# Teaching Scenario, Demo Lesson and Lesson Plan

Project: Robo STEAM – Inclusive Technologies

Platform: StreamIT – Robotic Tele-Visiting Platform

Work Package: WP4 – Methodology and Teachers' Toolkit

Document Type: Teaching Scenario / Demo Lesson / Lesson Plan

Language: English

Location: Kavadarci, The Republic of North Macedonia

Institution: SOU Kiro Spandzov Brko, Kavadarci

Museums: "Wine museum and Ethno- Museum/ Museum Galley of Kavadarci"

## 1. Teaching Scenario Overview

This scenario outlines a teacher-led, classroom-based learning journey designed specifically for the students of SOU Kiro Spandzov Brko. By integrating the StreamIT telepresence robot platform, we are moving beyond traditional lectures to allow students to virtually observe, explore, and discuss historical exhibitions in real-time. This approach turns the classroom into a launchpad for discovery, using technology to bring distant cultural and educational heritage directly to our students

## 2. Educational Context

**Target Group**: Secondary school students in their upper grades

**Learning Setting:** A collaborative, whole-class activity based right in the classroom

**Display Requirements:** Immersive and High-Definition To bring the "remote avatar" to life, we move away from small screens. We utilize high-quality projectors or large smart screens to create a truly shared, immersive social experience.

- The Technical Edge: This is made possible by our specialized hardware—a Raspberry Pi 5 running the ROS (Robot Operating System).
- Direct Interaction: Because our system uses an HD camera that streams directly to the classroom (bypassing public services like YouTube), we achieve the low latency needed for real-time interaction. Students see the museum in crisp detail the moment the robot moves, ensuring they never lose that vital sense of "being there.

**Visit Type:** Non-guided (teacher-led)

**Duration:** 45 minutes

## 3. Learning Objectives

By the end of this 45-minute journey, our students will be able to:

- Deeply understand the historical development and legacy of their educational environment.
- Identify the notable achievements of distinguished graduates, providing them with real-world inspiration.
- Reflect thoughtfully on how education shapes both personal growth and the broader development of society.
- Master the use of telepresence robotics, gaining hands-on experience with cutting-edge tools for remote learning and observation

## 4. Connecting to the Curriculum (STEAM)

This lesson isn't an "extra"—it is deeply rooted in our core subjects:

- History & Social Studies: Exploring institutional history and cultural heritage.
- Technology: Engaging directly with telepresence robotics and modern digital platforms.
- Science & Mathematics: Reflecting on the scientific milestones and analytical achievements of alumni.
- Arts & Humanities: Learning the art of presentation and the interpretation of historical materials

## 5. Classroom Materials

- StreamIT Platform with Telepresence Robot Access: This includes the robot itself, which, for your institution, is powered by ROS (Robot Operating System) on a Raspberry Pi 5.
- Projector or Smart Screen: This is vital for "Collective Viewing," ensuring that the entire class can participate in a shared social experience rather than being isolated on individual devices.
- Preloaded Exhibition Materials: These include digital archival documents, historical photos, and supplementary texts that the teacher can "dual-source" alongside the live robot feed.
- Prepared Guiding Questions: These are used by the teacher (the "Director") to spark curiosity, lead the narrative, and facilitate inquiry-based learning during the 25-minute exploration phase.
- High-Speed, Stable Network Connection: As discussed in our conversation history, a reliable internet connection is essential to support the direct HD video stream from the robot's camera, ensuring low latency without the use of external services like YouTube.

## 6. The Lesson Plan Structure: Our 45-Minute Journey

The structure of this lesson is designed to move from curiosity to active discovery, ensuring that the technology serves the learning, not the other way around.

### 6.1 The Introduction: Setting the Stage (10 Minutes)

The teacher opens the session by grounding the students in the historical context of the exhibition, transforming the classroom into a mission control center. This is the time to build excitement and clearly define the "mission" of the day. Students are introduced to their "remote avatar"—the StreamIT robot. The teacher explains that thanks to the Raspberry Pi 5 and ROS (Robot Operating System) powering the device, they will have a high-performance, responsive link to the museum. We brief the students on how their questions will act as the "remote controls" for the robot's path through history.

### 6.2 Live Telepresence Exploration: The Heart of the Lesson (25 Minutes)

This is where the learning becomes truly immersive. The teacher steps into the role of the "Director," expertly navigating the robot through the exhibition using the StreamIT platform. The journey is punctuated by pauses at predefined "high-interest" positions, such as key historical artifacts or stories of distinguished graduates. Because we are utilizing a direct HD stream that bypasses third-party services like YouTube, the video on the classroom screen is crisp and instantaneous, maintaining the vital "being there" feeling. As the "Director," the teacher provides deep context and invites students to lead the way—their inquiry dictates the robot's next move, ensuring the exploration is a living, breathing dialogue.

