Sustainablitz

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Game Goals

Sustainablitz is part of an educational experiment lead by Christopher Marlow of Ball State's Landscape Architecture program. This game was developed over the course of a semester by a seven member team. There were primarily three goals intended by the project.

- Students will learn about Landscape Architecture as they develop the game
- The game will include a learning element so that those who play will also learn about Landscape Architecture.
- The game will be developed for use by the American Society of Landscape Architects

Story Overview

The story of Sustainablitz placed the player in the role of a Landscape Architect. They arrive in Evergreen City to find that there is a very special tree called Lady Evergreen. She is in bad shape because the city is very polluted and unsustainable. The city hires the player to help save Lady Evergreen and the city.

Each level is designed to introduce a different sustainable project which both shows the player what it is and how it works.

The villain character, who creates the challenge of the game, was intended to realize his wrongs and become a sustainable developer at the end of the game.



Each level started and ended with a briefing session designed to introduce the project and instruct the player on what it did and how to build it.

Gameplay Overview

Players use a grid based system to create a sustainable project. Players select a grid square and then press a button to perform an action. Each level has a time limit which is displayed at the top of the screen. Players are not only working against time but must also prevent an enemy Robot Goat from destroying the player's work. Each completed grid space is worth a certain number of points. These points go towards the players score. When the player's score is greater than or equal to the goal score, the player has completed the level.



Game Controls

- The player uses the mouse to select a grid square by clicking on it.
- Once a square is selected (indicated by a blue highlight) the player then uses one of the buttons on the side of the screen.
- The player can only build in a specific order.
- If the Robot Goat is on the stage, players can destroy it by first selecting the whistle button and then clicking on the Robot Goat.



Image from School level showing all stages of development

Technological Requirements

- The program GameSalad was used to create Sustainablitz.
- GameSalad uses Rules (logical statements) and Attributes (variables) instead of a programing language to build game systems.
 - This allows users to have minimal knowledge of programing and coding.
 - At the same time, it limits the capabilities of the game engine.
- GameSalad was chosen as the design platform because of its accessibility.

Compatibility Issues

- Because GameSalad is an early adopter of HTML5 and browser support for HTML5 is not universal, the team was unable to publish Sustainablitz on the web.
- At this time, GameSalad must be installed in order to play the game through its internal runtime engine.

Technological Requirements

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GameSalad program interface

Game Levels

• Sustainablitz consists of two different levels with plans for a third level.

- Residential Installing a Green Roof
- School Developing a Rain Garden
- Skyscraper Growing a Living Wall

Educational Features

There were two problems present in the two levels of the game. Each problem had a provided solution which the player had to construct.

Problem 1: Residential lots experience heating and cooling issues

Solution 1: Construct a Green Roof to absorb sunlight.

Procedure: Removal of roof tiling.

Adding a waterproofing layer Building a matrix of soil filled boxes

Plant the Green Roof plants

Problem 2: Flooding due to too much concrete

- Solution 1: Construct a Rain Garden
- Procedure: Removal of concrete

Laying down a soil mix

Adding plants and trees to create the Rain Garden

Residential Level

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- The object of the Residential Level is to create a Green Roof.
 - The player accomplishes this by removing roofing shingles and planting green roof plants.
 - The level is complete when the player has planted foliage in 20 of the 27 squares within 300 seconds.
 - The Robot Goat teleports onto the roof at random intervals to destroy foliage.

Residential Level Educational Goals



- The Residential Level teaches players about the basics of creating a green roof. They learn that Green Roofs absorb water as a part of a Rainwater Management System. They also cool the building as the plants absorb sunlight.
- Though the process is simplified in the game, players learn what a Green Roof is and an overview of how they are built.

School Level

- The object of the School Level is to create a rain garden.
- The player achieves this by digging up concrete, laying soil mix, and then planting either shrubs or a tree.
- The level is complete when players reach 30 points.
 - Shrubs are worth 1 point.
 - Trees are worth 2 points.



School Level Educational Goals



- The School Level teaches players about Rain Gardens. Rain Gardens are important elements of a Rainwater Management System. They help to collect water and send it back into the ground instead of having it carried away by a sewage system.
- Players get to participate in transforming a public space into a Rain Garden.

Skyscraper Level

- The object of this level is to create a Living Wall.
- Players achieve this by first constructing lattice on the side of the skyscraper and then planting climbing foliage.
- Once the player has completed a row, the player can then continue to build on the next row.
- The level is completed when the player reaches the roof of the building.
- Robot Goats with jetpacks randomly appear and attempt to remove the climbing foliage.
- This level was never implemented into the game.



Skyscraper Level Educational Goals



- The Skyscraper Level teaches player about living walls and living wall functionality.
- While the location for the living wall is not realistic, this level brings awareness of the sustainability of green walls.

Enemy Behavior

- Throughout the game, the players will encounter the Robot Goat.
- The Robot Goat appears at random intervals and teleports to a random grid square on the game space.
- The goat moves one grid at a time in random directions.
- The Robot Goat's objective is to destroy any foliage created by the player.
 - This is achieved with lasers shot from the Robot Goat's eyes.



Victory Conditions

- Victory is achieved when the player reaches the goal amount of points.
- The current point value and goal point value are displayed below the timer.
- Once the player has reached the goal, the points display turns green, indicating success.



Residential Victory





- The player achieves victory by either completing every grid square or by having a score equal to or greater than the goal when the time runs out.
- Upon victory in the Residential Level, the player is presented with a "click to continue" message.
- By clicking, the player returns to the map overview where the player can then play the School Level or play the Residential Level again.

School Victory



- Victory is achieved by having 30 points or more when time runs out.
- If players achieve victory, they are prompted to click to continue, which brings the game back to the overview.
- Player can then replay through the two levels.

Character Design

- Caleb is in charge of the city's construction projects and acts as a guide to help you progress throughout the game.
- The villain is an evil developer. He thinks sustainable design costs too much money and is trying to stop it from happening.
 - The villain's design was inspired in part by Ganandorf from Nintendo's Legend of Zelda and Jack Dunagy from **30** Rock.
- The goats are the villain's creations. Goats are actually helpful to the environment so these are Robot Goats and cause the environment harm.



Audio and Animation Design

- The audio for Sustainablitz came in two forms: Background music and sound effects.
- The background music for the world map, the residential, and the school levels were composed originally for this game. The first two were recorded into Avid ProTools from a keyboard. The last was composed on Mixcraft.
- The sound effects in the game selected from the sound effects library of Ball State's Telecommunications department. They had to be converted to a different format in order to be used with GameSalad.
- There were two animated sequences in the game: The Robot Goat teleportation and walking movement. Both animations were rendered through Adobe After Effects.



Site Design

- Site Design was done predominantly in SketchUp.
- Both sustainably designed and unsustainably designed versions of each site were used in the briefing sessions.







About the Team

The Sustainablitz team consisted of interdisciplinary skill sets and majors. Because of this, each student contributed unique content to the team.



(From Top Left) Ty Heimann - Music Bixia Zhou - Landscape Architecture and Site Design Jing Shi - Landscape Architecture and Site Design Yiwen Zheng - Landscape Architecture and Site Design **Chris Marlow** - Instructor Caleb Eno - Lead Designer Will Bohn - Programing and Mechanics **Brittaney Edwards -** Character Design