

ΧΩΡΟΕΥΑΙΣΘΗΤΑ ΠΑΙΧΝΙΔΙΑ

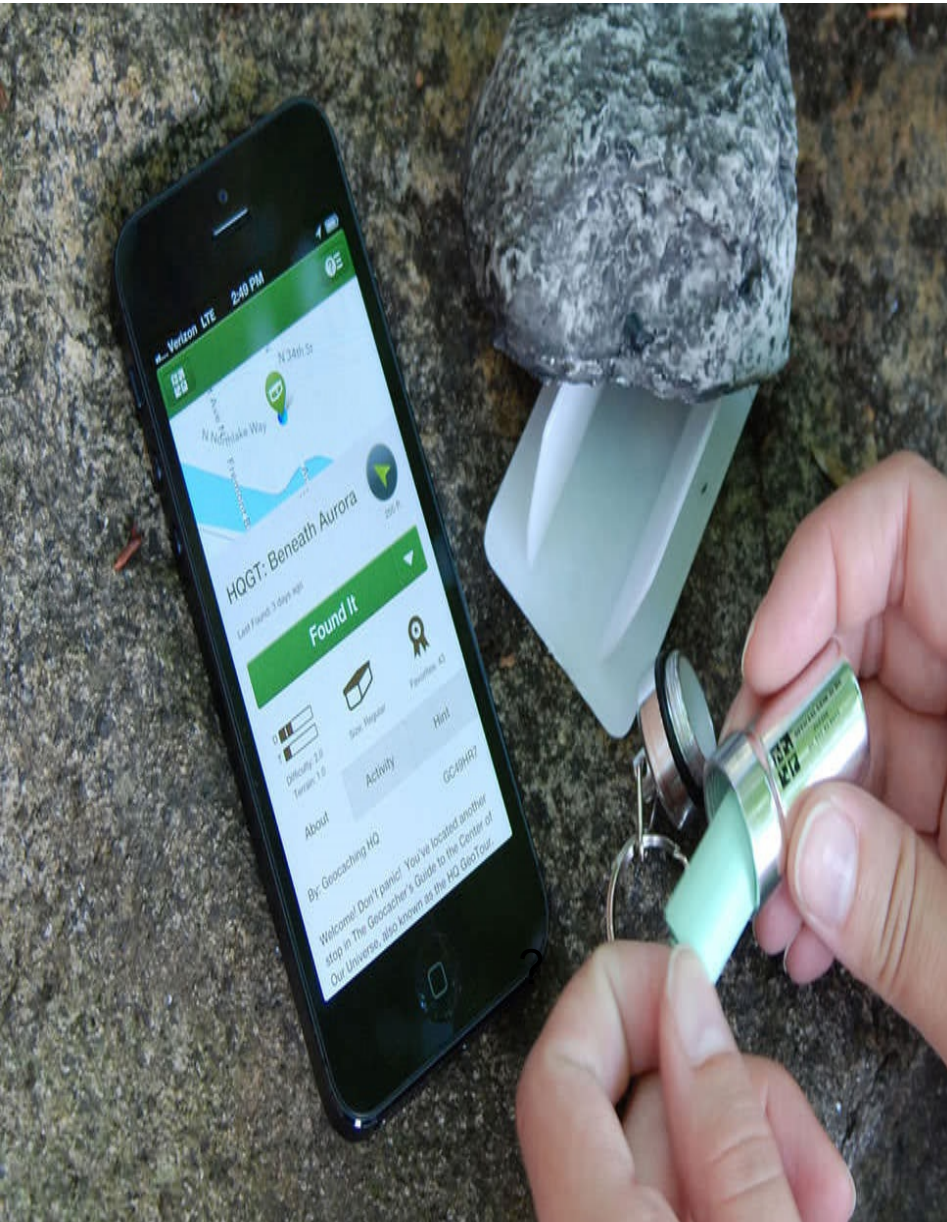
Επισκόπηση & Συγκριτική Ανάλυση
Εργαλείων Ανάπτυξης



mai19044@uom.edu.gr

Δαμιανός Μετκαρίδης

Έναρξη



LBG Characteristics

Pervasive Computing, Positioning Techniques, Augmented Reality, Educational Purposes, Game Elements, Development Tools

TaleBlazer

Fundamental Concepts, Editor Tabs

ARIS

Fundamental Concepts, Editor Tabs

Unity/Mapbox

Fundamental Concepts, Editor Tabs

Implementation

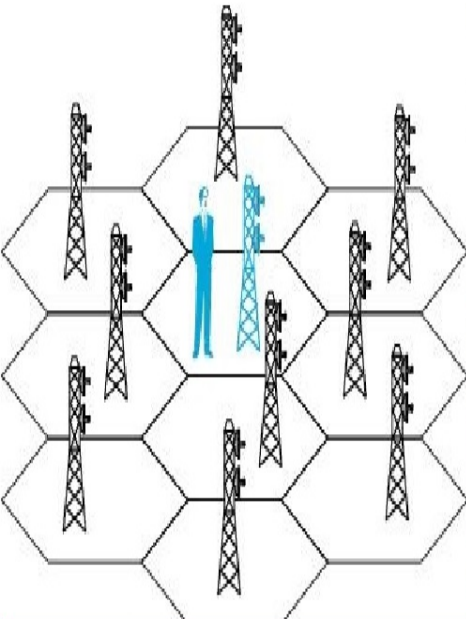
TaleBlazer, ARIS, Unity

Comparison

Bibliographic & Implementation Metrics

Conclusions

TaleBlazer / ARIS, Unity / Mapbox



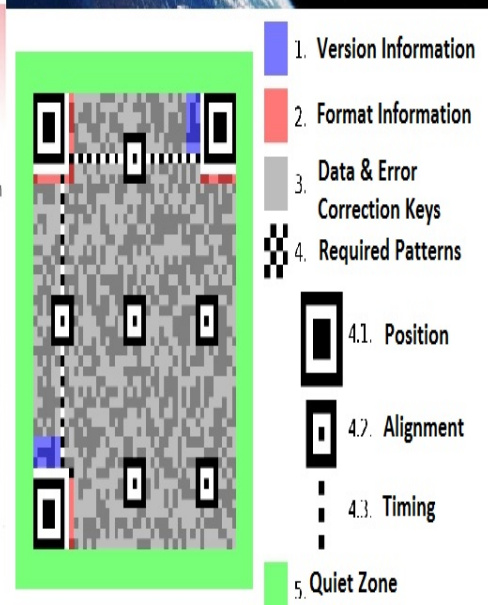
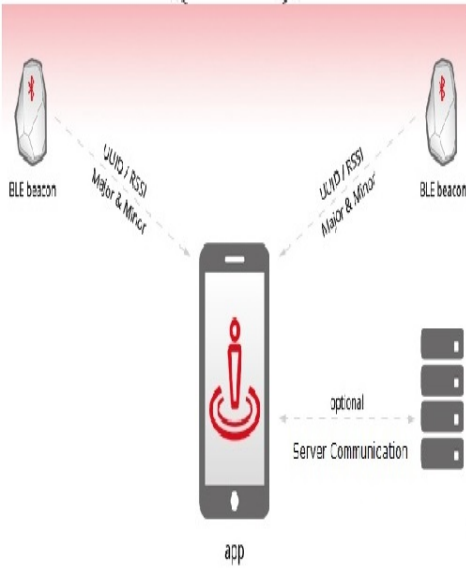
LBG Definition

