FLOOD PROTECTION

PLAY | RESUME | SCORES | OPTION | HELP

Water Game:
Interactive Game for Water and Disaster Education

Game Proposal

Development Team 3 - Flood Protection Game

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Abstract

Flooding worldwide has been brought to attention by the media in recent years. Not just in Taiwan but also in other countries such as the United Kingdom. Regardless of the time and location, flooding always bring a host of challenges to settlements and leave both short-term and long-term impacts; the impacts are seldom beneficial, which is why it is crucial students understand the basics of flood protection.

Overview

Game purpose

Through the process, the students will learn different basic engineering measures and concepts regarding flood prevention. The main purpose is to let the player understand how to use existing engineering resources to combat flooding before and after it occurs, and to instill modern water conservation approaches and policies in the player. The player will not only acquire information they wouldn't normally learn in the high school but they will be prompted to look at the bigger picture of this issue.

Gameplay

Brief description

Similar to the keeper game, the player will need to defend the flood-prone area from waves of floods by using a variety of objects representing different engineering methods. Placing the appropriate objects to counteract the floods that attack is the key to victory. Objects can be upgraded to increase their effectiveness in battle and use special policies. After a certain number of rounds, the total score will be calculated depending on the money earned by protecting each area as well as the score from the Happy Index.

UI Design

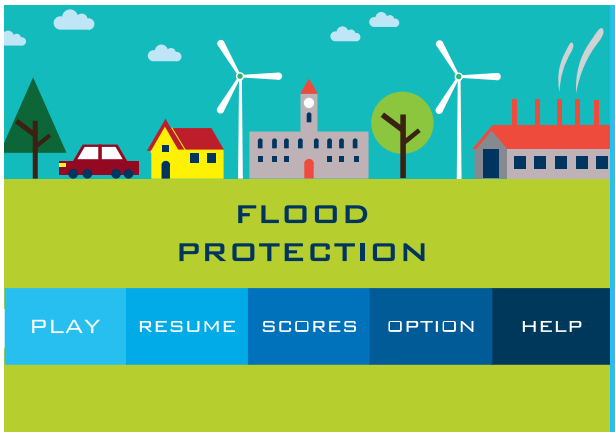

Figure 1 - Game Start

Figure 2 - Map Selection

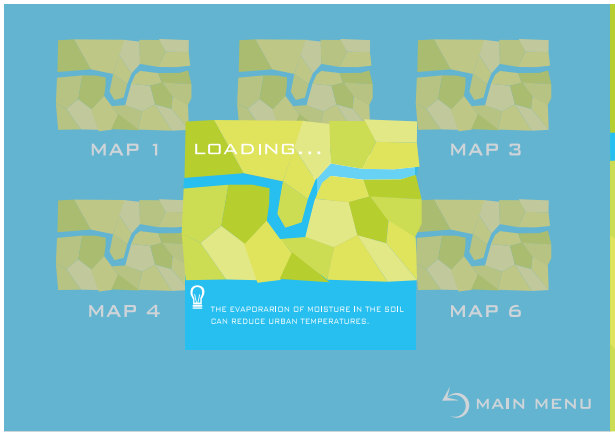

Figure 3 - Map Loading

Figure 4 - Gaming

Happy Index (HI)

Happiness index reflects the urban residents. When the protection area suffer from flood, HI will be reduced. The game will fail if HI become 0. After the end of the total number of turns, HI is one of the main reference of the total score.

Money

Players can use money to buy and upgrade flood prevention objects and infrastructures. The protection area (residential, commercial, industrial) can earn money with time. People can use money to upgrade the protection areas to make more money. Money is also important when calculating the final score.

Protection Area

There are three protection areas, Residential, Commercial, Industrial.

	Residential	Industrial	Commercial
Productivity (dollars per 10 sec)	5	10	15
Importance (sec per -1 HI)	5	10	15

Table 1. Property setup table of protection areas

* Productivity : The higher productivity is, the more money will be earned in a fixed period of time.

* Importance : The more important areas are attacked by floods, the more the HI will be reduced.

Approach (4 method, 2 policies)

Method	Unit	Cost	Building Time	Life Span	Level
Pump	1	100	n/a	10 sec	n/a
Park	1 3 4	300 800 1000	3 sec 10 sec 15 sec	Permanent	1 ~ 3
Sand Bag	1	20	n/a	5 unit water	n/a
Dike	3	1000	15 sec	Permanent	1 ~ 3

Table 2. General property setup table of all objects

A. Initiative Methods

a. Pump

Pumps can extract a fixed unit of water in a certain period of time but does not last forever; thus, reflecting the fact that it is not a long-term solution.

b. Retention Park (3 kinds)

There are three types of retention parks, all varying in sizes. Retention parks can extract a small and fixed amount of water unit in a certain period of time and has no limited lifespan.

