The Unknown Realms of Mycelium: A Critical Board Game Exploring More-than-Human Systems

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This paper presents The Unknown Realms of Mycelium, a critical board game that explores more-than-human perspectives through decentralized systems. Unlike traditional strategy games centered on expansion, control, and resource accumulation, the game places players in the role of a mycelium network, emphasizing slow growth, ecological interdependence, and uncertainty. Drawing on theories of procedural rhetoric and more-than-human design, the paper examines how board games can convey critical arguments through rules and systems rather than representation alone. Through play testing, the study identifies a tension between the intended critical message and players' post-play reflections, highlighting the challenges of fostering more-than-human thinking in physical board games. By comparing the project with existing board and digital games, the paper argues that while digital games often offer stronger embodied experiences, board games can still perform critical work by embedding ecological logics into their mechanics. The paper concludes by proposing design directions that strengthen the role of nature as an active systemic force, encouraging cooperation over competition and inviting reflection on decentralized, non-anthropocentric ways of organizing life.

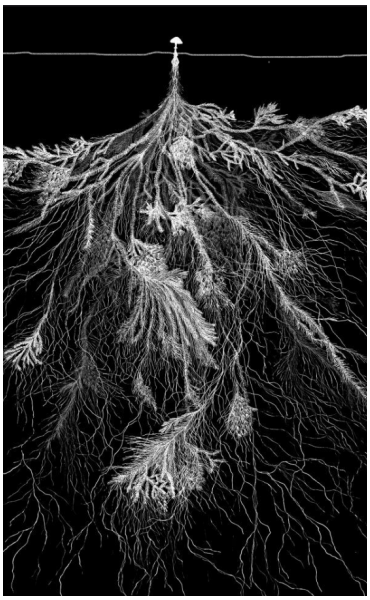
Introduction

"The unknown realms of Mycelium" is a strategy-based board game that invites players to explore through playing how mycelium networks behave; how they grow, what they need, how they collaborate and compete for survival, how the organism is affected by the environment etc. Although the game has an educational component, it can be categorized as a Critical Game and Ecological / More than human game.

Background

Figure 1

Mycelium growing under the soil (Stamets, 2005)



Mushrooms are widely known as food, for their role in producing antibiotics, or for being dangerous. But little is known about mycelium, often described as the "roots of the mushroom", a dense underground network made of tiny threads called hyphae, capable of spreading across large distances under the soil, extracting nutrients and minerals on its way, and forming symbiotic relationships with trees and other species. Mycelium is in main organism, while the mushroom is only its fruiting body, the tip of the iceberg (Stamets, 2005).

One of the most interesting characteristics of mycelium is that it behaves as a decentralized network. Rather than having a single central point from which all growth spreads, it has multiple nodes (starting points) where hyphae expand and connect to each other and to other nodes. This form of organization makes the system both resilient and highly sensitive to its environment: it can redirect growth, abandon infected or unproductive areas, increase local density by creating new nodes, and continuously adapt to the environment, all without any central brain (Stamets, 2005).

Situating the game within game theory

Although the game has educational elements related to mycelium, ecosystems, and decentralized networks, it is more accurately described as a critical game, since its primary aim is not to transfer knowledge or skills, but to open up conversations, foster reflection, and create awareness and understanding.

Critical games aim to raise questions about conventional systems, human behaviour, societal norms, or abstract concepts, and it does so by creating "safe spaces" where players can explore new perspectives and discover alternative ways of thinking or acting (Flanagan, 2009). Rather than aiming to make players experts on a theme or instruct them, critical games foster an ability to think critically both during and after play. The

Unknown Realms of Mycelium does this by representing the slow growth of mycelium, the rising tension between cooperation and competition as the game develops, the presence of multiple strategies for winning, and the uncertainty and fragility of natural systems.

