

Assignment 1: Innovation and Project Management

Tuesday, March 3, 2026 5:31 PM

Changemakers: Creativity and Value Creation

Computing (Games Development)

William Foot 2405192

Q1: Innovation

04 February 2026 10:33

The Online Topic: Unit 1 Topic 1 – How Innovation Shapes the World, discusses the importance of innovation and creativity, and their impact on technology and society [1], [2].

Innovation is Everywhere

This section focuses on how innovation has influenced society and improved our lives. These innovations can be things that make our lives easier or improve our health. A video by AsapSCIENCE covers some of the essential innovations of all time [3]. A paper by Suzanne van den Bosch and Mattijs Taanman discusses how innovation impacts society, focusing on 'high-potential and high-risk' innovations that contributed to significant societal change [4].

A video by Hans Rosling shows changes in lifespan and income from 1810 to 2010. At the beginning, life expectancy and income were low, with only the UK and the Netherlands having life expectancies slightly over 40. As time progressed, incomes rose, and life expectancies increased. However, not all countries progressed at the same rate. At the end of the video, most countries had an income of over \$4,000 and an average lifespan of 75 years, while some still had a life expectancy of less than 50 years and a low income [5] as shown in the figure below.



Figure 1. A Comparison of Income and Lifespan over 200 Years [5]

The Onward March of Technology

The first three revolutions were marked by the invention of steam power and mechanical production, the introduction of electricity and wireless communication, and the development of electronics and information technology. Finally, we reach the fourth industrial revolution, which involves cyber-physical systems and robotisation [1], [2], [6]. Robotisation allows machines to perform complex tasks and adapt, becoming more similar to the flexibility of the human workforce [6]. Cyber-physical systems use connected technologies to help people manage their lives. It is a fusion of physical and digital technologies [7].

The Kondratieff Wave, or Kondratieff Wave, is an economic cycle of prosperity that rises and then falls, coinciding with significant innovations [1], [2], [8].

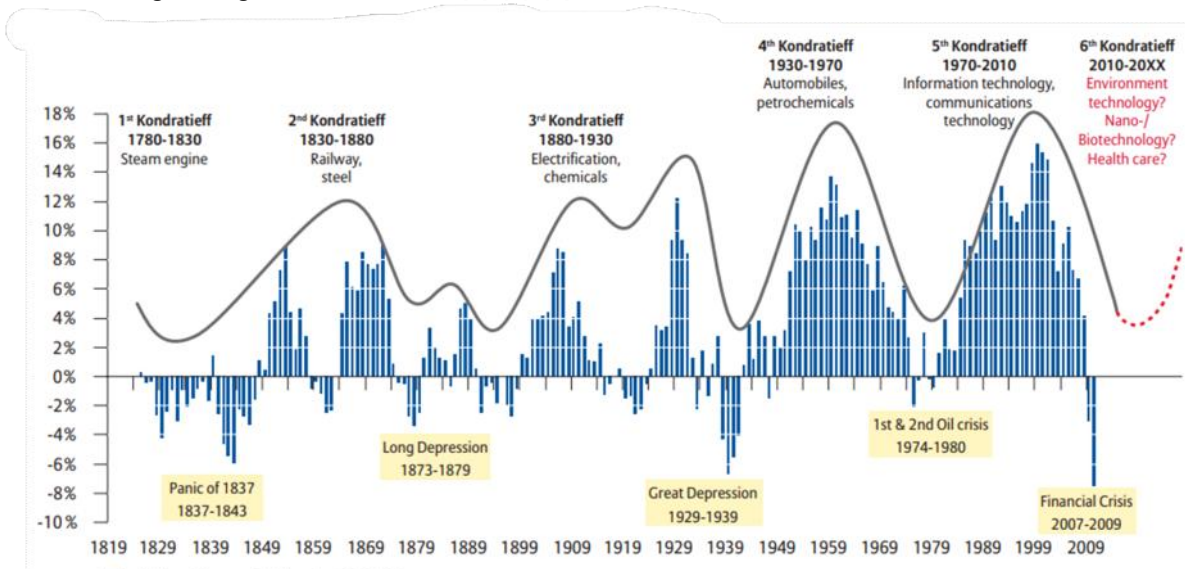




Figure 2. The Five Kondratiev Waves [9]

The figure above shows the five identified Kondratiev Waves, each occurring during a significant period of innovation [9]. It is believed that we are now in the sixth wave, which coincides with the fourth industrial revolution [10].

Creativity and You

This section discusses the value of creativity in individuals and argues that it is not limited to those who pursue artistic activities [1], [2]. Innovation can also be seen as “practical creativity” [11], a structured application of an individual's creativity. In Sir Ken Robinson's TED talk, he notes that education and society seem to convey the idea that being wrong is bad. This can relate to the process of being creative: “If you’re not prepared to be wrong, you’ll never come up with anything original” [12].

This section also mentions René Descartes’ philosophical treatise, *The Passions of the Soul*. He states that the human soul is made up of six basic passions [1], [2], [13]:

Wonder: This is a response to something that surprises us; it could be different from what we know or what it is supposed to be.

Desire: This passion is future-oriented; it is a want to continue having something good or to be without something evil.

Love: This is a response to something good or beneficial; it makes us love that object and want to be joined to it. It is opposed by **Hatred**, which is a response to something bad or harmful and makes us want to be separated from that object.

