Game Design

Bio

mindbytes®

Mount Laurel Library

MAKE IT @ Mount Laurel Library

New Jersey Association for Gifted Children

THINKSTER MATH

RUTGERS School of Engineering
150 Years Engineering Out Front

Ocean County Library
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Building Community
Transforming Lives

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CAMDEN DREAM CENTER

HOPEWORKS 'N CAMDEN

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Introduction

- What is Game Design?
  - Rules to elaborate rules and mechanics to facilitate interaction between players
  - Board games, Card games, Physical games, Social games. Video games etc
  - 1947-1958 – British Mathematician Alan Turing – theoretical computer chess – program to play chess but not yet complete.
  - 1958 – Tennis for Two – William Higinbotham
  - Games from MIT, Stanford – Galaxy Game & Spacewar!

Why Game based learning?

- Make learning interesting
- Not every kid can memorize
- Genuinely engage students in learning new concepts
- Games provide a safe and interactive way to for kids to engage with complex ideas
- It is an instructional choice which could help in handling differentiated learning
- Students can work Collaboratively with others.

Elements

- Platforms
- Time Intervals
- Player mode
- Game Elements
- Goals
- Genres
- Geographics

Core Game Mechanics

- What does the main Character do
  - Active verbs – running, jumping, chasing, exploring, counting
- Goals
  - What does a player needs to do to achieve the goal
  - Barriers or obstacles
  - How a player lose a game?
  - Reward points when he achieves something
- Components
  - Power –ups, enemies, what do they look like? What do they do? How can a player interact with them
- Controls
  - Control the game, keyboard control, mouse control, button control,
- User experience
  - How a player should play the game, instruction on screen, levels in the game

Deciding on Levels

- Game within a Game
- Fun
  - Completing a pattern, game ceases to be fun, people stop playing games
- Reward
  - Tackles and wins, expects a reward
  - Completing task successfully
- Risk
  - Has taken risk to discover
  - Battled to acquire something
- Challenge
  - Different challenging levels
- Consistency
  - When one box explode, all the boxes explode
- Interest
  - Engagement – mix and match the factors

Level

- Narrative games
  - Different stories
- Puzzle games
  - Familiar approaches
  - Arrange the levels according the difficulty
- Strategy games
  - Difficulty based on the section of the game
  - Learning curve

Steps – Capture in GDD

- Overall Vision for the game
- Target Audience
- Platform
- Genre
  - Sample Game Design Document - Template

Steps – Capture in GDD

- Overall Vision for the game
  - Short Summary or description of the game – Why would they want to play it? What makes it sound fun and engaging.
- Target Audience
  - Specific audience in mind - boys, girls, kids, adults?
- Platform
  - How is to be played – console or web or hand held devices. Game design targets a specific platform and easy to program when chosen earlier.
- Genre
  - Action, Adventure, Strategy, Puzzle, Racing. Platformer and Role Playing. Mix of genres?

Scenario

A rover traverses the surface of Mars. Every time it crosses plant-life or vegetation, it blinks and beeps. A child clicks the mouse to learn what the rover found. Points are won.

Imagine this is a science project on Life in Mars that children can not only use in the classroom, but actually build themselves.

Different Forms of Games

- Indoor games
- Word games
- Puzzles
- Board Games
- Jeopardy/ Wheels of Fortune
- Create 2D, 3D Games
- Virtual reality
- Augmented reality

Introduction to Kodu

- A tool for narrative creation and storytelling
- Logic and problem solving in a sequence
- Object Oriented concepts
- Analyze the problem deeply and structure the solution

Creating a new world

- Terrain
  - Texture
  - Changing Brush
- Raising Terrain
- Creating Spikey Terrain
- Smoothing
- Water
- Adding characters

Programming in Kodu

- Start with a When condition, followed by a Do condition to be executed.
- The choice of tiles at any point is determined by what went before.
- Conditions are evaluated simultaneously.
- If there are no tiles in the When area, then the action will be done at all times.
- F1 to help
- Esc to play
- Practice by creating valley, land, fortress and with water

Lessons

- Creating Landscapes
- Understanding objects
- Properties
- Simple actions
- Creating Path
- Creating Creatables - Spawning – live creation of a character in the game.

Creatables

- Right click on the object to be spawned
- Click settings
- Creatables option – turn it on
- Right click on the object that has to spawn and specify the seconds within which it has to create.
- Follow path.

Path, Timer & Scores

- Path is a nice way of controlling how characters move.
- Timer
  - Can be used to create objects every few seconds
  - Can be used to time out the game
- Scores
  - Scores are based on colors
  - Red- user score
  - White – object score – used in creatables mostly
  - Program to end or lose a game

Creating a new page & Level

- The "switch to page x" construct is used for code to be run only after a specific event or condition has been achieved – it is used to create multiple states for a character or object.
- Switch between one behavior to another – 12 pages
- Shortcut to retain the program in pages
  - Click on the page number – press delete key- again press insert key – goto page 2 - press insert

Next Level

- Create different terrains for different levels
- Create a goal which will teleport the character to next level
- Make the character you want to teleport as creatable and

  Create it once when the score or rule is set.
- Once the goal is reached, program to vanish and based on the rule, teleport the character
- Also, While saving, your world, add instructions to your game – how to play, what characters and what is the aim of your game.
  - Sometimes it will recognize words and give you character image in the editor.