Park Size 1 Level	Cost	Extract speed (unit water per second)
1st	300	1
2nd	100	2
3rd	200	3
Park Size 3 Level	**Cost**	**Extract speed (unit water per second)**
1st	800	3
2nd	200	4
3rd	400	5
Park Size 4 Level	**Cost**	**Extract speed (unit water per second)**
1st	1000	4
2nd	300	5
3rd	600	6

Table 3. Property setup table of three level of all park size

B. Passive Methods

a. Sand Bag

Sand bags can be placed on the corners of each district to mitigate water overflow from flooding. Nevertheless, sandbags will be damaged over time with sustained impact from flooding.

b. Dike

Dikes function in the same manner sand bag; the only difference is that dikes won't be destructed by sustained impact from flooding.

Dike Level	Cost	Affordable Wave Level
1st	1000	3

2nd	300	4
3rd	500	5

Table 4. Property setup table of three level of dike

C. Policies

a. Green Roof

This policy can be applied to a chosen to upgrade an infrastructure to having the ability to store water. Infrastructures can extract a certain amount of the water within a certain period of time.

b. Green Street

Apply to a chosen protection area to make itself have the functions of water storage. With this policy, protection area can extracts a certain amount of the water within a certain period of time.


FLOOD PROTECTION
STORYBOARD
PLAY
RESUME
SCORES
OPTION
HELP
MAP 1
MAP 2
MAP 3
MAIN MENU
LOADING...
MAP SELECT
Every map will have a thumbnail image list in the map selection page. Players can choose the map they want to play.
LODING BAR
The loading bar is the river itself. It fills up according to the percentage of the loading process.
The evaporation of moisture in the soil can reduce urban temperatures.
EDUCATIONAL TIPS
While waiting for the game to load, random flood protection knowledge is displayed to hint and aid players in learning how to handle flood disasters like in the real world.
START
HAPPY INDEX
It stands for the happiness of the residents. When the protection area suffer from flood, HI will reduce. The game will fail if HI become 0. After the end of a stage, HI is one of the main reference of the total score.
1
20
$ 1 2 3
MONEY
To buy and upgrade the flood prevention methods and policies.
WAVE COUNT
It tells players how many waves of heavy rain in total and which they are undergoing.
DIKE
Dike can be placed on the corner of the river to block the overflow result from flood, and it will never be destructed.
RESTART
SAVE AND QUIT
OPTION
POP UP
CLICK!
PLAY
FAST FORWARD
SETTINGS
TIME CONTROL
These three buttons are located at the left bottom corner when playing the game. They allow players to play, pause, and fast forward to arrange the timing for protection methods. A setting panel is included here.
SAND BAG
PUMP
DIKE
PARK
METHODS
Four measures can be taken for flood protection. Initiative and passive measures are all included. Follow down the river then you can see more specific details and abilities of each methods.
GREEN ROOF
GREEN STREET
Green roof and street policies can be applied to a chosen area to give buildings and streets in the protection area the function to store water.
POLICIES
Pump can extract a fixed great amount of unit water in a certain period of time, but the only flaw is that it is time-limited.
PUMP
PARK
Parks comes in different shapes and sizes. The bigger they are, the more water they can store.
Sand bags can be placed at the river bends to block water overflow during flooding but they will damage with sustained water impact.
SAND BAG
RESIDENTIAL
This area is where housing predominates, as opposed to industrial and commercial areas. This area is slower at generating money but holds the highest priority when faced with a natural disasters.
COMMERCIAL
This area is used for commercial activities. Common infrastructures seen include grocery stores, banks and shopping malls. This area generates money fast but should be consider last when faced with a flood disaster due to having relatively less casualties when compared to other areas.
INDUSTRIAL
The industrial area is a place that is crowded with factories, heavy trucks, and exhaust. In this game, this area is the second fastest money maker and also the second most important area when flood strikes.
WAVE ALARM
Wave alarm pops up before every wave to tell players how big the rain is so they can plan for resource distribution.
HEAVY RAIN!
FAIL ...
When the happy index comes to zero, the player has failed to save the city from flood disaster. There is no score calculation and restart option appears.
YOU FAIL...
FLOOD STRIKES
An exclamation mark will show up and glow to warn the player that a flood is about to strike. A sad faces indicates the casualties and damages, causing the happy index to lower.
YOU SUCCESS!
SCORES: + $123 = 250
MAP SELECTION
RESTART
SUCCESS!
When the player manages to pass all waves in a map with happy index left, a congratulation message appears with a calculated score. The score will be calculated using a function that considers the happy index, money and total time used.
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