Famous Games

Geocaching, Ingress, Pokémon Go

Characteristics

- Technology (UC, Positioning, AR, Apps)
- Temporality / Spatiality
- Sociality (Interaction, Communication)
- Informal Learning (Constructivism)



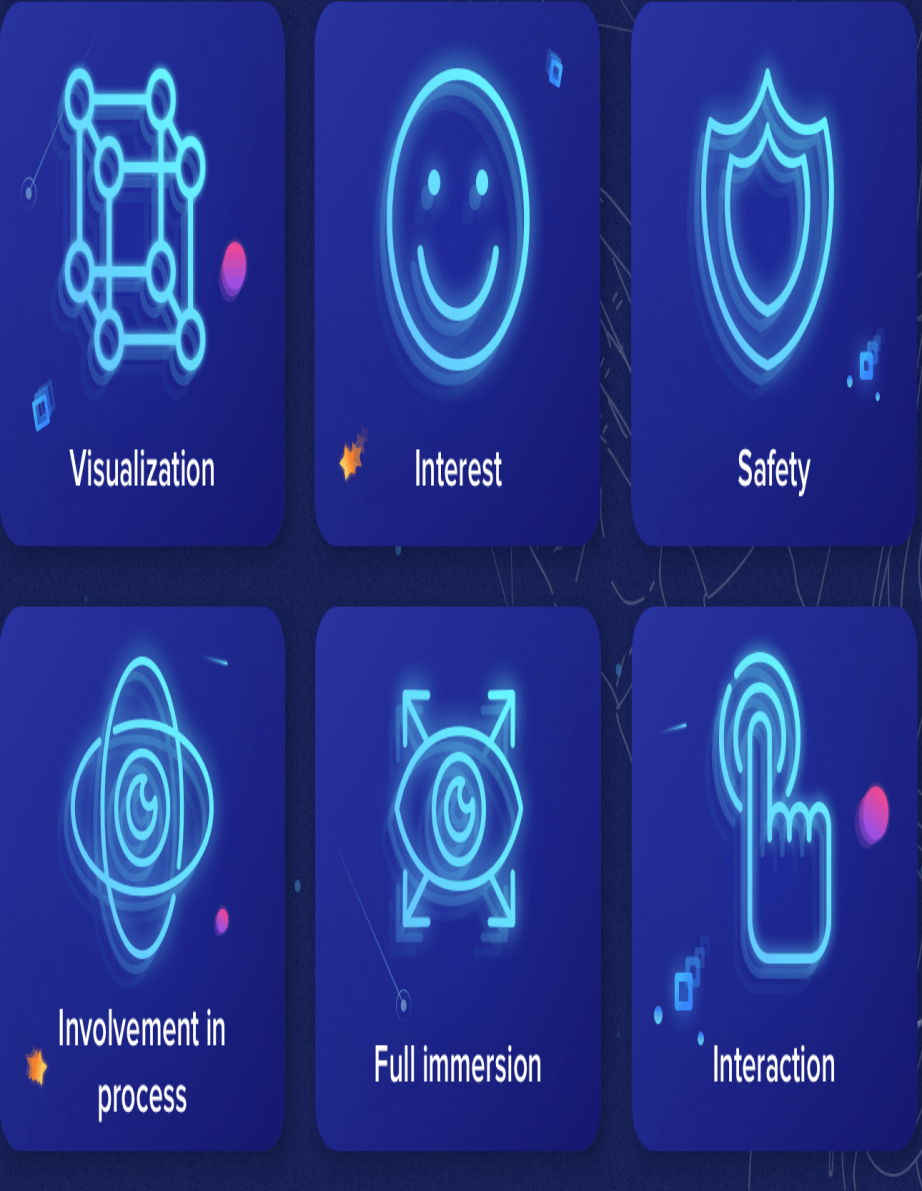
Ubiquitous Computing

Player Experience

Physical, Cognitive, Social, Emotional

Positioning Technologies

- Cell Positioning (GSM, Transceiver Station, Cell)
- Global Positioning System (Satel, Stations, Receiver)
- Bluetooth Beacons (BLE, UUID, Major, Minor)
- Quick Response Codes (Barcode, Data Storage)



Augmented Reality

Technology Components

Device, Application, Marker, Content

Disadvantages

Weather, Privacy Breach, Physical Security

Learning Benefits

Immersion, Interaction, Visualisation

Informal Learning

Narration

LBG Categorisation

Lydic (Action Games, Treasure Hunts, RPGs)

Hybrid (Mobile Fiction, Museum Games)

Pedagogic (Language Learning, Active Sim)

Learning Theories

Behaviorism, Cognitivism, Constructivism,

Social, Contextual



Game Elements

Map, Area, Quest, Track, NPC, Bump, Item, Unlock, Dialogue, Progress

Game Design

Concept, Mechanics

Design Document, Design Pattern

Development Tools

Available Tools (TaleBlazer, ARIS, Unity, AirFresh...)

System Architecture (Editor, Server, Application)

Game Development (Standardised / Non Games)

Development Process (Map Authoring, Coding)

Game Publication (Developer Licence)

Developer Functionality (Fast & Effective Process)

Player Captivation (Engaging & Meaningful Games)



Agent Dashboard



Treasure Chest

A vast pirate treasure.

★ Open Chest

🗨 Find Treasure

Player Tab



Name

Adventurer

Description

A person who seeks danger and excitement.

