

Virality

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1. Learning Outcomes and Degree Relevance

A serious game is a game designed for a primary purpose other than pure entertainment. I have designed and created Virality, inspired by my Extreme Environmental Biology module (HR308). This module covers pathogenic evolution under extreme selection pressures and has been chosen not only because of my love for the subject but because it provides exaggerated, simplified concept opportunities. Virality aims to teach the basic concepts of genetic mutations to 16–20 year-olds who are interested in biology, can seat 2–4 players and takes 30–40 minutes to play.

Virality works well as a serious game due to the integrated learning outcomes (LO). The game has two primary LO, keeping focus on providing knowledge and understanding of the subject while rewarding further interaction with the game. These utilise almost all levels of Blooms Taxonomy, as players remember and understand their knowledge but also have to create solutions of their own and analyse the validity of their opponents' answers, allowing for complex learning (Krathwohl, 2002).

LO1 is for players to “Understand that mutations can be positive, neutral or negative to their host”. More often than not, mutations negatively impact a pathogenic population, which is often glossed over in lower education. This LO is deeply built into the game as the mutations that players interact with make up the heart of the game, allowing beneficial passive learning to occur (Sousa, 2023).

LO2 is for players to be able to “Apply knowledge of viruses and genetics in order to problem solve why biological concepts apply to situations”. Applying knowledge is arguably the hardest skill to actively teach but the most sought after in young people. Virality aims to implement game mechanics that reward not only having knowledge of a subject but also reasoning why this knowledge is correct. This is also my justification for the target demographic.

Virality includes other elements that enforce the serious nature of the game. In the rulebook there is a section detailing how to utilise the game in a meaningful way with tips for players on how to improve after failure. This also includes notes on how teachers can constructively align the game to their assessment strategies to support the learning goals (Biggs & Tang, 2011).

2. Design Choices

2.1. Mechanics

The mechanics of my game are quite simple, and are explained in detail in the rulebook, so here I will mainly elaborate on why I included these in the game. Cards are played or discarded as soon as they are picked up, eliminating the “player hand” that most card games have. This limits decision paralysis and reduces cognitive load, making the game more enjoyable to play and run smoothly (Sweller, 1998). Players have action points, allowing them increased player agency within defined limits, allowing gameplay to feel customisable to many Bartle’s player types (Bartle, 1996). Protection of traits and cards that let players interact with the decks that they are drawing from increased player agency as well, allowing the game to feel more influenceable while still including the elements of chance that allow students to develop risk-management skills.

2.2. Rules and Gameplay

It is important to me that a game is easy to set up. This is the reason for the “quick start” guide for returning players or people who learn in a more tactile way. I also make sure to have the players set up the game before introducing definitions and the walkthrough of the turn order allowing for engaged kinaesthetic learning (Begel, 2004). I have made sure that the turn order and every action that a player can take is built into their player board, reducing the setup, additional pieces and allowing increased pre-planning of turns to increase game flow (Csikszentmihalyi, 1990).

To support the serious nature of the game, I have included clarifications of all of the keywords, definitions and a statement on how to deal with clarification of rules if there are disagreements over how to interpret a rule. This is something I have appreciated heavily in games that I have played as it makes the game seem more personal and catches any unanswered questions.

2.3. Aesthetics and Narrative

For the aesthetics of my game, I have been heavily inspired by genetic sequencing software that I have interacted with in my university degree, specifically SPSS (Fig.1). The minimal design, cool colour scheme and windowed aspects all come from SPSS. The idea is that as players use cards (Fig.2), it looks as if they are adding/closing tabs and windows on their computer, monitoring their virus population and the mutations that occur. This allows for added immersion and strengthens the players role within the game of scientists who are seeing what mutations occur in viruses they are growing, meaning that players can emotionally connect to the game, taking care of their population and making the experience more enjoyable and memorable (Paivio, 1973). This is the limit of the narrative in my game, as more storytelling is not necessary. The design not only familiarises players with the software they will be use in their future career, but also sensationalising the serious elements of the game, allowing positive attribution to potentially boring software.

2.4. Accessibility

To make my game as accessible as possible, I ran each design I made through a colour blindness checker, producing results of 100% colour-blind-friendly with 100% certainty. The font is clear, easy to read and as large as possible on the cards. The cards themselves should be large enough to hold, and no intricate placing of any elements of the game are required. Additionally, there is no reason that any player is not able to reach or place specific pieces for another player.