Joy: This is the response of a present good and causes us to feel well-being, comfort, or pleasure. It is the opposite of **Sadness**, the response to a present evil that causes us to feel discomfort or pain. These core passions can manifest as other passions, such as **Remorse** over an unfulfilled **Desire** or **Repentance** for doing something we think is evil.

Q2: Ideation

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Project Ideas

VR 3D Tetris Game

A VR implementation of the classic Tetris game, the player will use the motion controllers to move the pieces as they fall. It could be set up on a surface for an Alternative Reality experience, or a simulated world could be created instead. It could also be set up in a cube-like space, allowing you to move the pieces forward and back, not just side to side.

VR Visualisation of Hyperboxes (3D, 4D... etc. arrays of data)

This project investigates the use of VR to visualise a 3D array of data, enabling the user to view and manipulate its contents. The user would use the controllers to rotate, scale, and navigate through the array. For example, the user would use the thumbsticks on the controllers to remove the first 'layer' of the data to view the next layer's contents.

This framework could then be gamified, allowing the user to play Sudoku in a 3D hyperbox environment, a 9x9x9 grid. They can change the numbers within the array to solve the puzzle.

Implement VR for Indie Game Development Project

This project involves enhancing a project that I am working on in my Indie Game Development module. The game involves working with your friends to gather resources and explore a procedurally generated cave system. You will have to navigate hazards while working as a team to progress. I aim to develop a VR solution for an Unreal Engine game using a Meta Quest 3. The solution should also support other VR headsets if feasible. The player should be able to move around the game world and interact with objects and items.

Selected Project

Title

An investigation and implementation of Virtual Reality in a Co-op Puzzle Game in Unreal Engine.

Aim

Implement Virtual Reality (VR) into a game using Unreal Engine.

Objectives

- Add VR support to an existing game
- Allow the VR player to interact with the world with the same amount of functionality as a non-VR player
- Create VR-specific UI components that can accurately display player vitals, currency, abilities, and tools
- Create a balanced and fun experience for both VR and non-VR players

Description

The game will feature local and online co-op, allowing 2 or more players to navigate a map, avoid traps, and solve puzzles using VR and item physics. During the game, they will be able to interact with their friend by shoving them to ragdoll them. The goal is to complete all puzzles with a low combined death count. The game aims to encourage players to work together to gather loot and complete puzzles.

Q3: Research

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I have researched a few courses and relevant documentation to help me achieve my project goal.

[Unreal Engine Virtual Reality Documentation –](#)

<https://dev.epicgames.com/documentation/en-us/unreal-engine/virtual-reality->

[development?application_version=4.27](#)

This is the documentation for the software I will be using to create the game. It describes the setup and some best practices for implementing VR into Unreal Engine applications.

[Meta VR Development Documentation –](#)

<https://developers.meta.com/horizon/documentation/unreal/unreal-engine-basics/>

I will be using a Meta VR headset for testing the application, and this documentation describes the steps needed to integrate this type of VR headset into Unreal Engine.

[LinkedIn learning, getting started with VR in Unreal Engine –](#)

<https://www.linkedin.com/learning/paths/getting-started-in-ar-vr-using-unreal-engine?>

[u=77966930](#)

This is a link to a short course for creating VR applications with Unreal Engine.

[LinkedIn learning, designing for Virtual Reality –](#)

<https://www.linkedin.com/learning/designing-for-virtual-reality/design-vr-for-two-user->

[realities?u=77966930](#)

This course discusses the design process for creating VR applications.

Q1: Project Scope

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Project start: 11/02/2026

Project end: 30/04/2026

The desired deliverable for this project is an interactive multiplayer game playable online with 2 players. One or both players can use a VR headset to interact with the game world. The project will be created using Unreal Engine and should be playable on PC and PC-VR. The VR player's movement should be mapped to the same player model as a first-person PC player, and all functionalities should be shared between the two, with neither player having an advantage over the other. This project could be played on a standalone VR headset, such as the Meta Quest 3, but this will be subject to performance testing and may be beyond the scope of the desired deliverable.

