GAMEPLAY SYSTEM DESIGN - CORE SYSTEM
NUTRITION AND EXPANDED COOKING SYSTEMS

JACK PULLEN

Table of Contents

High Level Summary **3**

System Essence Statement 3

Chosen game analysis 3

MDA Framework (Mechanics – Dynamics – Aesthetics) 7

System analysis of chosen game 13

Problem statement 13

How the system addresses the problem 13

Core system concepts 14

Expected player experience 14

Game Research **15**

Chosen game research and analysis 15

Design considerations with chosen game 15

Similar games analysis 15

Similar systems analysis 16

Academic research 16

4 Keys to Fun (Lazzaro, 2004) 16

"Patterns in Game Design" Bjork and Holopainen Theory 19

Octalysis Framework 25

Iterative Documentation **31**

Design Outputs Iteration 1 31

Iteration 1 Evaluation and Rationale for Changes to Iteration 1 34

Design Outputs Iteration 2 34

References **40**

High Level Summary

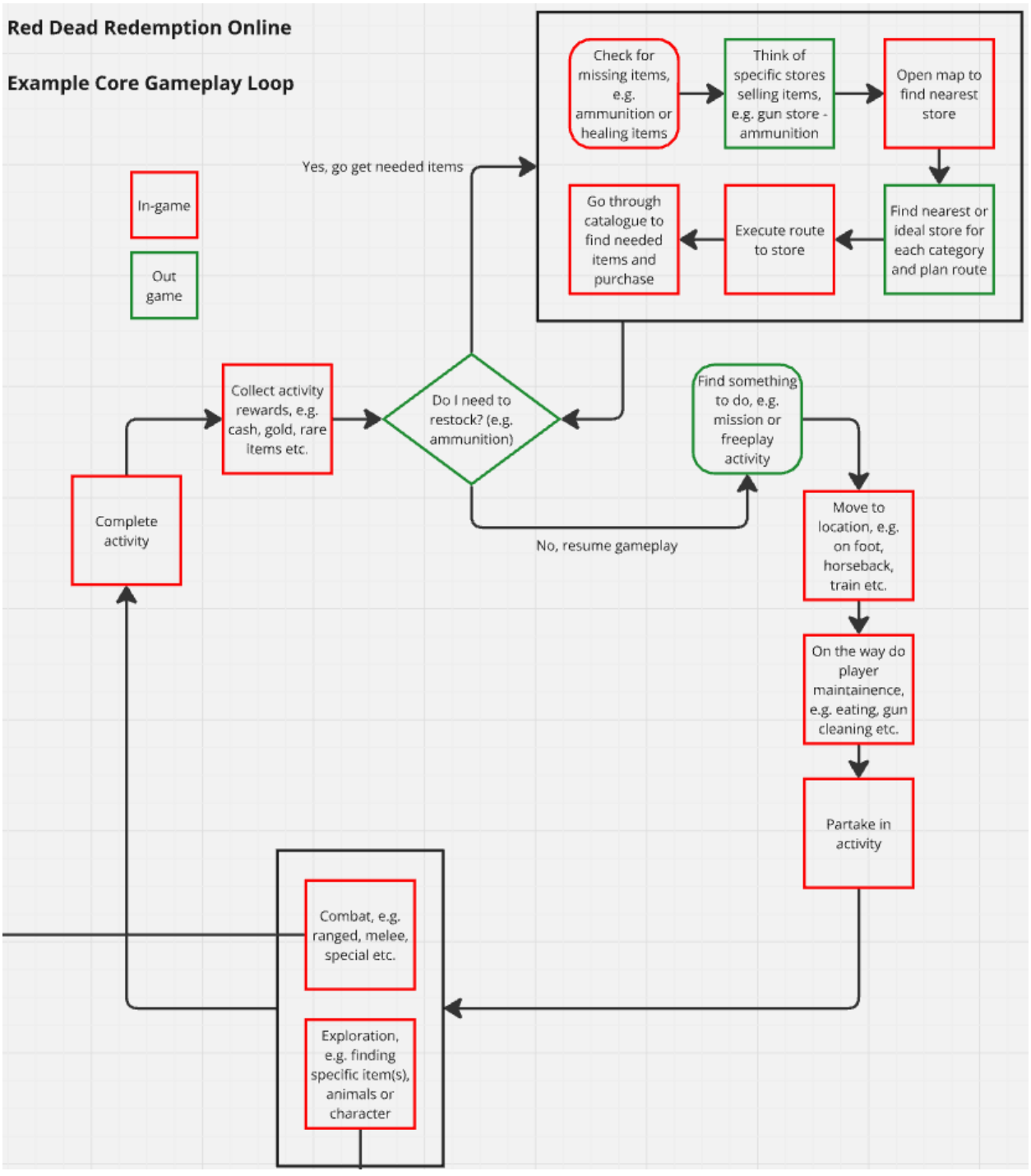
System Essence Statement

Framed for a murder you didn't commit, explore an open-world United States of America at the end of the 20th century. with a new nutrition system, and a newly expanded cooking system, hunt and gather your way across the map to make a slew of delicious and nutritious meals, fighting off the harshness of the Wild West.

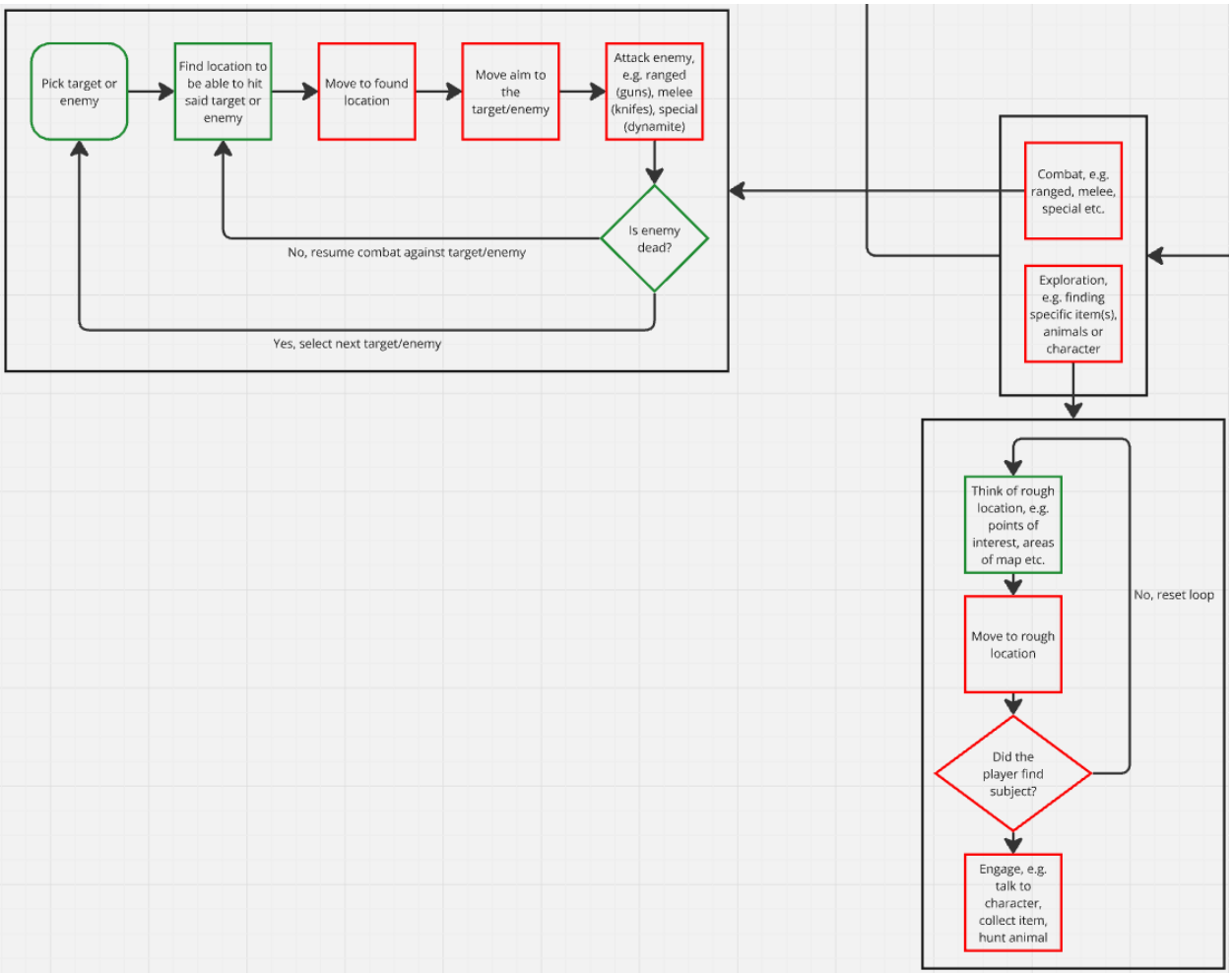
Chosen game analysis

"Red Dead Redemption 2", released 26th October 2018, is an action/exploration game, in which a band of outlaws struggle to survive, where they will steal and kill their way across America. The "Online" mode sees the player framed for murder and released into a sandbox version of the same game, able to so as they please, such as complete missions, hunt, team-up with other players etc.

