiating conversations in these interviews. Indeed, most interns were eager to share their thoughts and concerns about GAI. Yet, our initial findings suggest that an overwhelming majority of the interns were skeptical of the claimed benefits of using GAI in their workflows, and that many even refused to use GAI tools for any part of the development process. Some of the GAI applications used by SIP interns include ChatGPT, MidJourney, Github Copilot, and Dall-E.

While data collection is ongoing, coding of the current data resulted in four themes:

- **Resistance to GAI.** The most common sentiment expressed in interviews was a general resistance to GAI. Most interviewees directly expressed concerns about the ethics of the

technology, as well as skepticism regarding the benefit of its use. When one intern was asked to explain the ethical concerns that led their team to decide not to use any GAI tools, they responded: “A lot of the current AI image generation tools kind of pool in their data just from scraping the internet; scraping Art Station, scraping Sketchfab for art and models and stuff like that, and they use the art. That’s the art that they used to create the images, and we just feel uncomfortable using other artists work for our own benefit.”

- **Diverging perceptions of GAI’s benefits.** The SIP director’s decision to encourage the interns to use GAI was motivated by professional development concerns, hoping to prepare them for the uncertainty of future workflows. Despite this, interns expressed a shared concern that there are taken-for-granted assumptions about GAI due to a desire to increase efficiency of development tasks. Yet, the interns tended to see such benefits as irrelevant to their context. For instance, one artist expressed practical concerns regarding their attempts to use GAI to create game-ready 2D assets: “I just find it really difficult to use. You can’t really... it’s really hard to adjust a lot of your images, and a lot of the good images come from putting in [prompts] like, ‘made on Art Station’, ‘made by This Artist’, ‘in This Style by This Artist’. It’s just not something I want to spend time writing the perfect prompt for when I could just draw it.”

- **Type of work: programming vs. art asset creation.** Despite their initial resistance, many of the programmers among the SIP interns warmed to using GAI over time (towards around the 5th week). While their ethical concerns were not entirely alleviated, they accepted the main premise of GAI and found ways to use it for troubleshooting or predictive coding. One intern who used Chat GPT and Github Copilot for programming expressed their journey with GAI during SIP: “When [we were first encouraged] to use more AI this summer, there was some hesitancy. I know from what I’ve heard, a lot of the artists still prefer to stay away from it—either for ethical reasons or just because it’s not as good at concepting as would be useful. But on the programming side, I think we’ve just kind of accepted it.” This, of course, saved the programmers time compared to finding solutions with more traditional methods. In sharp contrast, the artists among the SIP interns were not able to find ways to make GAI useful. For them, assets were not game-ready, and often lacked consistency. Indeed, some of the interns attempted to use GAI to generate 2D assets or music, but decided not to use what was produced. As one intern put it: “we need *game-ready assets*, and it just can’t do that yet.”

- **Skills to benefit from GAI.** Most of the interviewed interns highlighted that the widely circulating idea among their peers is that GAI would be able to replace a human developer for most tasks and, as it does, it would increase efficiency as a whole. However, many interns disagreed with such claims. For them, GAI has the potential to change the ‘nature’ of game development, but not to replace them or other

developers. For instance, rather than imagining a character and drawing them from scratch, the artists told us, they see their future selves working primarily with imperfect images generated by the technology. The programmers also expressed the need for technical expertise when using GAI to assist the writing of code; the tools they used would often provide false information presented as fact, and they used their own knowledge to avoid wasting time on the incorrect solutions that are provided by GAI.

The results show that, even within the context of a small professional development program in game development, both the work-related impacts and ethics of GAI manifest differently for different types of tasks, workflows, and skill sets. The programmers we interviewed were more willing to accept, use, and benefit from GAI, while the artists had greater difficulty increasing their ‘efficiency’ with GAI and tended to feel more ethically and practically opposed to the technology. Overall, the interns were more accepting of GAI when it would be used as a supplementary tool to augment workflows rather than something to replace those workflows entirely.