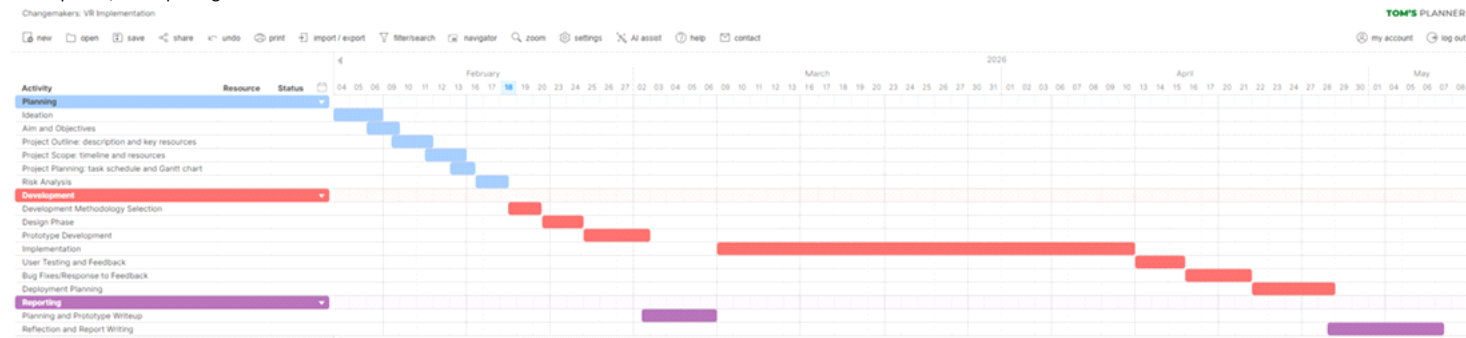
Task Schedule

<i>Task</i>	<i>Start Date</i>	<i>End Date</i>
<i>Ideation</i>	04/02/2026	06/02/2026
<i>Aim and Objectives</i>	06/02/2026	09/02/2026
<i>Project Outline: description and key resources</i>	09/02/2026	11/02/2026
<i>Project Scope: timeline and resources</i>	11/02/2026	13/02/2026
<i>Project Planning: task schedule and Gantt chart</i>	13/02/2026	16/02/2026
<i>Risk Analysis</i>	16/02/2026	18/02/2026
<i>Development Methodology Selection</i>	18/02/2026	20/02/2026
<i>Design Phase</i>	20/02/2026	24/02/2026
<i>Prototype Development</i>	24/02/2026	02/03/2026
<i>Planning and Prototype Writeup</i>	02/03/2026	06/03/2026
<i>Implementation</i>	09/03/2026	10/04/2026
<i>User Testing and Feedback</i>	13/04/2026	21/04/2026
<i>Bug Fixes/Response to Feedback</i>	21/04/2026	28/04/2026
<i>Deployment Planning</i>	28/04/2026	01/05/2026
<i>Reflection and Report Writing</i>	01/05/2026	07/05/2026

Q2: Using the Software

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Below, I have created a Grant chart using tomsplanner.com to document and outline the different stages of my project [14]. I have created tasks and organised them into three sections: planning, development, and reporting.



Q3: Risks and Challenges

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	<i>Risk</i>	<i>Impact</i>	<i>Contingencies</i>
1.	Implementation of VR could be more complex than initially thought	Medium	Establish a working prototype and review the time spent.
2.	As this project depends on the progress made in the Indie Game Development module, setbacks or delays in that module could affect this project.	Medium	Core mechanics for the game should be implemented first, allowing me to build a VR solution for them. Assets can be added later.
3.	Hardware failure/availability	High	I will be using my own VR headset to develop and test the project. Will need to research the availability of other headsets
4.	Loss of data	Medium	Backups of project files should be kept on separate machines. A GitHub repository containing project files has been created.
5.	Time Management	High	A Gantt chart has been created to track project tasks. A Jira board has been created to track development progress. Weekly team meetings have been scheduled to track group progress in the Indie Game Development module.
6.	Scope Creep	Medium	The team in the Indie Game Development Module have set a cut-off date for new feature requests. Any new features will only be added to the project after the 1.0 release.
7.	Skillset	High	Courses and documentation have been identified to help learn relevant skills and best practices.
8.	User testing and feedback	High	Testers may not possess a VR headset to test the project with. Will need to research the availability of other headsets

Q1: Development Method

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For this project, I am choosing to follow an agile development method that combines the Scrum process of separating work into sprints with the implementation of a feature prototype at the end of each sprint. This will allow me to rapidly build the minimum viable product's basic features and then improve them. I have chosen the Scrum framework as it focuses on the sprint technique and its iterative approach [15]. Creating prototypes at each sprint cycle will allow me to test, identify, and address bugs or challenges early in the development cycle.

Q2: Design Work

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Requirements Specification

ID	Title	Priority	Description
1	Core Mechanics	High	Players will have stats associated with them (Health). These can be incremented or decremented to produce different effects. The players will be able to move around the level and interact with puzzles/objects.
2	Software and Hardware Selection	High	The project will be built with Unreal Engine and released on Steam for Windows PCs.
3	Multiplayer	High	The core aspect of the game is the cooperation between 2 or more players. The system will use Steam invites to host and join sessions.
4	VR Performance	Medium	Relevant steps will be taken to ensure performance is not affected by the use of a VR platform.
5	UI	High	UI should be implemented for both player types; it may need to be adapted for VR platforms.
6	Testing	High	After each feature is implemented, tests should be performed to ensure it works correctly. 3rd-party testing will also be conducted at major milestones, and feedback forms will be created.
7	Character Model	Medium	The VR player's actions will be mapped to the player model.
8	Levels and Content	Medium	Levels will feature engaging puzzles and world interaction that highlight VR and physics, as well as co-op gameplay.

Flowcharts

I have created a few flowcharts that show how some player attributes will work.

Health

This flowchart shows how the player's health increases and decreases based on factors such as healing or taking damage. When the player's health reaches zero, they will ragdoll and need to be revived by their teammate.