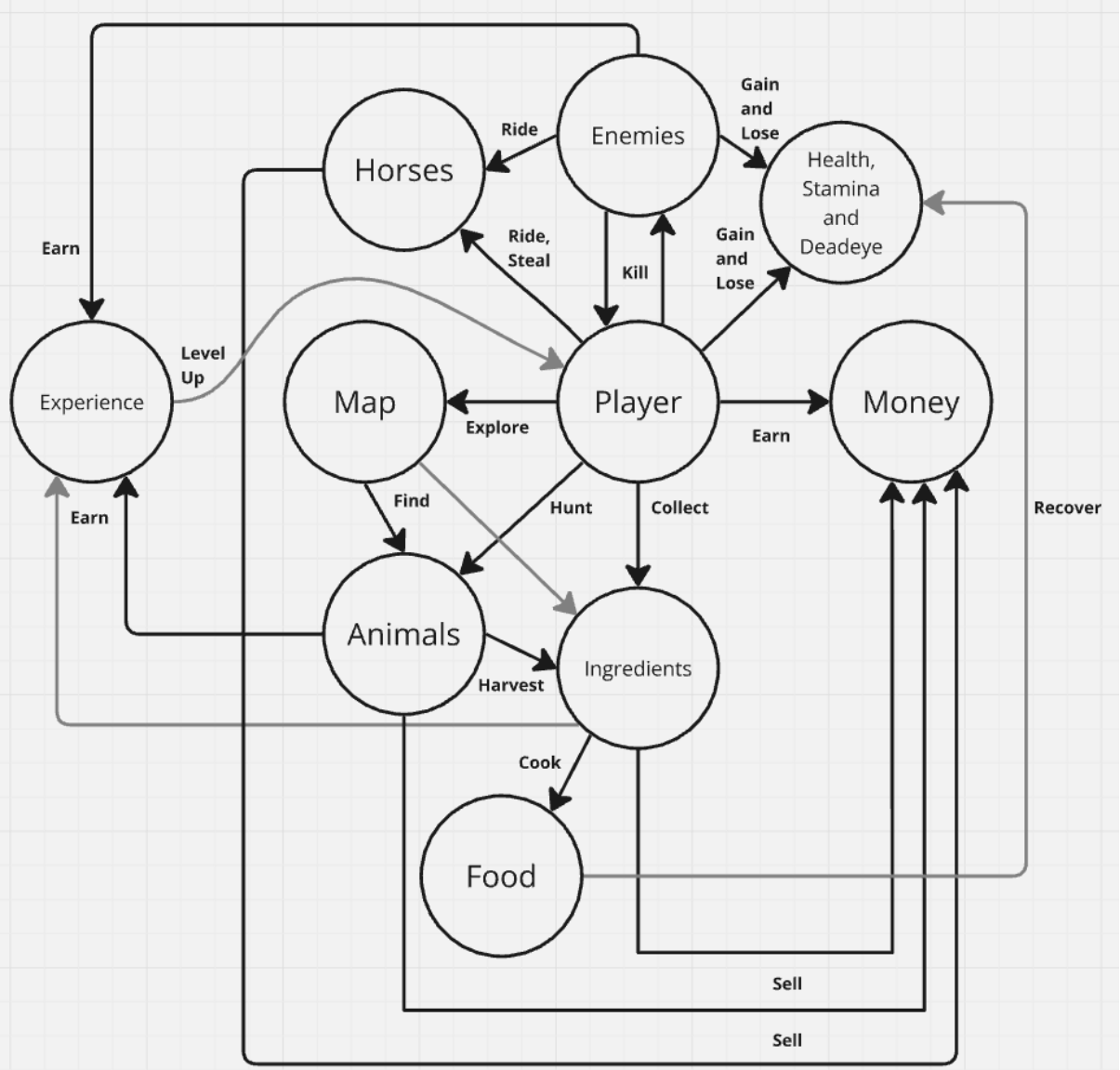
- Core gameplay loop



- Combat and exploration loops

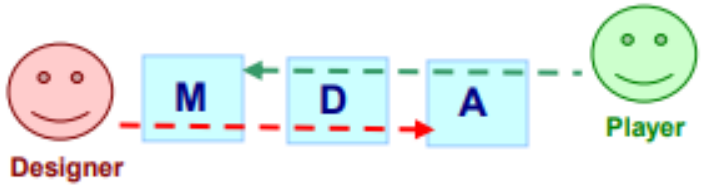


- Example Noun/Verb diagram for overall game

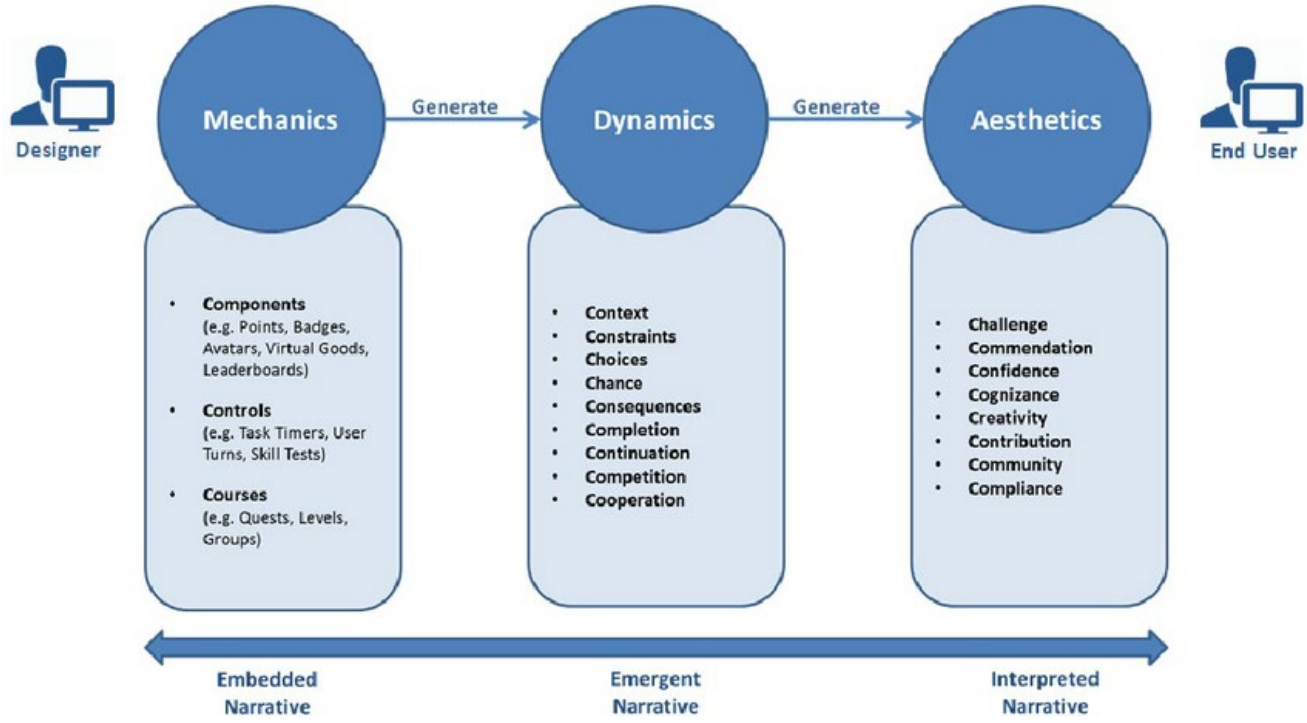


MDA Framework (Mechanics – Dynamics – Aesthetics)

The "MDA Framework" (Hunicke et al, 2004)[i], "is a formal approach to understanding games – one which attempts to bridge the gap between game design and development, game criticism, and technical game research." Here, games are broken down into their mechanics, Dynamics, or how these systems create different types of gameplay, and Aesthetics, or different player responses and receptions to said dynamic(s) (see figure 1). The following is an example list of Mechanics, Dynamics and Aesthetics, followed by a series of applied MDA examples. In coming up with the list of Dynamics specifically, the list was expanded (Ruhi, 2015) with aid of "The MDA Framework and the 20 C's of Meaningful Enterprise Gamification[ii]" (see figure 2).



(Figure 1, the MDA framework diagrams from the original 2004 paper)



(Figure 2, the 20 C's of Meaningful Enterprise Gamification)

Mechanics

- Quests
- Combat
- Equipment and Inventory systems
- Open World
- Health system
- Stamina system
- Deadeye system
- Horse Riding
- Online system

Subsystems

- Equipment system - Ammunition
    - The player requires ammo for guns and cannot use them when they tun out until they get more
- Equipment system + open world system - Hunting
    - The player can hunt animals and collect resources such as meat, pelts, horns etc.
- Open World - Exploration
- Inventory system + health/stamina/deadeye - Cooking
    - Cooking and eating meals restores ”Cores”

Dynamics

- Consequences
- Choices
- Constraints
- Camping

- Sniping
- Exploration
- Completing quests
- Player interaction
- Horseback combat
- Open World exploration

Aesthetics

- Mastery
- Satisfaction
- Immersion
- Confidence
- Completion
- Freedom
- Sensation (Game as sense pleasure)
- Fantasy (Game as make-believe)
- Narrative (Game as drama)
- Challenge (Game as obstacle course)
- Fellowship (game as social framework)
- Discovery (Game as uncharted territory)
- Expression (Game as self-discovery)
- Submission (Game as pastime)

- Mechanic

Combat system

- Dynamic[s]

Sniping, camping, horseback combat etc.

- Aesthetics

Challenge [aiming for perfect kill for perfect kill, managing ammunition]

Satisfaction [achieving perfect hunts for perfect kills]

Mastery [achieving expression from unlocking and wearing intended hunting-based clothing]

Expression [the player can do as they wish using weapons available to them]

- Mechanic

Open World

- Dynamic

Open world exploration

- Aesthetics

Sensation [good looking game from graphics and particle effects [sight] with music and sound design [sound]]

Narrative [backstories behind places found and characters met]

Discovery [finding new locations, new animals to hunt and herbs to collect]

Submission [passing the time in exploring the world]

- Mechanic

Equipment system

- Dynamic

Choices [freedom to use any equipment available to player, free to change how their character looks [character themselves, hair, makeup etc.], and dress how they want]

- Aesthetics

Freedom [free to do so how and when they want]

Immersion [getting to change how the character looks helps to immerse the player over just playing a set character]

Expression [the player can express themselves with certain clothing and colour choices, the weapons they use etc.]

Submission [the player can spend as little or as much time as they want doing this]

Challenge [ammunition management, the player has the freedom to switch between guns with different ammo types, e.g. rifles versus repeaters, pistols versus revolvers]

- Mechanic

Online system

- Dynamic

Player interaction

- Aesthetics

Freedom [free to do so, or not do so, changing when they want]

Expression [free to portray themselves how they want, both their character and themselves personally, e.g. roleplaying]

Submission [the player can spend as little or as much time as they like doing so]

Challenge [Player Vs Player [PvP] options, e.g. duels, PvP missions etc.]