4. Discussion

These findings show that SIP participants expect their work to change, and the nature of that change impacts various roles in different ways; particularly with regards to programmers (who have shown a greater affinity to benefit from GAI) and artists (who perceive more vulnerability to lose jobs or to have a less satisfying and meaningful experience in performing their work). Furthermore, for the interns, the over-ambitious and over-hyped promises of GAI are misaligned with the needs of a successful and meaningful game development workplace. Because GAI tools’ outputs are often imperfect or misleading, requiring an amount of time to assess and fix, the interns think that the ‘fixing’ time is often more than a game developer simply outputting the work in the first place. Although many in the game development industry have found themselves in a popular hype in which GAI is being ‘imposed’ on them with an anticipation of increased efficiency, game developers (at least the ones we worked with in our study) are actively responding to the possibilities and limits of GAI tools. We think that this finding is especially important because it shifts the question to a design inquiry. Our study thus suggests that the GAI tools matter not simply in terms of their technical capabilities, but mainly through their affordances for a meaningful design process.

In order to move away from the over-hyped and over-ambitious discourse of GAI, many—including the authors of this paper and many of the interns we interviewed—prefer to talk about GAI as a tool [19, 20]. There is no doubt that this is an effective response to the current moral panic as it reasserts the role and place of ‘human skills’ in creative industries. Yet, tools are commonly viewed as passive, manipulable, and unthreatening, and, as such, the idea of ‘GAI as simply a tool’ does not help us understand the interns’ process of ‘figuring out’ how to work with GAI. Thus, instead of

seeing AI 'as a tool', we propose an alternative framework that shifts to GAI's role in design inquiries into the limits and possibilities of creative expression in game development.

Given the massive amount of media attention given to GAI, we were surprised to find the intern's initial resistance and continuing reluctance to using it. One key difference between SIP and a more traditional professional workplace is the amount of freedom given to the interns. While they were all encouraged to use GAI, there was no requirement to do so. Developers in a games company may be more strictly required to implement this technology into their workflows and may be less resistant to doing so if they are used to taking instructions at face value. This comparison is important: primarily because of the space of experimentation and co-learning provided in SIP, the interns were able to try to figure out how to make this technology work for them, rather than make themselves work for technologies.

The scope of the study is limited to this particular program and its findings are not sufficient to make any comprehensive claims. One limitation of this study is that the interns were required to figure out how to make GAI useful while also working in a professional game developer setting for the first time. This could have made it difficult for interns to engage with learning GAI tools in addition to learning the other tools of the trade.

While this study is still ongoing, these preliminary findings indicate that GAI-as-support-tools for art creation are not as robust and integrated as their programming counterparts. While programmers set aside ethical obstacles and found ways to make GAI applications useful for assisting their development process, artists were more hesitant to use GAI tools for both ethical and practical reasons. Furthermore, many artists expressed less resistance to GAI tools that assist in the creative process rather than replacing the process altogether. Future GAI tools for art creation should focus on assisting artists in their existing creative process.

5. Conclusions & Future Work

This work-in-progress study answers the call for further investigation of industry-specific impacts of generative artificial intelligence by examining the use of this technology in the Summer Innovation Program, a professional development program for students seeking to enter the games industry. Interviews with the program participants revealed a strong resistance to using GAI, disparity in the perceived benefits of the technology, and sensitivity regarding ethical implications.

The scope of the study focused on the creative practices of the program's developers and did not quantitatively evaluate the use of GAI for game development. Rather, the importance of this research lies in the subjective data collected from the interns, providing context-specific responses regarding the impacts the technology has and is perceived to have.

The remainder of the study will be spent gathering interview responses reflecting on the interns experience with the program, their use of GAI (or lack

thereof), and looking to their future careers. Future research could include an investigation into how future professional development programs could approach GAI, and the implications of context-specific GAI applications (rather than the general-purpose applications) for game development workflows.

