Game Design

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Introduction

You and your group of friends are responsible for maintaining a spaceship and bring it safely to its destination. The captain leads the group and will communicate incoming events. The crew must try saving the ship from causing damage. Your team must be prepared to face the most exciting and dangerous tasks throughout the galaxy in order to arrive at your designated planet.

This document provides the outline for the game described above. The game design document contains player information, gameplay aspects, and outlines how players are challenged within our game.

1. Player formation

The game is played with 2 to 5 players. All players are in the same physical space. One of the players will wear the Virtual Reality (VR) headset and the rest will play on their mobile device.

1.1 Captain

The VR player, referred to as the captain, is able to start a game. When a game is started the player begins in the main menu where they can select some general options in game.

When choosing ‘New Game’ the VR player gets into a public lobby where they can wait for other players to join the game lobby. When everyone is ready the VR player is able to initiate the game. Once the game is initiated the VR player functions as the captain of the spaceship.

1.2 Crew Members

The players without the VR, referred to as crew members, use a mobile device. Via an app they can join the lobby after the VR player has created one. Locally they can communicate verbally with the VR player about whether to start the game or not.

Before the crew members agree to be ready they should select a role to play in the game. Every role has different kinds of mini games and communication tasks. The amount or roles that can be chosen from will grow, but here are a few examples:

- Engineer
- Gunner
- Scientist

After the crew members chose a role, the VR player is able to start the game. The crew members then get positioned in their working room of choice:

- The engineer is located in the Engine Room
- The gunner is located in the Weapons Room
- The scientist is located in the Lab

The crew members can then get instructions from the captain and begin their tasks.

2. Gameplay aspects

This section discusses the core aspects that define the gameplay, such as the goal of the game, the importance verbal communication, events and tasks and minimized idle time.

2.1 Goal of the Game

The game revolves around a spaceship whose crew bears the responsibility of delivering a freight. The goal of the game is for the players to maintain and guide the spaceship in order to reach the final destination. The way to achieve this by responding to events appropriately, which randomly appear during gameplay.

A secondary goal is about setting a high score. When the final location in the game is reached the scores achieved during the game are accumulated and saved into a high score. The high score depends on for example how much health the spaceship has at the end of the run and on the amount of credits earned along the way. Credits are a virtual commodity and can be earned throughout the game by the players. Players are rewarded with credits by completing tasks.

2.2 Verbal Communication

A key aspect of the gameplay is communication. During the game all participants are required and therefore constantly encouraged to communicate by means of speaking with each other. As problems are introduced during the game, their occurrence and solution will have to be discussed in a two-way communication scheme between captain and crew.

The captain is to report all his/her experiences in the virtual world to the crew members. These experiences, after all, are not perceived by the crew, while the crew is exclusively capable of reacting appropriately to these experiences. The nature of these experiences is discussed in the next section.The crew may in turn inquire additional information about these experiences or some status updates on what tasks remain or how the ship is doing.

2.3 Events and Tasks

As introduced in the preceding section, captain and crew communicate on the experiences in the virtual world. This section discusses the nature of these experiences, or events, and elaborates the way these are to be reacted upon by performing tasks.

2.3.1 Events: The Dangers of Space

The game mainly evolves around random events occurring with respect to the spaceship. As briefly indicated in section 2.2, events consist of experiences in the virtual world that are indicated to the captain. Mostly, these experiences will concern lurking dangers that are to be dealt with as soon as possible.

Events are introduced in an increasing pace and have a short deadline which is indicated per event. All events will be logged in a captain's log, allowing the captain to keep track of everything that remains unsolved. Communication between captain and crew will revolve primarily around these events, in order for the crew to be able to respond to the events. Responding to events concerns performing a unique corresponding task.

If the crew fails to resolve the issue caused by the event within the given timeframe, the spaceship will be damaged. When the damage reaches a threshold the game is lost, and thus, events are what players will need to primarily focus their attention to.

2.3.2 Tasks: The Crew to the Rescue

In order to clear an unsolved problem in the captain's log, a corresponding task will have to be performed by a crew member. The task must be completed within the given timeframe in order to prevent the ship from being damaged. When a task is completed successfully, the players are collectively rewarded with credits based on their efficiency. Some tasks can be performed by all crew players, whereas others are to be completed by the player with the appropriate role.