Fellowship [works as a social framework, meeting and hanging out with people]

- Mechanic

Inventory system, Health/Stamina/Deadeye

- Dynamic[s]

Cooking system

- Aesthetics

Constraints [players must first have the necessary ingredients to cook each meal]

Freedom [provided player has ingredients, they are free to make any meal they can]

Immersion [player will hold cooking meal over a campfire and eat off their knife, adds to immersion]

Mastery [player can maintain and improve their character by regularly cooking and eating said meals]

Here then, the gameplay has been broken down to understand both how the systems work, and what the player experience of each dynamic through said system will be. This is important to understand the "fun" of a game, since feedback on the project highlighted a lack of "fun", and more-so just resource management with no real gain or upside for the player. Analysis like this then helped guide designing both the negatives [malnutrition] and positives [Surplus] of each effect, as well as how the player experiences said system.

System analysis of chosen game

The Online version of the game “Red Dead Redemption 2” lacks in its cooking system, and there is no form of nutrition. The online cooking system is barebones compared to the story-mode of the game. In Online mode, the player can cook a single ingredient, such as a piece of meat or fish, with a single herb for different effects based on the ingredients, such as regenerated “Health”, “Stamina” or “Deadeye” cores.

In reference to ingredients, different animals and fish spawn around the map in different places, and can migrate around the map, for instance if they run away from the player. Likewise, herbs spawn across the map, each growing in different areas. Additionally, some of these ingredients can be purchased at various stores.

The system of collecting ingredients is much the same as the game’s predecessor, Red Dead Redemption. In the case of animals, the player can harvest a dead animal for various ingredients, the only gameplay difference being that the sequel places arbitrary caps on the maximum numbers of each ingredient a player can hold, such as 10 of each herb, or 10 of each meat [with the exception of venison which is capped at 20 instead of 10 with no explanation].

Problem statement

The cooking system of the Online version of Red Dead Redemption 2 is far too limited and restrictive. Something should be done to make the system more enjoyable, as well as to give the new system a reason to exist.

How the system addresses the problem

The new system will allow players much more freedom when it comes to cooking, with eating being one of the main aspects of character maintenance. The new nutrition system will make the cooking system that much more important, and give players a better reason to interact with a currently wasted system, since failure to do so will be at a detriment to their gameplay experience.

Core system concepts

- More player freedom when cooking
- More enjoyable ingredient collecting and cooking experiences, making it something players actively want to do, instead of having to for character maintenance
- Give players a better reason to engage with the cooking system
- Enhance Aesthetics [MDA] of realism and immersion

Expected player experience

The player would be expected to now spend more time collecting ingredients such as fish, meat, and herbs, on a higher priority or more naturally occurring to said player than before. With these collected, the player would seek out somewhere to cook, e.g. their camp, where they would prepare said ingredients and make a much more varied range of meals than before, getting to enjoy animated almost mini-cutscenes as they do so.

Game Research

Chosen game research and analysis

Design considerations with chosen game

- Lack of nutrition will not seriously debilitate or kill the player

The system will not do things like induce cancer from too many of X, or any permanent conditions, such as Diabetes. This is to make the gameplay enjoyable with an element of challenge, yet not so punishing that players would drop the game or permanently suffer a worse gameplay experience. Any deficiency or overdose can be beaten to return the player character to normal health.

- Not doing calories or fat

The game has an in-build system for checking how much the player eats. Adding an additional layer to this would be to overcomplicate the system. Calories and fat would then both play into the system, so there is no point in doing either.

Similar games analysis

Other Rockstar Games titles, such as the online version of "Grand Theft Auto V" (2013) uses a similar format of a nameless, customisable protagonist placed in an open world, where they can freely explore, kill, rob etc. There are several core differences between them however, such as GTA V Online being set in the modern day, compared to the start of the 20th century in RDR2. Additionally, GTA V Online and RDR2 have different perspectives on open world, non-mission content, with RDR2 having hunting, fishing, item collecting etc., while GTA V basically just has different flavours of "kill people".

Similar systems analysis

"The Legend of Zelda: Breath of the Wild" (2018) and later "The Legend of Zelda: Tears of the Kingdom" (2023) have cooking systems similar to the proposed idea. Here, the player can use up to 5 ingredients to cook, both making food acting similarly to RDR2, restoring health, stamina etc., and elixirs, which do the same but with a different set of ingredients. Different combinations of ingredients make different meals and elixirs, with rarer or better ingredients having stronger effects. Like in RDR2, different herbs have different effects and adding them to meals gives said meals the same effects. This was the basis for the concept of multiple additional ingredients, instead of just 2 (1 meat/fish + herb).

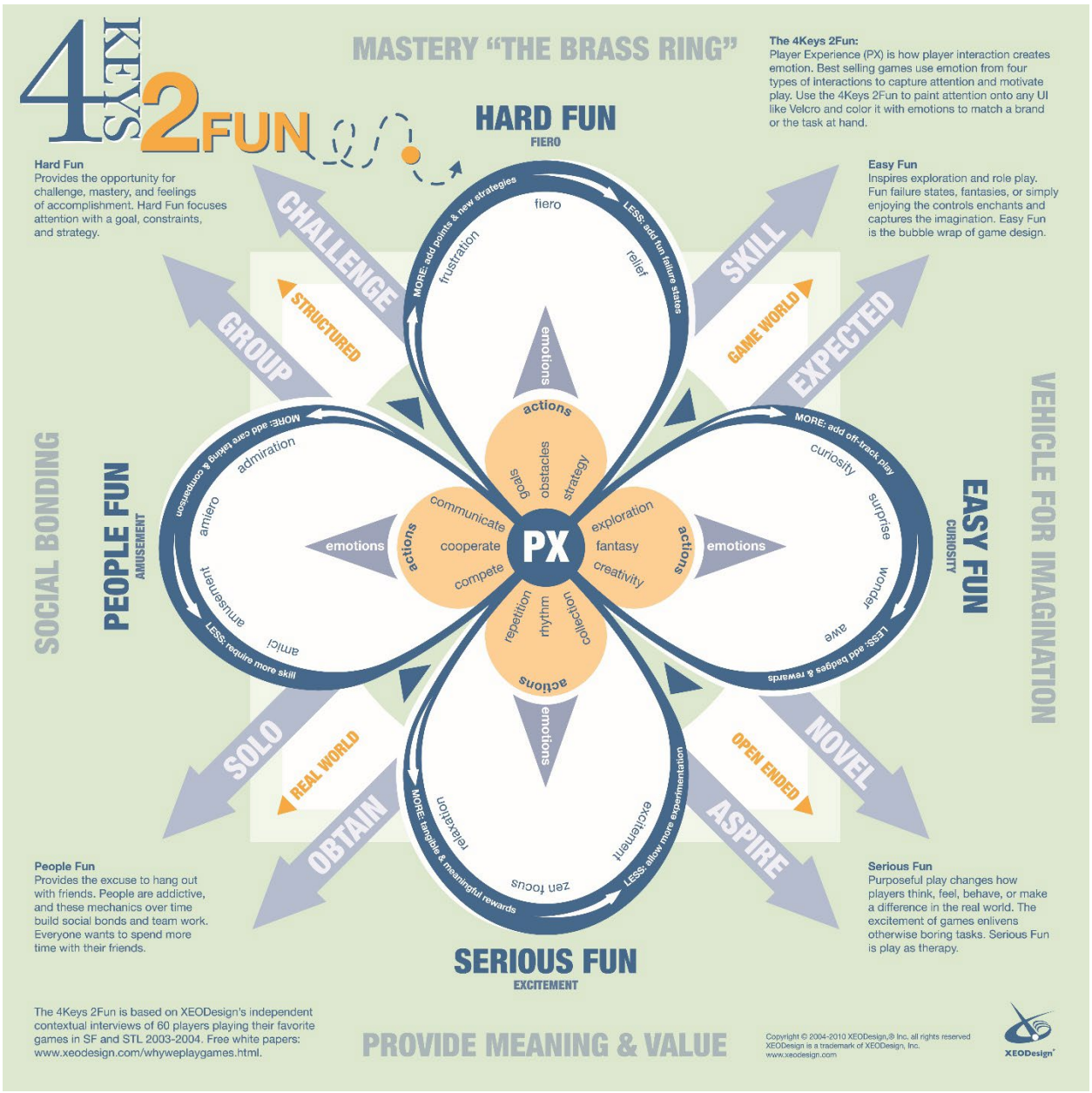
Academic research

4 Keys to Fun (Lazzaro, 2004)

"The 4 Fun Keys create games' four most important emotions
1. Hard Fun: Fiero – in the moment personal triumph over adversity
2. Easy Fun: Curiosity
3. Serious Fun: Relaxation and excitement
4. People Fun: Amusement".[iii]

"These four main reasons why people play games are how best sellers create more emotions for more captivating play. Each key unlocks a different set of play experiences. Because players alternate between them during a single play session best selling games offer at least three of the 4 Keys 2 Fun."

Applying the "4 Keys 2 Fun", like the MDA Framework, helps to define the different player experiences, as well as being used to detect any holes in "fun" or the gameplay experience, e.g. in this case a lack of crossover with other Online players (people fun). Thanks to the 4 Keys 2 Fun, this could now be addressed, e.g. a free-roam mission around cooking, the ability to trade ingredients with one-another, or the ability to cook for other players, e.g. in the same posse/group, as a form of camp cook.



[Figure 3, the "4 Keys 2 Fun" diagram from Nicole Lazzaro's blog]

Hard Fun (Fiero):

"Provides the opportunity for challenge, mastery and feelings of accomplishment. Hard fun focuses attention with a goal, constraints and strategy."

Here, Hard Fun is achieved by all 3 metrics, the example of challenge achieved by different in-game goals, such as "Daily Tasks", a set of 7 in-game tasks, each rewarding the premium currency "Gold", which can be used for premium outfits, premium weapon customisation, and the in-game roles such as "Trader", "Moonshiner" etc. Mastery is met by giving player a level system, in which higher levels grant access to faster and higher damage weapons, rarer or more unique clothing and customisation options etc. Different in-game statistics are also tracked that reward players with eventually golden belt buckles that can be worn, such as for 1000 animals harvested, 1000 fish caught etc. attention is then focused on player-generated goals, such as unlocking x clothing item or y weapon, using the constrains of the different systems, e.g. the ammunition system, the weapons currently available to them etc., and strategy including going to certain locations for specific animals or fish, completing certain daily tasks for gold to unlock roles etc.

Easy Fun (Curiosity):

"Inspires emotion and role play. Fun failure states, fantasies, or simply enjoying the controls enchants and capture the imagination. Easy fun is the bubble wrap of game design."

