

WORK SAMPLES

Case Study 1: Adaptive Educational Game in VR

Game Design, Interaction Design, Prototyping



Project Overview

When does learning become fun? Can VR embodiment contribute to this? These questions gave rise to the idea for an adaptive racing game during a team brainstorming session. In the game students answer questions by steering a spaceship through gates with possible answers. Teachers can use an external web tool to add their own questions, images, and sounds to tailor the game to individual learning needs.

My Role

I developed the concept based on the initial idea and am currently developing a prototype in Unity. At the same time, I created the web tool for teachers. I am also responsible for the visual design, interaction design, and structure of the story and tutorial elements.

Goals

My goal was to develop an interaction design that utilizes the potential of VR to create an intuitive and immersive steering and gaming experience. In addition, the web tool should be easy to use and allow for a variety of question formats to enable adaptation to different school subjects.



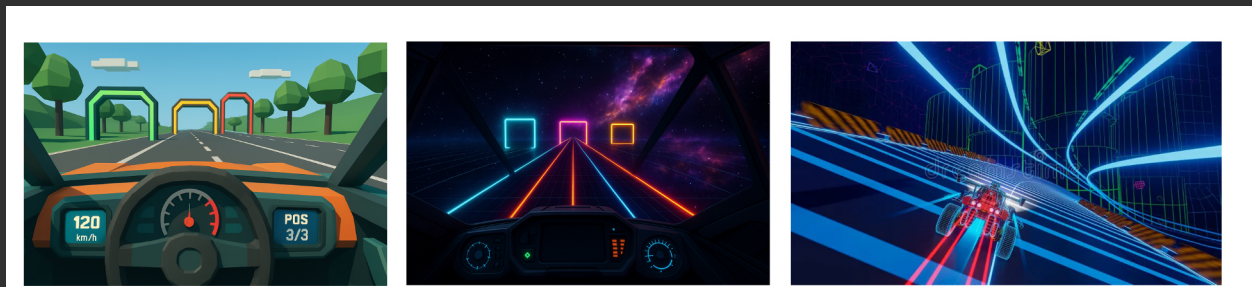
WORK SAMPLES

Case Study 1: Adaptive Educational Game in VR

Game Design, Interaction Design, Prototyping

Problem

The connection between science and practice is a constant challenge in digital education. Resources and time are often scarce, making it difficult to motivate teachers to deal with additional teaching material to supplement their lessons. The game must therefore be easy and quick to understand, allow flexible content, and offer students the added value of digital media without distracting them from learning.



Recherche möglicher Grafikstile und Aufteilungen der Fahrbahn

Design Process

I started by analyzing successful fun racers and creating mood boards, which resulted in the space setting. I used GPT to create the first graphic prototypes as a guideline. Afterwards, I modeled simple 3D models in Blender while developing the look and feel and UI elements of the cockpit in Figma.

A prototype for the web tool was needed early to build and test the entire mechanics in Unity. Initially, the tool was designed for text input only. Later, I added image and sound upload possibilities, as well as error prevention and troubleshooting processes, so that teachers could use the tool independently without needing extra support of our staff.

After the initial tests, I found lots of room for improvement in the interaction design. Severe motion sickness and a lack of intuition for the steering mechanics of the ship prompted me to adjust the control options. To improve orientation and immersion, I integrated the gameplay into a short story and added tutorial elements: an AI voice guides players through the hangar. Once players are seated in the cockpit, the controls are explained briefly.