### 6.3 Discussion and Reflection: Processing the Experience (10 Minutes)

Once the "avatar" has concluded its journey, the teacher moderates a group reflection to help students process what they've seen. We move beyond the "what" and into the "how" and "why." The focus rests on the students' personal impressions: How did it feel to navigate a space virtually? Why is it important for us to preserve this heritage? By discussing how cutting-edge technology like ROS and direct streaming is changing the face of education, we help students see themselves as part of a modern, inclusive digital world

## 7. Assessment, Feedback, and Inclusivity

**Formative Assessment:** Learning Without Pressure At SOU Kiro Spandzov Brko, we believe that engagement is the best measure of success. There are no high-stakes tests in this scenario. Instead, assessment is formative, based on the quality of student participation, the curiosity shown in their questions, and the depth of their contributions during the final reflection. Feedback is gathered naturally through classroom dialogue, allowing the teacher to gauge understanding in real-time.

**Accessibility for All:** Breaking Down the "Digital Silo" The core mission of the StreamIT platform is social inclusion. By bringing the museum directly to our classroom on a large screen, we ensure that every student—regardless of physical mobility, financial situation, or socioeconomic barriers—has an equal, front-row seat to history. This "Collective Viewing" approach prevents the isolation of the "digital silo" and ensures that the exhibition is a shared community experience where every voice can be heard.

## 8. Demo Lesson Evidence

This section documents the successful implementation of the StreamIT platform at SOU Kiro Spandzov Brko. These images capture the moment technology transforms into a bridge for cultural discovery, moving beyond the "digital silo" to create a truly inclusive, shared experience. (Video Link 1, Video Link 2)

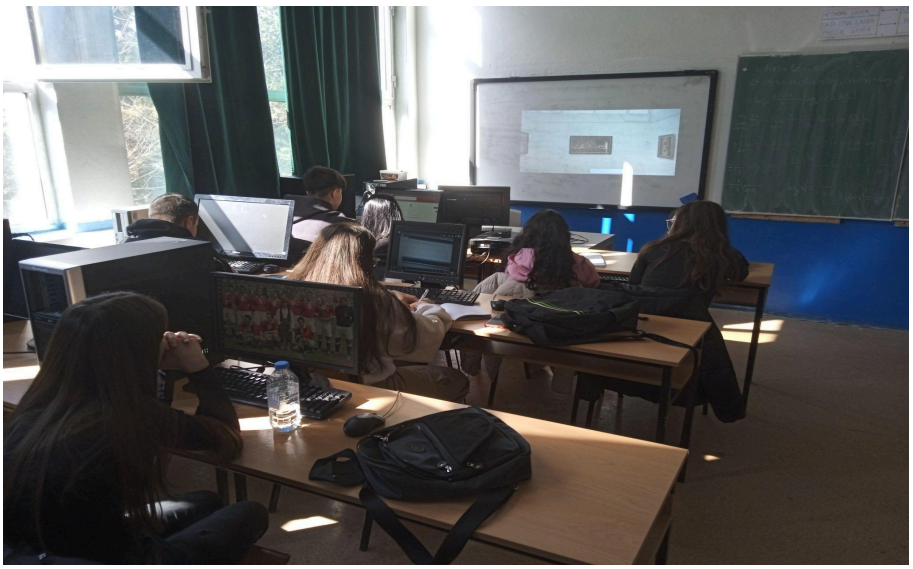

Figure 1: Students at SOU Kiro Spandzov Brko engage in a shared social experience through collective viewing of museum artifacts on the classroom's smart screen

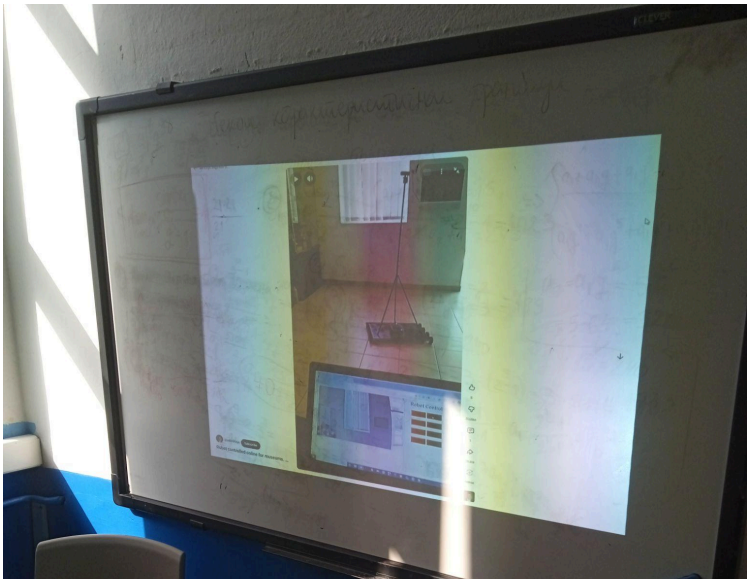

Figure 2: The classroom display shows the StreamIT control interface and the direct HD video feed powered by the robot's Raspberry Pi 5 system.

Figure 3: This live, real-time view from the robot's camera allows the class to explore distant museum exhibitions through their "remote avatar".

## 9. Transferability: A Blueprint for Future Discovery

While this specific scenario is tailored to our school's unique context and our specific ROS-based hardware, the methodology itself is highly flexible. It is designed as a modular blueprint that can be easily adapted for different school museums, local cultural sites, or specialized scientific exhibitions. This ensures that the Robo STEAM framework can be reused and evolved across various partner institutions, making it a sustainable tool for modern, inclusive education.