
Strategy: Grenade Shop

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Intent Statement

By erasing the gameplay barrier between management and combat present in many shop management games, such as Recettear and Moonlighter, through combining time based ordering, crafting, and a central resource with combat based resource gains all in one scene, I wish to make a system that feels cohesive, fun, and easy to play.

Research History

When I came up with this idea, I knew that I wanted to make everything as connected as possible. This way, the player would have an easy path to follow through the game (Kill enemy with grenade to get materials -> use materials to make grenades -> use grenades to fill orders and kill more enemies -> etc). I used two of my research articles for this, one to look at why games like Recettear and Moonlighter work, and the other on how to balance games like this. Since I have one interconnected resource, I needed to make sure it feels good to use, otherwise the entire game would be affected by it.

I also wanted to focus on realistic crafting. That didn't turn out in this prototype, but I did get some great ideas for future development through a great article about different types of crafting. However, the idea of realism stayed. By collecting the base materials of a grenade (casing, fuse, powder), the player can craft grenades, which enable them to get more materials. This circular method of resource gaining is a core method of many games that focus on crafting (Minecraft, Terraria) and I wanted to make sure to include it in this prototype as well.

Thesis

By combining shop management, combat, and a central resource needed for both, a connected, intuitive, and engaging system is created.

Mechanic

I decided to make *Grenade Shop* in Unity. There are 9 main mechanics at work in this prototype. I won't be mentioning movement and camera systems since they are more basic and don't require explanation.

The 9 main systems at play in this prototype are:

- Grenade Types
- Throwing Grenades
- Enemies
- Loot Boxes
- Crafting
- Money
- Buyer Requests
- Buying Materials
- Begging Altar

☐ Grenade Types

- ☐ There are 3 types of grenades in the game. They are:
 - ☐ Basic Grenade
 - ☐ This grenade has a 3 second fuse time (time until it explodes after being thrown)
 - ☐ This grenade has a medium blast radius
 - ☐ Frag Grenade
 - ☐ This grenade has a 5 second fuse time (time until it explodes after being thrown)
 - ☐ This grenade has a large blast radius
 - ☐ Impact Grenade
 - ☐ This grenade explodes upon contact with another object
 - ☐ This grenade has a small blast radius

☐ Throwing Grenades

- ☐ Before throwing a grenade, at any time, the player can select which grenade they want to throw. This is done by pressing the 1, 2, or 3 key on the keyboard, or by scrolling up or down on the mouse wheel. The selected grenade is shown by a red arrow next to the selected grenade.
- ☐ To throw a grenade, the player holds down the left mouse button. While this is happening, an arrow fills up under the crosshair, representing the current power of the throw. An arc is also drawn showing the trajectory of

the throw, helping with accuracy. The player can release the mouse at any time to throw the selected grenade.

❑ Enemies

- ❑ Enemies are randomly spawned every 6 seconds around the outskirts of the map. They move slowly towards the center of the map, and when they get within a certain distance of the player's base, they explode after 3 seconds. This does damage to the base, but since this system isn't fully implemented, I'm not giving it its own bullet.
- ❑ Enemies are killed instantly if they are hit by a grenade explosion and drop a loot box on death.

❑ Loot Boxes

- ❑ Loot boxes are dropped when an enemy dies. They contain a random amount of grenade materials (casings, fuses, powder). The player collects these materials by standing near the Loot Box, looking at it, and pressing the E key. The box disappears only after it has been looted.

❑ Crafting

- ❑ Crafting is one of the central systems in this game. The player can access the crafting system through a UI menu, which pops up after the player has interacted (pressed "E" while being close to and looking at the object) with the crafting bench.
- ❑ The crafting UI contains three buttons, one for each grenade. The crafting requirements for each grenade are:
 - ❑ Basic Grenade - 1 Casing, 1 Fuse, 2 Powder
 - ❑ Frag Grenade - 2 Casings, 1 Fuse, 1 Powder
 - ❑ Impact Grenade - 1 Casing, 2 Fuse, 1 Powder
- ❑ If the player has enough materials to craft a grenade, the button is interactable. If the player clicks on it, the materials are subtracted and the grenade is added to the player's inventory.

❑ Money

- ❑ Money is a smaller resource in the game. The player starts with \$0 and earns more by completing Buyer Requests. It is used to buy more materials, which will be explained in the Buy Materials section.