Players encounter these aspects and get to their own conclusions and understanding, not through explanation but by playing the game. This relates to the concept of procedural rhetoric, introduced by Bogost (Bogost, 2007), which describes how games can make arguments about the world through rules, systems, and processes rather than through words or images alone. While traditional rhetoric makes arguments verbally or visually, procedural rhetoric does so by modelling how a system works and allowing the player to interact with it. Examples include the representation of aviation rules in flight simulators or the modelling of consumer capitalism in games such as Animal Crossing (Bogost, 2007) (Nintendo, 2001).

Through play, the player explores these systems and gradually comes to understand the perspectives or arguments embedded within them, while remaining free to evaluate, question, reflect upon, or reject them (Bogost, 2007). In this way, the game functions not as a tool for instruction, but as a medium for exploration and reflection on decentralization, interdependence, and mycelium role-play.

Most strategy games traditionally focus on building a civilization, conquest, capital accumulation etc. The Unknown Realms of Mycelium challenges this anthropocentric model by placing players in the position of a non-human organism, where they experience slow growth, interdependencies and the fragility of other life forms. Instead of controlling a population or an economy, players manage relationships, environmental change, and to deal with the uncertainty of nature.

Through play, players understand how centralized control is unstable in this context since no single node guarantees success, partnerships can be both beneficial and risky, and small environmental changes can rapidly change the progress of a network. These aspects reflect how survival depends on adaptation, cooperation and resource management instead of complete domination (Bogost, 2007).

This perspective aligns with more-than-human approaches explored by authors such as Donna Haraway, Anna Tsing, and James Bridle, who argue for recognizing planetary intelligence, foster collaboration across species and promotes humans getting into the skin of other organisms (Haraway, 2016), Tsing (2015), (Bridle, 2022). They recognize the importance of Games as a tool that makes it possible to explore those aspects and can open up conversations about sustainability, ethics and the reorganization of human systems. In Ways of Being, James Bridle describes how complex systems in nature function without centralized control. He provides examples such as the intelligence of slime molds when finding the shortest path, the distributed nervous system of the octopus, and the “wood wide web”, the underground fungal networks that connect trees. By growing a decentralized network during the game, players experience the advantages and disadvantages of a distributed system and learn to value it (Bridle, 2022).

Process

Inspiration

Strategy games that were related to ecology were explored to get inspiration for the game.

- Photosynthesis, a game where player have to grow a whole forest competitively and expand throughout the board getting light resource tokens, inspired us on how to implement economy in our game and how to use resource to expand and grow (Blue Orange Games, 2017).

- Kodama. This game aligns more with the More than human approach since every player represents a tree, and the goal is to grow its roots following different strategies. They are insects involved, flowers, and the spirits of the forests, showing how the tree depends on other species to thrive (Action Phase Games, 2016).

Figure 2

Playing Photosynthesis on the left and Kodama on the right.

A game that was closer to ours both in theme and mechanics was Mycelia.

- Mycelia is a strategy game puts players in a fungal/ecological system. As well as The Unknown Realms of Mycelium, it focuses on network growth and resource flow. However, the focus is on efficient resource collection, network expansion and competition rather than reflection or the interdependencies between mycelium networks or between mycelium and other species (Ravensburger, 2023).

Lately, the game Bees: The secret kingdom put players into the role of bees in a colony, this game does highlight cooperation within the hive, division of labor and environmental dependencies. This game inspired us on how players must coordinate and adapt to the environment, making the fragility of the ecosystem visible (The Tabletop Family, 2020).

The Unknown Realms of Mycelium

Each player represents a mycelium network. The goal of the game is for them to experience how a mycelium network grow, what it needs and how it relates to other mycelium networks. The game shows how, in order to thrive, mycelium needs to establish symbiotic relationships with trees and ants and decide whether to cooperate or compete with other mycelium networks.

The board is made up of multiple tiles with organic shapes that the mycelium network needs to reach to extract resources and collect points at the end of the game. Resources can be used for popping up mushrooms, spreading spores, growing the network or playing action cards.

The game was designed with the intention of players experiencing life as a non-human organism and inviting for reflection on interdependencies, decentralized systems and the fragility of mycelium under uncertain environmental conditions.