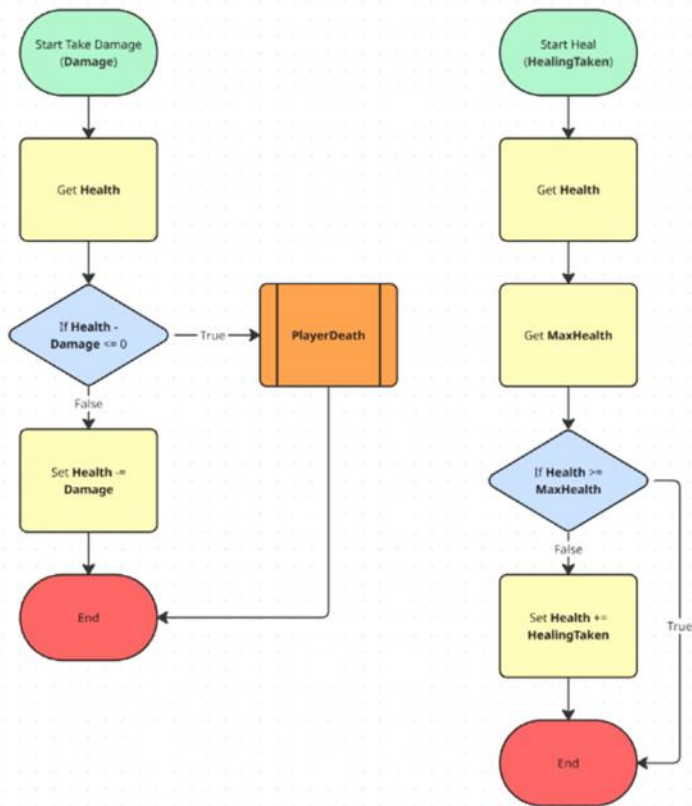


Figure 4. Player health flowcharts

Stamina

The player's stamina controls how they move around the world. Actions like jump and sprint will deplete stamina, and once it reaches zero, the player will be slowed and have to wait for it to regenerate.

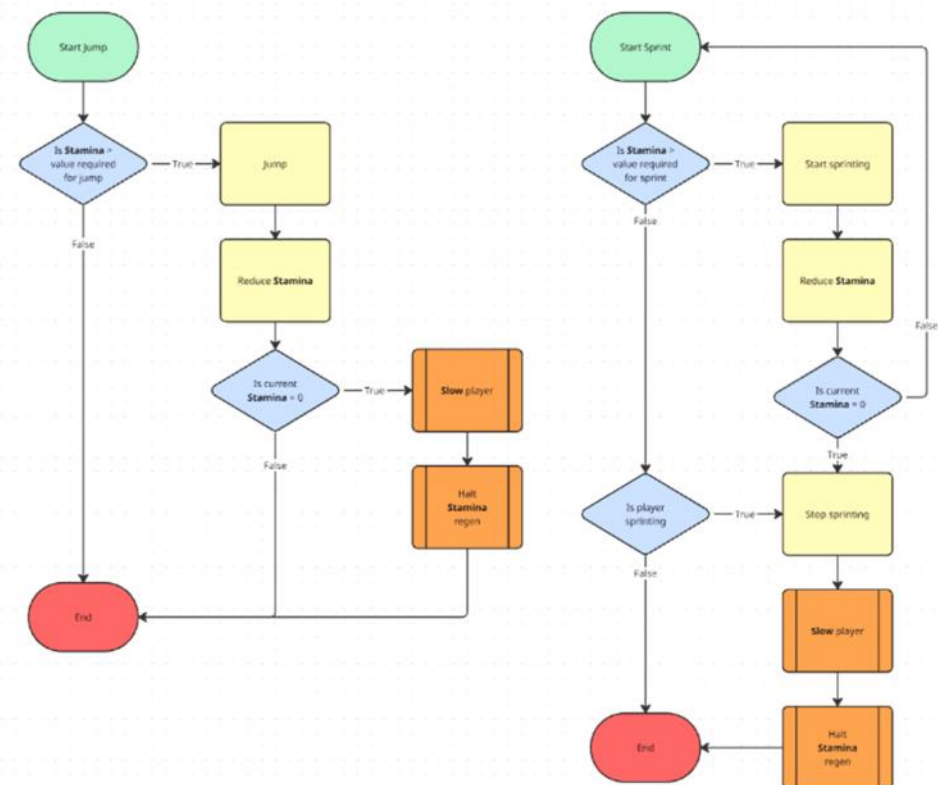


Figure 5. Player stamina flowcharts

Debuffs

Debuffs are effects that will negatively affect the player, like slowing them or stopping their stamina regeneration. These two flowcharts show the processes for two of the debuffs I plan to implement.