Performing tasks consists of performing atomic actions or playing very brief mini games consisting of a sequence of these actions. Each of the player roles will get a balanced amount of tasks at their disposal. Roles having their own unique mini-games grant them a unique and fun experience.

When the game is played more often by the same people, some tasks might come to feel repetitive. The combination of roles and role specific tasks increases the replay value by allowing players to try out different roles, which results in them having different tasks during events.

Given the relatively fast and gradually increasing pace, as described in section 2.3.1, there is a certain pressure on the crew. Therefore the mini-games themselves must not be overly complicated. Since the players are gradually given more and more work to do, the mini-games must be able to stack and interleave conveniently.

The following task ideas are meant to illustrate what events and their respective tasks might look like.

Hostile Alien Spaceship:

- Visuals: an enemy ship will appear in front of the spaceship.
- Communication: the captain communicates with the Gunner about the situation.
- Task: *Draft Idea:* The captain states the unique details of the enemy ship to the gunner. The gunner then can decide which ammo type to use according to what kind of enemy ship it is. With it, the captain gives a few coordinates to the gunner which the gunner must accurately follow. If the gunner fails, then damage will be done to ship.

Plasma Leak:

- Visuals: a light flicker in the cockpit.
- Communication: between captain and worker at the specific location.
- Task: *Draft Idea:* The engineer must play a game on their mobile device in which they reconnect some broken pipes in a certain order. When re-activating the flow of plasma, the ship will have an electrical failure if the order of pipes was incorrect.

Asteroid Field:

- Visuals: an asteroid field appears.
- Communication: between captain and workers
- Task: *Draft Idea:* The ship can be hit by an asteroid, after which the captain will be notified of where the impact was, as well as how long until the impact site becomes too hard to repair. The workers need to repair the damage before time runs out.

Fire:

- Visuals: fire flickers showing where the fire is.
- Communication between captain and worker at the specific location.
- Task: *Draft Idea:* Crew members must pass fire hose along their phones and avoid a small obstacle on each of their devices. If one person fails, the others must play longer. If all fail, instant failure due to ship explosion.

2.3.3 Minimized Idle Time

The idle time in the game is defined as time between subsequent tasks allocated to a player. The captain should have close to no idle time whatsoever. The crew members, however, don't always have a task to carry out, even though the pace will be optimized to minimize idle time.

This problem is solved by introducing collectibles and unconditional mini-games. Every role gets its own sort of collectibles. In order to motivate players to spend their time on collecting and playing mini games, these are awarded with additional credits.

3 Challenging the Players

As derived and supported in our Product Vision, in order to make the game entertaining, we aim to embed the following characteristics in our computer game:

- A balance between difficulty and the player's skill.
- A control system that is easy to understand.
- The ability to keep a player immersed in the game.
- The use of distributed cognition to improve co-operation in the game.

This section discusses how the concept at issue is meant to achieve these goals.

3.1 Flow: Balance between Difficulty and Skill

The game optimizes flow, which means that a balance is enforced between difficulty and skills. This is nicely demonstrated by the chronological journey of the spaceship in the game. The game starts off with relatively easy tasks for the players to carry out. This gives the players new challenges and a clean start. When the game progresses, the tasks for the players will begin stacking and will be more difficult over time. The pace at which these tasks are introduced will gradually increase as well. Therefore the players will not get bored of easy tasks and always have to improve themselves. Figure 1 gives an illustration of the Theory of Flow in our game.