The map, with different areas and biomes, animals, fish and herbs, encourages exploration of as much of the map as possible to get as full a gameplay experience as possible. Certain roles also encourage this, such as the "Collector" role, which has items like tarot cards, wild flowers and jewellery like necklaces and rings all over the map, thus further encouraging exploration. In tandem with "People Fun", roleplay can be achieved in the Online mode through interactions with other players, or even a lone experience with the NPCs of the game world. In normal open-world gameplay failure states are often non-serious, just respawning the character if they die, and does not always punish the player for dying. Fantasies come from the cowboy setting of the game, while enjoyment of the controls can come from horseback riding, the snap-to cover system, or the gunplay.

People Fun (Amusement):

"Provides the excuse to hang out with friends. People are addictive, and these mechanics over time build social bonds and team work. Everyone wants to spend more time with their friends."

As mentioned in Easy Fun, teaming up with other players is an integral part of the experience of Online, and has seen several notable examples of this. Especially in the Covid-19 lockdown period, the game helped to forge enduring friendships and to combat loneliness, a good example being the "Rift Trials"[iv], a group of over 1600 female players who could not see their real-life horses due to lockdown. Described as one of the "Kindest" posses in Online, their source of fun comes not necessarily from the gameplay itself, more so using Online as a hangout place, where they can share their love of horses together.

Serious Fun (Excitement):

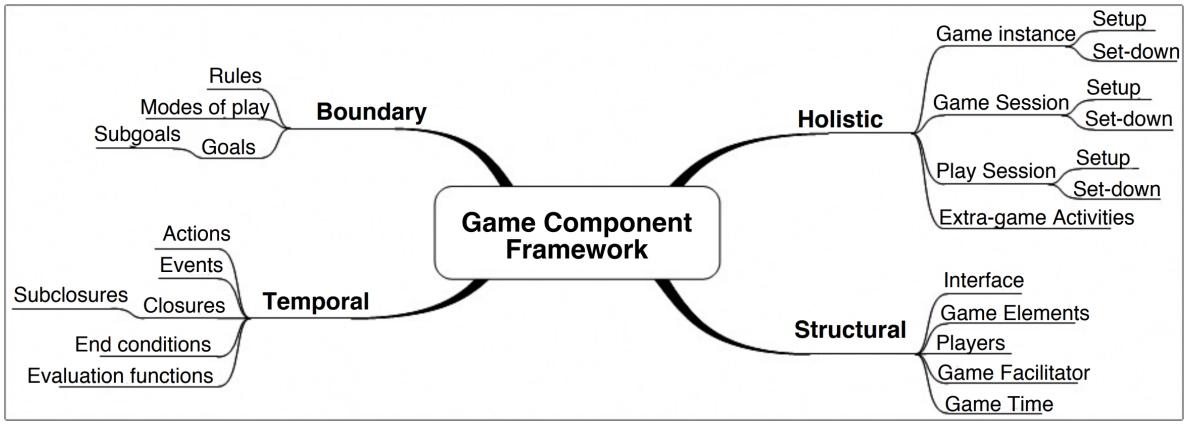
"Purposeful play changes how players thing, feel, behave, or make a difference in the real works. The excitement of games enlivens otherwise boring tasks. Serious fun is play as therapy."

The idea of "Relaxation and Excitement", and "Play as Therapy", Online can be as relaxing or exciting as the player wants, based on their choice of gameplay. The contrasting sensations of a mass PvP shootout in a sprawling urban centre compared to the relaxation of quiet fishing, or anywhere in-between are freely available to all players at any time.

"Patterns in Game Design" Bjork and Holopainen Theory

According to the Google Books synopsis *(Björk et al, 2005)*[v], "Annotation Patterns in Game Design provides professional and aspiring game designers with a collection of practical design choices that are possible in all types of games. These choices, called patterns, are used to illustrate the varying types of gameplay found in games. For the purposes of this book, gameplay is defined as the structures of player interaction with the game system and interaction with other players. This includes the possibilities, results, and reasons for players to play. By putting these elements of gameplay into practical patterns, designers

have access to a common set of concepts that can be used by all developers, allowing game projects to be approached with more standard tools. These patterns help designers put their concepts and ideas into words, which makes communication between members much easier. The patterns also help with making design choices, understanding how other games work, and inspiring game ideas. The book itself is divided into two main parts. The first part covers the theoretical aspects of describing games and defining the template used to develop the game design patterns. The second part includes the actual patterns divided into chapters based on the aspect of gameplay they cover. The patterns can be used in any order and referenced as you would a dictionary. By studying these various game design patterns, designers learn about the choices they'll have to make when using a pattern in their own designs, and they'll gain an understanding of what gameplay is, so that they can design better games." [see figure 4].



[Figure 4, Game Component Framework from "Patterns in Game Design"]

Holistic

- Game instance

The game instance includes the players, the NPCs, the game map, fish and animals etc. This also includes the main HUD and UI elements like the menus, e.g. the world map, profile page etc.

- Game Session

The game session is open to whatever the player wants, e.g. intended main tasks like main plot missions, free play missions etc., as well as independent, player-driven tasks, such as the different “Roles” work, or activities like hunting and fishing.

- Play Session

The Play Session is up to the player, this could be anywhere between a few minutes to pass the time, all day, or anywhere in-between.

- Setup

Setup is simple, launching “Online” from the start menu of the game. If the player is playing for the first time it put them into the character creator, and give them the option of the tutorial, or if the player is returning it will spawn them close to where they left the game last play session.

- Set down

The player may do something like a character overview, e.g. check their cores, ammunition counts, currencies etc., to make a rough plan for the next time they play, e.g. go back to their camp to eat and recover their cores, head to a gunsmith and restock ammunition, go clothes shopping etc.

Boundary

- Rules

Rules include things like maximum numbers of ammunition and items, e.g. 100 rifle rounds, 200 revolver rounds etc., or 10 of each herb, 20 of each canned good etc. The main currency Dollars can be earned through a variety of tasks, e.g. missions or selling items like ingredients, which can then be spent in stores on consumables e.g. ammunition, food, medicine etc., or on permanent unlocks such as new weapons or clothing. Committing crimes in front of NPCs will have them try to alert law enforcement, if they succeed then sheriffs spawning to chase and kill the player. The player can escape them by escaping their search area, however they will incur a bounty, which can be paid off at railway stations around the map. Earning “Experience Points” from completing missions, killing enemies, hunting etc. levels up the player at increasingly higher intervals,

with most unlocks in the game such as horses, horse cosmetics, weapons and clothes unlocked at certain levels.

- Modes of Play

The player can adopt a PvP or PvE stance, the latter making PvP players initialising more difficult, although if PvE players start combat they are automatically switched to a PvP stance to prevent abuse of the system by PvP players looking to get the jump on unsuspecting players. A self-imposed mode, players can either play solo, any interactions with other players either incidental or accidental, or actively engage with other players, these two very different gameplay experiences. Different missions determine how players can interact with one-another, with free play missions such as hunting contests disabling PvP for their duration.

- Goals

There is no real, final end goal for Online, there being no real intention or need for players to stop playing. If players wanted an excuse to stop playing, they may come up with their own goals, e.g. reach level X, as close to 100% completion as possible etc.

Temporal

- Actions

The player has free control over their character, able to move freely like a regular human, and can ride a horse realistically as well. The player is also able to aim freely in all directions, with the exception of only so high a maximum aim angle when looking upwards, which would only have very specific niche uses anyway, such as hunting birds or high-up enemies.

- Events

The player can partake in the overarching story of Online, as well as free play missions like fishing competitions or photography contests. These are of course optional, and the player can choose whether or not to join freely. There are also in-world random events, such as the chance to get ambushed by NPC enemies, strangers needing transport from point A to point B, gang hideouts the player can wipe out etc.

- Closures

Free play events will end after X time limit, e.g. 5 minutes, while missions will end either after completion [success], or the team dies to many times and the mission fails [failure]. The player will naturally bring closure to anything they do freely, such as hunting or herb collecting, since they will eventually run out of either ammunition or inventory space, at which point carrying on would be wasteful since they can gain nothing from said activities, asides from tiny amounts of experience points.

- End Conditions

As mentioned, there are no real closures, and thus no real end conditions. To give an example of player-made conditions, the 100% completion might include maxing out all "Roles", e.g. Collector, Trader etc., as well as getting gold on all buckle unlocks, e.g. 1000 enemies killed, 1000 kills with x weapon etc.

- Evaluation Functions

To again use the example of 100% completion, the game tracks completion of said buckles on the main achievements screen, broken down into categories, using an "X out of Y" number.

Structural

- Interface

Interfaces would include the main player HUD, which includes the minimap, and the player stat bars "Health", "Stamina" and "Deadeye", a 0-100% fullness meter, as well as their "Cores" again 0-100% bars acting as secondary emergency bars. interfaces also include the different menus, such as the achievements menu, player profile etc. Multiple in-gameplay menus would also be included, such as the Inventory screen, weapon wheel etc., from which the player can check for item limits, consume food and healing items, switch weapons and check ammunition counts etc.

- Game Elements

Game elements include the players and their equipment, any NPCs, any enemy NPCs and their equipment, and animals and herbs spawning around the map. Animals and herbs will spawn in random, defined group sizes within certain regions of the map, while

enemy NPCs will have a randomly generated look, outfit and weapon loadout, typically consisting of repeaters and revolvers.

- Players

In Online there is a maximum of 32 players in a server, the rest of the game populated by NPC characters, the majority random strangers, but some important to the gameplay. As such, shopkeepers are invincible, and weapons cannot be used in their shops, e.g. the gunsmith, tailor, doctor etc. Otherwise, players could grief one-another, not allowing each other to buy or sell anything.

- Game Facilitators

One example of a Game Facilitator would be that if the player attempts to take out an enemy NPC gang hideout and is killed in the process, the player will respawn nearby with the enemies still in place, and still hostile to the player. Another would be the reporting system if the player suspects another of cheating or hacking, in which the player reports not just that character but the account owner, at which point if an offence is found, the account is banned from Online play, not just the specific character, otherwise the cheater could just make another character on the same account, picking up where they left off.