❑ Buyer Requests

- ❑ This is the main system present in the shop management side of the prototype. Just like the crafting system, Buyer Requests are represented through a UI menu, accessed through the Selling Station present in the base.

- ❑ The menu contains 3 orders, each with a set of information attached to them:
 - ❑ Order number
 - ❑ Time left until order expires
 - ❑ Amount of grenades required to fulfil an order (Example: 9 Basic Grenades, 15 Frag Grenades, 22 Impact Grenades)
 - ❑ Fill Order button
- ❑ If the player has the required amount of grenades in their inventory to fill the order, and it is within the time limit, the player may click on the Fill Order button to complete the order. This subtracts the grenades from the player's inventory and adds money to the player's money amount dependent on the difficulty of the order.
- ❑ When an order expires, or if one is fulfilled, it gets replaced with another, randomly generated order.

❑ Buy Materials

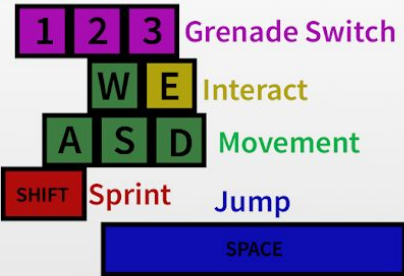
- ❑ This is the secondary system at play in the whole shop management system. Just like the Buyer Request menu, the Buy Materials menu is accessed the same way, just in a different window of the Selling Station. Using the money the player has earned, they can spend \$50 to gain 100 of any of the three materials.
- ❑ When a material pack is bought, it is transferred to the player via a Drop Box. This is a Loot Box like object that drops at a random location in the world.

❑ Begging Altar

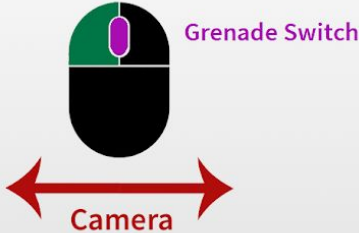
- ❑ The Begging Altar is the solution to the problem of limited grenades. If the player spends all of their grenades and doesn't have any materials left to craft new ones, they can take grenades from the Altar. The Altar gives one of each grenade and refreshes every 30 seconds, regardless of whether or not the player has grenades/materials in their inventory.

Grenade Shop

Zach Phillips




1 2 3 Grenade Switch
W E Interact
A S D Movement
SHIFT Sprint Jump
SPACE




Throw Grenade/UI Interact
Grenade Switch
Camera


Grenades



Basic
- 3 second fuse
- Medium radius



Frag
- 5 second fuse
- Large radius

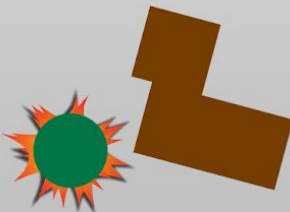



Impact
- Explodes on hit
- Small radius

Kill Enemies →


Get Loot →

Craft Grenades →





(Random)
+2 Casings
+1 Fuses
+3 Powder



→ **Sell Grenades** →

Order #1
Time Left: 3:24


21 Basic Grenades
8 Frag Grenades
15 Impact Grenades

Fill Order


Buy Loot

100 Casings - \$50

↓



+100 Casings



Other Notes

- Loot doesn't despawn
- The player character doesn't get hurt
- All unfilled orders are replaced after the time is up

Game Video

I created a video showing off this system. You can find it here:

<https://youtu.be/wg83tp2cbfY>

Post Mortem & QA

I had a lot of fun with this project. As I mentioned before, the Shop Management/Combat genre is very appealing to me, and I was happy to make my own version of it. Unfortunately, I got everything working later than I liked, and as such only got 7 people to playtest my game. For playtesting, I had my testers play as long as they like. Since there is not win or lose state present in the game, I wanted the player to focus on how they felt while playing. They were allowed to quit whenever they wanted.