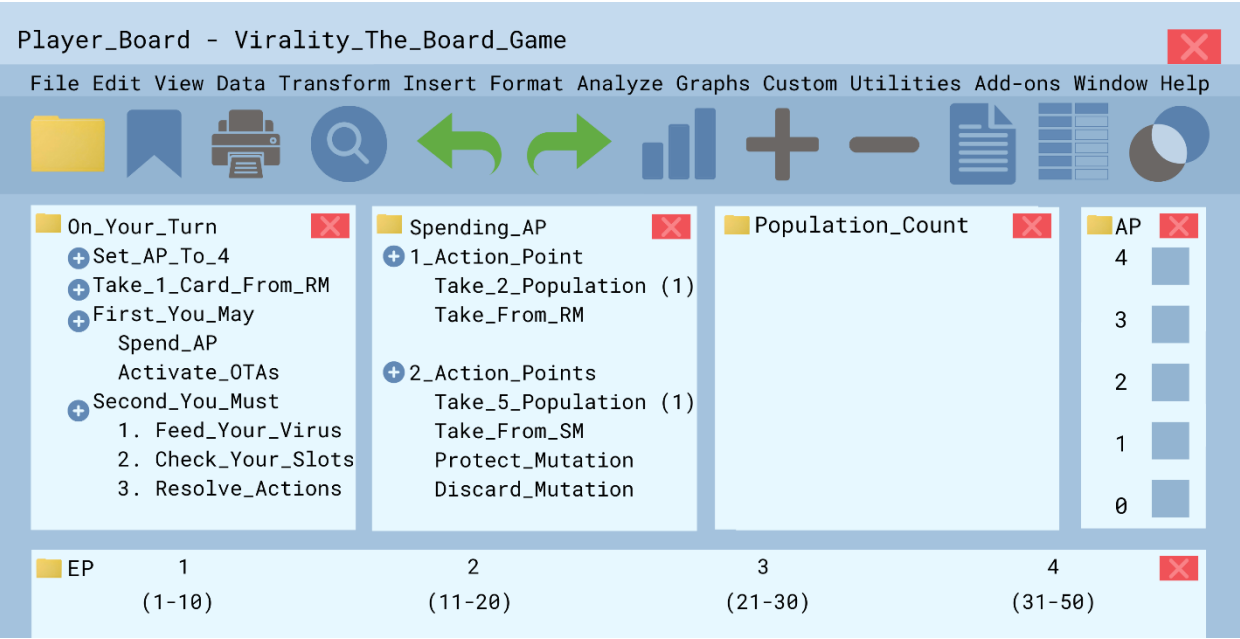


Figure 1. Player Board. This is the design of one of the player boards. Included on it is the turn order, the actions that you can take on your turn, space for population to be counted and places for tracking the players Action Points and Effective Population.

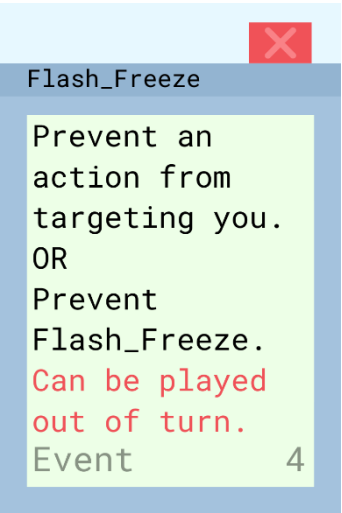


Figure 2. An example card from the Random Mutations deck. This is an event card that allows a player to respond to an action or another of the 4 Flash Freeze cards.

2.5. Challenges with Design

There are many challenges that arose in the design stage of the game. Initially I had another resource for players to control- nutrients. This was inspired by *Evolution* (by North Star Games), which has players control size of population and nutrients to feed the population separately tracked. This felt overcomplicated for a short simple game, especially with my focus on learning and allowing players to apply knowledge, which is already an additional element to be keeping track of, so I combined these into one.

I also originally set the players AP to 2. I realised quickly that this did not allow for much agency or strategizing. Increasing this to 4 allowed players to combine moves and gave more scope for players interacting with features like “protection” without feeling as if their whole turn was wasted.

3. Playtesting

Playtesting of the game was conducted both within class time and personal time, with ethics approval acquired. I conducted this in an iterative manner (which you can see in Fig 3. and Fig.4), with players able to rate categories of the game and comment why they had these opinions. This was also partially done using my target customers, as all of the volunteers were within the correct age category, and two of my play testers studied biology-themed degrees.

The game had many positive points of feedback on the design (“The cards are really easy to read”, “Oh that is so cute”), game mechanics (“The game felt really easy to follow once we had it all explained”) and the overall game, with all 5 of play testers rating it 6 or more stars out of 10.

Playtesting also proved to be invaluable for improvement, as there was a general consensus that players did not have enough agency or control over the board state in preliminary tests. The original prototype depended too much on what cards the players drew, rather than their strategies. To fix this I made sure to include a higher proportion of cards that allowed players to interact with the deck, lessening output randomness and increasing input randomness to increase agency and reduce stress (Garry, 2018, Burgun, 2012).

Another player also mentioned boredom when it was not their turn, so I also added in a new type of card that allows higher protection of a player’s assets (a card that you can respond to other players actions with). I was able to playtest the game with that same person, who reported increased levels of attentiveness throughout the other players turns.

Additionally, I noticed that mutations did not stay on the board as long as I had envisioned. I had hoped that players would slowly build their own virus, but with too many removal cards in the game, this dynamic had clearly shifted from what I originally had planned. Because of this, two new keywords were created (swap and steal) and replaced the keywords “remove” and “discard” on many cards. Feedback from this decision was overwhelmingly positive, and in conjunction with the other changes I made during my iterative playtesting, increased the games rating to 8 or higher from the 5 play testers.