The game makes the expansion of mycelium tangible through game play and physical elements using physical materials like:

- Elastics with different colors, representing the mycelium network.
- Tiles representing the different resource types, trees and ants to be reach.
- Wood tokens to count the resources.
- Cards for making actions.
- And 3D models representing mushrooms and nodes.

Figure 3

Physical materials in the game

Playtest

Playtesting showed that the game was successful in representing the growth and structure of mycelium networks. The players that were familiar with mycelium reported that the game effectively conveys interdependence, both between fungal networks and with other species. Participants appreciated the aesthetics and materiality of the game, particularly the use of elastics, and noted that its similarity to familiar strategy games such as Catan helped them quickly understand the rules while still feeling new and interesting.

Players enjoyed the mechanics related to nodes and mushroom growth, highlighting how the network becomes increasingly complex and aesthetically pleasing as the game progresses. However, this complexity also caused some confusion, particularly regarding what constitutes a shared branch and where shared connections begin and end. This suggests a need for clearer rules in the game instructions.

Regarding cooperation and competition, players valued having both options available and recognized the risks involved in forming partnerships. Nevertheless, despite a balanced number of collaborative and competitive cards, the overall experience was perceived as more competitive. As one player mentioned, “It still feels more competitive because you connect to get a benefit after all and win the game.”

Figure 3

Playtesting

Follow-up discussions conducted a few days after playing showed that players primarily remembered the game’s aesthetics, materiality, and strategic elements, while deeper reflection on mycelium, ecological interdependence, or cooperation versus competition was not mentioned.

Discussion

The results from the Play test revealed an important tension between the intended critical aspect of the game and the way it was perceived by players after play. While the procedural systems successfully model ecological interdependence, decentralization, and relational growth, these themes were not always verbalized

by players. This gap is not interpreted by a failure of the game but rather it highlights the challenge, central in critical games, of translating the experience of playing the game into reflection. From the early inspiration, it is concluded that this is an issue that is common in Critical board games. All the games provided as an example rely on mechanics centered around resource management, accumulation and exchange, reducing more-than-human-worlds into abstract economies.

Digital games, however, allow more immersive and embodied experiences with non-human species. Thanks to computational systems, they can model aspects such as the changing of the seasons, long-term consequences of small actions, and relationships with the ecosystem that are difficult to represent in physical board games. Examples of such critical games are Endling: Extinction is Forever and Everything.

Endling places players in the role of the last surviving fox in a devastated world that is dominated by humans. The game does a good job in showing vulnerability, care and loss (Herobeat Studios, 2022). Everything, by contrast, allows players to inhabit a wide range of beings, animals, plants, insects and even glaciers or mountains, giving the players a different perspective on life and forms of existence. Rather than focusing on strategy or resource management these games invite reflections by exposing the interrelationships across species (O'Reilly, 2017).

The remaining question is how The Unknown Realms of Mycelium could be redesigned to deepen its critical aspect and foster reflection after play, serving as a reference for other critical board games?

From the play experience it was extracted that a key factor that could potentially make the game more critical is making nature as an active systemic force that is generally hostile. In this way, while players are still technically able to infect each other and compete, the environmental force of nature makes the purely competitive play increasingly unstainable. This acknowledgement would align well with procedural rhetoric since the game would make the argument that survival and expansion is not achieve through domination, but through adaptive collaboration (Bogost, 2007). This message would not be received explicitly but players will realize it as the game develops. Besides this supports Haraway's argument that humans are not external managers of the ecosystem but entangled species within them and Tsing's emphasis on precarity and interdependence (Haraway, 2016), Tsing (2015). It is believed that through this modification the game would invite reflection on mutual dependence, decentralized systems and the insufficiency of purely competitive strategies.

To conclude, this discussion suggests that while board games face limitations in representing more-than-human perspectives, they remain a valuable tool for critical reflection. It is believed that by shifting emphasis from control and optimization toward cooperation, vulnerability, and systemic entanglement, The Unknown Realms of Mycelium could show how physical games, despite their limitations, can still open space for ecological reflection, dialogue, and more than human awareness through play.

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