VRChat PlayBall — Creating a Multiplayer Game in Virtual Reality

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Brief Description:

This course introduces students to creating interactive worlds within VRChat using Unity and UdonSharp. Through project-based learning, students will step-by-step develop a multiplayer sports game called **VRChat PlayBall**, integrating programming, 3D design, and teamwork within a virtual environment.

Justification or Contextualization

Need:

Virtual reality technologies and the creation of immersive worlds are transforming the fields of education and video game development. Many young people interested in programming do not know how to bring their ideas into the VR world. This course addresses this need by offering a practical and motivating experience.

Student Profile:

Adolescents aged 14 to 18 with basic programming knowledge (beginner level in Unity or C#). Recommended for creative students interested in video games, virtual reality, and collaborative work.

Course Objectives

General Objective:

Learn to create, program, and publish a multiplayer game in VRChat using Unity and SDK3 (UdonSharp).

Specific Objectives:

- Understand how VRChat works and its world architecture.
- Master basic concepts of Udon and Unity to create scenarios and interactions.
- Implement multiplayer game systems (teams, scores, collisions, HUD).
- Apply best practices for designing, testing, and publishing a VRChat world.
- Develop autonomy, creativity, and problem-solving skills.

Competencies to Develop

- **Digital:** Use of Unity, VRChat SDK, and scripting with UdonSharp.
- **Cognitive:** Logical planning, computational thinking, and iterative design.
- **Creative:** Scenario and game mechanics design.
- **Social:** Collaborative work and peer communication within a shared project.
- **Transversal:** Perseverance, autonomy, critical thinking, and innovation.

Contents or Modules

Course Modules

Module	Title	Brief Content
1	Introduction to VRChat	Setting up the environment and publishing an empty world.
2	Scenario Creation	Building the arena and applying lights, boundaries, and colliders.
3	Basic Interaction	Creating a "Play" button with UdonSharp to start the game.
4	Team Formation	Automatic assignment of players to teams with colors.
5	Basic HUD	Displaying the team name on each player's screen.
6	Ball Creation	Automatic generation of network-synchronized balls.
7	Picking Up and Dropping the Ball	Implementing physical interaction with objects.
8	Goal Detection	Detecting collisions with scoring zones.
9	Player Collisions	Controlling contact between opposing teams.
10	Player States	Managing "with ball" and "without ball" states.
11	Playing with the Ball	Ability to score points by bringing the ball to the opponent's goal.
12	Playing Without the Ball	Mechanism to steal the ball from another player.
13	Global Scoring System	Real-time synchronized scoreboard.
14	End of Match	Automatic end after 5 minutes and result display.
15	Match Restart	Option to replay the entire session.

Methodology and Pedagogical Approach

The course follows a **"learn-by-doing"** approach. Each session introduces a specific challenge that becomes a new game feature.

Teaching Strategies:

- Active and constructive learning using Unity and VRChat.
- Guided exploration and problem-solving.
- Optional creative activities: custom arena design, special effects, or sounds.
- Collaboration among students in creating and testing worlds.

Evaluation Strategy

- **Continuous Evaluation:** Each session includes a small practical challenge (creating a functional element).
- **Self-Evaluation:** Students check the functionality of their VRChat world.
- **Final Project:** Publishing the complete "Ball Run Arena" game with all mechanics implemented.
- **Passing Criteria:**
    - Complete at least 80% of the sessions successfully.
    - Present a playable and functional final project.
    - Actively participate in feedback activities or tests.

Digital Tools and Resources

- **Main Platform:** Unity + VRChat Creator Companion (VCC).
- **SDK and Extensions:** VRChat SDK3 (UdonSharp, VRC SDK Worlds).
- **Additional Resources:**
    - Short video tutorials.
    - Step-by-step PDF guide.
    - Forums or Discord channels to share progress.
    - Example of a final world as a reference.

Schedule or Duration

Total Duration: 15 sessions of 1.5–2 hours each (approx. 30 hours total).

Course Modules

Week	Sessions	Main Focus
1–2	1–3	VRChat environment and first interaction
3–5	4–8	Game mechanics and physical interactions
6–7	9–12	Collisions, states, and scores
8	13–15	Complete game, testing, and publishing

Visual or Graphic Proposal

Recommended Visual Scheme:

- Timeline with the 15 sessions as game development stages.
- Flowchart of the VRChat world:
    - Spawn Zone → "Play" Button → Arena → Goals → Score Screen → End.
- Brief storyboard: images of the process (from an empty world to the complete game).

Optional Aspects

- **Student Profile:** Curious adolescent with an interest in video game design and cooperative work.
- **Communication Style:** Close, motivating, and practical.
- **Gamification:** Weekly challenges, digital badges for each completed module, and public showcase of the final project.