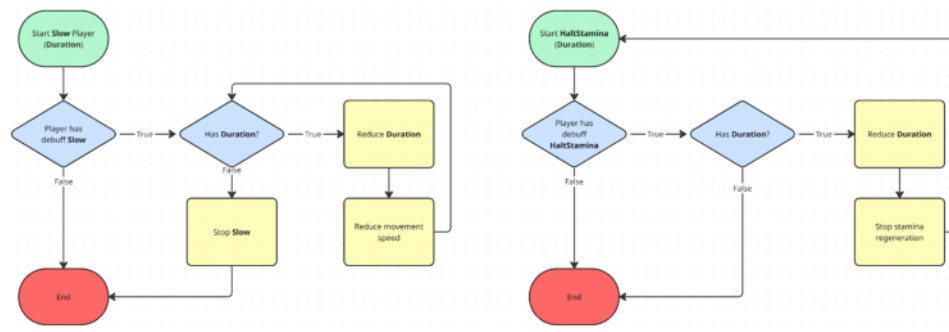


Figure 6. Player debuffs flowcharts

Q3: Implementation

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Gameplay Ability System

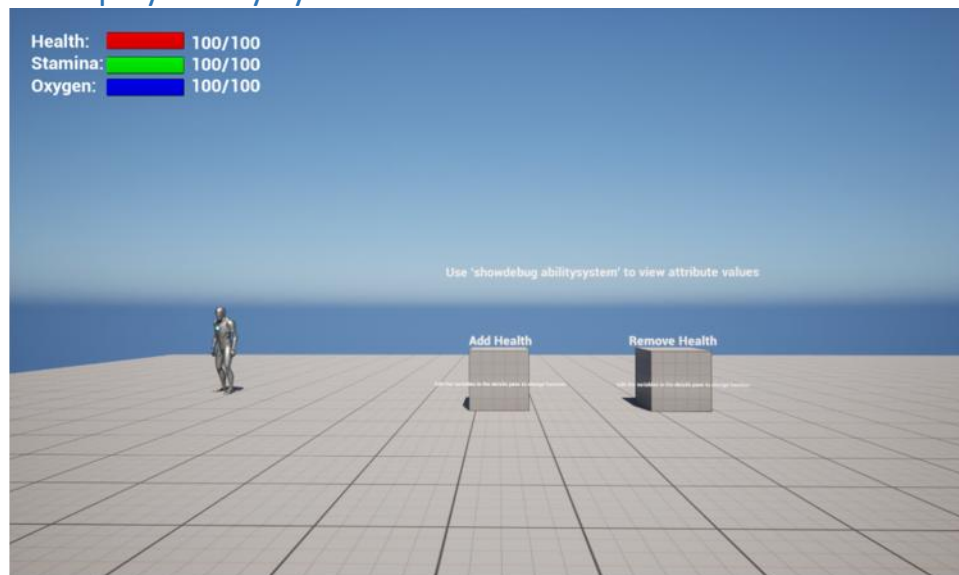


Figure 7. My player attributes test level

This is a basic map with a character, an enemy, two actors (the cubes) that can add or remove health from the player, and a basic Heads-Up Display (HUD).



Figure 8. Adding and Removing health test

When the player collides with a cube, it will either add or remove health. In the image above, you can see that the health bar has been reduced in the HUD.

VR Implementation

I have successfully set up the Unreal Engine VR template on my computer and have it working on my headset.

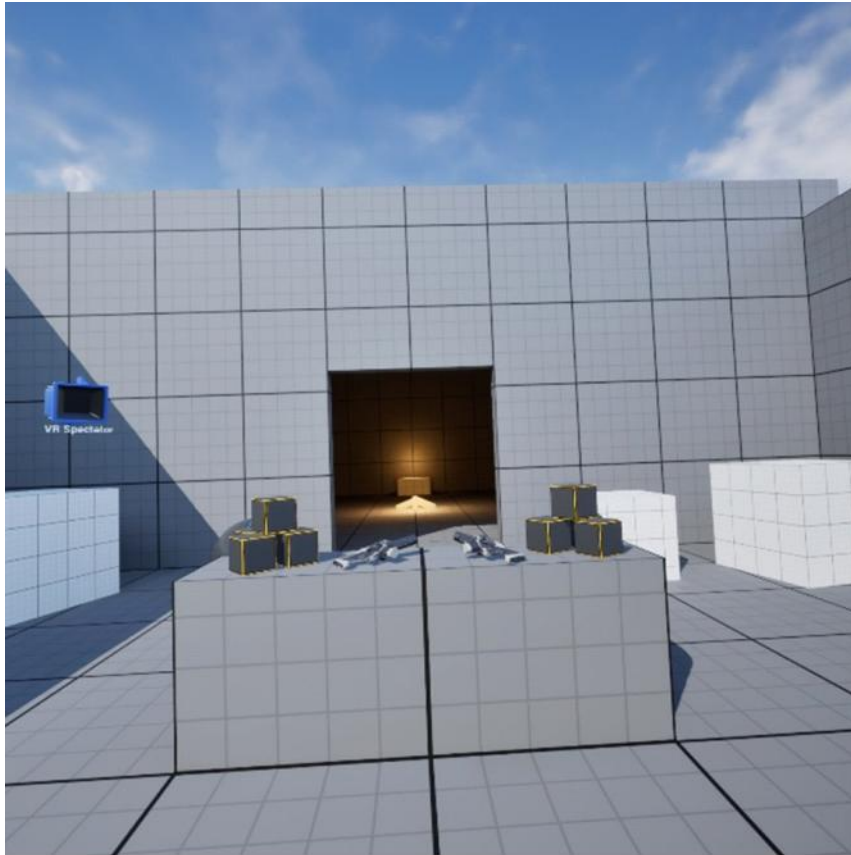


Figure 9. Initial VR template level

Using this template, I can start implementing some of the functionality in my project.

Such as:

Item movement: allowing the player to pick up and manipulate objects.

