# A Comparison of the Potential Pedagogical Effectiveness of Life Simulation Games

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Abstract

A life simulation game is a type of video game that allows players to simulate and control aspects of artificial life in a virtual environment. While life simulation games in general have never been the most popular form of entertainment, simulations that incorporate evolution into their gameplay have become increasingly prevalent in recent years. These games can be a fun and engaging way to learn about evolution, but their scientific accuracy can vary. This paper compares the scientific accuracy of several popular life simulation games that incorporate evolution into their gameplay, focusing on Spore, Thrive, and The Bibites.

Keywords:

Digital Media Production, Evolutionary Studies, Educational

## Introduction

The study of evolution is a complex and often controversial subject, and finding effective ways to teach students about it can be a challenge. Life simulation games that incorporate evolution into the gameplay offer a unique and interactive experience, and have been suggested as a tool for teaching children about evolution. However, the scientific accuracy of these games can vary, and it is important to understand the strengths and weaknesses of each game in order to use them effectively as educational tools. In order to compare the scientific accuracy of these life simulation games, several criteria were used. These criteria included their representation of the key concepts of evolution, such as selection pressures, adaptations. Other factors to consider included their ability to engage the players, how effective education of the players would be, and their potential to generate misconceptions about evolution.

## Analysis

There are several evolution simulation games currently on the market. They all fall into one of two categories, single-player games and zero-player games. For the sake of brevity, only three of these games will be analyzed in-depth, but each example outlines the strengths and weaknesses of each category.

Spore is a popular single-player life simulation game that allows players to control the evolution of a species from single-celled organisms to space-faring civilizations. This is the game that has the most pre-existing academic literature associated with it. The game has a low degree of scientific accuracy because the role of random mutation and natural selection are not fully represented. Spore is highly engaging and interactive, and can be a fun and educational experience. According to a study led by Dr. DorothyBelle Poli, SPORE scored a “16 out of a possible 20 on Rice’s rubric for evaluating video-game cognitive viability” (Poli et al., 2012).

However, the game does not delve deeply into the science of evolution, and players may not gain a complete understanding of the subject from playing the game.

Thrive is an open-source, fan-made “spiritual successor” to Spore. It allows players to evolve their species from single-celled organisms to more complex beings, but the later stages of the game are still in development. The game has a higher degree of educational value, as it provides expositional segments to explain evolutionary concepts during gameplay. For non-player creatures in the game, there is also an “auto-evolve” feature that approximates speciation across successive generations. Thrive is highly engaging and interactive, but may not be as accessible to younger players. Not only that, but despite its increased complexity it still inherits the cognitive biases in the gameplay structure of its predecessor.

The inherent ability for the players of single-player life simulation games to “manipulate the outcome of reproduction and evolution directly” (Bean et al., 2010) wildly misrepresents the mechanics of evolution. Natural selection is not an intentional process, but the structure of these games implicitly relates the player to an intentionality in life’s adaptations. Not only that, but these games perpetuate the “naive species-selection fallacy” (Geher et al., 2019) which frames evolution as a competition between species as opposed to the reality that natural selection primarily functions on the level of intraspecies competition.

The existing alternative to the single-player framework of life simulation games is the zero-player framework. In zero-player life simulations, the player merely controls the initial conditions for the autonomous organisms before observing their intergenerational development over time. Cellular automata such as Conway’s Game of Life produce emergent complex behavior from simple starting parameters, but they do not evolve over time (Conway, 1970). The Bibites is a zero-player life simulation that does incorporate evolution into the mechanics. The

autonomous organisms are pixelated, borrowing the aesthetic of early cellular automata, but the forms are distinct enough that they give the impression of aquatic crustaceans (Caussan, 2016). These zero-player games more accurately reflect the mechanics of evolution in the real world, but they do not have the level of player interactivity that made games like Spore successful.

## Conclusion

Life simulation games that incorporate evolution into the gameplay can be a fun and engaging way to learn about evolution, but their scientific accuracy can vary. Spore, Thrive, and The Bibites are all popular life simulation games that incorporate evolution into the gameplay, but each has its own strengths and weaknesses in terms of scientific accuracy. When used in conjunction with other educational resources, these games can be a valuable tool for teaching about evolution, but it is important to understand their limitations and to carefully evaluate their scientific accuracy.

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