- Game Time

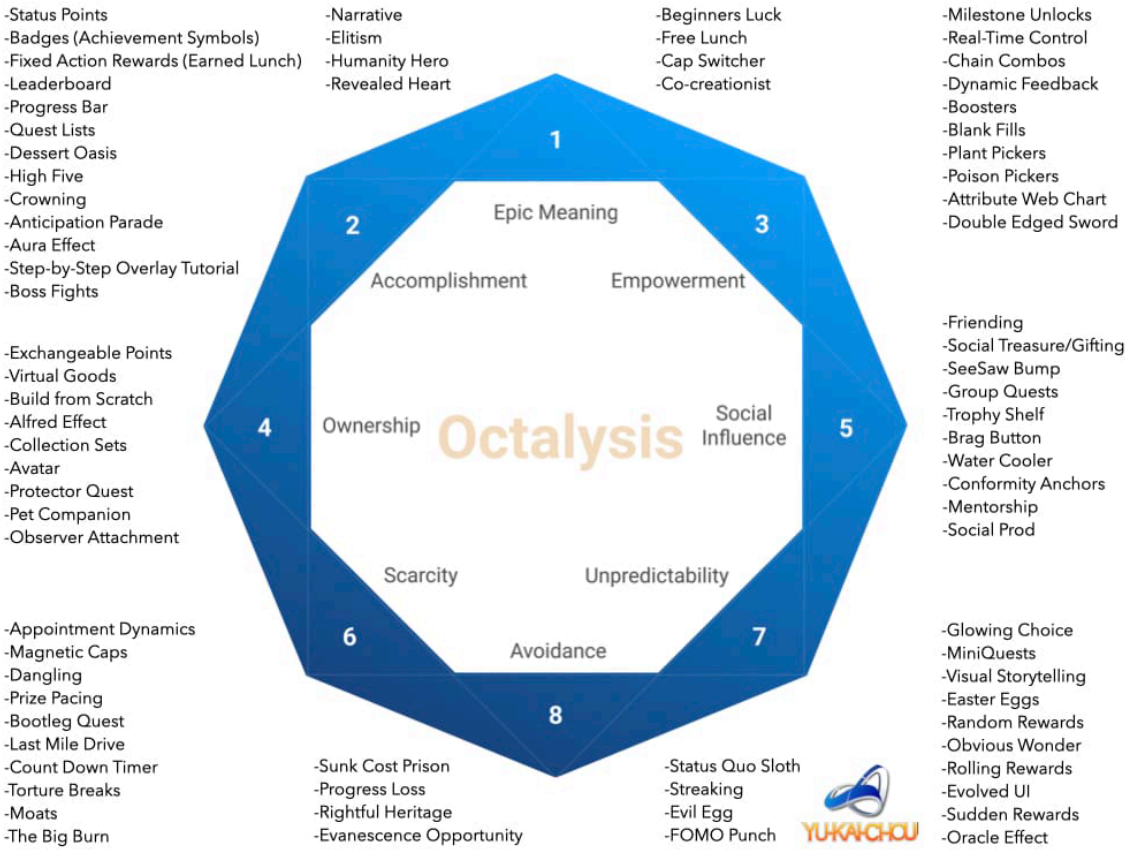
1 in-game day is set to 48 real minutes, thus an extended play session can last several in-game days. the player joins a server to the time of the server, rather than individual times for each player, so it can then match enemy spawning times and locations, nocturnal animal appearances etc. starting a free-play mission like a hunting contest will put players in a separate instance at a set time, and then added back to the same server at the updated time passes in the players absence.

Here, the Game Component Framework was useful for setting the time scales of different effects [Structural – Game Time], how half and quarter-portions will be addressed [[Boundary – Rules] etc.

Octalysis Framework

"Gamification, a design approach centered around human motivation, takes elements from games and applies them to real-world activities. Octalysis emphasizes "Human-Focused Design" instead of mere functionality, optimizing human motivation and engagement within a system.

The framework comprises 8 Core Drives represented by an octagon shape, including Epic Meaning & Calling, Development & Accomplishment, Empowerment of Creativity & Feedback, Ownership & Possession, Social Influence & Relatedness, Scarcity & Impatience, Unpredictability & Curiosity, and Loss & Avoidance. By understanding and implementing these Core Drives, designers can create engaging experiences that cater to intrinsic motivators and promote positive user experiences."[vi] [Chou, 2015] [see figure 5 for diagram]



[Figure 5, Octalysis diagram, this specific diagram found on Visuer Lab – The Octalysis Gamification Framework for corporate eLearning[vii] [Kho, 2022]]

- Epic Meaning and Calling
    - Contributing to a Higher Purpose – With an emphasis on player interaction, part of the "Higher Purpose" would be to engage with these interactions, to the betterment of the gameplay experience of others
    - Narrative for Epic Meaning – The narrative epic calling is more so for the single player, the character of "Arthur Morgan" protecting his gang from the law
        - There is some element of this in Online, the player framed for a murder they didn't commit, and then set out to catch the real killer, however there is less emphasis on this, since the missions are not critical to the Online experience as it is the story mode
    - Fostering Group Pride via Elitism – In online, players might side either with griefers, who go out of their way to do Player versus Player [PvP], actively looking for players to kill, or an anti-PvP stance, preferring the rest of the Player versus Environment [PVE] gameplay, and looking for a more relaxed and calmer experience
        - This is aided by the "Posse" system, essentially forming roaming gangs, thus making either stance easier, since a group of people are A] harder to take down [PvE], and B] make targeting players easier [PvP]
        - These stances can swap, for instance if a PvE player is repeatedly harassed by PvP players, they might then engage, at which point the PvP player may get upset and leave them alone, temporarily taking a more PvE stance
    - Believability is a Key Factor – Characters in Online are written to be believable, with authentic emotions, drives, relationships etc.
        - Asides from the players gunning each other down, the game world and average player experience is also believable, a PvE player just navigating the world and trying to survive

- Development and accomplishment
    - Importance of Challenges – RDR2 Online has a variety of challenges, including "Daily Tasks" [discussed in more detail later], as well as challenges for each of the player "Roles"
        - To an extent, the player could perceive anything they do as a "challenge", such as hunting or fishing, fighting outlaw camps etc.,

since there is some difficulty, and a learned process involved to do so better and more efficiently

- Need for Goals and Growth – For completing different challenges, players get experience, which can level up the player
  - This grants per-level unlocks, such as new clothes or weapons unlocked at level X. This is also the case for the player "Roles", with new equipment and cosmetics unlocked at each Role rank 1-5
- Never Make Users Feel Dumb – If the player was fighting a group of enemies and could not find 1 or 2 taking pot-shots at the player, proving to be troublesome, the minimap will show their location with red dots
  - Likewise, any animal that dies from hunting will show as a black paw that stands out against the minimap background

- Empowerment of creativity and feedback- X

- Ownership and possession
  - Cultivating Motivation – Players can amass a variety of weapons and clothes, which are permanently owned and cannot be lost for any reason. Likewise, the player can be customised at the start of Online, later able to change features like their hair, makeup or facial hair
    - Players then attach themselves to their favourite or most-used weapons, and most worn clothes, enhancing their sense of ownership
    - Players are also motivated to earn money, since it is spent on clothes, guns, ammunition etc.
  - Investment of Time and Resources - Players can put hundreds of hours into their Online characters, as they complete different parts of the game
    - These can include all the belt buckles, maxing out the player "Roles", levelling up etc.
  - Collecting for Emotional Fulfilment
    - Players who engage extensively with the hunting system may meet and trade with the character "Gus", a retired trophy hunter, who in exchange for perfect pelts can get unique clothes, such as a bearskin coat, deer skin bandoliers etc. These are all good looking and designed to stand out against normal clothes bought from a tailor.

Players might instead go out of their way to collect 1 of each item as a form of unofficial completion

- Social influence and relatedness
    - Motivating Through Connection – Players that get killed by other players are motivated to hunt them down and kill them in kind, improving at the game in the process
        - Likewise, players can band together in "Posses" with other players, roaming around the map and doing missions together
        - Continuing, the player meets several mentors, such as in the story "Dutch", leader of the "Van Der Linde Gang", as well as older members of the gang, with a variety of advice
            - In the Online mode, the player likewise meets aged and wise characters who act as mentors
    - Harnessing Social Integration - Constant requests from players to join their posses, or constant mission invites, and frustrate the player
        - This makes said invites meaningless, since the game should see that the player does not intend to do said activities, but the game constantly bombards them regardless
    - Bragging Rights and Trophy Shelves – The player's "Camp" can be upgraded to look progressively better as they level up, such as more unique furniture, a grander and better-looking tent, a custom flag etc.
        - A lower-level player can then recognize better camps as belonging to higher level, and thus more invested, better players
    - Harnessing Conformity Anchors – Online Missions, such as free roam missions, keep up-to-date leaderboards of scores of each participating player, with the current leader always displayed on the main player HUD

- Scarcity and Impatience
    - The Value of Rare Pixels – Different items can be obtained through different achievements, such as belt buckles for 1000 x, e.g. herbs harvested, animals killed etc.
        - These are designed to be good-looking and stand out, as well as scale in rarity based on tiers, e.g. 1, 10, 100 etc.

    - Perceived vs Actual Value – Premium clothing bought using “Gold” might be perceived as having different values based on the perceiving players
        - Players might believe they spent many hours grinding tasks for “Gold” across a long time, making best use of “Daily tasks” and missions
            - Likewise, the player might just see a good-looking player and assume they blew a load of money to cheat their way to dressing more impressively than other players, at which point they might fairly judge them as being pathetic
    - The Dangling Technique – The premium currency “Gold” can be purchased, which is used to unlock “Roles”, which add much more content to Online than the relatively basic default Online experience
    - Evolving UI – The game does not make use of Evolving UI, due in part to the simple design in the first place. Basic UI is introduced throughout the tutorial, such as the map, cores etc.