Buttons

Add Button

Introduction

Scheller Teacher Education Program, MIT

System Architecture (Mobile App, Web Editor, Game Server, Multiplayer Server, Analytics Server)

Famous Games (Red Butte Garden Game Suite, ImparApp, AR_Zombie Apocalypse)

Fundamental Concepts

Agents

Item, Character, Tapping, Proximity, Clue Code

Traits & Actions

Variables-Buttons (Text / Video / Builtin / Script)

Regions

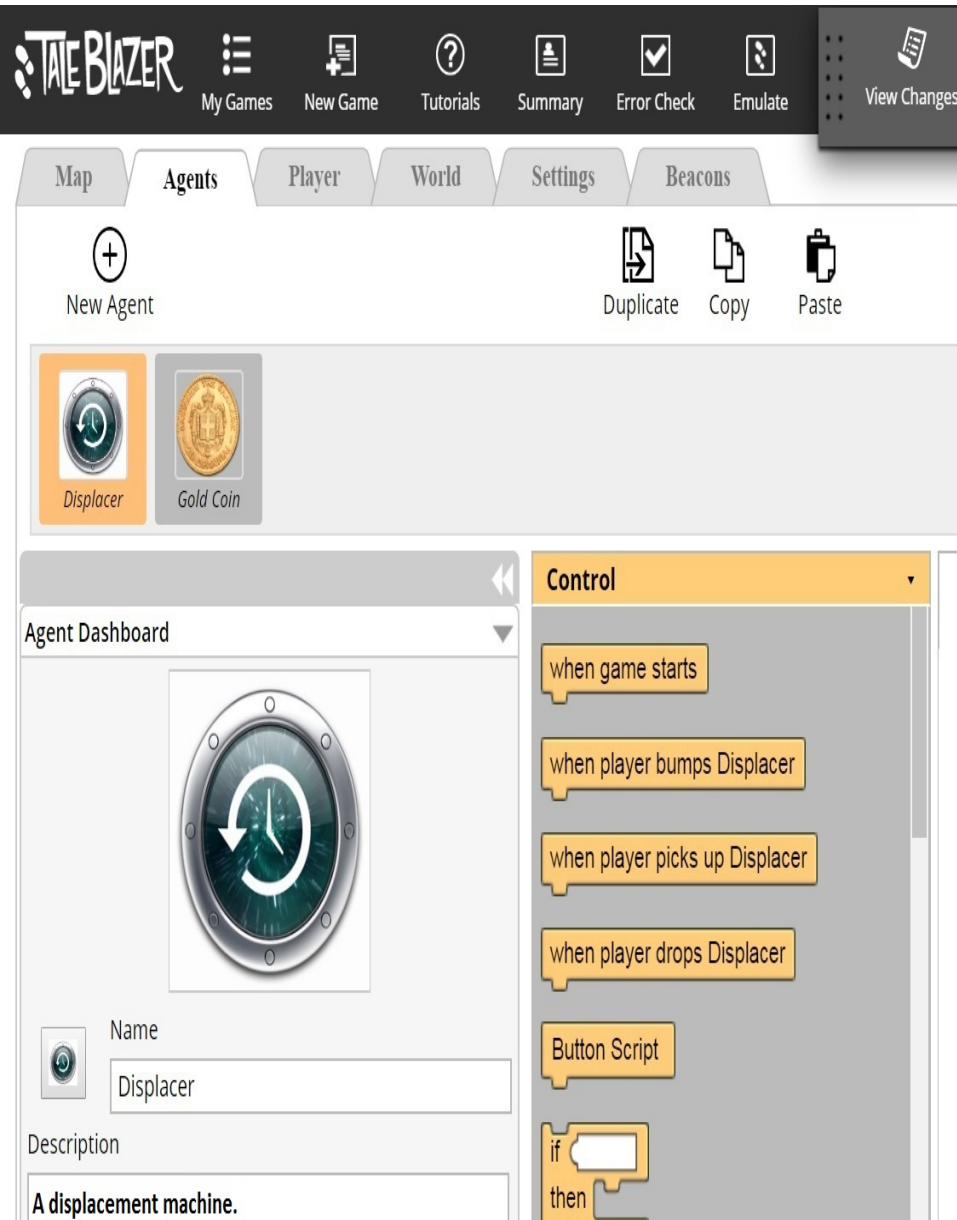
Physical-Digital, Open-Close

Roles

Player Classes

Scenarios

Difficulty, Duration, Start Location

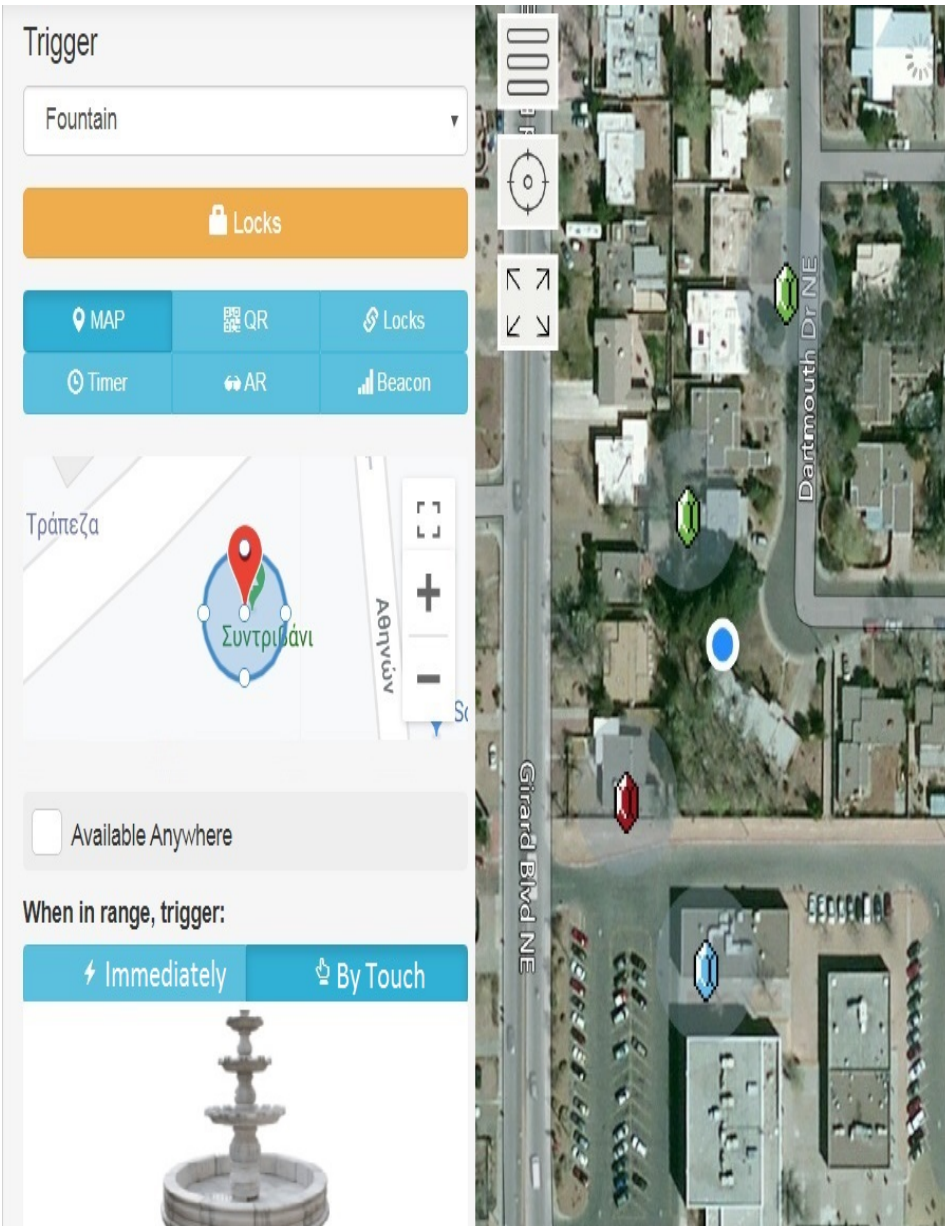


Editor Tabs

- Map (Regions, Coordinates, Custom Maps, Indoor)
- Agents (Dashboard, Settings, Buttons, Traits)
- Player (Role, Dashboard, Buttons, Traits)
- World (Dashboard, Buttons, Traits)
- Settings (Tabs, Introduction, Scenarios, Bump Setup)
- Beacons (Dashboard, UUID, Major, Minor, Bump)

Blocks Based Scripting Language

- 8 Block Groups (Agents / Player / World Tabs)
 - Control (Orange, Conditions, Repetition)