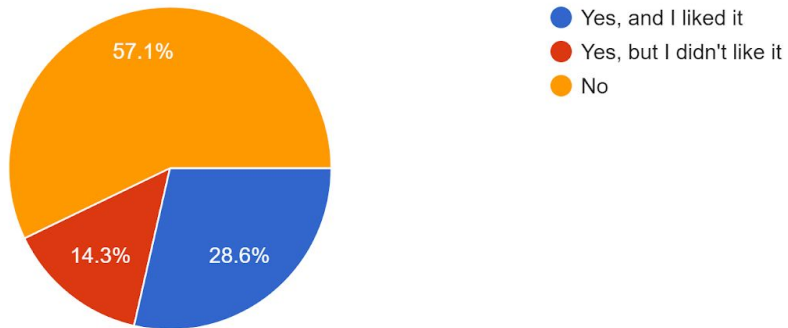
I wanted to focus on the experience and how all the systems felt. After all, since I had a very circular gameplay loop, if anything felt bad then the entire game would feel off. As such, the questions I asked were:

- Have you played Shop Management games such as Recettear or Moonlighter?
- How did you feel about having to fend off enemies, craft more grenades, and manage a shop?
- Did you have a strategy that you followed?
- Grenades? Horrible, Meh, Better than Average, or Great?
 - Accuracy
 - General Power
- Please rate the grenades. Most to least favorite
 - Basic
 - Frag
 - Impact
- Speed? Way too slow, a little slow, perfect, a little fast, or way too fast?
 - Throwing charge speed
 - Grenade thrown speed
 - Walking
 - Running
- Numbers and Prices? Way too low , a little low, perfect, a little high, or way too high?

- Grenade crafting costs
- Enemy loot box materials
- Bought materials price
- Bought materials amount
- Order time (relative to the difficulty of the order)
- Money from filling an order
- Begging Altar time (Respawn every 30 seconds)
- Begging Altar given grenades (1 each)

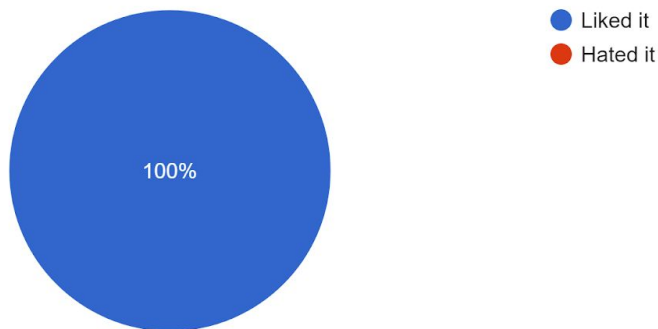
Have you played Shop Management games such as Recettear or Moonlighter?

7 responses



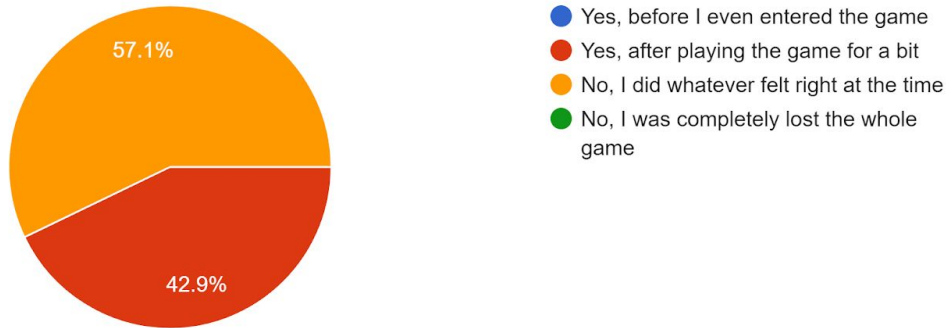
How did you feel about having to fend off enemies, craft more grenades, and manage a shop?