- Unpredictability and curiosity
    - Finding the Right Risk-Reward Incentive – Red Dead Redemption 2 Online players can play poker with other players, which any player can either win or draw. Players can each bet different amounts, higher or lower
    - Power of Uncertainty – This is obviously unpredictable, and if the house wins any player can just blame them, even if the game is not rigged to be anti-player, and the player might be captivated to beat the house
    - Glowing Choice Techniques – Different items around the map can be seen using “Hunter Vision”, normally using white raising particles, or a smell-looking particle effect for specifically animals
        - Collectable items for the “Collector” role instead glow using gold particles, standing out against the normal items and instantly grab the players attention due to their rarity

- Loss and Avoidance
    - Small-Scale and Large-Scale – The player could conceivably run out of ammunition mid-gunfight, or mid-hunt, and then risk a higher chance of death as they loot dead enemies for any ammunition, Large-Scale

        - On a smaller scale, the player only has so many slots to stow hunted animals, such as birds and animals, meaning if the hunted anymore they could not bring the carcass, and thus would either abandon the carcass, or harvest it for some ingredients and just not the body itself, which otherwise would have sold for around a dollar
    - Cropping Your Losses – Players can start and maintain an activity streak, which increments on its layouts every 7 days, e.g. days 7, 14, 21 etc., up to a maximum of 28 days, before it resets, and the player gets a cash payout
        - To start this, the player must complete at least 1 "Daily Task", 7 preset tasks such as killing x amount of a certain animals, travelled x distance, each task granting x "Gold" premium currency
        - Said gold is spent on premium-looking clothes and weapon skins, premium roles such as "Bounty Hunter", "Trader" etc.
            - If the player misses completing a task for a day, the streak will reset to day 0 and the player loses all progress, the streak resetting
    - Ultimate Loss vs Executable Loss – If the player spends a lot of ammunition or healing items against a load of enemies, or their horse dies mid-mission, and they then lose said mission, the spent resources would have been for nothing, an example of Executable Loss
        - The game goes out of its way to avoid Ultimate Loss. Nothing can be lost permanently, e.g. the player Horse, which can be recovered at a stable, weapons and clothes cannot be dropped etc. This would be especially problematic for horses, since the player can invest many hours training their horse's stats, such as its maximum Stamina
    - Grace Systems – When the player is pounced on by an animal, they get a short window to throw the animal off instead of being killed immediately
        - Credibility, players that are hacking can be reported, found guilty and banned, thus maintaining a fair system
            - This does mean the player has to either A] wait until the ban report goes through and the player is banned, or B] rejoin Online in a separate server to avoid them

Iterative Documentation

Design Outputs Iteration 1

- Basic premise outline

As mentioned in the similar systems analysis, the main inspiration for the system was the cooking system in "The Legend of Zelda: Breath of the Wild", which has the player combine between 1 and 5 ingredients to make either a meal or elixir. Looking at this, the idea arose that the player could divide portions, into either halves or quarters, so that they could use the same amount of ingredients in more meals. This would also mean that rarer ingredients would last longer if the player wanted, using them slowly in multiple meals, instead of all at once.

- Nutrition information outline, rounds 1 and 2

Nutrition (per 100g)	Carbs	Fibre	Iron	Protein	Sodium	Sugar	Vitamins
Ingredient							
Venison	0	0	<0.1	22.9	<0.1	0	<0.1
Boar	0	0	<0.1	28	<0.1	0	<0.1
Goose	0	0	<0.1	24.2	<0.1	0	<0.1
Chanterelle	7.4	3.7	<0.1	1.8	<0.1	0	<0.1
Oregano	68.9	42.5	<0.1	9	0.2	4.1	0.9
Mint	14.9	8	<0.1	3.7	<0.1	4.9	0.2
Bluegill	0	0	<0.1	25	<0.1	0	<0.1
American Alligator	0	0	<0.1	13	<0.1	0	<0.1
Pekin Duck	0.4	1	<0.1	23	0.1	0	<0.1
Blackcurrant	15.3	0	<0.1	1.4	0.1	0	0.2
Milkweed	5.5	2.5	<0.1	2.5	0	0	<0.1
Wild Carrot	9	2.7	<0.1	0.8	<0.1	4.5	<0.1

Here, some nutrition values were found for an array of sources, broken down into each nutrient for version 1 of the planned effects on the player. These included a variety of ingredient categories, such as mammals, reptiles, poultry and fish, as well as herbs, wild vegetables and mushrooms. These took place in "rounds", as seen by the table split, where 3 meats and 3 foraged items were analysed for each round, for a total of 6 meats and 6

herbs, mushrooms, vegetables etc. For the final version, this would be repeated for all ingredients.

List of sources for each nutritional value:

- American Alligator, Eat This Much[viii]
- Bluegill, MyNetDiary[ix]
- Boar, Eat This Much[x]
- Goose, Wild Harvest Table[xi]
- Mature Venison, Wild Harvest Table[xii]
- Pekin Duck, Eat This Much[xiii]

- Blackcurrant, Fatsecret[xiv]
- Chanterelle Mushrooms, Healthline[xv]
- Milkweed, Bing Copilot
- Mint, US Department of Agriculture[xvi]
- Organo, Verywell health[xvii]
- Wild Carrot, Healthline[xviii]

Using these values, one could then take the values, divide them by 2 or 4 if the player uses half or quarter portions, and add each ingredient to a total nutritional value for said meal. For future iterating, one could look for any missing values, or few high-value ingredients, and look for those in a 3rd round of ingredient nutrient collecting.

Random example meal made from listed ingredients

- 200g Venison
- 100g Chanterelles
- 100g Carrots

Carbs – 0 + 7.4g + 9g = 16.6g

Fibre – 0 + 3.7g + 2.7g = 6.4g

Iron – Something less than 1 gram each = maximum 3g

Protein – 45.8 + 1.8 + 0.8 = 48.4g

Sodium – Something less than 1 gram each = maximum 3g

Sugar – 0 + 4.1 + 4.5 = 8.6g

Vitamins – Something less than 1 gram each = maximum 3g

According to a male nutrition breakdown by the British Nutrition Foundation[xix], this would equal:

- Carbs (at least 333g) = ~5% daily intake
- Fibre (30g) = 21% daily intake
- Iron (8.7mg/d) = needs further study and breakdown
- Protein (55g) = 88% daily intake
- Sodium (no more than 6g) = needs further study and breakdown
- Sugar (no more than 33g) = 26% daily intake
- Vitamins (less than 1g) = needs further study and breakdown

Iteration 1 Evaluation and Rationale for Changes to Iteration 1

Iteration 1 both works very well and has several critical flaws. Positives first, the actual nutrition values for carbs, fibre and protein work well. The multiple round system showcasing the nutritional differences between meat and herbs is nice to see and makes for easier reading than blocks of meat and herbs would. Conversely, the basis of iron, sodium and vitamins are poor. Upon further research, the maximum need is only a few grams or micrograms for these, and <0.1 isn't very useful when using micrograms measurements. Bunching up all vitamins was a waste of time, since more time must now be spent to re-find individual vitamins. Additionally, getting the values is nice, but having no point of comparison, or an actual daily intake value makes this information worthless. Going forwards, 3 things out be outlined:

A] – Get values in micrograms to use for values like iron and vitamins

B] – Break down vitamins into individual values, not 1 lump sum that tells the system basically nothing, or how to differentiate vitamin A vs D deficiency amounts.

C] Get a daily intake value for each nutrient, preferably from the same place, to make a % intake per 100g of each ingredient

Design Outputs Iteration 2

- New table outline

The new outline was to make a table with individually broken-down vitamins, and all information properly filled in to exact values, such as the case with sodium and iron. The new table then looks like this:

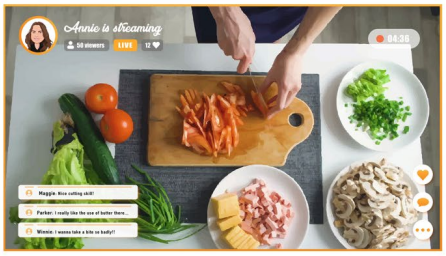
Nutrition (per 100g or dv%)	Carbs	Dv%	Fibre	Dv%	Iron	Dv%	Protein	Dv%	Sodium	Dv%	Sugar	Dv%	Vit A	Dv%	Vit B	Dv%	Vit C	Dv%	Vit D	Dv%
Ingredient																				
Venison	0	0%	0	0%	3.4mg	39%	22.9	41%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Boar	0	0%	0	0%	1mg	11%	28	51%	60mg	1%	0	0%	0	0%	0.4mg	28%	0	0%	0	0%
Goose	0	0%	0	0%	5.9mg	68%	24.2	44%	0	0%	0	0%	117mg	16%	0	0%	0	0%	0	0%
Chanterelle	7.4g	2%	3.7g	12%	0.87mg	10%	1.8g	3%	0	0%	0	0%	0	0%	0	0%	0	0%	1.4 mcg	14%
Oregano	99g	29%	79.2g	240%	0	0%	19.8g	36%	44.5mg	0%	0g	0%	0	0%	0	0%	0	0%	0	0%
Mint	14.9	4%	8	26%	5.08mg	58%	3.7	6%	0	0%	4.9	14%	212mcg	30%	0	0%	0	0%	0	0%
Bluegill	0	0%	0	0%	1.05mg	12%	25	45%	78.7mg	1%	0	0%	9.4mcg	1%	0	0%	2.35mg	6%	0	0%
American Alligator	0	0%	0	0%	1mg	11%	13	23%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Pekin Duck	0	0%	1	3%	1mg	11%	23	41%	121mg	2%	0	0%	26mcg	3%	0	0%	0	0%	0	0%
Blackcurrant	15.3	4%	0	0%	1.54mg	17%	1.4	2%	0.1	1%	0	0%	12mcg	1%	0	0%	181mg	201%	0	0%
Milkweed	18.2g	5%	2.6g	8%	1.8mg	20%	2.5	5%	0	0%	0	0%	0	0%	0	0%	20mg	50%	0	0%
Wild Carrot	9	2%	2.7	9%	0.3mg	2%	0.8	1%	0	0%	4.5	13%	0	0%	0	0%	0	0%	0	0%

Here, each nutrition is based on 100 grams, as before, now though displaying both gram-based and microgram-based amounts, based on the type of nutrition, e.g. carbs or protein are grams, and vitamins in micrograms. Outlined is the % daily intake per 100g of ingredients, using the British Nutrition Foundation figures, making visualising or reading how much to eat substantially easier, rather than leave it all to mental maths.

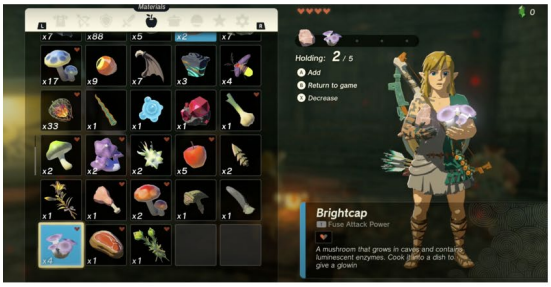
Using a reference image of the Online cooking system UI [see figure 6], the new system UI was then wireframed to include the selection of different ingredients and portion sizes, as well as their conventional effects [health, stamina and deadeye cores].