Acknowledgements

This material is based upon work partially supported by the National Science Foundation (NSF) under Grant No DGE-1922761. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF. We would like to thank Monty Sharma, Tim Loew, and all of the participants of MassDigi's 2023 Summer Innovation Program.

References

- [1] Amershi, Saleema, et al. "Guidelines for human-AI interaction." *Proceedings of the 2019 chi conference on human factors in computing systems*. 2019.
- [2] Cook, Michael, et al. "Danesh: Interactive tools for understanding procedural content generators." *IEEE Transactions on Games* 14.3 (2021): 329-338.
- [3] Cook, Michael. "Optimists at Heart: Why Do We Research Game AI?." *2022 IEEE Conference on Games (CoG)*. IEEE, 2022.
- [4] Cook, Michael. "The social responsibility of game ai." *2021 IEEE Conference on Games (CoG)*. IEEE, 2021.
- [5] Gudmundsson, Stefan Freyr, et al. "Human-like playtesting with deep learning." *2018 IEEE Conference on Computational Intelligence and Games (CIG)*. IEEE, 2018.
- [6] Guzdial, Matthew, et al. "Friend, collaborator, student, manager: How design of an ai-driven game level editor affects creators." *Proceedings of the 2019 CHI conference on human factors in computing systems*. 2019.
- [7] Jacob, Mikhail, Sam Devlin, and Katja Hofmann. "'it's unwieldy and it takes a lot of time"—challenges and opportunities for creating agents in commercial games." *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*. Vol. 16. No. 1. 2020.
- [8] Jonnalagadda, Aditya, et al. "Robust vision-based cheat detection in competitive gaming." *Proceedings of the ACM on Computer Graphics and Interactive Techniques* 4.1 (2021): 1-18.
- [9] Liapis, Antonios, Georgios N. Yannakakis, and Julian Togelius. "Computational game creativity." *ICCC*, 2014.
- [10] Liapis, Antonios, Georgios N. Yannakakis, and Julian Togelius. "Sentient sketchbook: computer-assisted game level authoring." (2013).
- [11] Mass. Digi Digital Games Institute. <https://www.massdigi.org/programs-services/summer-innovation-program/>

- [12] Melhart, David, et al. "The Ethics of AI in Games." *IEEE Transactions on Affective Computing* (2023).
- [13] Partlan, Nathan, et al. "Design-driven requirements for computationally co-creative game AI design tools." *Proceedings of the 16th International Conference on the Foundations of Digital Games*. 2021.
- [14] Peres, Renana, et al. "On ChatGPT and beyond: How generative artificial intelligence may affect research, teaching, and practice." *International Journal of Research in Marketing* (2023).
- [15] Pfau, Johannes, Jan David Smeddinck, and Rainer Malaka. "Automated game testing with icarus: Intelligent completion of adventure riddles via unsupervised solving." *Extended abstracts publication of the annual symposium on computer-human interaction in play*. 2017.
- [16] Pfau, Johannes, Jan David Smeddinck, and Rainer Malaka. "The case for usable ai: What industry professionals make of academic ai in video games." *Extended abstracts of the 2020 annual symposium on computer-human interaction in play*. 2020.
- [17] Plut, Cale, and Philippe Pasquier. "Generative music in video games: State of the art, challenges, and prospects." *Entertainment Computing* 33 (2020): 100337.
- [18] Smith, Gillian. "Understanding procedural content generation: a design-centric analysis of the role of PCG in games." *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. 2014.
- [19] Tang, Kevin, et al. "'It Has to Ignite Their Creativity': Opportunities for Generative Tools for Game Masters." *Proceedings of the 18th International Conference on the Foundations of Digital Games*. 2023.
- [20] Vimpari, Veera, et al. "'An Adapt-or-Die Type of Situation': Perception, Adoption, and Use of Text-To-Image-Generation AI by Game Industry Professionals." *arXiv preprint arXiv:2302.12601* (2023).