 - Operators (Green, Mathematical Operations)
 - Game (Yellow, Agent / Player / Scenario Choice)
 - Looks (Lavender, UI Related Functionality)
 - Movement (Blue, Regions & Distance)
 - Traits (Pink, Name, Description, Traits)
 - Time (Gray, Time Counters)
 - Bluetooth (Light Blue, BLE Support)

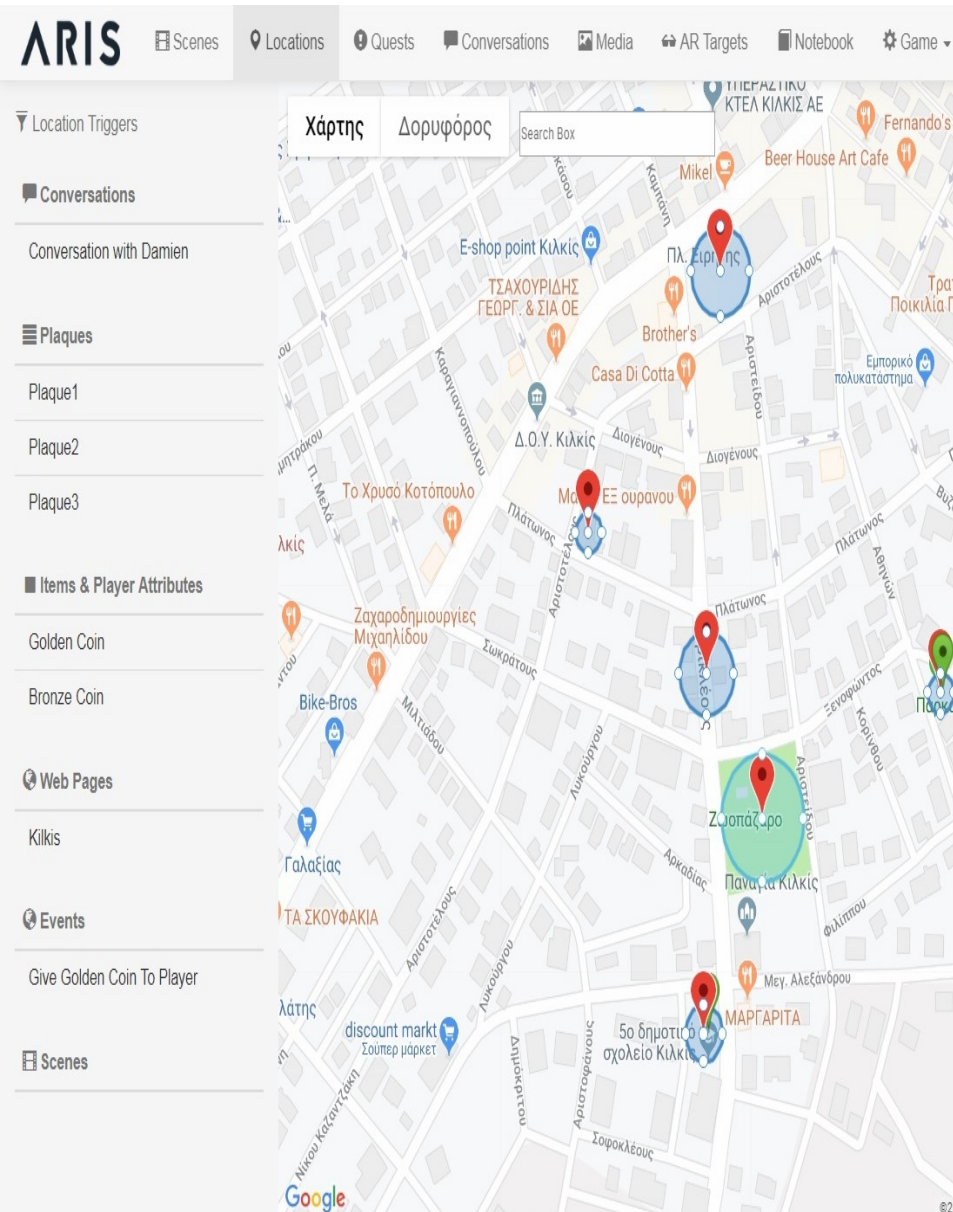


Introduction

- Center for Educational Research, Wisconsin
- System Architecture (Mob App, Web Editor, Server)
- Application Types (Tours, Scavenger Hunts, Interactive Stories, Situated Documentaries, Data Collection Activities, Geolocation Games)
- Famous Games (Mentira, Dow Day, Digital Graffiti Gallery, Rupee Collector, Explorez)

Fundamental Concepts

- Objects (Characters, Plaques, Items)
 - Traits: Name, Description, Icon
- Triggers (Sensor+Action)
 - Location, QR Code, Lock, Timer, Beacon, AR
- Locks (Condition Functionality, AND / OR Structure)
 - Triggers, Quests, Conversations, UI Tabs
- Events (Execute Action)
 - Action: Give, Take, Set, Run JS
- Factories (Random Item Spawn)

