

A3 – Teachers' Toolkit

Project: Robo STEAM – Inclusive Technologies

Platform: StreamIT Televist Platform

Work Package: WP4 – Methodology & Teachers' Toolkit

Document Type: Comprehensive Teachers' Toolkit

1. Introduction

The **Robo STEAM – Inclusive Technologies** project represents a shift in how digital resources are integrated into the modern classroom. Rather than viewing technology as a distraction, this toolkit positions the **StreamIT platform** as a bridge between formal schooling and the cultural wealth of museums.

By utilizing robotic tele-visiting, educators can transcend geographical and financial barriers that often prevent physical field trips. This section provides the foundational philosophy: technology should serve the curriculum, not dictate it. We aim to empower teachers to become facilitators of high-tech exploration, ensuring that every student—regardless of physical ability or socioeconomic status—has a front-row seat to world-class exhibits.

2. Purpose of the Toolkit

The **Teachers' Toolkit** serves as more than a simple operational manual; it is a comprehensive strategic framework specifically engineered to streamline the adoption of robotic tele-presence within the school environment. By bridging the gap between advanced technology and classroom reality, the toolkit ensures that the **StreamIT platform** becomes a sustainable part of the educational ecosystem rather than a one-time novelty.

The design of this toolkit is centered around four primary objectives intended to empower educators:

- **Curriculum Alignment and Planning:** The toolkit provides structured assistance to help teachers identify exactly where a virtual museum visit intersects with national STEAM standards. It moves beyond "sightseeing" by guiding educators to define clear learning objectives and select specific exhibits that reinforce the current lesson topic.
- **Inclusion by Design:** A core pillar of the **Robo STEAM** project is ensuring that students with diverse learning needs are fully integrated into every activity. The toolkit offers pedagogical recommendations that favor whole-class engagement over individual device use, creating a shared social and sensory experience that prevents any student from being sidelined.

- **Resource Efficiency and Practical Support:** Recognizing the time constraints faced by modern educators, the toolkit aims to reduce the "prep-heavy" nature of integrating new technologies. It achieves this by providing ready-to-use resources, including **lesson plan templates**, **step-by-step instructional videos**, and **practical implementation checklists** to ensure a smooth technical and pedagogical flow.
- **Community Building through Demo Lessons:** To foster professional growth, the toolkit encourages a "share-back" culture through the use of **demo lessons**. Teachers are supported in creating their own lesson plans, sharing their unique classroom experiences, and utilizing peer-reviewed examples to refine their teaching practice with the StreamIT platform.

By combining these practical tools with high-level pedagogical guidance, the toolkit facilitates meaningful, inclusive, and high-impact STEAM learning experiences for all participants.

3. Overview of StreamIT for Teachers

StreamIT is a sophisticated, web-based robotic tele-visiting platform. Unlike a static 360-degree photo or a pre-recorded video, StreamIT provides **real-time, low-latency access** to museum environments.

The platform acts as a remote "avatar." From the classroom, the teacher controls (or coordinates) the movement and perspective of a robot physically located in the museum. This allows the class to ask a guide to "move closer to that specific brushstroke" or "look at the underside of that fossil," creating a sense of "being there" that is essential for inquiry-based learning.

4. Getting Started

Success with the **StreamIT platform** begins well before the projector is turned on. Teachers must navigate three key preparation pillars to ensure a seamless experience for their students.

Administrative Onboarding and User Management The first step toward a successful virtual visit is official registration within the system. The **School Administrator** holds the primary responsibility for this setup, handling the registration of both teachers and students onto the platform. Once teachers have been introduced to the interface, they gain the specific authority to register their own students and organize them into their corresponding classes for easy session management. This structured onboarding is vital not only for booking specific visit slots but also for accessing saved museum preferences and exhibit details that align with the curriculum.

Hardware Audit and Connectivity Requirements Because **StreamIT** is optimized for "Collective Viewing," the physical classroom setup is just as important as the digital one. The



platform is primarily designed for high-quality online streaming, making a stable internet connection with sufficient bandwidth for HD video mandatory during the entire time of the visit. To facilitate this whole-class activity, teachers must have access to a classroom projector or a large-format smart screen. This centralized display ensures that the virtual tour is a shared social experience, allowing the entire group of students to observe and discuss the exhibits simultaneously.

Museum Coordination and Scheduling Strategy Teachers should utilize the **StreamIT internal calendar** to browse available museums and schedule their visits based on the specific exhibitions they wish to explore. During the booking process, the platform allows for the selection of specific exhibits that align with the lesson's STEAM objectives. It is highly recommended to communicate with museum partners prior to the session to confirm the robot's availability and the specific artifacts the class intends to see. In instances where a required museum or exhibition does not have a slot available, the teacher or School Administrator can contact the **Museum Coordinator** directly to assist with booking the necessary time.

5. Planning a Lesson with StreamIT

A virtual visit should be the "peak" of a learning unit, not a standalone event.

5.1 Define Learning Objectives

Identify the **STEAM (Science, Technology, Engineering, Arts, Mathematics)** competencies you want to target. For example, a visit to a natural history museum could focus on "Scientific Observation" or "The History of Engineering in Paleontology".

5.2 Selection Strategy

Browse the StreamIT Museum lists to select museums that offer specific artifacts relevant to your topic. Don't just pick a museum; pick a specific *exhibition* that matches your week's lesson. The Museums and the exhibition lists are available on the platform, so the teacher can choose the visit accordingly.

