"Planting World Seeds": Procedural Content Generation, Labour and Conceptual Art in Digital Games

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INTRODUCTION

In 2005, *The Sims* designer Will Wright proposed that Procedural Content Generation (PCG) would be the "future of content" in games (Wright 2005).[1] PCG is a way to automate the creation of content through random procedures that are encoded in software, and has become a common tool in games development – especially to create game worlds.[2] In many cases, procedural generation occurs as the player plays the game, like in the world and item generation of *Dwarf Fortress* (Bay 12 Games 2006)*, No Man's Sky* (Hello Games 2016)*, Ultima Ratio Regum* (Johnson 2011), and *Minecraft* (Mojang Studios 2011). On the other hand, PCG is often used during development to create pre-made assets – like the trees of *Far Cry 5* (Ubisoft Montreal and Ubisoft Toronto 2018) or the planets of *Starfield* (Bethesda Game Studios 2023) – to populate the game world, but which the player never actually sees the generation of. While both forms of content production are PCG, there have been few attempts to make a distinction between them, as the interchangeable use of "PCG" to refer to both forms of production flattens and hides their labour-based and aesthetic particularities. In this paper, I aim to show what these two distinct forms of production – what I will call "Runtime PCG" and "Development PCG" – tell us about the automation of games production, and about how this automation affects aesthetics: a crucial thing to examine in an industry that is not only facing ever-increasing automation (Chia 2022), but continuing waves of layoffs (Carpenter 2024).

Following from Galloway's argument that "video games are actions" (Galloway 2006), I define the first form of PCG – where the algorithm is executed and the world is created only when the player launches the game – as "Runtime PCG". We can see Runtime PCG occurring when we press "generate world" in *Dwarf Fortress* or *Minecraft,* and in its most extreme examples it expresses what Mark Johnson has called a "procedural aesthetic" (Johnson 2020). Through a close analysis of generation in Freehold Games' 2015 Science-fantasy rogue-like *Caves of Qud* (Fig. 1)*,* I show how Runtime PCG is an extension of 20th century conceptual and computer art movements that emphasized the process and labour of artistic production as much as the finished work (Hartung 2018; Lippard 1997; Taylor 2014). Using conceptual artist Sol LeWitt's essay "Paragraphs on Conceptual Art" (LeWitt 1967) as a leaping-off point, I propose that

the Runtime PCG in *Caves of Qud* foregrounds the production process within the form of the game itself, as the complexity of the PCG system comes to be just as aesthetically important as the content it produces. Rather than simply trying to automate the production of content as efficiently as possible, games like *Caves of Qud* have idiosyncrasies to their generation systems that *aestheticizes* generation, producing a self-reflexive "procedural rhetoric" (Bogost 2007) that helps players think through the production of games.

Figure 1 - Caves of Qud (2015)

By contrast, I label PCG performed during the game's development as Development PCG. Building off Aleena Chia's work on PCG and outsourced labour (Chia 2022) as well as *Capital Vol. 1* (Marx 1990), I argue that Development PCG's purpose is often to automate what would otherwise be human labour through *more efficiently* creating assets. This not only changes the quantity of human labour used on the game, but the quality of it, as with Development PCG there is an increased distinction between the "conceptual work" of world-building and narrative writing, and the "articulation work" of ensuring that generated outputs meet the desired goals (Star and Strauss 1999). Just as the approach of Runtime PCG changes the gameplay and aesthetics, I argue that the automation of Development PCG contributes to a form of commodity fetishism that hides the game's production in the game's form. These games refer to a "reified" (Fang 2024) aesthetic of nature to hide automation – as Developed PCG often aims to create more "realistic" game assets through modelling natural processes (like erosion and tree growth) to justify the displacement of workers (Galloway 2004). Through this, I will show that *Starfield's* planets are not in fact created by erosion, but rather by masses of "dead labour" (Marx 1990).

Across these examinations, my paper shows the need for a critical lexicon that understands the forms that PCG takes in production, and how it manifests in games. With the massive wave of layoffs that have recently plagued the industry – no doubt partially due to the rapid rise of automation and generative systems — it is now more crucial than ever to understand the relationship that the formal elements of games have to production and automation. This paper is therefore an important contribution to understanding the ideologies that hold our "future of content" together, not only at their most expressive and interesting, but their most problematic too.

BIO

Finn Dawson (he/him) is a PhD Candidate at the University of Sydney researching worlds and world-building in digital games, and their relationship to capitalist social relations. He has presented on world-building, virtual worlds, and realism, and has co-authored a paper on South by South West (SXSW) Sydney 2023.

ENDNOTES

[1] PCG as an acronym is commonly used throughout both the industry and in academic conversations.

[2] PCG is functionally distinct to the machine learning technologies and datasets that undergird Generative AI, as there is rarely an attempt in PCG to learn from inputs to change future outputs, nor is there commonly a reliance on servers and systems that are external to the software. While some of my analysis may cross over to discussions on Generative AI, an in-depth look at it is well beyond the scope of this paper.

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