Project Definition Document

Computer Science with Games Technology

First-Person Shooter implementing Key Game Design Principles

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Martin Walter

The project was proposed by me.

Word count = 1310

**Problem to be solved:**

For my project, I want to develop a first-person shooter game that will incorporate key game design principles. Alongside the game, I want to create a short paper going into detail about each principle, addressing topics such as why is the principle important, good and bad examples of the principle in popular games, how a game designer could implement it into their game and how I have implemented it into my game.

Some of the principles I will cover include Challenge, Goals, Constraint, Reward, Punishment, Flow, Feedback and Storytelling.

I will find the existing knowledge about game design in “The Psychology of Games” course on Udemy by Pixelcademy (Udemy, n. d.), “Level Up! The Guide to Great Video Game Design” (Rogers, 2014) and “Games, Design and Play: A Detailed Approach to Iterative Game Design” (Macklin and Sharp, 2016)

The existing technical knowledge required to make a game in Unity I will find on the “Unity Learn” website, specifically, the Junior Programmer Pathway (Unity Learn, 2020) and “Game Coding Complete” (Mcshaffry, 2013)

**Project Objectives:**

Main Objective:

To create a well-rounded first-person shooter in Unity incorporating at least 1 example of each game design principle mentioned and produce a write-up going in depth about each principle used.

Write-up Specific objectives:

1. Produce a write-up of at least the following principles:
   1. Challenge
   2. Goals
   3. Constraint
   4. Reward
   5. Punishment
   6. Flow
   7. Feedback
   8. Storytelling
2. For each principle I will have a section for:
   1. The necessity of the principle in games
   2. Good and bad examples of the principle
   3. Potential ways to implement the principle into games
   4. How I have implemented the principle in my game

Game-Specific Objectives:

1. Objectives for the player:
   1. The player should be able to:
      1. Walk
      2. Run
      3. Jump
      4. Crouch
      5. Shoot
      6. Throw
      7. Aim down sights
      8. Pick up loot
      9. Take damage from enemies
      10. Take fall damage
      11. Utilise a weapon wheel
   2. The player should slow down after taking damage
   3. The player should have 200 health
   4. The player’s health should be able to regen over time
2. Objectives for map design:
   1. The map should have 3 traversable buildings with:
      1. Enemies in 2 of the buildings
      2. One building having a puzzle element.
      3. Chest locations
      4. 2 locations for secret loot
      5. Different music for each building
      6. Different lighting for at least 2 of the buildings
   2. The map should have a 4th inaccessible building filled with enemies
3. Objectives for the enemies:
   1. Small enemy
      1. Mainly carry small weapons
      2. Miniscule chance to carry a rocket launcher
      3. Take damage from the player`s bullets
      4. Should be 1.5x players running speed
      5. Should have 50 health
      6. Should have simple AI always converging on the player
   2. Medium enemy
      1. Mainly carry medium weapons
      2. Take damage from the player`s bullets
      3. Should be 0.8x players running speed
      4. Should have 100 health
      5. AI should try to take cover occasionally
   3. Heavy enemy
      1. Mainly carry medium weapons and snipers
      2. Small chance to carry a rocket launcher
      3. Take damage from the player`s bullets
      4. Should be 1.2x players running speed
      5. Should have 200 health
      6. AI should always try to take cover
      7. AI should always try to keep some distance from the player
   4. Boss
      1. Has a charge attack
      2. Has a ranged attack
      3. Has a heavy and slow attack
      4. Has a light and quick attack
      5. Takes damage from the player’s bullets
      6. Should be 1x the player’s speed
      7. Should have 2000 health
4. Objectives for progression
   1. 5 total levels
   2. Level up based on xp
   3. xp can be acquired by:
      1. Killing enemies
      2. Opening chests
   4. The player should receive rewards for every level
5. Objectives for the loot
   1. 3 types of chest:
      1. All 3 chests will reward the player xp
      2. All 3 chests will drop small ammo guaranteed
      3. Chests have varying chances to drop guns and throwables
   2. Enemy loot drops:
      1. Enemies have a percentage chance to drop ammo and their current gun on death
6. Objectives for the guns
   1. Should have 5 different guns
      1. Pistol
      2. SMG
      3. AR
      4. Sniper
      5. Rocket launcher
   2. Should have 4 different ammo types
      1. Small
      2. Medium
      3. Sniper
      4. Rockets
   3. Guns should have a 2x headshot multiplier
7. Objectives for the throwables
   1. Should have 2 different throwables
      1. Grenade
      2. Molotov cocktail
8. Objectives for the visual fx
   1. There should be a:
      1. Visual hitmarker when the player shoots an enemy
      2. Different hitmarker when a player hits a headshot
      3. Visual displayed when a gun is fired
      4. Visual for the explosions
      5. Visual informing the player they have levelled up
      6. Visual when the player takes damage
9. Objectives for the audio fx:
   1. There should be:
      1. Sound for a hitmarker
      2. Different sound for a headshot hitmarker
      3. Sound for a gun firing
      4. Sound for explosions
      5. Sound informing the player they have levelled up
      6. Sound when the player is at critical health
      7. Footstep audio for player and enemies
      8. Silenced footstep audio when the player is crouched
      9. Spontaneous noise from enemies as if they are talking
10. Objectives for the HUD:
    1. The HUD should:
       1. Display the player level
       2. Display the mini-map
       3. Display a compass
       4. Display what the current weapon is
       5. Display the ammo for the current ammo
       6. Display a different crosshair for each weapon
11. Objectives for the overall game:
    1. The game should:
       1. Checkpoint the player after each floor
       2. Revert the player to the latest checkpoint after they die
       3. Allow the player to save the game whenever
       4. Have a high score table based on xp
       5. Have a table recording the fastest times
       6. Have a start menu
       7. Have a pause menu
       8. Have achievements
       9. Have somewhere to display the controls of the game
       10. Have an end card