[Figure 6, Red Dead Redemption 2 cooking UI reference image, obtained from RDR2.org [Gibbs, 2018][xx]]

UI Generation collation of reference images to go with RDR2 Online Example UI



Not named by the source https://www.behance.net/gallery/69356441/Cooking-Game-UI but this was the first picture seen that formed origin of the mood board



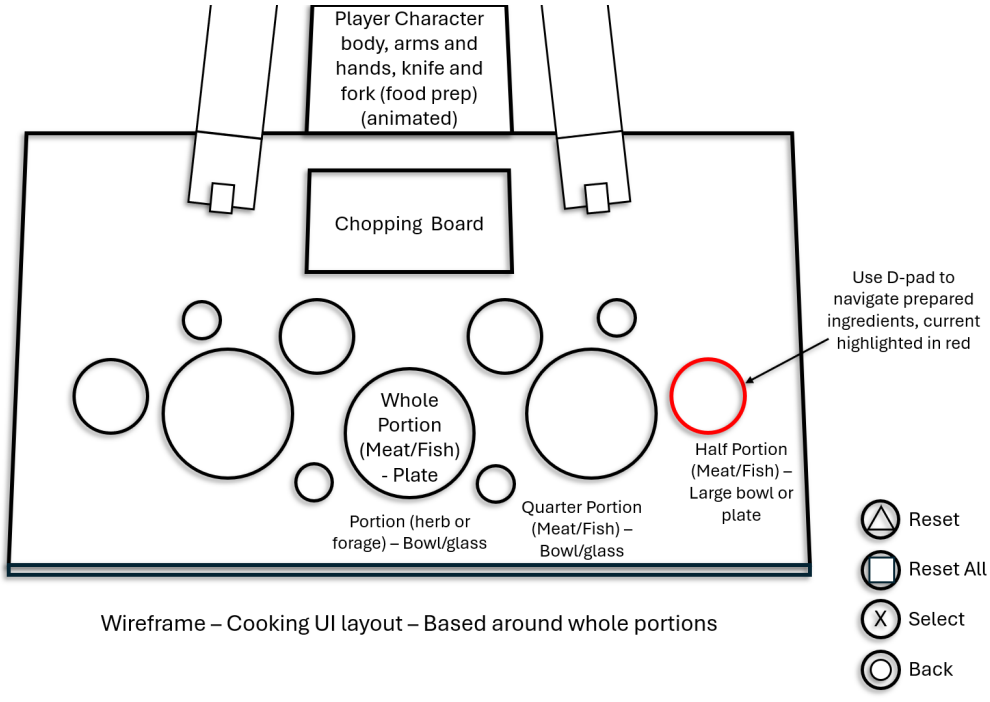
The Legend of Zelda: Tears Of the Kingdom (ToTK) (2023) ingredient UI

Final Fantasy XV (2016) cooked recipe UI with effects

The Legend of Zelda: Tears Of the Kingdom (ToTK) (2023) cooked meal pop up w/ effects

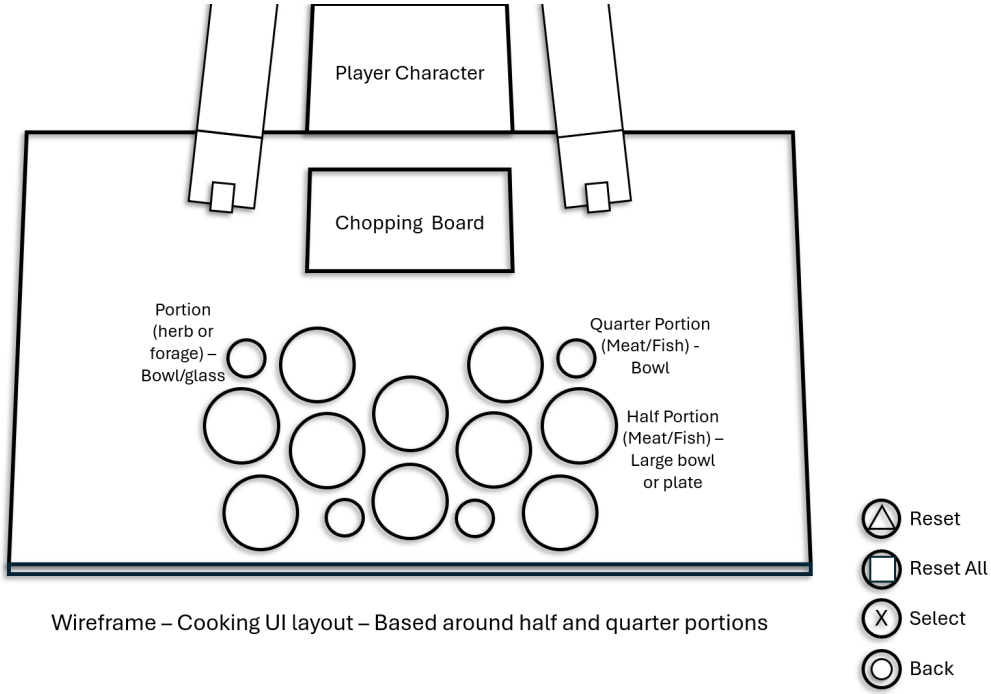
"Binging with Babish 2 Million Subscriber Special: The Every-Meat Burrito from Regular Show" - YouTube

UI Wireframe 1 – Example layout of ingredients



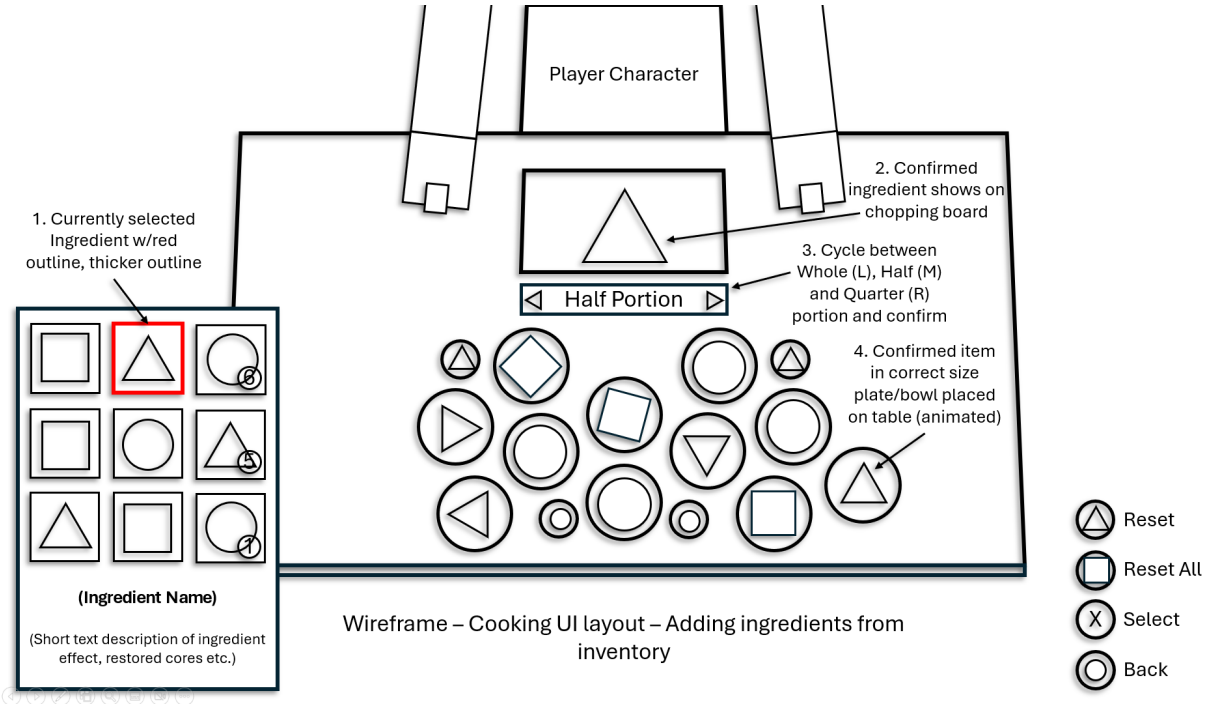
Wireframe – Cooking UI layout – Based around whole portions

UI Wireframe 2 – Alternate example, different amount of ingredients



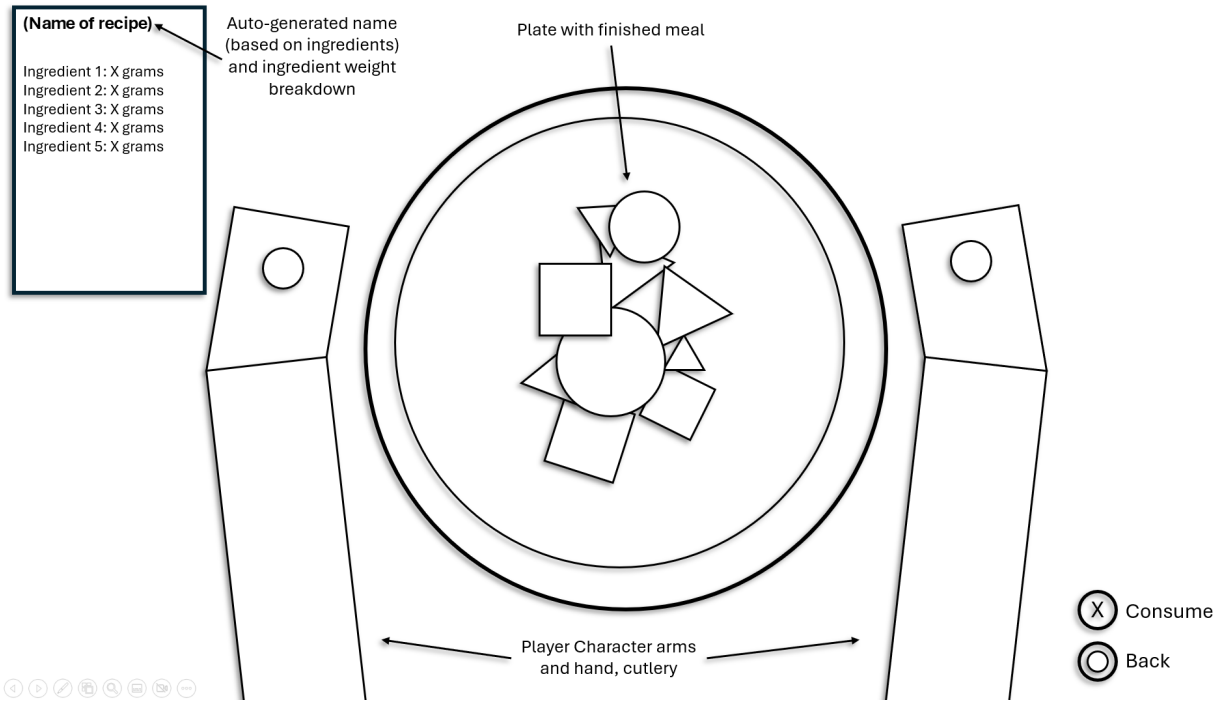
Wireframe – Cooking UI layout – Based around half and quarter portions