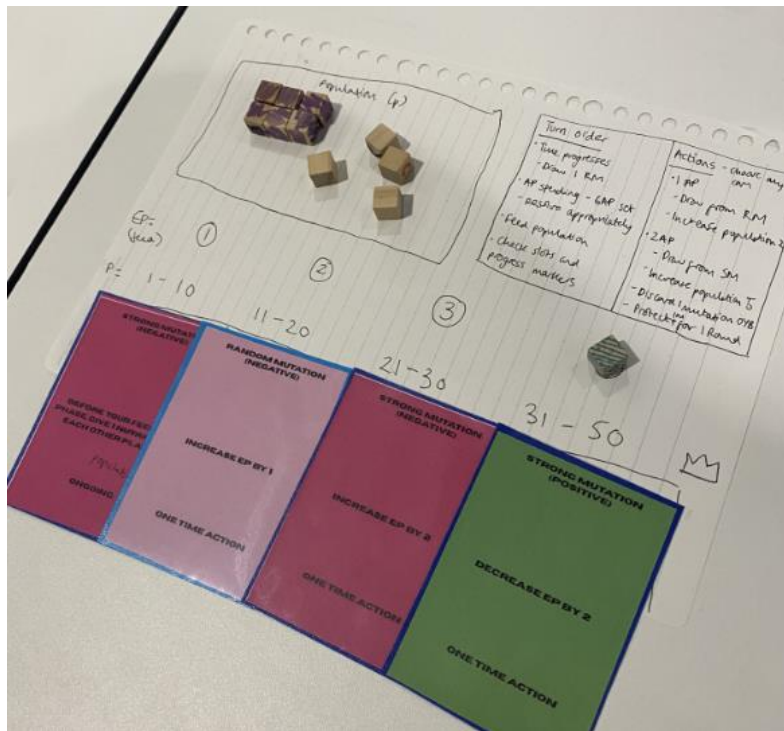


Figure 3. Initial Playtesting. Conducted in class on 12/12/2025. 5 people play tested the original prototype of the game. This is taken part-way through the gameplay.

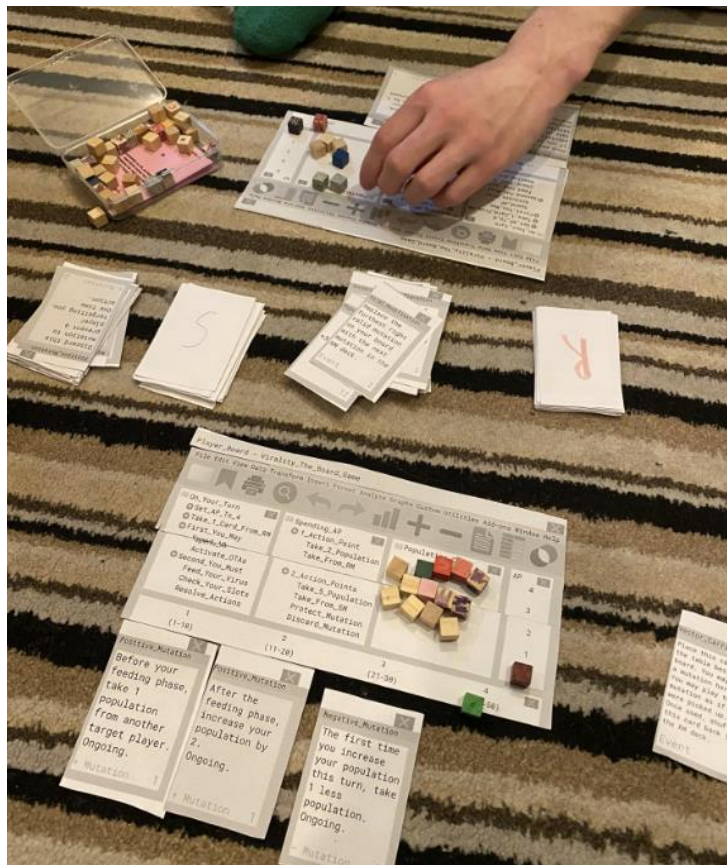


Figure 4. Final Playtesting. Conducted out of class on 20/01/2026. The third round of play testing conducted. 2 people play tested the secondary prototype of the game (printed in black and white). This is taken part-way through the gameplay.

4. Future Developments and Conclusions

Looking to the future, it would be interesting to develop Virality more. I initially had planned for each card to include more information on it, however when I attempted to do this the cards looked extremely cluttered, so this is definitely worth further investigation. I also would be interested in interspersing fun facts throughout the rulebook and naming each mutation with a specific viral mutation that matched the effects brought on by the card.

Another potential avenue for further development into the serious elements of Virality would be to expand the educational section of my rulebook to include more in-depth descriptions of justifications, key words and teaching plans. This would ideally become a separate booklet so that the rulebook can still have a condensed version that anyone can use.

Finally, I would like to conduct much more play testing, as the feedback from this has been an invaluable resource to developing the gameplay and game mechanics.

5. Appendix

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