**Build approach:**

I will employ a 3-build approach. The first build will have the majority of the game completed to a somewhat complete degree. It won’t have any shiny bells or whistles, but it will get the job done. I will also complete half the write-up about the game design principle by this stage. The second build will have more complex features to my game and complete the write-up for the principles. The third build will have some final features that may help me get around 80% total for the project. I can also add more to the write-up based on what I have done at this stage.

**Project Beneficiaries:**

The main beneficiary of this project is me. I hope to create a game and write-up that I am very proud of to put on my portfolio for potential employers to see.

Another beneficiary of the project could be other game designers or people in the games industry who could potentially use my write-up to help them design their games or build upon my work and further develop either the game or the write-up.

**Plan:**

I have developed a Gantt chart here that maps my objectives against time. It should be noted that the report for the final project submission will be completed alongside each individual step in my Gantt chart.

The Gantt chart is very large so some of the text is quite small. I can send the full Gantt chart on an excel spreadsheet should you need it.

Chart

Description automatically generated

Chart

Description automatically generated

A screenshot of a computer

Description automatically generated with medium confidence

Project Risks:

Risks to my project have been evaluated in the following risk chart:

Graphical user interface, application

Description automatically generated

As I am designing a video game I do not believe there are any risks to others that my project can cause.

Ethics Checklist:

**Part A: Ethics Checklist**

|  |  |  |
| --- | --- | --- |
| **A.1 If you answer YES to any of the questions in this block, you must apply to an appropriate external ethics committee for approval and log this approval as an External Application through Research Ethics Online - https://ethics.city.ac.uk/** | | *Delete as appropriate* |
| 1.1 | Does your research require approval from the National Research Ethics Service (NRES)?  e.g. because you are recruiting current NHS patients or staff?  If you are unsure try - https://www.hra.nhs.uk/approvals-amendments/what-approvals-do-i-need/ | **NO** |
| 1.2 | Will you recruit participants who fall under the auspices of the Mental Capacity Act?  Such research needs to be approved by an external ethics committee such as NRES or the Social Care Research Ethics Committee - http://www.scie.org.uk/research/ethics-committee/ | **NO** |
| 1.3 | Will you recruit any participants who are currently under the auspices of the Criminal Justice System, for example, but not limited to, people on remand, prisoners and those on probation?  Such research needs to be authorised by the ethics approval system of the National Offender Management Service. | **NO** |
| **A.2 If you answer YES to any of the questions in this block, then unless you are applying to an external ethics committee, you must apply for approval from the Senate Research Ethics Committee (SREC) through Research Ethics Online -**  **https://ethics.city.ac.uk/** | | *Delete as appropriate* |
| 2.1 | Does your research involve participants who are unable to give informed consent?  For example, but not limited to, people who may have a degree of learning disability or mental health problem, that means they are unable to make an informed decision on their own behalf. | **NO** |
| 2.2 | Is there a risk that your research might lead to disclosures from participants concerning their involvement in illegal activities? | **NO** |
| 2.3 | Is there a risk that obscene and or illegal material may need to be accessed for your research study (including online content and other material)? | **NO** |
| 2.4 | Does your project involve participants disclosing information about special category or sensitive subjects?  *For example, but not limited to: racial or ethnic origin; political opinions; religious beliefs; trade union membership; physical or mental health; sexual life; criminal offences and proceedings* | **NO** |
| 2.5 | Does your research involve you travelling to another country outside of the UK, where the Foreign & Commonwealth Office has issued a travel warning that affects the area in which you will study?  *Please check the latest guidance from the FCO -* [*http://www.fco.gov.uk/en/*](http://www.fco.gov.uk/en/) | **NO** |
| 2.6 | Does your research involve invasive or intrusive procedures?  These may include, but are not limited to, electrical stimulation, heat, cold or bruising. | **NO** |
| 2.7 | Does your research involve animals? | **NO** |
| 2.8 | Does your research involve the administration of drugs, placebos or other substances to study participants? | **NO** |
| **A.3 If you answer YES to any of the questions in this block, then unless you are applying to an external ethics committee or the SREC, you must apply for approval from the Computer Science Research Ethics Committee (CSREC) through Research Ethics Online - https://ethics.city.ac.uk/**  **Depending on the level of risk associated with your application, it may be referred to the Senate Research Ethics Committee.** | | *Delete as appropriate* |
| 3.1 | Does your research involve participants who are under the age of 18? | **NO** |
| 3.2 | Does your research involve adults who are vulnerable because of their social, psychological or medical circumstances (vulnerable adults)?  This includes adults with cognitive and / or learning disabilities, adults with physical disabilities and older people. | **NO** |
| 3.3 | Are participants recruited because they are staff or students of City, University of London?  For example, students studying on a particular course or module.  If yes, then approval is also required from the Head of Department or Programme Director. | **NO** |
| 3.4 | Does your research involve intentional deception of participants? | **NO** |
| 3.5 | Does your research involve participants taking part without their informed consent? | **NO** |
| 3.5 | Is the risk posed to participants greater than that in normal working life? | **NO** |
| 3.7 | Is the risk posed to you, the researcher(s), greater than that in normal working life? | **NO** |
| **A.4 If you answer YES to the following question and your answers to all other questions in sections A1, A2 and A3 are NO, then your project is deemed to be of MINIMAL RISK.**  **If this is the case, then you can apply for approval through your supervisor under PROPORTIONATE REVIEW. You do so by completing PART B of this form.**  **If you have answered NO to all questions on this form, then your project does not require ethical approval. You should submit and retain this form as evidence of this.** | | *Delete as appropriate* |
| 4 | Does your project involve human participants or their identifiable personal data?  *For example, as interviewees, respondents to a survey or participants in testing.* | **NO** |

References:

* Udemy. (n.d.). *The Psychology of Games - Secrets of Good Game Design.* [online] Available at: https://www.udemy.com/course/the-psychology-of-games-secrets-of-good-game-design/ [Accessed 30 Jan. 2023].
* Rogers, S. (2014). *Level up : the guide to great video game design*. Chichester: Wiley.
* Macklin, C. and Sharp, J. (2016). *Games, design and play : a detailed approach to iterative game design*. Boston, Ma ; San Francisco, Ca: Addison-Wesley.
* Unity Learn. (2020). *Unity Learn*. [online] Available at: <https://learn.unity.com/>.
* Mcshaffry, M. (2013). *Game coding complete*. Boston, Ma: Course Technology, Cengage Learning.