7 responses



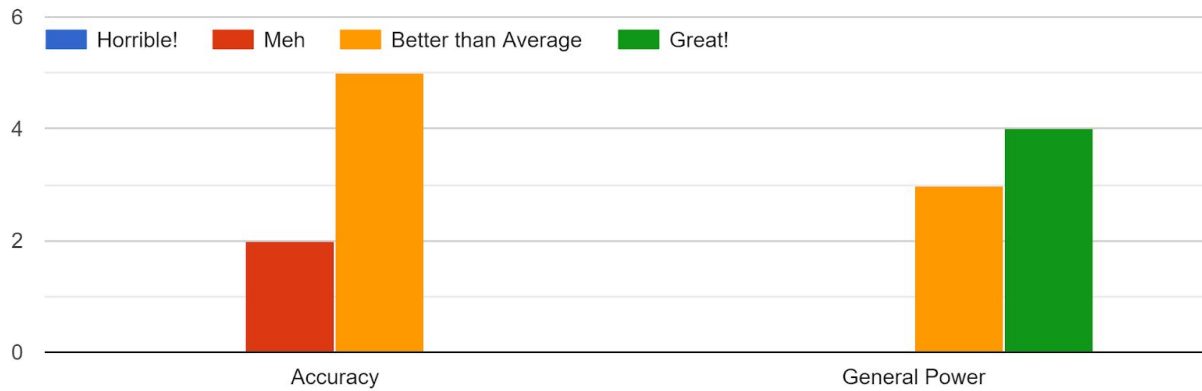
Did you have a strategy that you followed?

7 responses

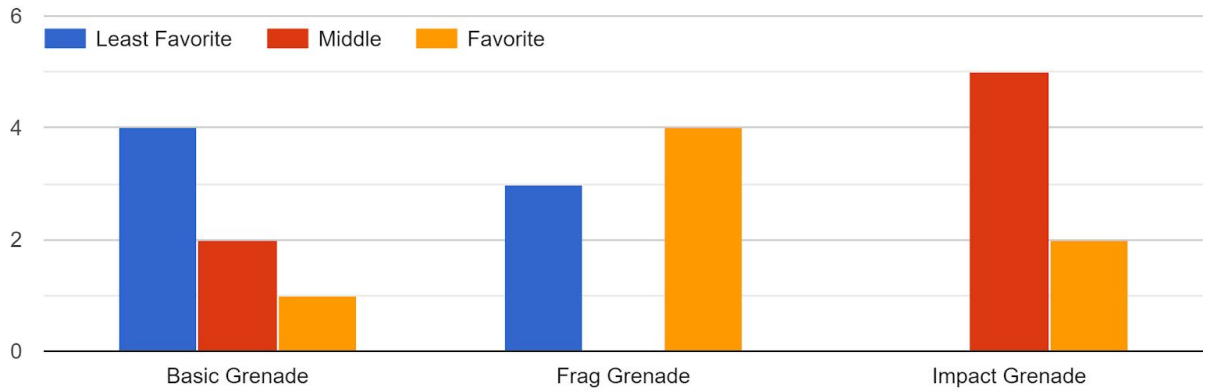


These three questions established the general feel of the game. I wanted to know the audience I was dealing with, if they had a strategy, and if they had fun.

Grenades?

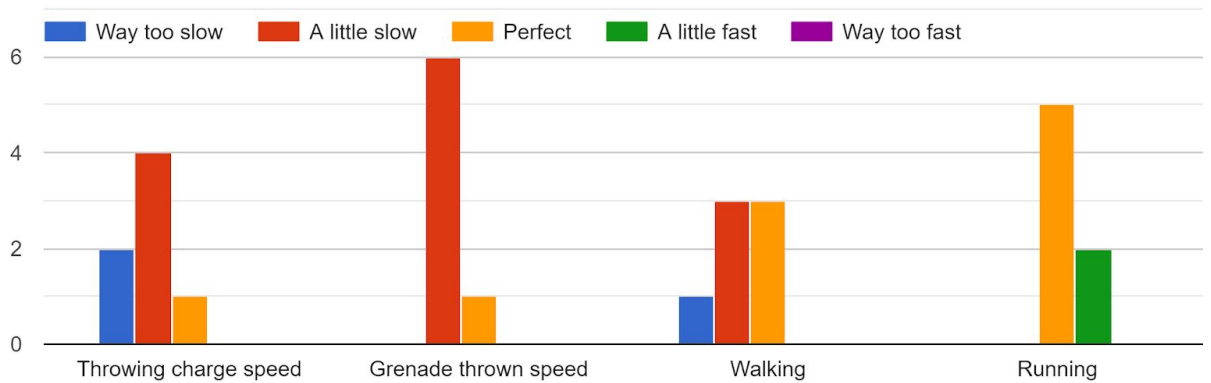


Please rate the grenades.