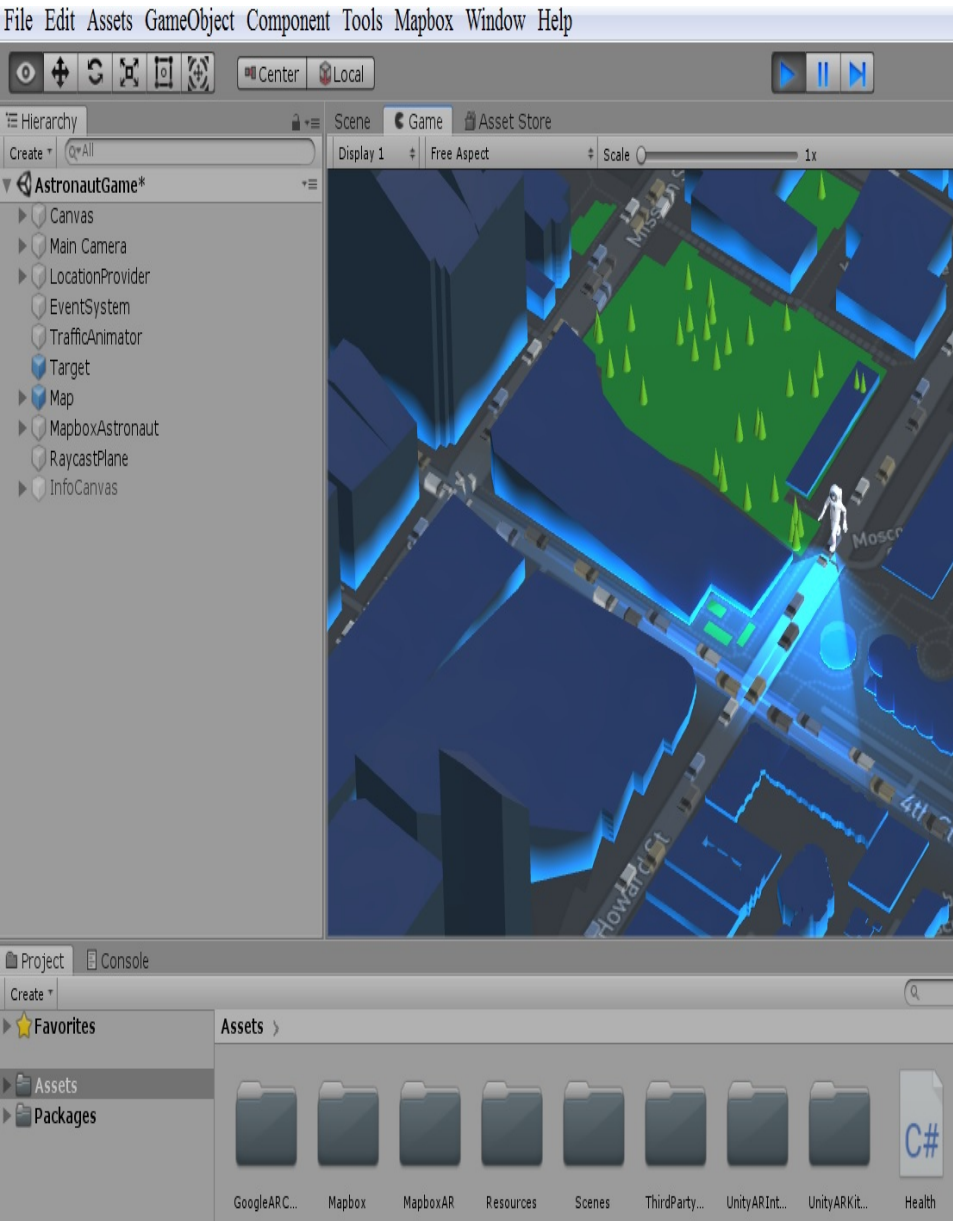


Editor Tabs

- Scenes (Objects, Conversations, Events, Factories)
- Locations (Location Triggers, Coordinates, Range)
- Quests (Missions)
- Conversations (Characters, Lines, Choices)
- Media (Icons, Images / Sounds / Videos, Referenced)
- AR Targets (vuforia.com, Trigger Image, AR Overlay)
- Notebook (Data Collection, Tag+Media)
- Game (Settings, UI Tabs, Groups, Tags, Sharing)

ARISjs

- JavaScript Code Embedded in Text Frames
- Immediate Execution/Delayed Execution
- 4 Function Categories
 - Legacy (Deprecated)
 - Main (Backbone)
 - Cache (Synchronisation Risk)
 - Callback (Synchronisation Certain)



Introduction

Unity Technologies/Mapbox (Digital Maps Provider)

System Architecture (Mob App, Local Editor)

Mapbox SDK (Map-based App Dev,
Mapping / Geocoding / Directions,
Vector / Cloudless / Elevation / Custom Maps)

Famous Games (Pokémon Go, Ingress, Zombie Go)

Editor (Personal Edition Licence)

Header (Toolbar & Menu Items)

Left Sidebar (Hierarchy)

Main Window (Scene, Game, Asset Store)

Right Sidebar (Inspector, Services)

Footer (Assets / Packages / Favorite, Console)