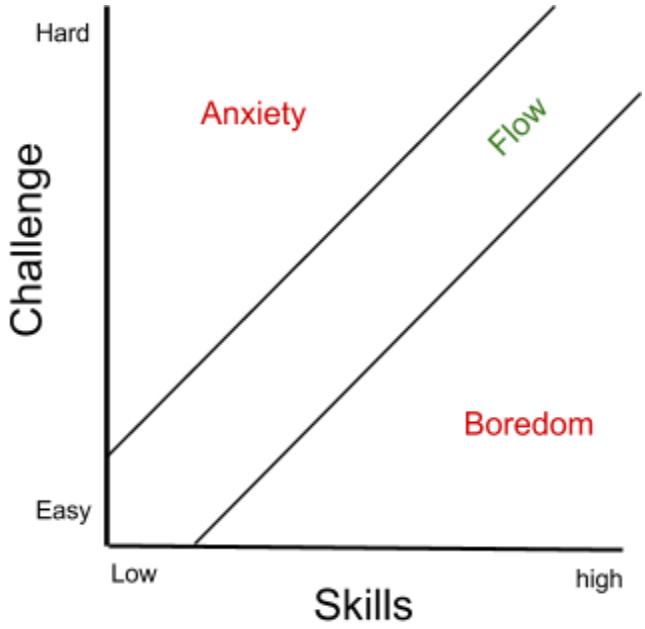

Figure 1: A visualization of the Theory of Flow.

We can define anxiety and boredom by the following:

- Anxiety: the players get too many tasks to handle without having the means and skills for it and will get frustrated.
- Boredom: the players complete the tasks with ease and get bored of the game.

3.2 Intuitive Control Systems

The system makes use of different modalities for user interaction. Players are not only interacting by means of pressing buttons, but they are also verbally communicating. In addition they are listening to auditive indications of the game (alarms). Finally the captain is using his/her vision extensively to process the information introduced by the game. The distributed interaction with the system reduces the burden on each of the individual modalities.

One might think that the control of a spaceship would be insanely hard to manage. The fact is that the captain mainly has to look around his cockpit without there having to be too much available buttons and lights around. Most of the time the captain simply sees and hears events and then communicates them to other players. Controlling the cockpit should thus feel very intuitively.

The crew members have their mobile device to play. When playing mini-games or picking up collectibles the player only has to push and drag. This may happen when having to move different sort of pipe-pieces or ammunition. This system is quite intuitively because the mobile device also works with drag and drop and the use might thus feel very comfortable. Depending on the player's skill and the challenges, the pace of the game might determine

whether one must quickly touch the screen or not. In any way, the player won't have any difficulties with controlling his/her own device.

Because both control systems are intuitive and thus easy to use, there is more focus left over for communication between players.

3.3 Immersion in the Virtual World

The captain and crew members have a different view of the spaceship, but everyone will have a real immersion into the virtual spaceship in a way. It might be because of virtual reality, maybe a mobile device or even by forming a real bond in the group.

3.3.1 Virtual Reality Immersion

The VR player will be the captain of a spaceship. When the game starts he gets to have a 360^{o} look of the captain's cabin. From here the captain will have to monitor the ship's parameters. Whenever there is a notification, a sound will be heard with corresponding visuals.

The moment an event occurs something will happen in the environment of the captain. When the captain notices something that should be taken care of he can communicate with his crew members to help him.

Another decision the captain can make is quest paths. Every time that the ship arrived at a certain location a new quest must be chosen. This is done a two-way choice. The captain can choose 1 of each location whereafter the ship sets course to this destination. The decision making is done in a fast-pace way where there is no a lot of thinking involved, except for communication with the other members which way to chose.

The game will have a length of about 10 locations. Having a duration of around 1 minute at each location.

Overall, the captain will have an immersed living environment where he can experience an exciting cockpit with lots of action.

3.3.2 Involving the Crew

The captain is not the only player in the game. The crew members will have their mobile device to play on. With cooperation the group will really come together as one.We assume the group will bond by communicating extensively and by solving tasks together. Furthermore, the hectic discussions that are expected to arise decrease players' idle time. This will disallow players from getting distracted, thus increasing the immersive effect.

The nice part of being a crew member is that they may choose their own role in the game. Role-playing allows for even more immersion in the game. A crew member really has a feeling of responsibility.

3.4 Stimulating Cooperation

Playing this game in a group is a coordinative and exciting fast-paced experience. This means that the players must use their eye-hand coordination and verbal skills. After all, communication is required while playing the game. The players' excitement is determined by the fact that the group has to work together as a team in a fast-pace environment. Hence, a player's adrenalin will get pumped up, which causes a way of fun.

Another challenging factor is the highscore of the game. The game keeps track of the total scores achieved by teams finishing their route in the game. Because of this, other teams subsequently playing the game are challenged with the task of outperforming their predecessors by achieving higher scores. This stimulates player to improve on both their own scores as well as the scores of other players by co-operating more efficiently, as a well-oiled space machine.