Game Dynamics

- Game Dynamics
  - process of the game that occurs in any given game session. The run-time
  - behavior of the game can be predicted to a certain extent when forming the game rules and objectives
  - For dynamics to be fully understood, we need to test the game.
  - How did the rules create the fun?
  - 🎬 What patterns came out in the dynamics of the game?
  - 🎬 What other settings, genres, design patterns or subjects might fit this game - unleash your creativity

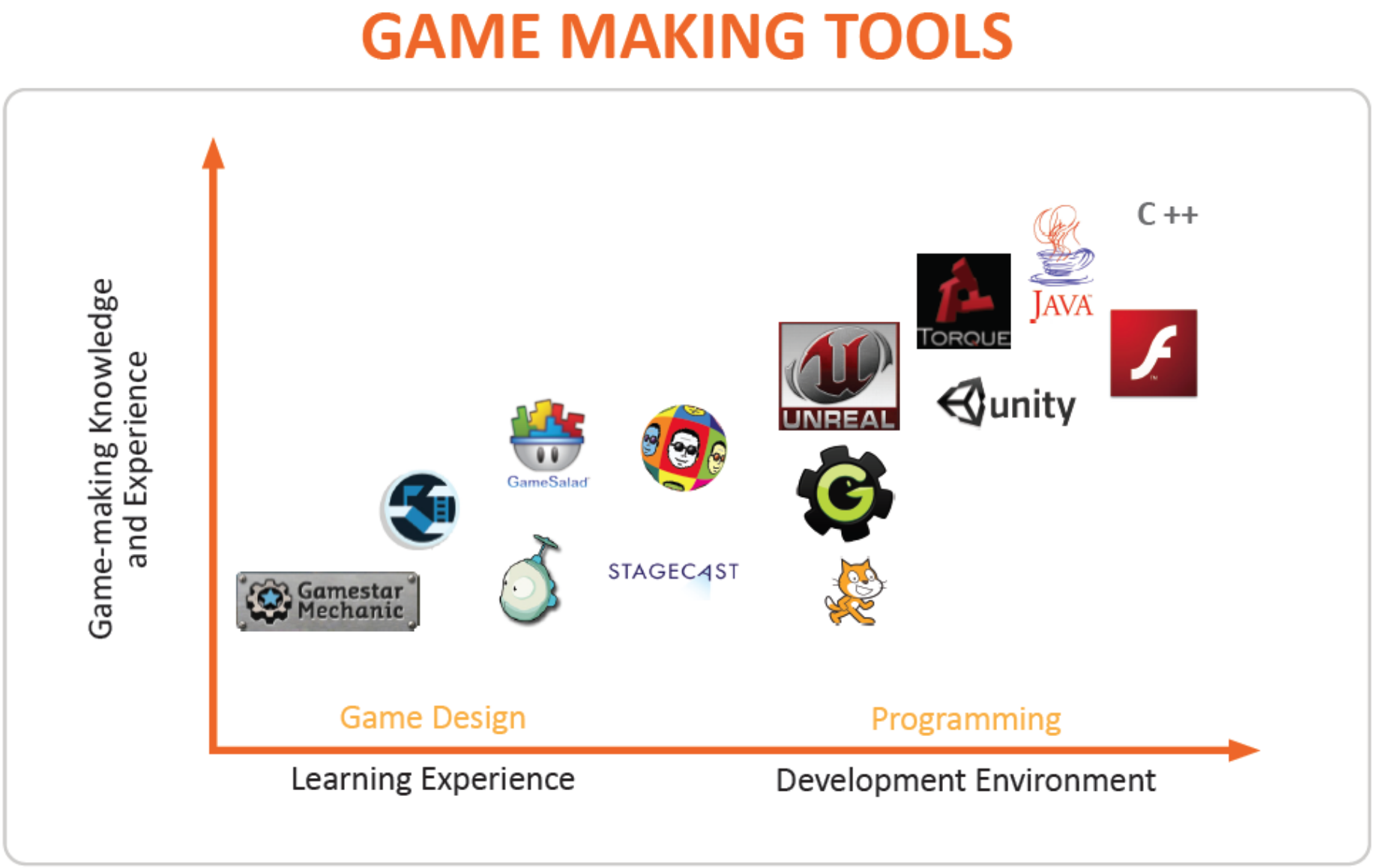
Game Mechanics

- Covers the rules and concepts that formally make the games.
- The objects and characters that make up the game
- Their attributes and states.
- Also included in the mechanics of the game are the code that make up the game and the rules and objectives that comprise the game.
- Important rule is the primary objective of the game, followed by the individual rules and constraints of the various objects and parts of the game.
  - How is the character controlled? Can it run, jump(action)? reaction with other characters and events?
  - What do the characters do?
  - What different states do the characters have? (actions)
  - What rules apply to the characters?
  -

Creating a GDD

- Describes the overall vision for a game.
- Game design documents address the **target audience**, the **platform,** the **genre**, the **core gameplay**, the **visual style** and **characters and storyline**.
- In real world, GDD's guide all of the people who work together to make a game – the artists, the programmers, the level designers, the sound designers, etc. – so that they all can understand and work towards the game designer's unique vision for the game.
- In addition to describing the creative vision for the game, professional game design documents often include material about *how* the game will be made including things like team members, technology, budget and schedule.

Other Tools



Source : stemchallenge.org

Advantages

- Clear on goals
- Foster collaborative learning
- Encourage creativity, interactive problem-solving
- Strengthen critical and systems thinking
- Go for adaptive challenges
- Spark Curiosity
- Building the right skill in children

Ideas

- Game Design in classrooms
  - Science
  - Math
  - Social Studies
  - STEM
  - Competitions
- National STEM Video Game Challenge
- Games for Change
- Questions?

Thank you