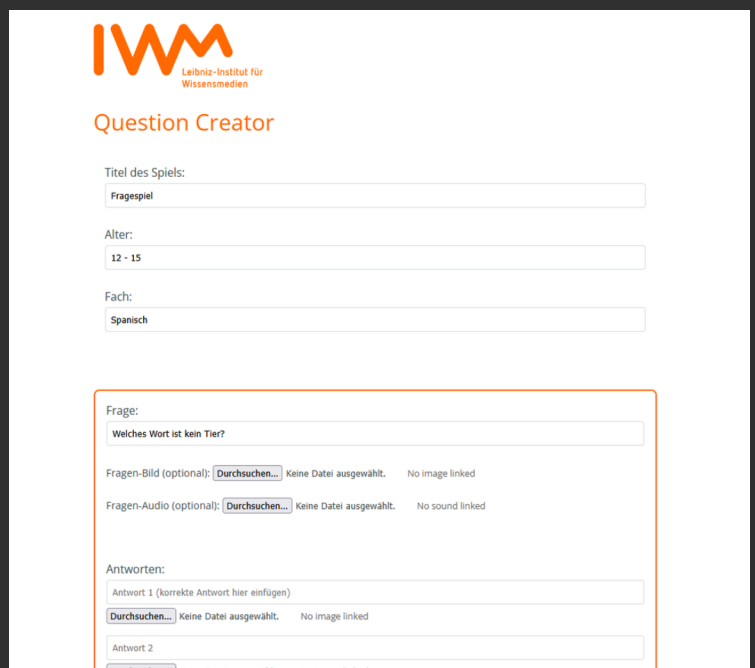
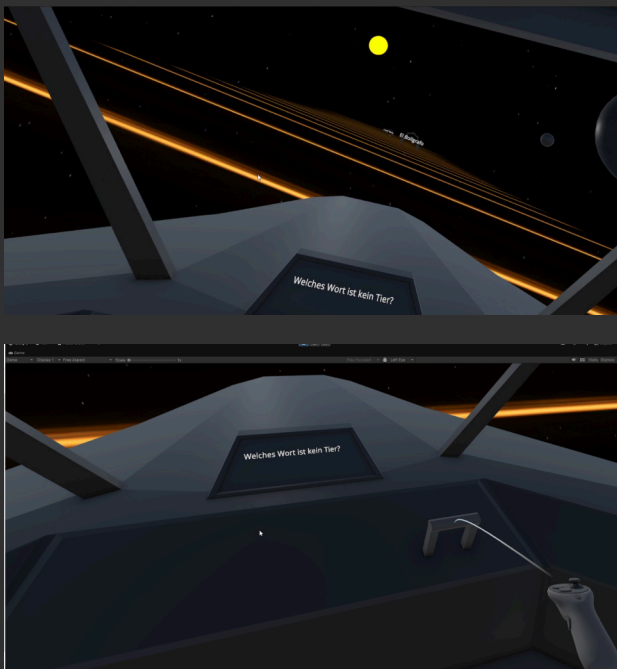
ARBEITSPROBEN

Case Study 1: Adaptive Educational Game in VR

Game Design, Interaction Design, Prototyping

Current State and Results

Teachers can use the web tool to create their own questions and answers. They produce a JSON file with that tool, which is integrated into the game and displays the questions dynamically. A/B testing has shown that the game causes stress for players when the gates are positioned behind each other and gradually come into view. If they are positioned next to each other, players can see all possible answers at the same time, which makes the gaming experience more comfortable and less stressful. Instead of using the controller stick, the ship is now steered by tilting the head left and right. This reduces motion sickness significantly. The lever for accelerating the ship can be operated directly with the controller and must be pushed forward or backward by the players and be held in position to regulate the speed. The prototype will be used as basis for a bachelor's thesis on the topic of VR embodiment in teaching.



IWM
Leibniz-Institut für
Wissensmedien

Question Creator

Titel des Spiels:

Alter:

Fach:

Frage:

Fragen-Bild (optional): Keine Datei ausgewählt. No image linked

Fragen-Audio (optional): Keine Datei ausgewählt. No sound linked

Antworten:

Antwort 1 (korrekte Antwort hier einfügen)
 Keine Datei ausgewählt. No image linked

Antwort 2
 Keine Datei ausgewählt. No image linked

Reflection

This project taught me a lot about the possibilities of interactions in VR and how these can affect the user experience. This medium is not only about engaging users, but also about ensuring physical stability in the virtual environment. The feedback from the test subjects helped me to understand interactive environments in VR better and to view them separately from interactions with conventional controllers and gaming environments. I am currently planning feedback mechanisms for the prototype, such as SFX and VFX, graphical highlights for interaction possibilities and scoring systems, as well as adaptive difficulty levels. I used ChatGPT for support with programming in JavaScript and C# in Unity.