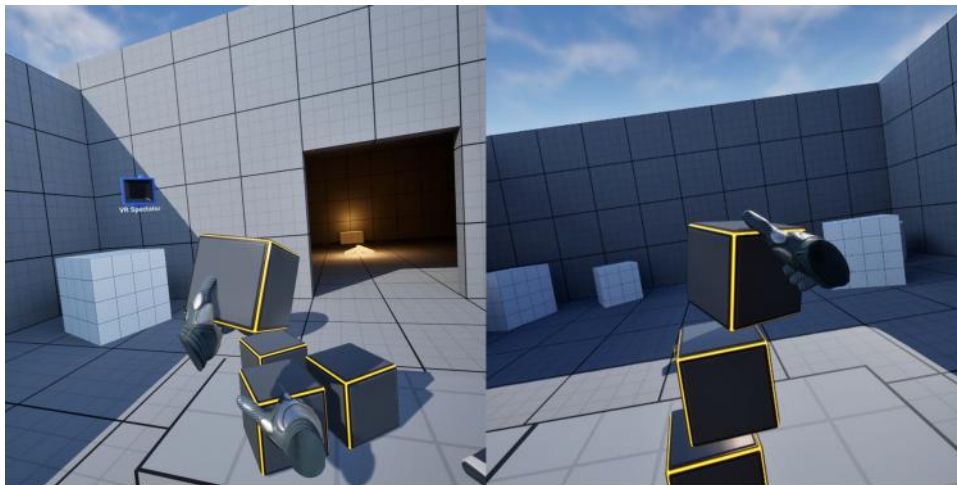


Figure 10. Moving items with the hand controllers

Movement: Currently, the template supports a teleport-based movement system. I will change this to support either a system where you swing your arms to move forward or one where you use the thumbsticks to move your character, to keep movement more consistent across VR and non-VR players.

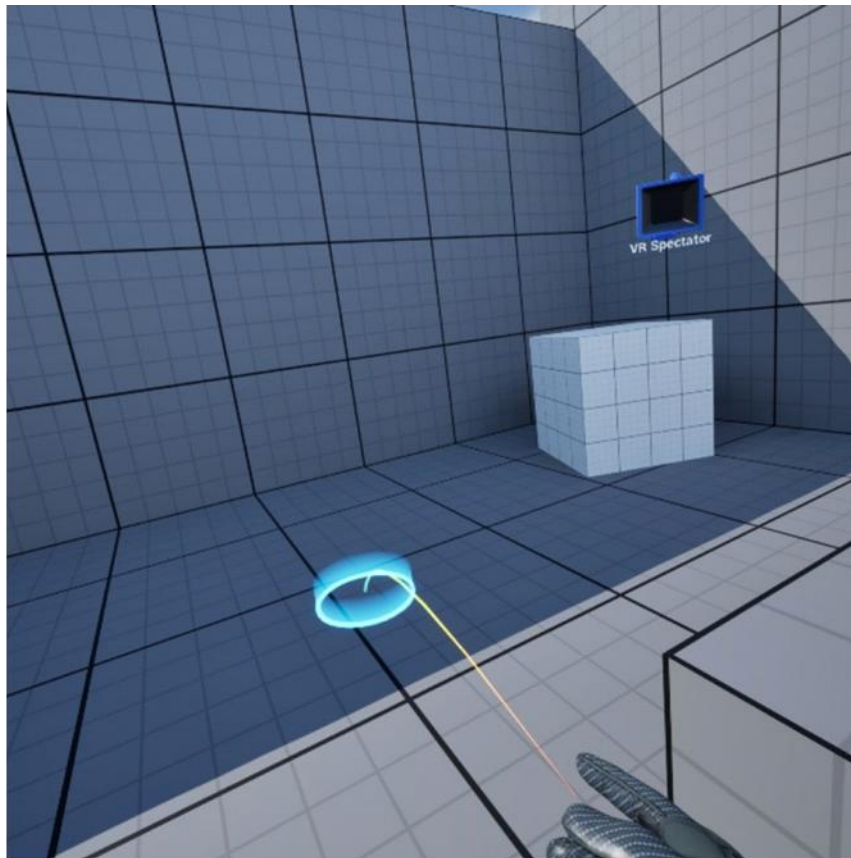


Figure 11. Teleport movement system

GitHub Repository

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I have created a GitHub repository to manage version control for my project. This repository lets me keep backups of files in the cloud to avoid losing work.

The screenshot shows a GitHub repository named 'Cavern' (Private). The repository is on the 'main' branch, with 5 branches and 0 tags. The commit hash is 6c83d2d, and it was committed last week. There are 14 commits in total. The repository contains several files and folders, including .idea, Config, Content, Plugins, Source, .gitignore, .vsconfig, Cavern.uproject, and README.md. The README.md file is selected, showing instructions for generating Visual Studio files and the required build tools (MSVC v143 - VS 2022 C++ x64/x86 build tools (v14.44-17.14) (NEEDS TO BE 14.44)).

File/Folder	Commit Message	Commit Time
.idea/idea.Cavern.dir/idea	Initial Commit	2 weeks ago
Config	Merges origin and GAS branch to solve conflicts	last week
Content	Added UI for client players	last week
Plugins/AdvancedSessions-5-4/AdvancedSessi...	Initial Commit	2 weeks ago
Source	Merges origin and GAS branch to solve conflicts	last week
.gitignore	Initial Commit	2 weeks ago
.vsconfig	Initial Commit	2 weeks ago
Cavern.uproject	Merges origin and GAS branch to solve conflicts	last week
README.md	Update README with Visual Studio file generation steps	last week

README

You will need to right-click > Generate Visual Studio File on Cavern.uproject when downloading to your machine. Create your own branches to work on, then when merging them put a message on Discord to avoid two people merging at the same time.

