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SOAP MAKING SIMULATOR

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INTRODUCTION

This project focuses on the development of an interactive learning simulator. This offline simulation aims to teach people the procedure of making cold-process soap. While it is not an exceedingly difficult process, it requires plenty of care and attention to detail. After the crafter understands what is required for making such a product, it can be very fun and satisfying to make various soap designs by thinking creatively.

Soap making is based on a recipe that can be broken down into many simpler steps. The simulator intends to present those steps to players in a straightforward and logical manner.

By the end of the session, players would have a good understanding of how the procedure of making soap works in the real world. A desirable outcome when people play this game is to help them figure out if they would be interested in making soap before using any physical resources. The outcome would be the reduction of material costs while determining if they would like to pursue such a hobby.

SOAP ART

Soap can be obtained by following one of the three methods: hot-process, cold-process and melt-and-pour. Before any of those processes can begin, it is crucial that crafters ensure their own safety by equipping a pair of gloves, safety goggles and optionally a face mask.

The cold-process method involves a series of steps:

- Preparing all the necessary equipment: beakers, a hand blender, a spatula, a sieve and a kitchen scale.
- Preparing all the necessary ingredients: caustic soda crystals, distilled water, olive oil and optionally, colouring powders or fragrance oils.
- Measuring all the above-mentioned ingredients into their own beaker.
- Pouring the distilled water over the caustic soda crystals and mixing with a spatula until they dissolve completely. The resulting mix is called the lye water solution.
- Mixing the lye water solution and olive oil into the same beaker using a hand blender.

The result of this process is a mix that must be poured into a mold. The soap will then solidify as a result of a process called saponification. The soap is then ready to be cut into small blocks. [1]

TECHNOLOGIES

The technologies used will be the Unity game engine, the C# programming language and Adobe Illustrator for editing 2D assets.

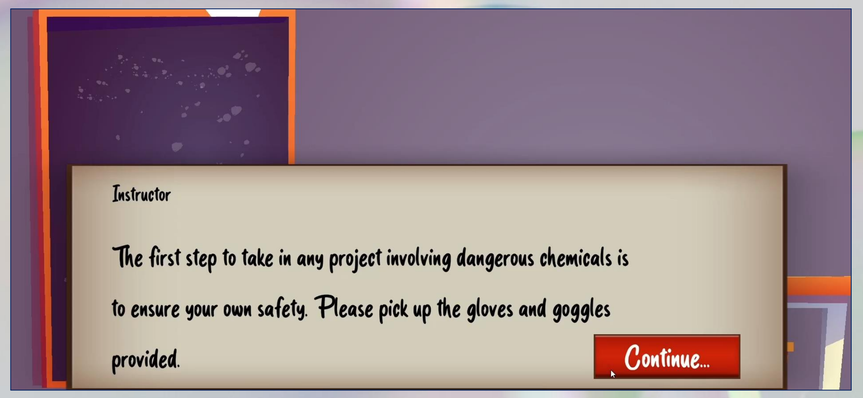

Figure 1. Highlight on the tutorial aspect of the simulator. In this section, players are being introduced to the game. The text is kept minimal and straightforward

Figure 2. Highlight on the menu system of the simulator. Currently, it contains basic functionality, but more advanced options will be added. For example, in-game settings that players would be able to change according to their preference.

Figure 3. Background of the simulator including all objects required for the simulation. Players can pick up these objects and move them around the scene.

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DESIGN & IMPLEMENTATION

In this simulation, there are some well-defined aims:

- ✓ Combine an assortment of chemicals to produce a soap mix in a 2D environment.
- ✓ Always display the soap recipe on the player's screen. Players should be able to minimise the recipe.
- ✓ After the soap mix solidifies, transition to 3D view to show the final soap batch.
- ✓ Cut the soap into smaller pieces.
- ✓ View the individual pieces of soap in 3D.

To meet the above aims, some objectives must be fulfilled:

- ✓ Build a 2D interaction system using the Unity engine.
- ✓ Develop a fluid simulation system to represent different types of liquid.
- ✓ Obtain assets that accurately represent the real-world utensils required for soap making.
- ✓ Build an intuitive user interface to facilitate learning. A past example of a working chemistry simulator is taken into consideration while designing the UI.[2]
- ✓ Use mesh-cutting techniques in the 3D view.

By using the Unity Engine, it was possible to build a 2D environment where users can create soap.
The first step when creating the interaction was to allow users to pick up objects by working with the objects' physics properties and using C# scripting. Next, a dialogue system including instructions and buttons was required to provide players with the tutorial aspect as shown in Figure 1. A menu system has also been created to allow players to pause or quit the current game session as illustrated in Figure 2.

After the core mechanics were implemented, 2D assets were added to the scene to illustrate the real equipment necessary for making soap as shown in Figure 3.

FUTURE WORK

The game as it stands is not fully developed and does not show the full functionality mentioned within the aims. By the end of the project, the plan is to illustrate the full process of making soap. This should be in such a manner that users will be able to learn from it and have a solid idea of what the real-life procedure is like.

More work could be done in the future to make the simulation fully immersive through a Virtual Reality environment or provide better visualization for soap making using high-quality 3D graphics. In the case of a VR setup, users would benefit from tangible responses from the game, thus improving the overall learning experience.

REFERENCES
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