

iMuSciCA - Interactive Music Science Collaborative Activities

Team Teaching for STEAM Education

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The **iMuSciCA** project addresses contemporary requirements in education and learning for new STEAM pedagogical methodologies and innovative educational technology tools by supporting **active, discovery-based, personalized**, and more **engaging learning** and providing students and teachers with opportunities for **collaboration, co-creation** and **collective knowledge building**.

The **iMuSciCA** workbench addresses **secondary school students** with the aim to support mastery of core academic content on STEM subjects (**Physics, Geometry, Mathematics, and Technology**) alongside with the development of **creativity** and **deeper learning** skills through the students' engagement in **music activities**.

iMuSciCA focuses on the following objectives:

Develop and explore **original and innovative enabling technologies** to facilitate the incorporation of open co-creation tools in music activities in order to support STEM learning, thus providing evidence of the positive impact of art and science interaction on creativity and innovation. Innovative educational technologies include:

- **Virtual 3D environments** with **gesture and pen-enabled interaction** to design personalized musical instruments using geometric forms and tools.
- **Computer generated sound** produced by varying the design parameters of musical instruments with interpretations of the related physics and mathematics.
- **Gesture and pen-enabled multimodal interaction** of learners with the virtual **3D musical instrument** for co-creation and music performance.
- **Interactive STEM authoring and learning environments** with advanced tools for the creation and presentation of lesson plans.
- **3D printing technology** for realizing the physical musical instrument as an actual/tangible physical object.

Develop a set of **practical activities** to give learners the opportunity to explore different phenomena/laws of physics, geometry, mathematics and technology through creative music activities, to examine them from various viewpoints and to increase integration among various curriculum subjects contributing to innovative cross-disciplinary educational approaches.

Encourage students to engage in innovative interactive music activities with advanced multimodal interfaces that enable them to discover new ways to look at science with the support of creative and artistic interventions, raising their interest in science and technology.

Enable teachers to design meaningful and **engaging project-based, problem-based STEAM learning activities**, produce rewarding and self-fulfilling teaching materials by acquiring and integrating innovative and stimulating educational technologies in their teaching practice.

Provide teachers with a coherent and rigorous set of **lesson plans for STEAM learning**.

The **iMuSciCA** framework will be **pilot-tested and evaluated in real learning contexts** by a substantial number of students and teachers in **three European countries** (Belgium, France, and Greece).

iMuSciCA is a pioneering approach using music for **fostering creativity and deeper learning**, thereby setting new grounds in the European STEAM curricula.