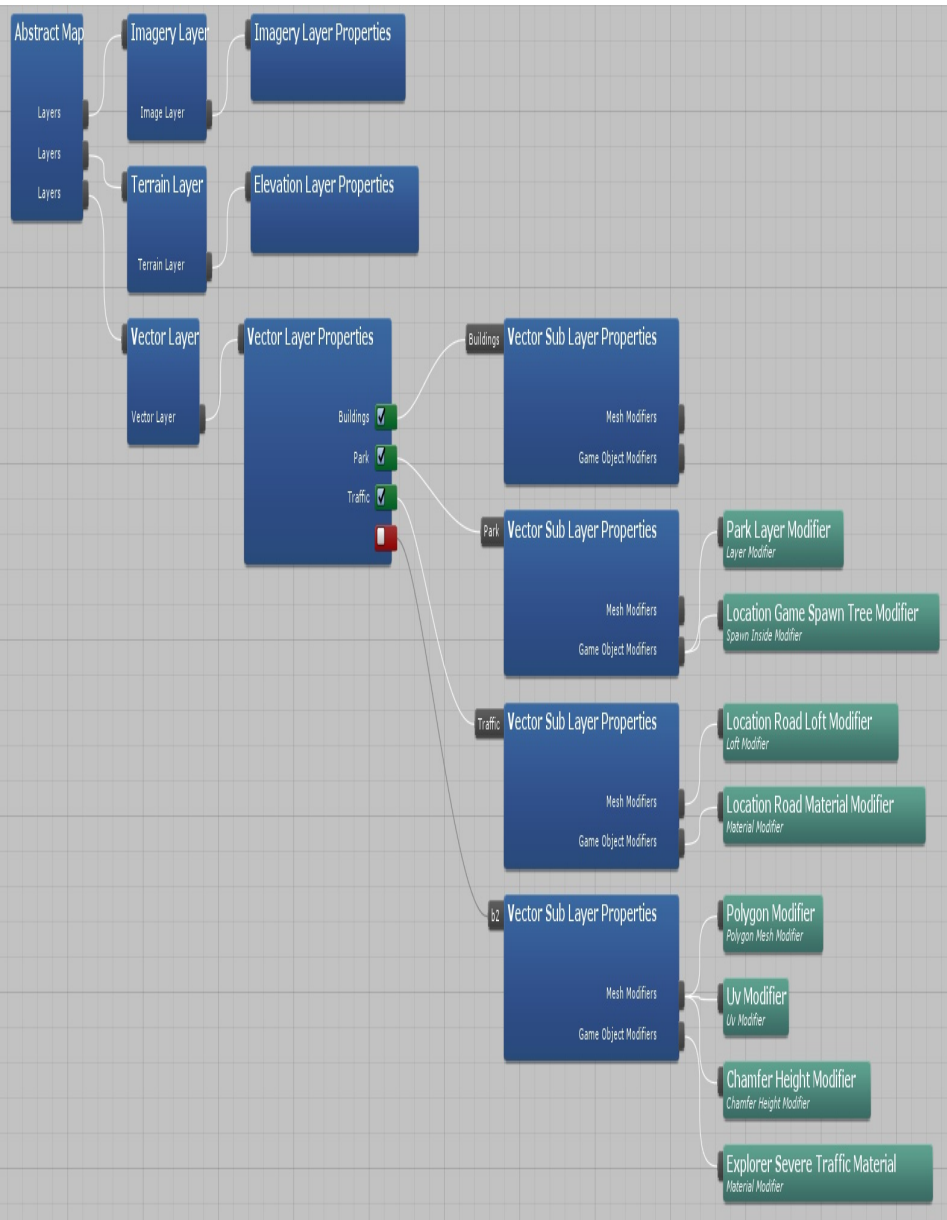
Fundamental Concepts

Assets (Multimedia Content)

GameObjects (Game Elements)

Components (Functionality)

Prefabs (Reusable Assets)



Editor Tabs

Mapbox Assets

- Modifiers (Mesh Visualisation Enhancement)
- AtlasInfo (Texture Atlases on Buildings)
- ScriptablePalette (Color Pallet Containers)
- MapVisualizer (Tile-based Map Builder)

Atlas Template Generator (Texture Atlases)

Setup (Parameters)

Map Editor (Map Tree Representation)

C# Scripting

Microsoft Visual Studio

Benefits: Input Handling, Event Prioritisation, Special Effects, Behavior Control, Artificial Intelligence

Scripts as GameObject Components

Unity MonoBehaviour Class (Start / Update)

Unity Specific Code (25 Namespaces)

Mapbox-SDK-CS (17 Namespaces)



Agent Dashboard

Name: Damien

Description: This man is famed for his love of the Games.

Settings

Location
 SquareOfPeace X 88 Y 167
 Use the location of this agent as the start location for the game.

Accessibility
 Is this agent included in the world when it starts?
 Agent is included at start
 Agent is NOT included at start
 Password protect buttons and traits

Inventory Settings
 Can be picked up Can be dropped

```

Provide Services
if Energy of me (Damien) > 99
then
  set Energy of me (Damien) to 0
  say Hello friend and welcome ...
  move player to AnimalBazaar
else
  if Gold Coin Medieval in inventory ?
  then
    say Well done! Here, I will t...
    drop Gold Coin Medieval
    include Gold Coin Modern in world
    exclude Gold Coin Medieval from world
    pick up Gold Coin Modern
    change Coins of player by 1
    move player to Hill
    display map text Damien's Quest Complete!
    switch to Map tab
  else
    if Gold Coin Modern in inventory ?
    then
      say Still here? You should be going to the Hill.
    else
      say Still here? You should be going to the Animal Bazaar.
  
```

TaleBlazer (Citizenship)