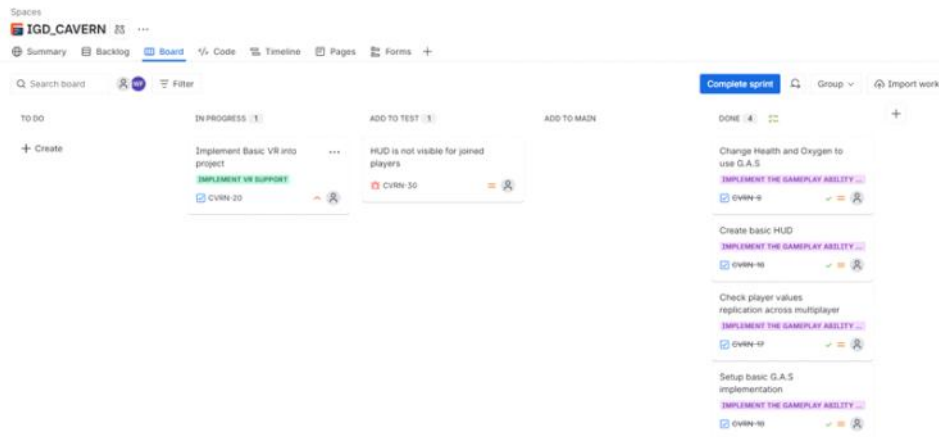
TO GENERATE VISUAL STUDIO FILES SUCCESSFULLY YOU WILL NEED:

MSVC v143 - VS 2022 C++ x64/x86 build tools (v14.44-17.14) (NEEDS TO BE 14.44)

Jira Board

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I have created a Jira Kanban board to help me manage tasks and sprints. Epics have been made that contain the steps necessary to implement major features, and the board has been split into different sections: To Do, In Progress, Add to Test, Add to Main, and Done.

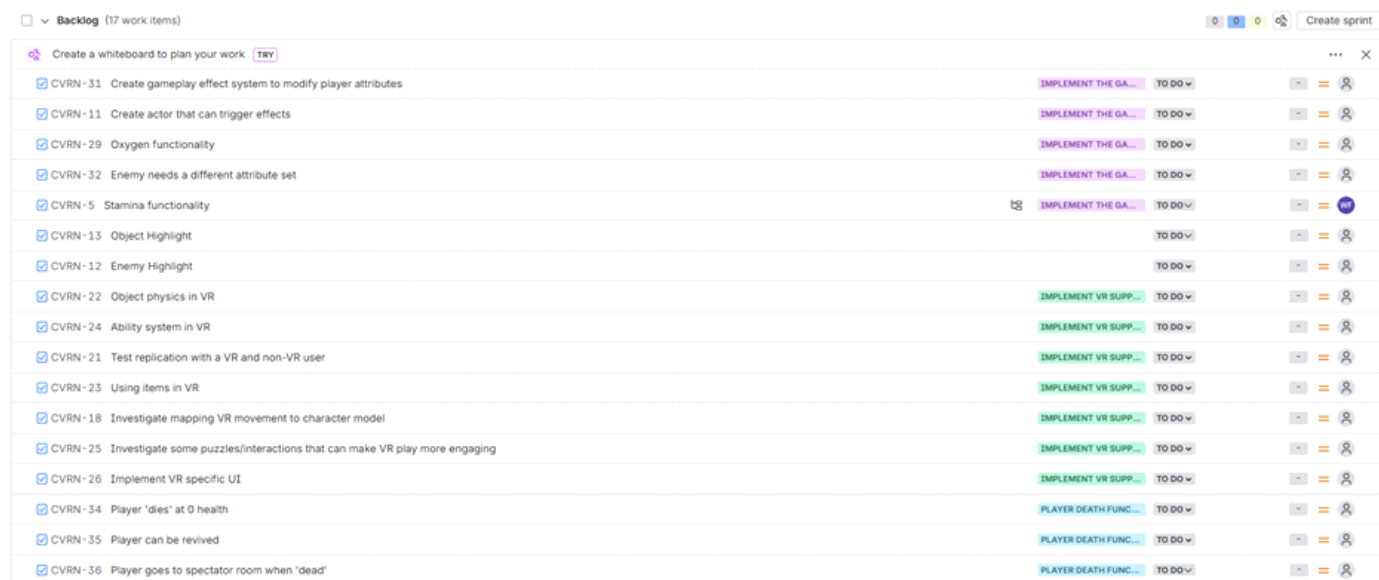


I have currently been using it to implement basic player attributes and incorporate a VR template into the existing project.



These are the tasks I have been working on during this sprint. It involved migrating an old player attribute prototype to use the Unreal Engine Gameplay Ability System and to integrate the Unreal Engine VR template into the project.

This is the backlog of planned tasks. When planning the next sprint, I will take the tasks out of here and create more if necessary.



I have also connected Jira to my GitHub repository, allowing me to create branches directly from Jira Tasks.