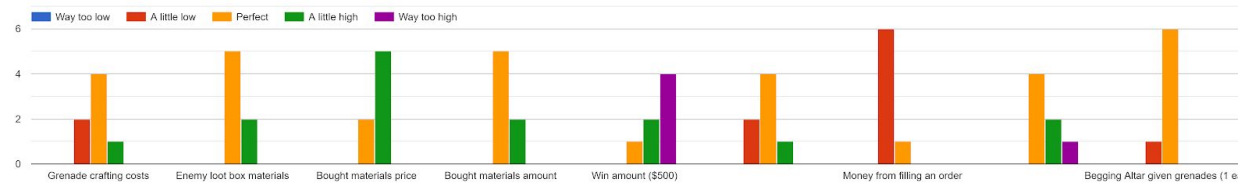


Next I asked about the grenades. I wanted to see how they felt and which grenades were the most popular.

Speed?



Numbers and Prices?



Last, I asked about Speed, Numbers, and Prices. This was a large section, but I wanted to see how everything compared. The two unlabeled data areas in the second graph are “Order time (relative to the difficulty of the order)” and “Begging Altar time (Respawn every 30 seconds)”, respectively.

Based off of all this data, I think that I did fairly well in meeting my intended experience. The mechanics fit well together, and most of the results hovered in a good area. The areas the need tuning are extremely evident (Grenade thrown speed, Throwing charge speed, and money from filling an order). As an aside, I removed the win state that I had previously (gaining \$500) but the question remained in this version of my QA data.

If I had to rate this as a Success/Failure, I would call it a convincing Success. From my own experience in these games, I followed the heart of the genre but added a new twist. The crafting and buyer request systems are easy to use and convey enough information to get the point across. Grenades are super fun to use, and running around the map, blowing up enemies left and right, is a very satisfying thing to do. The testers backed up this experience, and I created something I’m very happy with.

Annotated Bibliography

"The Appeal Of The Shop Simulator Genre." *Gamasutra.com*. N. p., 2019. Web. 1 Mar. 2019.

http://www.gamasutra.com/blogs/JoshBycer/20180720/322516/The_Appeal_of_the_Shop_Simulator_Genre.php

This blog post by Josh Bycer, a game designer and reviewer, examines the shop management genre and how games like Recettear and Moonlighter have set the standard for the genre.

The important points in this post are:

- There needs to be a balance between the shop management and the combat. Both studied games lean more towards the shop management by default, but have the ability to have the player focus more on combat as well.
- “While these games have good systems to them, they’re missing half the equation due to not having any real combat system. Many of the games I’ve played either abstract combat to something off screen, or let the player watch, but have no real control over what happens. In these cases, progression is entirely defined by the gear you’ve created or bought, but without player input.”
 - While timers are ok, don’t make it an idle game. There should always be something for the player to choose to do.

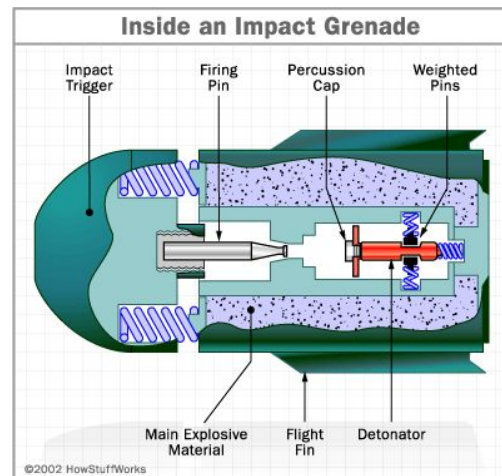
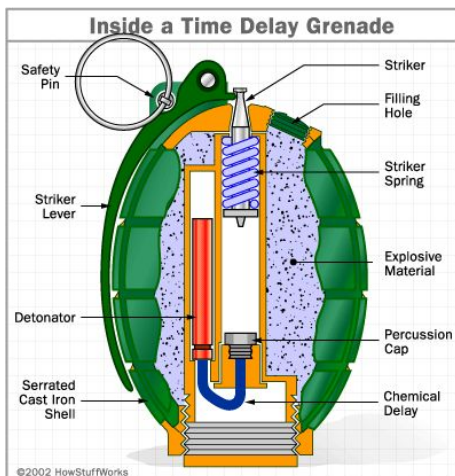
This is a really great post about shop management systems that are combined with combat. I think that I’m going to be taking a lot of inspiration from this article and it’s ideas on the ideal balance between the two systems. This post also featured a nice 15 minute video going more into depth about the reasoning and other, smaller choices in the systems that make the game feel more polished.