Game Type:
Pedagogic Game, Interactive Story, RPG

Educational Purpose:
Historical & Cultural Knowledge

Mission Objective: Pass the Tests

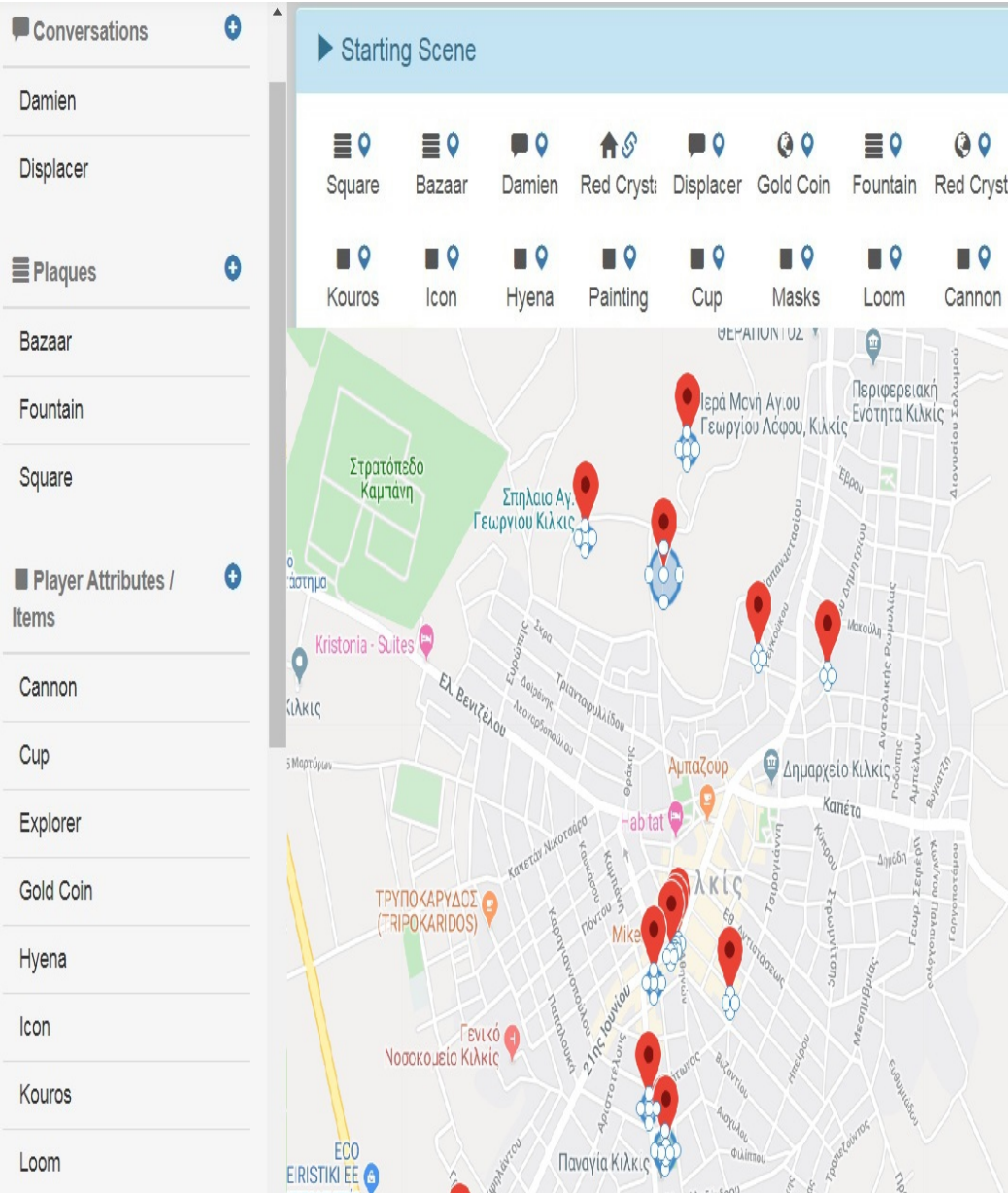
Ultimate Goal: Become Citizen

Game Scenario:
 Mayor, Damien, Kilkis, Citizenship, Examination, Tests, Relics

Elements Used:
 Regions, Agents, Roles, Scenarios, Introduction, Media, Traits, Buttons, Scripting

Development Process:
 Original Idea, Tool / Game Case Study, Educational / Game Content Design, Media Selection, Agent Placement, Trait / Button Definition

Prerequisites:
 Game Dev/Programming Experience, Understanding of LBG Principles



ARIS (Gathering)

Game Type:

Hybrid, Scavenging, Narration, Fiction, Unlock

Educational Purpose:

Tour Guide

Mission Objective: Treasure Collection

Ultimate Goal: Return Home

Game Scenario:

Displacer, Damien, Kilkis, Relics, Red Crystals

Elements Used:

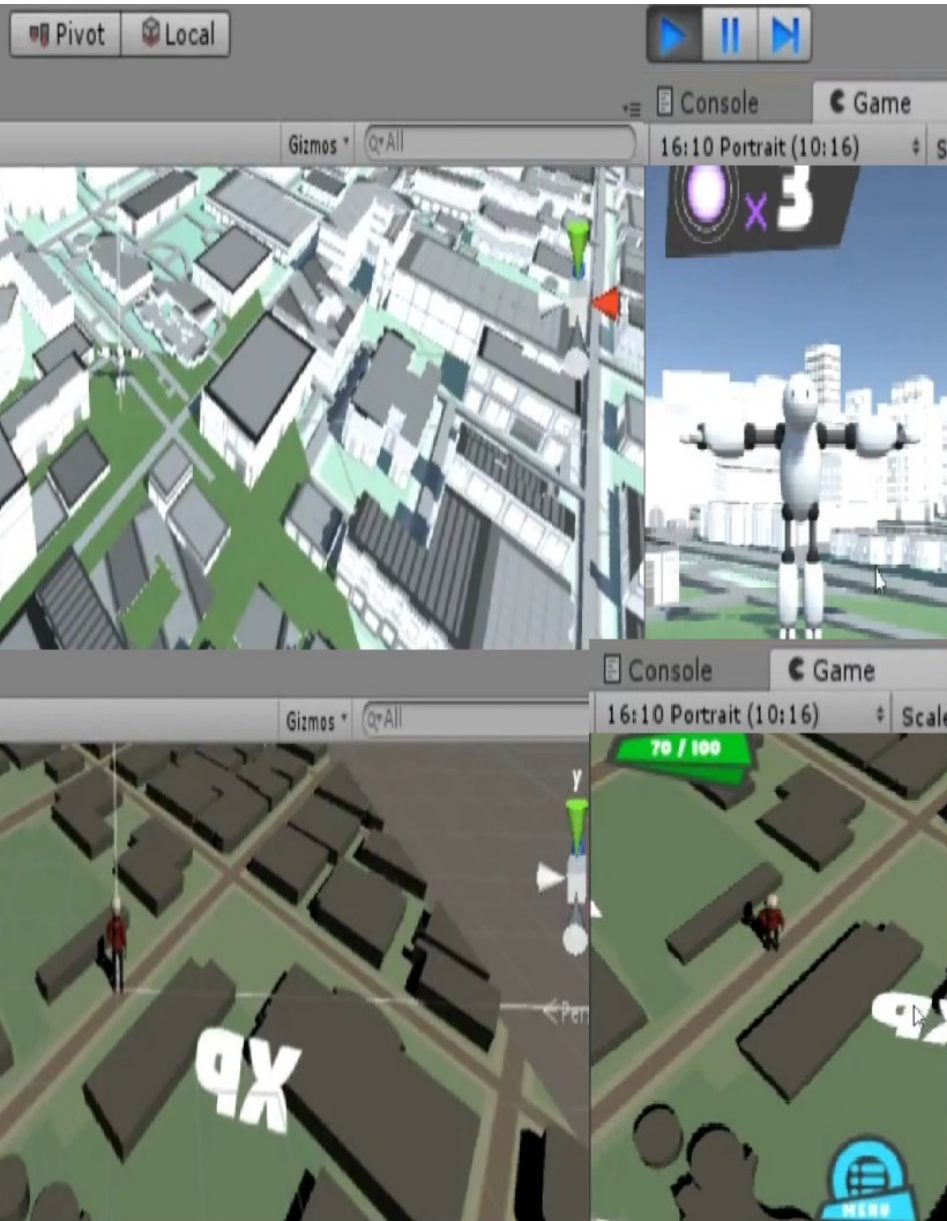
Scene, Factory, Events, Objects, Characters, Plaques, Items, Quests, Conversations, Media, Locks, Triggers.

Development Process:

Original Idea, Tool / Game Case Study, Game Content Design-Scenes, Objects, Quests Locations / Media Selection, Object Placement, Game Mechanics Design-Events/Triggers/Locks

Prerequisites:

Game Dev / JavaScript Experience, Understanding of LBG Principles



Unity/Mapbox (Pocket Droids Go)

Game Type:

Ludic / Action Game, Scavenger Hunt

Educational Purpose:

None

Mission Objective: Android Collection

Ultimate Goal: Reduce Android Population

Game Scenario:

Future, Android, Government, Capturing, Orb

Elements Used:

Mapbox SDK, Custom Maps, Points of Interest, LocationProvider GameObject, Vector Tile Meshes, Satellite Terrain, MapVisualizer Assets.

