ROBOXR STORYBOARD

NOTE: These are the Draft SCENARIOS and learning outcomes. As we go along the project we might change / alter them aiming to benefit the learning and learning outcomes. In addition these are based on our initial knowledge and capabilities of the VIROO/REACH/AAXLP systems that we will be investigated thoroughly.

Contents

This is the link a a downloaded scene (zip file)

https://drive.google.com/file/d/1uZDZpIAzXEgy1gghD3Z_5kVKRH9y9NJu/view

All scenes and descriptions (and capture screens) were included in a different file that was uploaded.

Title	
SCENARIO 1: AI-Assisted Industrial Layout Optimization in XR	
Target audience	
Job profile: Industrial engineering students, robotics/automation trainees, production planners, and entry-level to experienced manufacturing engineers involved in robotic cell layout and factory planning. **Education level:** Upper-secondary vocational (EQF 4–5), undergraduate (EQF 6), and postgraduate/professional upskilling (EQF 7–8). **Technical experience:** No prior XR experience required; onboarding is provided. Basic familiarity with manufacturing or robotics concepts is recommended but not mandatory. **Accessibility needs:** Designed for seated or standing use with minimal physical strain, clear step-by-step guidance, high-contrast visuals, audio support, and low motion intensity to accommodate varying physical and cognitive needs.	
Learning objectives	
By the end of the scenario, the user should be able to: - Design a basic robotic cell layout using AI-assisted tools. - Identify arrangements options - Recognize layout options strengths/weeknesses - Evaluate AGV routing efficiency and collision risks. - Interpret layout performance indicators (cycle time, space utilization, travel distance). - Compare manual vs. AI recommended layouts	
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Description	**Didactical contents**
Educational Scene Description **Narrative / Setting:** The user enters a virtual industrial production hall in miniature planning mode, acting as a layout engineer responsible for configuring a robotic manufacturing cell using AI-assisted tools. **Challenge:** Design a safe, efficient, and collision-free robotic cell layout while optimizing space utilization and AGV routing,	**Voice guidance:** Short instructional prompts explaining layout tasks and safety spacing. **Color-coded visual feedback:** Green/red highlights for valid or invalid object placement. **Simple information panels:** Brief text explaining layout rules and performance indicators.

• **What the user sees and interacts with:** A scalable factory floor model, robotic arms, CNC machines, AGVs, safety boundaries, AI layout tools, interactive control panels.	• **Basic movement simulation:** AGV path preview to visualize routing. • **Results summary panel:** Display of layout efficiency and safety validation outcome.

General pedagogical approach

🎬 **Gamification:**
May include performance feedback or scoring based on safety and efficiency.

🎬 **Single-user or collaborative:**
Primarily designed as a single-user experience, with the possibility of future collaborative extensions.

🎬 **Role-playing / exploration:**
Guided exploration where the user takes the role of a layout engineer and tests different configurations.

🎬 **Evaluation of success:**
Success may be evaluated based on completion of tasks, layout validity, and overall performance indicators.

Storyboard

Panel 1 – Entry
User appears inside a virtual production hall. Ability to to position Machines and robots via voice commands. Ambient industrial sound is heard. A voice explains that the user must configure the layout.

Panel 2 – Layout Editing
User selects a machine. The machine highlights and becomes movable. When placed too close to another object, the boundary turns red. When correctly placed, it turns green.

Panel 3 – AI Suggestion
User activates AI assistance and suggest the user machine / robot positions.

Panel 4 – Simulation
User activates simulation.

Panel 5 – Results
A performance panel appears showing layout status. User can adjust layout or finish.

Actions	Description
Enter scene	Factory layout visible in planning mode.
Move machine	Object repositions with safety feedback.
Activate AI	Layout adjusts automatically.
Run simulation	AGV path shows safe or conflict state.
View results	Layout status and performance displayed.

About the educational use case

Title

SCENARIO 2 – Robotic Machine Tending (REACH)

Target audience

🎬 **Job profile:** Robot operators, CNC/machine tending technicians, mechatronics trainees, maintenance technicians, and automation students responsible for operating or supervising robotic production cells.

🎬 **Education level:** Vocational/technical training (EQF 4–5), undergraduate engineering level (EQF 6), and professional upskilling for industrial personnel.

🎬 **Technical experience:** No prior XR experience required; guided onboarding included. Basic familiarity with machine operation, safety procedures, or industrial workflows is recommended.

🎬 **Accessibility needs:** Designed for safe seated or standing interaction with limited physical movement, clear visual and audio instructions, structured step-by-step workflow guidance, and minimal motion effects to support diverse physical and cognitive profiles.

Learning objectives

🎬 Execute the correct machine start-up and shutdown sequence.

🎬 Load and unload parts following safe operational procedures.

🎬 Recognize incorrect workflow steps and apply corrective actions.

🎬 Identify interlock dependencies (e.g., door closed before cycle start).

🎬 Respond appropriately to emergency stop events.

🎬 Complete a full robotic machine tending cycle without safety violations.

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Description

Educational Scene Description

- **Narrative / Setting:**
  The user is positioned inside an operatSional robotic machine tending cell, acting as a machine operator responsible for running a production cycle safely and efficiently.

- **Challenge:**
  Initialize the system correctly, load the part, start the robotic cycle, monitor operations, and handle interruptions (e.g., emergency stop) while following the correct industrial workflow sequence.

Didactical contents

🎬 **tep-by-step voice instructions:** Clear guidance for startup, loading, and cycle execution.

