Planning of an Economic System:

By: Nathan van Niekerk, Massimo Marchetti, Abdul Malik Khan and Matthew Tyler Beckett

A Brief Overview:

Our card game is a turn-based card crafter/deck builder where players search biomes, gain elements, and craft potions. Potions can be mixed together to create more powerful potions, with the victory condition being the player who can hold onto the “Magnum Opus” potion.

The biomes allow players to secure valuable elements which are necessary for the crafting of basic potions. In each of the biomes, an event card must be drawn for that biome at the start of each player’s turn. Event cards are random and offer various random choices in the form of bonuses and hinderances for the players.

Players have various choices with which they can use their potions. The primary player agency is as follows:

- Players can upgrade the potions to contribute towards the creation of the “Magnum Opus” potion.
- Players can affect the outcome of events through the usage of potions.
- Players can use potions against each other.

Resources:

Tap (Primary) Resources:

The five base Elements in the form of physical tokens are as follows:

- Water
- Earth
- Fire
- Poison
- Lightning

These resources can be gained passively through being in a biome, actively through event cards, or through another player.

Secondary Resources:

Tier-1 potions

They are mechanically basic potions used to craft tier-2 potions. Can be consumed for the player’s benefit. They can be used to change the outcome of an event card, or against other players.

Tier-2 potions

Are more complex versions of the basic tier-1 potions. They offer more powerful abilities to the player, but otherwise behave like tier-1 potions in the sense that they are consumable items. They also require a short brewing time.

The Magnum Opus

The Magnum Opus acts as the game’s primary negative feedback loop and victory condition. If a player mixes all three of the tier-2 potions, the player brews the “Magnum Opus”. The Magnum Opus acts as the game’s primary winning condition, but the winning player must stay vigilant. Other players can target the player holding the Magnum Opus and can even steal the Magnum Opus from him/her.

Event Cards:

Each biome has a set number of unique event cards. Event cards may grant players additional elements, or hinder the player’s progress towards crafting the Magnum Opus. On some rare occasions, a potion may be gained from an event card. These rare potions, however, may either aide or hinder the player.

Brewing Time:

The time required to “Brew” a potion is the number of player turns that must pass before a potion can be used.

Why the resources were chosen:

The resources add player agency and resource management to the game. Elements are necessary as a base component for all potions. Players may choose to craft and mix potions however they wish, so long as it remains within the limits of the different potion types. Players must also choose whether they want to conserve their resources or spend them, at the direct cost of losing out on potions that could contribute towards the Magnum Opus.

Resource Relationships:

Conversions:

Potion Conversions:

- The 4 base elements are used to craft six tier 1 potions.
- Tier 2 potions are crafted from mixing two tier 1 potions together.
- Tier 3 (i.e. The Magnum Opus) requires one of each tier 2 potion.

Other Conversions:

- Potions can be indirectly converted into an increased gain of elements through event cards
- Potions cannot be reverse crafted (i.e. they cannot be converted back into a lower tier).
- They can, however, be converted through event cards in exchange for benefits such as increased resource gains. (e.g. more elements gained per turn)
- Players may also exchange a “Theft Potion” for another player’s potion.

Drains:

Event cards can remove resources (including elements and most potions) from the player.

Damage potions are craftable by players and remove potions or elements from a targeted player’s inventory permanently.

The Magnum Opus is the only card immune to being drained from the game state. It renders the effects of event cards as null (if the event card applies to the Magnum Opus) and cannot be destroyed by damage potions. This way, the game is guaranteed to end.

Positive Feedback Loop:

As player’s gain more potions (which act as an output), the player will be given more opportunities through event cards to gain more resources (so the output feeds back into the input). It gives players a sense of progressing power and speeds up the pace of the game, so that the Magnum Opus is realistically achievable within 30 minutes of gameplay.

Negative Feedback Loop:

Once the Magnum Opus has been crafted, it needs to be brewed for a specified number of turns in order for a player to secure victory. During this time period, tensions will rise as the other players will attempt to sabotage the player with the Magnum Opus and take it for themselves. This gives opposing players, who were previously lagging behind economically, an opportunity to still win the game to the very last turn. The Magnum Opus wielder will need to switch playstyles, since the wielder had previously been conserving resources beforehand.

