

Game Design Document – For *Attack of the Killer Space Crabs* [working title].

Game Genre

2D Top Down Scrolling Shooter

Platforms

PC, Android and/or Console.

Game Engine

Unity 5.0+

Target Audience

Age 13+ (Unity Analytics - COPPA compliant)

Art

All concept art, sprite sheets, and asset art to be done by Daven Bettridge.



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Game Rationale

Data Analytics and its application in games is a relatively new area of research within the games industry. Although not much has been researched and published as yet on the subject, what has been published tends to deal with one of two main areas or focus, one being how data analytics can help with the monetization of games, and the other being how data analytics can improve learning in games. What my research will aim to do is fill the gap between those two areas, more specifically that is: How can data analytics be used to help game designers make games that player better and are more immersive? The game described here is intended to provide me with a platform for gathering data and explore how data analytics can help identify and thus remove impedences to a flow state, which is the most optimal form of player immersion.

Mechanics list

Player Abilities

- Plasma Blaster (basic weapon)
 - Launched from the front of the spaceship and travels in a straight line until collision with an enemy or it leaves the screen.
- Bomb (Area of Effect Clear)
 - Deploys below the ship and remains in place for a set amount of time, at the the end of which it detonates for large damage, clearing any enemy except for a boss.
- Ion Cannon – Special offensive weapon
 - A charged Ion Cannon, that if charged fully, will insta - kill any enemy and do massive damage to a boss. Cooldown – 30 sec (TBD)
- Shield – Special defensive ability
 - A shield that envelops the ship, making the player invulnerable to all damage for a brief time. Cooldown – 1 min (TBD)

Enemy Abilities

- Laser
 - Basic laser weapon, medium fire rate, medium damage.
- Energy Bomb
 - Enemies drop a bomb underneath them. Creates a hazard for the player to dodge. Explodes after a countdown and then explodes for high damage (insta-kill).

Boss Abilities

- Gauss Gun
 - High rate of fire, fires orbs in a cone in front of the boss. High damage.
- Shield (destructible)
 - A destructible shield that will decay as the player damages it. Will last between 4 and 8 hits with the Plasma Blaster. OR 1 hit with the Ion Laser
- Gauss Gatling Spread
 - A progression of the Gauss Gun ability. Will fire orbs in a 360-degree circle around the boss. Orbs will spread out after fired in a predictable linear path that will allow the player to dodge them by moving in-between the orbs.

Ability Progression

The game will aim to progressively teach the different abilities of the spaceship to the player over the first 2 levels (as seen in the table below). This will provide an interesting base line for the data that I collect. Are the abilities being taught correctly to the player? I would expect the data to show that as the abilities are introduced to the player, that they will begin to use them more and more. But if I don't see data that reflects that, then I can tune the ability progression to more gradually introduce each mechanic to the player. That is why I have chosen to produce 4 levels in the game, as that gives me the scope to tune each level if required to teach each ability to the player.

Likewise, with the enemies and boss, I can see if I've introduced them to early or to late, by the number of times the player dies to those assets, this would be a key indicator of how challenging the game is. This could result in a need to retune the health of the enemies or boss, or tune the damage of those abilities used by the assets.

Ability Sheet

	Level1	Level2	Level3	Level4
Player	PlasmaBlaster Shield(DefensiveSpecial)	Bomb IonLaser(OffensiveSpecial)		
Enemy	Laser	EnergyBomb		
Boss			GaussGun Shield(destructable)	GaussGatlingGun
PickUps	Health (Player)	—————→		

Player Design and Overall Artistic Style

The player will be represented at all times by a spaceship, flying over the environment. The design of the spaceship, and indeed the entire game, is meant to be colourful, almost childlike in its design. This is meant to be reminiscent of games like *Paper Mario* and *Little Big Planet*. This will hopefully prove to be a point of difference between this game and others in the genre.