Create GitHub Branch

Creating a branch for **CVRN-31**

Repository

WillFoot/Cavern

Branch from

main

Branch name

CVRN-31-Create-gameplay-effect-system-to-modify-player-attributes

Create branch

Online Course Evidence

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I have started a LinkedIn learning course on using Unreal Engine to create VR applications.

Learning Path

Getting Started in AR/VR Using Unreal Engine

12h · 4 items · Intermediate · Updated June 2025

 +1 4 Instructors

 11,173 learners

Unreal Engine from Epic Games is used for real-time visualization and AR/VR applications in almost every industry, moving well past its original use in games. Starting with the foundations, learn what you need to know to get started in AR/VR using Unreal.

10h 14m 23s left

[Resume](#)  



Pretty cool that's right behind me.

Continue with **Unreal Engine 5 for Beginners: Virtual Production Basics**

What you'll learn

- ✓ **Learn** AR/VR fundamentals.
- ✓ **Explore** techniques for lighting, creating materials, and more.
- ✓ **Develop** visualization skills.

Content in this Learning Path

4 items · 12h 2m 12s



35m

Course

Virtual Reality Foundations

 LinkedIn · By: Craig Barr · Jun 2017

✓ Completed 3/3/2026

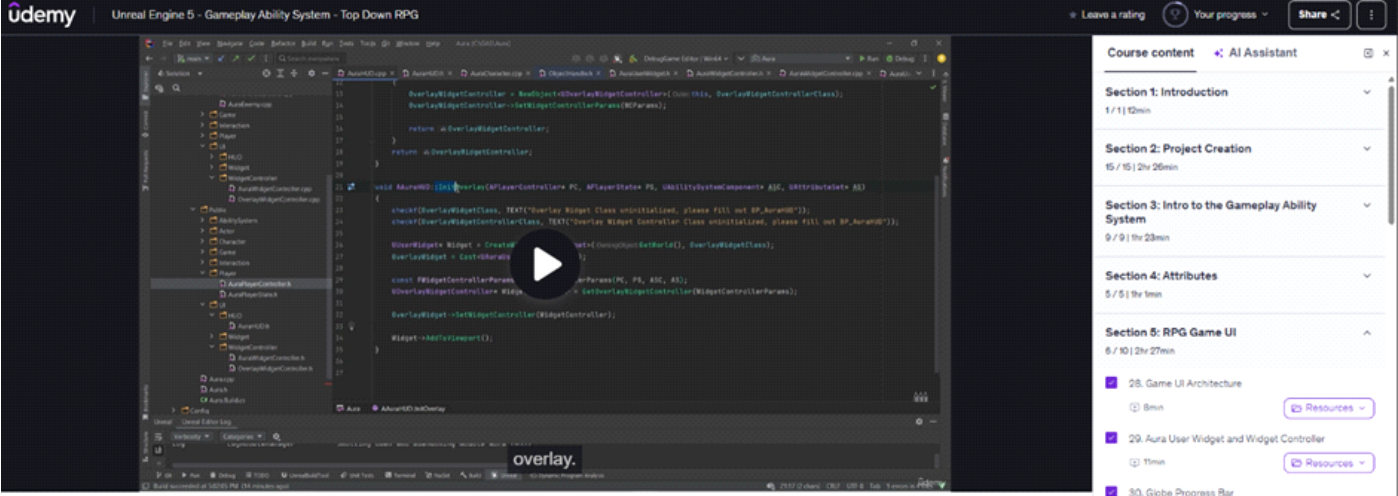
[Add to Profile](#)

I have also been using a Udemy course to learn how to implement the Gameplay Ability System in Unreal Engine.

Udemy

Unreal Engine 5 - Gameplay Ability System - Top Down RPG

Leave a rating · Your progress · Share



Course content · AI Assistant

- Section 1: Introduction (1/1 | 12min)
- Section 2: Project Creation (15/15 | 2hr 26min)
- Section 3: Intro to the Gameplay Ability System (9/9 | 1hr 23min)
- Section 4: Attributes (5/5 | 1hr 10min)
- Section 5: RPG Game UI (6/10 | 2hr 27min)

- 28. Game UI Architecture (8min) [Resources](#)
- 29. Aura User Widget and Widget Controller (11min) [Resources](#)
- 30. Globe Progress Bar (29min) [Resources](#)
- 31. Health Globe (11min) [Resources](#)
- 32. Aura HUD (8min) [Resources](#)
- 33. Overlay Widget Controller

Create a multiplayer RPG with Unreal Engine's Gameplay Ability System (GAS)!

4.7 ★ 26,787 Students 106 hours Total

3,367 ratings

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[HOW INNOVATION IMPACTS SOCIETY Patterns and mechanisms through which innovation projects contribute to transitions/links/574c06bd08ae9f0023e2230c/HOW-INNOVATION-IMPACTS-SOCIETY-Patterns-and-mechanisms-through-](https://www.researchgate.net/profile/Suzanne-Van-Den-Bosch/publication/237427252/HOW-INNOVATION-IMPACTS-SOCIETY-Patterns-and-mechanisms-through-which-innovation-projects-contribute-to-transitions/links/574c06bd08ae9f0023e2230c/HOW-INNOVATION-IMPACTS-SOCIETY-Patterns-and-mechanisms-through-)

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subject matter expert, researcher, educator S. is a financial therapist, T. Coach, and

with a special interest in helping women learn how to invest L. about our F. R. Board,

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