UI Wireframe 3 – Ingredient select and preparation menu



Wireframe – Cooking UI layout – Adding ingredients from inventory

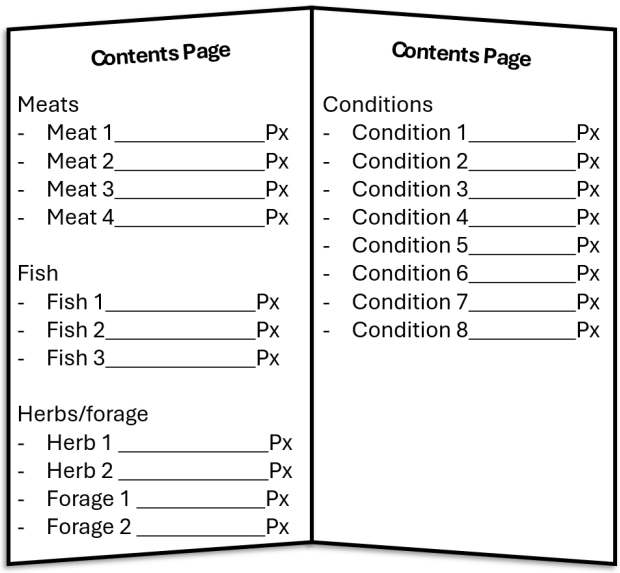
UI Wireframe 4 – Final prepared meal UI – X to consume or O to go back without eating



Quick-Reference Handbook (QRH)

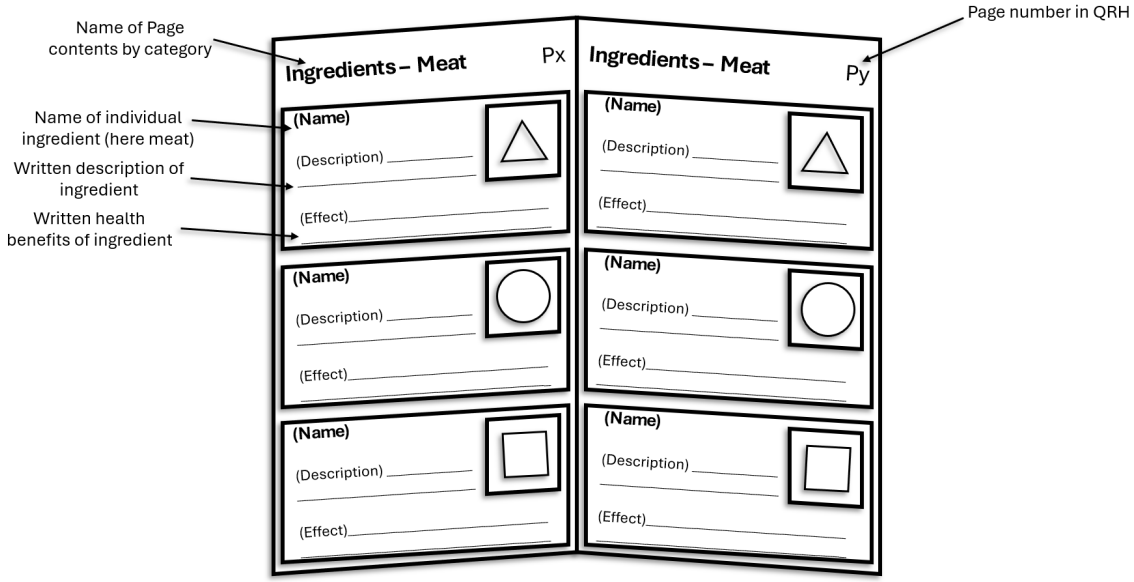
To communicate the nutrition to the player, rather than tell them explicitly (nutrition was barely understood at the time), a list of observable effects was produced, again using wireframes. Here, a contents page has a list of all ingredients (meat, fish, herbs/forage), for each listing their effects, as well as a list of all conditions, with their observable effects, which can then be used to deduce what is wrong with the player, and how to solve it.

UI Wireframe 5 – Example page of Contents



Wireframe – Quick-Reference Handbook (QRH) – Contents Page

UI Wireframe 6 – Example information page layout



Wireframe – Quick-Reference Handbook (QRH) – Nutritional information – Individual ingredients

References

[i] Hunicke, R., LeBlanc, M. and Zubek, R., 2004, July. MDA: A formal approach to game design and game research. In *Proceedings of the AAAI Workshop on Challenges in Game AI* (Vol. 4, No. 1, p. 1722) [Accessed 7 Nov 2024].

[ii] Ruhi, Umar. (2015). Level Up Your Strategy: Towards a Descriptive Framework for Meaningful Enterprise Gamification. Technology Innovation Management Review. 5. 5-16. 10.22215/timreview/918 [Accessed 7 Nov 2024].

[iii] Lazzaro, N. (2004). *The 4 Keys 2 Fun | Nicole Lazzaro's Blog*. [online] Nicolelazzaro.com. Available at: https://www.nicolelazzaro.com/the4-keys-to-fun/ [Accessed 17 Oct. 2024].

[iv] Morton, L. (2022). *Meet the hundreds of horse girls running Red Dead Online's kindest posse*. [online] pcgamer. Available at: https://www.pcgamer.com/meet-the-hundreds-of-horse-girls-running-red-dead-onlines-kindest-posse/ [Accessed 17 Oct. 2024].

[v] (Björk et al, 2005). *Patterns in Game Design*. [online] Google Books. Available at: https://books.google.co.uk/books/about/Patterns_in_Game_Design.html?id=IFQfyODK4wAC&redir_esc=y [Accessed 17 Oct. 2024].

[vi] Chou, Y. (2015). *Octalysis: Complete Gamification Framework - Yu-kai Chou*. [online] Yu-kai Chou: Gamification & Behavioral Design. Available at: https://yukaichou.com/gamification-examples/octalysis-complete-gamification-framework/ [Accessed 17 Oct. 2024].

[vii] Kho, J. (2022). *The Octalysis Gamification Framework for Corporate eLearning*. [online] VisuerLab. Available at: https://www.visuerlab.com/2022/01/08/the-octalysis-gamification-framework-for-corporate-elearning/ [Accessed 21 Nov. 2024].

[viii] Eat This Much. "Alligator Meat." *Eatthismuch.com*, www.eatthismuch.com/calories/alligator-meat-3136079. Accessed 6 Oct. 2024.

[ix] MyNetDiary. "Calories in Bluegill Fish and Nutrition Facts." *MyNetDiary*, www.mynetdiary.com/food/calories-in-bluegill-fish-ounce-41207314-0.html. Accessed 6 Oct. 2024.

[x] Eat This Much. "Boar." *Eatthismuch.com*, www.eatthismuch.com/calories/boar-3880. Accessed 6 Oct. 2024.

[xi] Wild Harvest Table. "Goose – Wild Harvest Table." *Wildharvesttable.com*, www.wildharvesttable.com/category/fowl/goose/. Accessed 6 Oct. 2024.

[xii] Wild Harvest Table. "Deer – Wild Harvest Table." *Wildharvesttable.com*, www.wildharvesttable.com/category/big-game/deer/. Accessed 6 Oct. 2024.

[xiii] Eat This Much. "Duck." *Eatthismuch.com*, www.eatthismuch.com/calories/duck-139955. Accessed 6 Oct. 2024.

[xiv] Fatsecret. "Calories in Black Currants (European) and Nutrition Facts." *Fatsecret.com*, 4 Feb. 2008, www.fatsecret.com/calories-nutrition/usda/black-currants-(european)? Accessed 6 Oct. 2024.

[xv] Ajmera, MS, RD, Raechelle. "Chanterelle Mushrooms: Nutrients, Benefits, and Recipe." *Healthline*, Healthline Media, 22 Apr. 2022, www.healthline.com/nutrition/chanterelle-mushrooms. Accessed 6 Oct. 2024.

[xvi] US Department of Agriculture. "FoodData Central." *Fdc.nal.usda.gov*, US Department of Agriculture, 1 Apr. 2019, fdc.nal.usda.gov/fdc-app.html#/food-details/173474/nutrients. Accessed 6 Oct. 2024.

[xvii] Cervoni, RD, Barbie. "What Are the Health Benefits of Oregano?" *Verywell Health*, 24 Jan. 2024, www.verywellhealth.com/oregano-8412166. Accessed 6 Oct. 2024.

[xviii] Adda Bjarnadottir, MS, RDN (ICE). "Carrots 101: Nutrition Facts and Health Benefits." *Healthline*, Healthline Media, 6 June 2024, www.healthline.com/nutrition/foods/carrots#nutrition. Accessed 6 Oct. 2024.

[xix] British Nutrition Foundation. "Recommendations for Men." *British Nutrition Foundation*, www.nutrition.org.uk/nutrition-for/men/nutrition-recommendations-for-men/. Accessed 19 Oct. 2024.

[xx] Gibbs, M. (2018). *Cooking & Crafting Guide for RDR2 Story Mode & Red Dead Online - RDR2.org*. [online] RDR2.org. Available at: https://www.rdr2.org/guides/cooking-and-crafting-guide/ [Accessed 21 Nov. 2024].