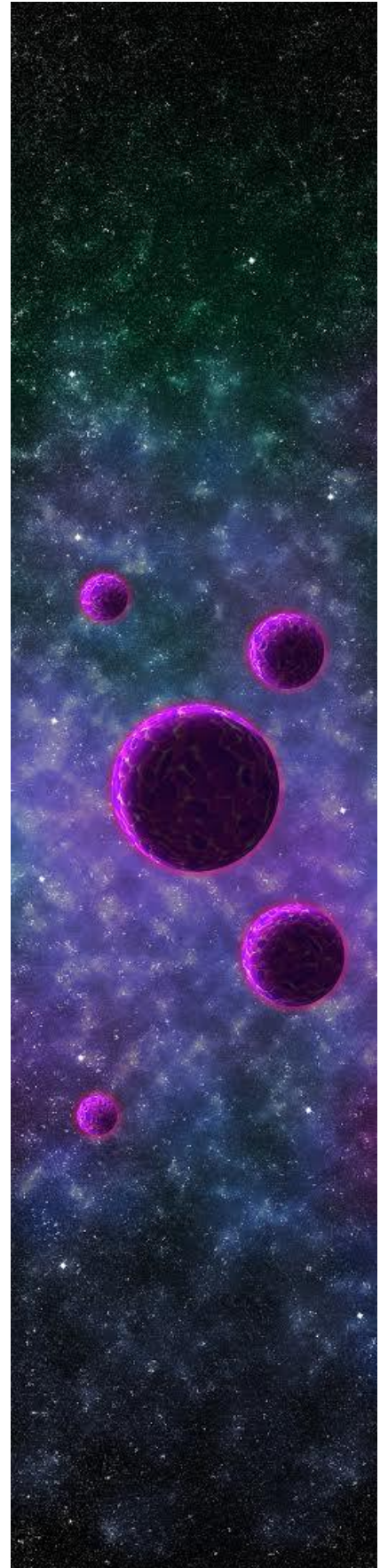
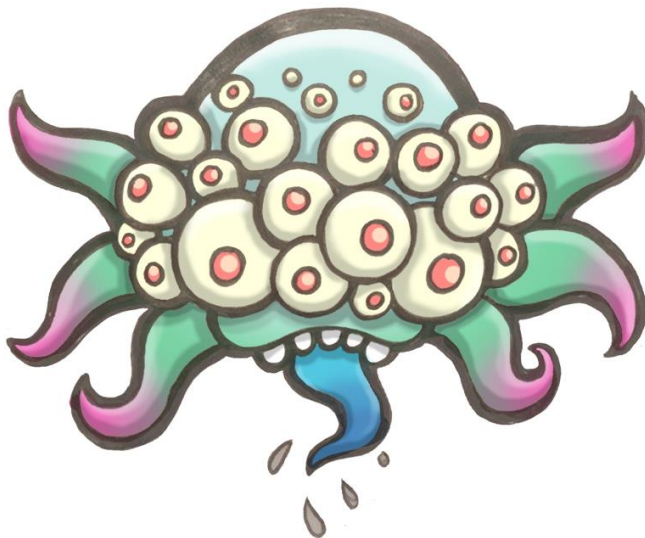
Level Design

The game will be broken up into 2 different themes, a Space theme and an Earth theme. These themes will correspond to the two different enemy types: A crab, and a space-eyeball-alien thing (as seen below).



Each theme will have 2 levels, therefore a total of 4 levels will be present in the game at completion (though at time of writing a special boss level may still be added). Due to the nature of a 2D space shooter, it is

possible to limit movement only to the background textures, thereby creating the illusion of an infinite level. This is accomplished by creating a background that tiles perfectly with itself, and therefore, when the background transition's or resets as it moves behind the player it won't be noticeable. Ultimately this will create an infinite "treadmill" for each level, allowing me freedom in the length of each level. To the right is an example of what that background might look like for the "space" themed levels.



Level Design (cont.)

The first two levels will be designed to teach the player how the 4 abilities work. Level 1 showing how the Plasma Blaster and Shield work, and level 2 showing how the Bomb and Ion Laser work. This is being done because it gives me the scope, depending on what the data shows, of dividing up the tutorials for each ability to up to all 4 levels. If players die frequently at the beginning, it will be possible to adjust the difficulty of the smaller enemies, and even adjust the speed or length of each level to make it easier. And by dividing up the 4 ability tutorials to each level, it will give players more time to learn each mechanic and how it affects the game.



Pick Ups

There will be two resources relevant to the player, one, obviously is Health, and the other will be Energy (pictures below). Each of these resources will be represented on the UI by the same image that the player will look for when trying to pick up health or more energy. This will hopefully reduce the need for an overly long tutorial explaining what each resource does, and hopefully make it more intuitive to the player.

Enemies

At the present, other than two bosses (as seen represented on page 4), there are only two currently designed minor enemies. One above, will fit with the crab themed levels, and the other below, will fit with the space theme. These enemies will be seen most as the player fights through each level.



Similar Games



Figure 2: Raiden, released in 1990, was a 2D top down scrolling shooter, and is the major inspiration for my game.



Figure 1: Space Invaders, although not a scroller, represent the peak of 2D top down shooters...for 1978.

