The G.A.STEM Project

October 2019

G.A. STEM European Project

Introduction

The European project entitled **G.A. STEM - Enhancing STEM skills through arts and mini-games** is coordinated by the University of Turku, and involves 8 transnational partners from 4 different European countries (Belgium, Estonia, Finland, and Italy). The project was funded by the **European Commission** in the framework of the **Erasmus+ Programme, KA2 - Strategic Partnership in the field of School Education**. The G.A. STEM aims at improving motivation in scientific study through the use of "art-works" as tools to trigger students' creativity and to develop more awareness about the everyday applications of scientific subjects.

Framework to integrate art in STEM using digital games

The first deliverable produced within the G.A. STEM project is the **Framework to integrate art in STEM using digital games**. This report provides the background and the overview of the framework itself.

First of all, it outlines a detailed analysis of the **"mathematization"** concept in relation to STEM schedule/exercises using the arts: why and how to combine STEM subjects with arts? How to bring scientific problems into an artistic context? The chapter replies to those questions, providing suggestions and experiences on the existing examples of STEAM practices in real-life, with a specific focus on secondary schools' students.

Secondly, it carries out a detailed analysis of **national school curricula with a selection of specific art-works**. The procedure of the identification of the G.A. STEM exercises started by a detailed analysis of the national educational standards in mathematics and science, as they are described in the national curricula of the countries involved within the G.A. STEM project: Belgium, Estonia, Finland, and Italy.

Game-based learning is defined as an experiential engagement of learning by trial and error, role-playing, and treating a certain topic not as 'content' but as a set of rules or choices and consequences. In a school curriculum, this means translating an element of a subject (such as a law of physics) into the mechanics of a game which

Project partnership

The international partners are:

- University of Turku (Finland)
- Sint-Lievenscollege Ghent (Belgium)
- Tallinn University (Estonia)
- Tamsalu Gymnasium (Estonia)
- Rieskalähde Junior High School (Finland)
- Istituto Comprensivo Maria Montessori (Italy)
- EU-Track (Italy)
- Pixel (Italy)

Erasmus+

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works independently in its own system, based on choices and consequences. In the fourth chapter, therefore, a specific analysis of the existing practices in the use of games for math and science study for 13-16 years old students is presented in the report. This section intends to underline the capability to prepare a game design and to select game elements starting by the selected math / science exercises.

Finally, the Framework provides teachers with two appendixes: the Math and Science topics selected by the G.A.STEM projects and a selection of exercises to be used.

The Report **Framework to integrate art in STEM using digital games** is available on the project website at the following link: https://gastem.pixel-online.org/framework.php.

Forthcoming activities within the G.A.STEM project

TASK 2:

- Definition of the contents and the methodologies for piloting training for teachers and students. It will be structured in **modules**.
- Development of the **learning environment platform** where teachers and students will benefit from the training and will be able to upload the games produced.

TASK 3:

- **Teachers training**: teachers will benefit the piloting path structured into modules available in the platform. They will test the methodology and pedagogical tools with their students.
- **Development of study project with students**: the students will develop their own game by combining STEM and ART.

Meetings

The second meeting was held on 15 – 16 May 2019 in Tallinn (Estonia). During the second meeting, the European project partners finalized the first deliverable, the "Framework to Integrate Art in STEM using Digital Games". In addition, the European project partners started discussing the organization of the second deliverable to be produced, the "Art and Mini-Games course" to be addressed to both teachers and students.


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