



Toolkit 1

Playful techniques for addressing STEM education challenges

1.1 The challenges of STEAM education

Lack of Interest in Science and the Need for Innovation

The declining interest in STEM fields among students has been extensively studied by researchers in educational sciences (Bybee and McCrae 2011, P. Anderhag et al. 2014, PISA studies, Palmer et al. 2017). This situation is a concern for educators, policymakers, and the research community as it impacts the career choices of young people in scientific fields. It is crucial to maintain and enhance scientific and technological research and innovation in our society.

At the primary level, science teaching plays a vital role in nurturing children's natural curiosity and preparing them for a deep understanding of the world around them. Engaging students in science from a young age is essential. Science provides children with an opportunity to ask questions, explore, experiment, and develop critical thinking skills that are applicable in various areas of life (Romero et al.).

One factor contributing to demotivation in science education is the need for pedagogical evolutions and innovations. Traditional lecture-based lessons and repetitive exercises can quickly become boring for students, leading to a loss of interest and motivation. To maintain interest and stimulate curiosity, interactive and engaging teaching methods such as hands-on experiments, educational games, and group projects should be introduced. These methods make teaching more interactive and effective. However, it is also necessary to develop programs that allow teachers to embrace these new approaches. The Mimesis project is one such response, providing teachers with innovative ways to integrate creative content into science education.

The Transition from STEM Education to the STEAM Approach

While the teaching of STEM subjects (Science, Technology, Engineering, and Mathematics) has long been considered essential, there is an increasing recognition among educators of the importance of integrating the arts (A) into this education. This has led to the emergence of the STEAM approach.

The interdisciplinary approach of STEAM aims to generate learners' interest in science and technology while developing their creative problem-solving abilities (Kim & Kim, 2020). It enhances students' effectiveness, confidence, and interest in learning science (Baek et al., 2011). By integrating the arts into STEM education, the STEAM approach encourages students to harness their creativity and imagination to solve complex problems. It also allows them to develop communication and collaboration skills through interdisciplinary projects, which are crucial in today's professional world (Romero et al.).



The STEAM approach offers multiple advantages for students. It allows them to see scientific and technological subjects from a different perspective, making them more accessible and stimulating. It also prepares students for the challenges of the future by fostering creativity, innovation, and a holistic approach to learning. This prepares them for careers in fields such as technological innovation, design, and media.

Implementing the STEAM approach requires rethinking how these subjects are taught. Collaboration among teachers of different subjects should be encouraged to create interdisciplinary projects. Teachers should have access to new tools, including technological and multimedia resources, to make learning more interactive and engaging. Specific training is also necessary for teachers to develop the skills required to use these resources effectively. Additionally, school spaces can be redesigned to offer more flexibility for students to explore and experiment freely, promoting autonomy and new forms of assessment.

Mimesis: Creating Links Between Sciences and Performing Arts

The learning of science and arts has traditionally been considered as two separate domains. However, they are closely linked and can mutually benefit learners, as suggested by the STEAM approach. Integrating science and arts in education provides opportunities to enrich learning with new knowledge, ideas, and methodologies. By connecting scientific concepts with forms of artistic expression, students are encouraged to explore both domains in a complementary and in-depth manner, while adding an emotional and personal component to their learning.



To put this interdisciplinarity into practice, it is necessary to rethink how subjects are taught. Teachers can collaborate to create interdisciplinary projects that integrate science and arts. For example, they can incorporate elements of artistic design to visually communicate the results of a scientific experiment or involve researching scientific concepts to inspire artistic creations in an artistic project.

At Mimesis, we seek to explore this approach at the level of pedagogical tools. Beyond the juxtaposition of scientific and artistic learning, the project focuses on how the scenic component, incorporating emotions, rhythm, and body movement, can allow for the exploration, illustration, and understanding of scientific concepts. The project aims to provide teachers with the necessary resources and training to integrate arts into their teaching.

Watch tutorial



Body & Space