5.3 Student Scaffolding

To maximize the educational impact of the **StreamIT platform**, teachers should prepare their students by building "anticipatory sets" that bridge the gap between the classroom and the museum environment. This preparation begins with a **pre-visit discussion** where the class explores their expectations of the upcoming exhibition. By asking "What do we expect to see?", educators can gauge existing knowledge and spark initial curiosity. To ensure students can follow the expert commentary or museum descriptions, teachers should introduce **5–10 key vocabulary terms** specifically related to the chosen exhibit before the session begins.

The most effective way to maintain high engagement is by providing students with a clear "mission" through **guiding questions**. For example, a teacher might task the class with finding three pieces of evidence suggesting a specific historical era was warmer than today. This approach ensures that interest remains high throughout the virtual tour, as students are not just passive observers but active investigators with specific tasks that keep them focused. By establishing these objectives early, the teacher creates a structured environment where students are motivated to engage deeply with the live robot feed and museum materials.

6. Conducting the Virtual Visit

During the live session, the teacher assumes the role of "Director," managing the flow of information and maintaining the energy of the room. This leadership role ensures that the technology remains a tool for exploration rather than a distraction.

- **The Front-Row Benefit through Whole-Class Focus** To foster a shared social experience, the video feed should remain on the main screen at all times. This collective viewing model provides every student with a "front-row" advantage. In a physical museum, students in the back of a large group often miss key artifacts or verbal points; however, the **StreamIT** platform ensures that every student has an identical, unobstructed view of the exhibits.
- **Interactive Navigation and Visual Clarity** The teacher should use the platform interface to toggle fluidly between the robot's wide-angle live feed and the high-resolution supplemental images provided by the museum. This capability allows the class to see "zoomed-in" details of specific artifacts that might be difficult to perceive with the naked eye, ensuring a clear understanding of the intricate details of each exhibit.
- **Facilitation and Student-Led Curiosity** Effective sessions prioritize facilitation over traditional lecturing by encouraging students to describe what they see. By letting student curiosity dictate where the robot "looks" next, the teacher fosters active participation and keeps the class engaged throughout the tour. This approach encourages "out-of-the-box" thinking, as students naturally become curious about the robot's mechanics and spatial movement in addition to the museum content itself.
- **Dual-Sourcing for Context and Continuity** To provide the most comprehensive experience, teachers are encouraged to have the museum's digital archives or pre-prepared lesson materials open in a separate browser tab. This "dual-sourcing" technique allows the teacher to display close-up details or additional educational context without interrupting the live movement of the robot. By keeping these resources ready, the teacher ensures that no information is missed and that the robot's journey through the museum remains seamless and visually constant.



7. Guided and Non-Guided Visits

The StreamIT platform offers two distinct pedagogical modes:

Feature	Guided Visit	Non-Guided (Teacher-Led)
Expertise	Led by a professional museum docent.	Led entirely by the classroom teacher.
Control	The guide usually controls the robot's path.	The teacher has full autonomy over navigation.
Best For	Introducing complex, specialized topics.	Deep-dives into specific curriculum points

8. Classroom Management and Inclusivity

A core tenet of the **Robo STEAM – Inclusive Technologies** project is **Social Inclusion**, ensuring that every student is an active participant in the learning journey. By utilizing a single large screen or projector rather than individual tablets, educators effectively eliminate the "digital silo" effect, where students often become isolated by their own devices. This shared perspective ensures that everyone looks at the same exhibit at the same time, naturally sparking spontaneous peer-to-peer discussions and a sense of communal discovery.

Furthermore, this model significantly enhances **accessibility** for students with limited mobility or fine motor skills who might otherwise struggle to navigate a mouse or a small touchscreen; here, they can participate fully in the verbal and visual discourse led by the teacher. To maintain balanced participation, teachers are encouraged to use engagement strategies such as "Think-Pair-Share" during the visit, ensuring that more vocal students do not dominate the conversation and that every voice is heard.

9. Assessment and Reflection

Traditional testing often fails to capture the subtle nuances and inspiration gained during a virtual field trip. Instead, the toolkit recommends focusing on **formative assessment methods** that track engagement in real time. Teachers should prioritize **real-time observation**, noting which students engage with the artifacts and who asks the most insightful questions during the live stream.

To deepen the reflection process, students can maintain **reflection journals**, perhaps by writing a "Letter from the Museum" that describes their favorite artifact in detail. Additionally, the virtual visit serves as an ideal primary research phase for **Project-Based**

Learning, where students use their observations as the foundation for follow-up STEAM projects, such as engineering a physical model or designing a digital presentation based on the museum's contents.

10. Demo Lessons

The toolkit provides "Demo Lessons"—tried and tested sequences used by other educators in the Robo STEAM network.

- **Adaptation:** Don't feel pressured to follow these exactly. Change the questions or the length of the visit to suit your class's attention span.
- **Peer Feedback:** After running a demo lesson, contribute your findings back to the community. What worked? What technical hurdles did you face?

11. Troubleshooting and Best Practices

Technology can be unpredictable. Being prepared differentiates a "failed" lesson from a "learning moment."

- **The 5-Minute Rule:** Always log in 5 minutes early to test the audio and video connection.
- **The "Analog" Backup:** Always have a set of printed photos or a short video clip ready in case the live stream drops.
- **Communication:** Keep the museum guide's contact info (or the StreamIT support chat) open during the session.

12. Conclusion

The **StreamIT platform** is more than just a technological tool; it is an invitation to explore the world without boundaries. By combining these pedagogical strategies with robotic tele-presence, you are providing your students—especially those with diverse learning needs—with a window into environments they might otherwise never experience. Together, through the Robo STEAM project, we are creating a more inclusive, tech-literate, and culturally connected generation of learners.