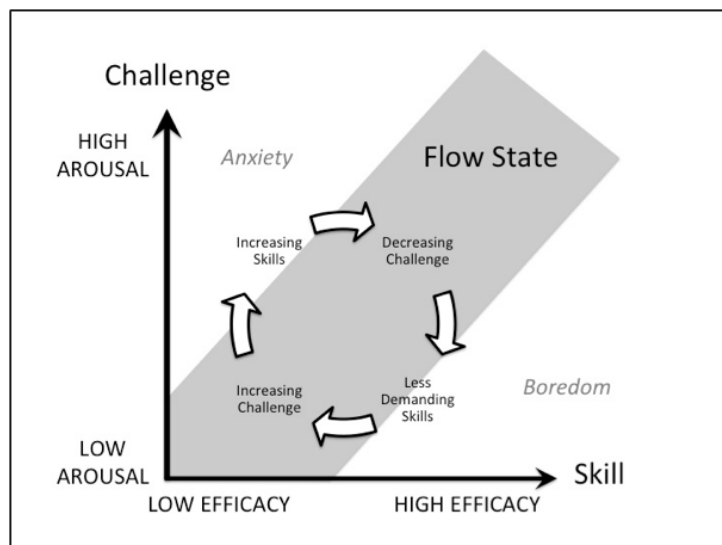


Figure 3: Beat Hazard, a more modern example of a 2d top down shooter, like Space Invaders, it doesn't scroll, but the use of particle effects is outstanding.

Analytics: The Important, Technical Bit

A key focus of this game will be the gathering of data. By using *Unity Analytics*, the implementation and formatting of this data collected will be streamlined considerably over other platforms. This is due to the powerful online dashboard tool Unity Analytics provides its users. This dashboard takes much of the data collected and visualizes it in easy to read formats (graphs, averages etc) for the end user to use.

The aim of any game should be to immerse the player in the world that has been created. Optimal immersion can be achieved when a flow state can be induced in the player. There are many different ways that have been researched regarding how to induce that state of flow. But the aim of this game is to try and better understand how data can help identify areas within the game that impede a state of flow being induced. What follows is a summary of what data I expect to gather that will best indicate a) whether a flow state has been induced and b) if the game is balanced well enough to even induce a state of flow in the player.



As can be seen in the above graph, a flow state can be achieved when a game can find a balance for the player between skill and challenge. The priority from a research perspective of this game, will be to essentially fill in this graph with points of data. That data will concern the following:

- **Time Played**
 - Time played is perhaps the most effective way of measuring if a game has achieved a flow state in its players. The longer a player remains in the game, the more likely it is that they have achieved flow.
- **Death Count**
 - Death count is an important point of data in regards to measuring the challenge of the game play. If an average number of players are dying too quickly, then it is logical to assume that the game is too hard. Particularly if that death count correlates to a decrease in the amount of time each player spends in the game.
- **Abilities Used.**
 - Which abilities are being used is important again in identifying the relative challenge of the game compared to the player's skill. If players are only using 1 ability, but successfully completing the game, then the game may be too easy. This is especially true if the players cease playing the game quickly, with an easy game reducing the replayability of the game.

Survey

It should be made clear; I do not expect it to be possible to induce a state of flow in every player. Flow is largely subjective, and whether or not it can be induced may very well be entirely down to a person's psychological connection with the game. Perhaps the music resonates with the player in exactly the right way. Or the art style is appealing to a person, enough to immerse them in the game. Perhaps it may even be that the player finds an emotional connection with a character in the game, and that desire to see how that character's story plays out is enough to provoke a flow state. No analytical model will be able to detect those kinds of flow experiences. But what this game will attempt to do is collect data to extrapolate a logical conclusion regarding if a flow state has been achieved and in how many players it was achieved. By using the indicators described on the previous page, I believe it will be possible to conclude that some players have achieved a flow state, or something approaching a flow state, where a player has become as immersed in the game as they likely can be. What data analytics can at least tell a game designer is that the game doesn't impede a state of flow according to the quantifiable aspects of flow that we already know about (learning curve, difficulty, option paralysis, etc).

However, another important tool that will be used, along with the data analytics described on the previous page, is a survey that players can complete after they have played the game. This survey will ask them questions about how they felt while playing the game. In this way, it may be possible to understand the more subjective elements about if a player experienced flow or not.

Questions will include:

- How challenging did you find the game?
- How quickly did you feel you learnt the mechanics of the game?
- Did the art style of the game effect you in any way, was it pleasing or a distraction?
- Did the music or sound become distracting during gameplay?