Supply and Demand:

The five basic elements (Earth, Fire, Water, Poison and Lightning) generally act as a stable supply; however, it may be affected by event cards. Event cards may boost this supply, if players choose to consume specific potions to affect the outcome of the event card. (See: Positive Feedback Loop) Thus, potions and the available supply have a direct correlation.5 The more potions there are in play, the greater the potential supply available to players.

Demand for potions may vary, depending on how useful the potion is to players during gameplay and what elements/lower-tier potions it requires.

Keeping the Resources balanced:

Players will be forced to biome swap at the end of each round. (A round ends when all players have finished their turn once) This adds tension to the gameplay by ensuring that players do not horde resources from a single

biome. Traps can also be set by players through the event cards, sabotaging the next player if that event card is drawn. Forcing biome swaps also ensures that players gain all of the neccecary elements to craft tier 1 potions, which allow the creation of tier-2 potions, allowing the Magnum Opus to be craftable, and hence the game can be realistically completed.

Using the MDA Framework to Justify the Economic System:

Using the MDA Framework (Hunicke et al, 2004), the game's aesthetic can be effectively linked to the game's economic system. The Magnum Opus requires lots of potion crafting, which will encourage players to craft and use a variety of different potions. (players engage with the crafting mechanic) At some point in the game, players will likely need to choose between saving a potion for the Magnum Opus or sabotaging a peer. (a core dynamic) This creates the aesthetic of being an academic alchemist (Fun of Fantasy), competing against your peers in a tense tournament (Fun of Challenge) to collect resources from biome exploration (Fun of Discovery) to craft an extraordinary potion through event cards.

Inventory:

A limited inventory would hinder the positive feedback loop, since players would no longer be able to gain an exponentially increasing number of resources. Thus, it would slow down the pace of gameplay beyond the 30 minutes of playtime because it would take longer to create the higher-tier potions required to craft the Magnum Opus.

Skill vs Luck:

Skill:

Which potions players decide to craft. Players will gain elements from the 4 different biomes throughout course of the game. They may choose to combine them however they want to create one of six unique tier-1 potions. Each potion has unique element requirements, with some overlapping elements between the different potions.

The "Earth" element serves as our "base", meaning that almost all of the tier-1 potions require the element. Players must therefore make a trade-off, since elements are limited and will need to choose between which potion that uses the "Earth" element should be crafted.

How players react to event cards. Players are given multiple choices on how they can solve the dilemmas in the event cards. If a player has a specific potion when an event card is pulled, he/she may use that potion to affect the outcome of the event. Else, the player can opt with a different choice, for example using a different potion, to get a different outcome.

If players know the event cards in the different biomes well enough, they can adjust which potions they want to create to anticipate decisions. Thus, the difficulty indicator can give newer players an idea of what potions may be useful.

How/when the potions are used. Players must decide for themselves when it would be better to sabotage other players that may be closing in on the Magnum Opus, or save their potions and instead progress towards the Magnum Opus for themselves.

Keeping track of which players own which potions. The potion tier is present on the back of all potion cards, but never the name of the potion. Players must, however, publicly consume resources for each potion, giving opposing players the opportunity to keep track of which potion they are crafting and what they still have in their deck.

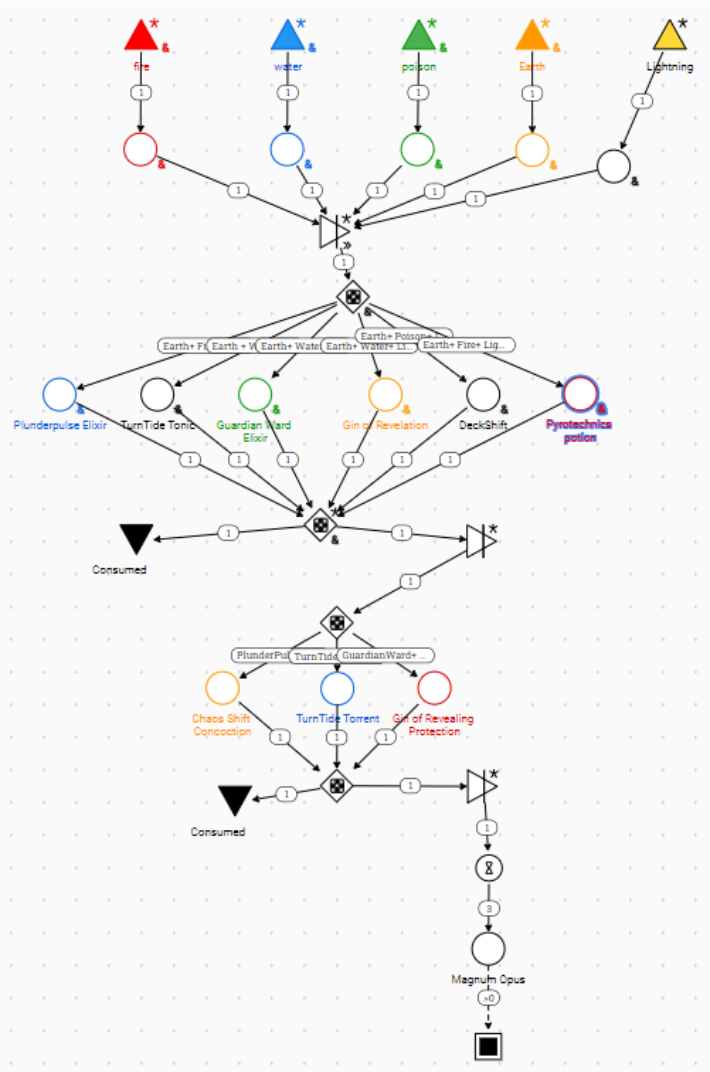
Luck:

Each biome has a set number of unique event cards, which must be shuffled before play begins. This way, the events will never become 100% predictable, and anticipating a certain card in a particular biome would also be a calculated risk to players. Event cards are also face down, so players do not know how to react ahead of time.

Predicting the opponent's next decision. Players will also never be able to fully predict what other players will do with their potions, since event cards are random, and would keep the opponents strategies dynamic. This will keep players second-guessing their opponent's next move, especially if he/she is not aware of the cards in the opponent's deck.

Machinations/flow chart:

https://my.machinations.io/d/potion-crafter-economy/33e87a836e8811ee8ff60a893d14f349



Process of Planning and Implementing:

Written as a group

Prototyping, machinations, and assigning roles within the group.

To create our economic systems, we split up into different roles among the group. Malik was tasked with creating the machinations flowchart, whilst the rest were assigned to creating the economic plan. Furthermore, Nathan covered the typing and layout of the document whilst Matthew and Massimo helped with creating the economic system.

We began our plan with a skeleton for our game and then fleshed out the essay for the game by building onto the skeleton. We used Mark Brown's (GMTK) framework for the economic system for structuring our plan's skeleton. We also used the MDA framework to break down how the mechanics would lead to the intended aesthetics for the game.

A shortfall was that we didn't have time to playtest, thus making it difficult to get a feeling for the balancing of the game. We overcame this by keeping the plan flexible enough that we wouldn't need to delve into the details of the mechanics which are subject to change.

We also had an issue of clashing ideas from everyone and we solved the issue by clarifying and elaborating on our ideas and would in some cases implement both features so as to maintain flexibility.

We succeeded in splitting ourselves into distinct yet flexible roles improved our time management. We also adhered to a mostly consistent time schedule for daily meetings, contributing to better time management.

What was Learnt about Creating Economic Systems in Games:

Written as a group

Importance of the basic economic system (taps, converters, drains, traders), keeping systems simple, feedback loops. We learnt how all of these features can be APPLIED to real games.

We learnt how to apply concepts taught in Game Theory into a practical scenario. We used the economic framework for systems (taps, converters, drains, and traders) in games and the MDA framework to both structure our plan and make informed decisions. We also used feedback loops to create a more balanced experience for players.

For example, take the case of how we implemented a positive and negative feedback loop into our game. Players will be able to use their potions to increase their resource gains in order to gain even more potions. Once the players reach the Magnum Opus, however, the player will be targeted by all of his/her opponents, because it cannot be destroyed. This keeps the game tense for the winning player because all of the opponents who were previously lagging behind still have the potential to take the win for themselves, even to the last turn.

We also learnt that player agency can increase drastically with the addition of only a few resources. We had initially removed an element from the game as to simplify the gameplay, but later reinstated it because the resource was necessary for greater player agency.

References:

Game Maker's Toolkit. (2022, April 25). *How Video Game Economies are Designed* [Video]. YouTube. https://youtu.be/Zrf1cou_yVo?si=jEW1scZpQ1jKPdUa

Hunicke, R., LeBlanc, M., & Zubek, R. (2004, May 26). MDA: A formal approach to game design and Game Research. Northwestern University. https://users.cs.northwestern.edu/~hunicke/MDA.pdf