Development Process:

Programming of Game Classes

Scene Editing

Prefabs: XP, Points Of Interest

Multimedia: Sound & Music

Prerequisites:

Game Dev / C# / Unity Experience,
Understanding of LBG Principles



| Developer Functionality | TaleBlazer | ARIS | Unity |
|--------------------------------|---|------------------------------------|---|
| Non-linear Authoring | Yes (<i>if-then</i> Block) | Yes (Locks/Triggers/ Events) | Yes (Script Components) |
| Visual Authoring | Yes (Editor GUI) | Yes (Editor GUI) | Yes (Editor GUI/ Scene Editor) |
| In-situ Authoring | No | No | No |
| Re-use & Re-editing | Yes (Remix/Copy) | Yes (Import/Duplicate) | Yes (Open Project) |
| Content Adding & Management | Partial (Can not delete/ rename multimedia) | Yes (<i>Multimedia</i> Tab) | Yes (Asset Import) |
| Editor Customisation | Partial (Foldable Menus) | No | Yes (Change Layout) |
| Simulation Mode | No (Discontinued) | No | Yes (Game Tab) |
| Game Analytics | Partial (Official Partners) | No | No |
| Map Authoring | Yes (<i>Map</i> Tab) | Yes (<i>Locations</i> Tab) | No |
| Visual Programming | Yes (Block Scripting Language) | Partial (Locks/Events) | Partial (<i>Mapbox/Map Editor</i> Tab) |
| Programming Interface | No | Yes (JavaScript) | Yes (C#) |

Bibliography Metrics

Game Element Equivalence

TaleBlazer (Friendly UI)

ARIS (**Better LBG Principle Support**)

Unity (Coding)

Developer Functionality

No In-Situ Authoring/Analytics

TaleBlazer (**Visual Prog**, -Prog. Interface)

ARIS (**Events / Locks**, ARISjs / JavaScript)

Unity (**Simulation Mode**, Editor Customisation,
C# Scripting, **-Map Authoring**)

Player Captivation

No Communication

TaleBlazer (**Balanced**)

ARIS (Multiple **Positioning** Technologies,
Multiple **Players**, Collaboration,
-Multiple O.S, -Connectionless Play)

Unity (-Outdoor-Indoor Playability, -Reflection)

Comparison



| Additional Functionality | TaleBlazer | ARIS | Unity |
|-------------------------------------|---|--|---|
| Game Start Event | Settings/Introduction +Block Scripting (When Game Starts) | Starting Scene | InitializeOnLoad Attribute+Class with static constructor |
| Game End Event | Block Scripting | Quest+End Scene | C# Scripting+End Scene |
| Scheduled & Random Events | Block Scripting | Timer Trigger | C# Scripting |
| Tap to Bump | Settings/Bump Settings/Allow Tap To Bump Tab | Game/Settings/Offsite Mode Tab | C# Scripting (Input.getTouch) |
| On Screen Navigation | Map Tab | Map Tab | Map Prefab |
| User Input | Buttons, Clue Code Tab, Trait & Action Passwords | Conversation Choices, QR Scanner, Decoder Codes | C# Scripting (Input Class) |
| Data Collection | - | Notebook | - |
| Multimedia Sharing Between Games | Stored in MyFiles & MyIcons | - | Asset Packages |
| User Application | User Tabs Only | User Tabs Only | No Standardisation |
| Customisation Automated | Game Revision History | - | Collab |
| Version Control | - | Game/Sharing Tab | Collab/Invite |
| Shared Editing | - | Game/Settings/Export Tab | File/Save Project |
| Game Export | Summary | - | Help |
| Help Button | Tutorials | - | Console Window |
| Error Checking | Error Check | - | - |

Implementation Metrics

Additional Functionality

TaleBlazer (-Shared Editing)

ARIS (**Data Collection**, -Multimedia Sharing,
- Version Control, -Help, - Error Checking)

Unity (-Programming Dependent)

Positioning Techniques

TaleBlazer (-No QRC, -Limited AR Capabilites)

ARIS (**Best Results**)

Unity (Strong AR Capabilites, -No QRC, -No BB)

Overview & Feedback

TaleBlazer (**Free**, Friendly UI, -Extensibility
Toolkits, -Active Community, -Forum)

ARIS (Open Source, Active Community, **Forum**,
Video Tutorials, -Minor Editor Bugs)

Unity (Professionality, Creativity, Extensibility,
Dimensionality, Support, -Close Source, -Local
Editor, - Demos, -**Tutorials**, -Documentation &
Manuals, -**Learning Curve**, -Unfriendly UI)



| Overview & Feedback | TaleBlazer | ARIS | Unity |
|---------------------------------|---|---|---|
| Open Source | Y (No Source Code) | Y (Source Code) | - |
| Costs/Price | Completely Free | Free until 100 players monthly | Free until \$100k gross limit |
| Extensibility | - | SIFTR, Vuforia | Mapbox, Vuforia, ARKit, ARCore etc |
| Toolkits | - | - | - |
| Game Dimensions | 2D | 2D | 2D/3D |
| Development Platforms | Chrome/Firefox | Chrome/Firefox | Windows/Mac |
| Server-Client Architecture | Yes | Yes | - |
| Editor Usage | Cloud | Cloud | Local |
| Official Support | Support Person | Support Forum | Support Forum/Person |
| Active Community | Minimal | Maximal | Moderate |
| Documentation & Manuals | Maximal | Maximal | Moderate |
| Video Tutorials | Moderate | Maximal | Minimal |
| Game Demos | Maximal | Maximal | Minimal |
| Friendly Developer UI | Moderate | Maximal | Minimal |
| Friendly Player UI | Maximal | Moderate | Moderate (Developer Dependent) |
| Playing System Requirements | Moderate | Moderate | Maximal |
| Development System Requirements | Minimal | Minimal | Maximal |
| Learning Curve | Moderate | Moderate | Maximal |
| General Advantages | +Great Educational Potential +Plenty Training Material +User Friendly GUI +Extra Developer Functionality | +Great Educational Potential +Plenty Training Material +User Friendly GUI +Truly Open Source | +Great Creative & Extensibility Potential +Great Official Support +Professional Tool +Advanced AR Capabilities |
| General Disadvantages | -Reduced AR Features -No Multiplayer Games -Limited Multimedia Management Capacities | -iOS Only -Internet Connection Required -Minor Editor Bugs | -Overwhelming Editor GUI -Scarce Training Material -Local Editor Installation -Programming Necessitated |

LBG Development Adequacy

TaleBlazer / ARIS

Role-based / Story-based Games

Use / Publishing Facility

Active Learning

Web-based Editor / Game Server / Client Application

Coding **Optional** / Map Based Authoring

Re-usable Games (Demos)

Training Content (Manuals / Documentation / Tutorial)

Unity / Mapbox

Action-based Games

Immersion

Professionalism

Local-based Editor / Client Application

Coding **Obligatory**

Big Learning Curve-Time Consuming

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