🎬 **Visual workflow cues:** Highlighted buttons, levers, or parts indicating required actions.

🎬 **Warning messages:** Text and light indicators for incorrect sequence or emergency stop activation.

🎬 **Simple process summary panel:** Overview of cycle completion and procedural accuracy.

• **What the user sees and interacts with:** A robotic arm, CNC/machine tool, raw and finished parts, control panel (buttons, levers, emergency stop), safety indicators, animated production cycle, and a results dashboard showing cycle time and procedural compliance.	

General pedagogical approach

🎬 **Gamification:**
May include feedback on procedural accuracy and task completion.

🎬 **Single-user or collaborative:**
Designed mainly as a single-user simulation, with potential for role-based extensions.

🎬 **Role-playing / exploration:**
Role-based learning where the user acts as a machine operator following operational steps.

🎬 **Evaluation of success:**
Success may be assessed through correct sequence execution, safe operation, and completion of the production cycle.

Storyboard

Panel 1 – Entry
User stands inside the robotic cell. Robot and machine are inactive.
A panel appears with two options:
Local Control (VIROO)
VORAUS Core Control

Note that this is the idea scenario: There might be a need to decide/configure it before starting the simulation

User selects one mode before continuing.

Panel 2 – Initialization
User pulls the power lever.
System activates.
If VORAUS mode is selected, a connection indicator is shown.

Panel 3 – Load Part
User grabs the raw part and places it inside the machine.
Correct placement is visually confirmed.

Panel 4 – Start Cycle
User presses the cycle start button.
Robot and machine begin operating.
If emergency stop is pressed, everything stops immediately.

Panel 5 – Completion
User unloads the finished part.
A summary panel appears showing task status

Actions	Description
Select control mode	System runs in Local or VORAUS mode.
Power on	Machine activates.
Load part	Part placed inside machine.
Start cycle	Robot and machine operate.
Emergency stop	Operation stops immediately.
Unload part	Cycle completes and summary appears.

About the educational use case

Title

SCENARIO 3 – Safety & Human–Robot Interaction

Target audience

🎬 **Job profile:** Safety officers, robot operators, production supervisors, mechatronics technicians, and engineering students involved in collaborative robotics and industrial safety management.

🎬 **Education level:** Vocational/technical level (EQF 4–5), undergraduate engineering level (EQF 6), and professional safety or industrial upskilling programmes (EQF 7).

🎬 **Technical experience:** No prior XR experience required; onboarding provided. Basic awareness of industrial safety principles or robotic systems is recommended but not mandatory.

🎬 **Accessibility needs:** Designed for low physical strain (seated or standing), clear zone-based visual cues (color-coded safety areas), structured audio guidance, minimal motion intensity, and step-based progression to support users with varying physical and cognitive abilities.

Learning objectives

🎬 Recognize safety zones around a robot (green/yellow/red).

🎬 Understand how robot behavior changes based on human proximity.

🎬 Trigger and reset an emergency stop following correct protocol.

🎬 Identify unsafe zone intrusion scenarios.

🎬 Apply the correct restart procedure after a safety interruption.

🎬 Demonstrate safe interaction within a human–robot collaborative workspace.

<table>
<tr><th>Description</th><th>Didactical contents</th></tr>
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<td>
<h3>Educational Scene Description</h3>

Narrative / Setting:
The user enters a collaborative robotic workspace designed to demonstrate human–robot interaction principles and safety zone logic.
Challenge:
Understand how robot behavior changes depending on proximity, respond appropriately to unsafe zone intrusions, trigger emergency stop when necessary, and execute the correct safety reset procedure.

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🎬 Visible safety zones: Clearly marked green, yellow, and red areas around the robot.

🎬 Robot behavior changes: Speed reduction or stop when entering restricted zones.

🎬 Audio alert for emergency stop: Basic alarm sound during interruption.

🎬 Reset guidance panel: Clear on-screen instructions for correct restart procedure.
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• **What the user sees and interacts with:** A collaborative robot operating within clearly marked green, yellow, and red safety zones, visual safety indicators, emergency stop button, reset controls, dynamic robot speed adjustments, and a safety performance panel providing real-time feedback.	🎬 **Safety feedback summary:** Short report on zone intrusions and correct response actions.

General pedagogical approach

🎬 **Gamification:**
May include safety awareness feedback or performance indicators.

🎬 **Single-user or collaborative:**
Primarily a single-user training experience, with the option to simulate multiple roles.

🎬 **Role-playing / exploration:**
Guided role-play within a collaborative robotic workspace.

🎬 **Evaluation of success:**
Success may be determined by correct recognition of safety zones, appropriate reactions, and proper completion of safety procedures.

Storyboard

Panel 1 – Safety Zones
User stands near collaborative robot. Green, yellow, and red zones are visible on floor. Robot operates normally.

Panel 2 – Yellow Zone
User steps into yellow zone. Robot slows down. A soft warning sound plays.

Panel 3 – Red Zone
User steps into red zone. Robot stops. Red indicator light activates.

Panel 4 – Emergency Stop
User presses emergency stop button. Alarm sounds. Robot remains halted.

Panel 5 – Reset
User enters cell, remove grasped parts from robot / machine, manually move robot to safe start point, restart processs. Robot resumes normal operation. Safety summary appears.

Note: these are indicative

Actions	Description
Enter yellow zone	Robot slows down.
Enter red zone	Robot stops.
Press emergency stop	Alarm activates and system halts.
Reset system	Robot resumes operation.
Complete session	Safety feedback displayed.