Harris, Tom. "How Grenades Work." HowStuffWorks. N. p., 2002. Web. 1 Mar. 2019. <https://science.howstuffworks.com/grenade.htm>

This HowStuffWorks article explains how grenades work and the various types of grenades that have been used.

The important points in this article are:

- The main types of grenades produce: Explosions, Fire, Smoke, Light, Gas
- The insides of two types of grenades look like:



This will help me a ton because I want my crafting system to be accurate to how grenades are actually made. Having this article also gave me a ton of ideas about different grenade types available for the player, as well as an idea for some dynamic crafting and combining of effects. While I wasn't able to get these ideas into the build, it will help with ideation if this prototype continues into the future.

King, Alexander. "5 Approaches To Crafting Systems In Games (And Where To Use Them)." Game Development Envato Tuts+. N. p., 2015. Web. 1 Mar. 2019.

<https://gamedevelopment.tutsplus.com/articles/5-approaches-to-crafting-systems-in-games-and-where-to-use-them--cms-22628>

This article on the learning database Envato Tuts+ looks at different crafting systems and the pros and cons of each.

The important points in this post are:

- There are 5 dominant crafting systems in games today:
 - "Money by Another Name"
 - "The so-called crafting here is abstract: you hand over some units of wood to a craftsman or workbench, and they hand you back a wooden shield."
 - "Find the Recipe"
 - "Crafting a given item can't be done until a representational recipe, schematic, or blueprint has been found that unlocks it ... Once the player acquires the recipe, crafting proceeds just as with "Money by Another Name" by exchanging resources for outputs in a fixed fashion"
 - "Guess and See What Sticks"
 - "In this method, the recipes for crafting are neither immediately known nor acquired in-game, but must instead be discovered by the player through combinatorial trial and error."
 - "Made-to-Order Customization"
 - "This is any system in which the crafting is modular or dynamic instead of following a set formula or fixed exchange. Rather than a shop-like mechanic, here the crafting gives items a build-your-own flavor, where the player is able to pick from a set of choices."
 - This is most likely the system I want to use
 - "Anything is Possible"
 - "This a broad category covering anything featuring a true crafting system, where the input variables can produce a wide array of possible outcomes. This allows for a truly dynamic process with

very deep strategic choice, like the blade-and-grip combination system of Vagrant Story which has thousands of permutations”

This is a FANTASTIC resource and it really made me think about all the different types of crafting systems that I want inside of my game. Since crafting in this game will be a means to both create combat weapons as well as a source of income, I want to make sure it is simple, easy to understand, and engaging. For the sake of time, I needed to create the most simple system, “Money by Another Name”, but I still feel like there is room to make something much more dynamic.

"Game Balance Concepts." Game Balance Concepts. N. p., 2019. Web. 1 Mar. 2019. <https://gamebalanceconcepts.wordpress.com/>

This massive post by Game Balance Concepts talks about economic systems and balance. It goes really in depth about balance, but I’m only going to be looking at the beginning section, which covers economies more.

- “Most economies that we think of as such, though, have one or more of these mechanics:
 - Resource generation, where players craft or receive resources over time
 - Resource destruction, where players either burn resources for some use in the game, or convert one type of resource to another.
 - Resource trading, where players can transfer resources among themselves, usually involving some kind of negotiation or haggling.
 - Limited zero-sum resources, so that one player generating a resource for themselves reduces the available pool of resources for everyone else.”
- No matter what I choose to do, the economic system influences the players in some way. It affects their actions and the choices they feel like are available to them.
- The most important thing to get right is supply vs demand. Without that being compelling there isn’t any motivation to spend time in the shop system.

This series of blog posts is actually something I had looked at before in Applied Ludology. It’s a fantastic series that has a wonderful insight into various game systems and balancing. The topic of economies takes over this post, and it is very well written and explained. Using this, it made me understand that it’s less about the system I create and more about the feelings it encourages. Without a good motivation to keep the shop alive, mainly encouraged through supply and demand, the player won’t want to interact with the system and lose out on the intended play experience.