Erasmus+

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GLOBAL COMPETENCE IN ACTION. SCHOOL PRACTICE

Title: OpenFAB

School: Institut Milà i Fontanals

Plaça Josep M. Folch i Torres s/n 08001 Barcelona
Website: https://agora.xtec.cat/ins-mila-bcn/
Mail: a8013196@xtec.cat

Global Competence dimension: *Dimensions related to the practice*

☐ Examine issues of local, global and cultural significance
☑ Understand and appreciate the perspectives and world views of others
☐ Engage in open, appropriate and effective interactions across cultures
☑ Take action for collective well-being and sustainable development

Subject: *Ttopics related to the 17 sustainable development goals (SDGs) to transform our world involved in the practice.*

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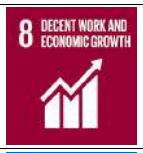
☐		☐		☐		X		X		X	
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21st century Skills: *Skills involved in the practice*

☐	Critical thinking	☑	Creativity	☑	Collaboration	☐	Communication
☐	Information literacy	☐	Media literacy	☑	Technology literacy	☐	Flexibility
☐	Leadership	☐	Initiative	☐	Productivity	☐	Social skills

Target groups:

☐ Primary education ☑ Secondary education ☐Other: (specify)

Age group: 13-14 year olds

School context: *Information about the school and its context*

The school offers lower and upper secondary education (12-18 year old students). The school is located in the centre of Barcelona in a deprived neighbourhood with many families of foreign origin. It hosts around 500 students. Most of them have a deprived family context and come from Pakistan, Bangladesh, North Africa and South America.

The aims of the school are to improve excellence and equity through students' better performance, decreasing dropout rates, the use of digital technology and school engagement. Arts and STEAM are fostered as learning approaches.

Description: *Summary including the goals and objectives of the practice*

In this practice, secondary school students make games and toys for a primary school in the neighbourhood. It is a way to enhance active and participative citizenship using STEAM and the "maker culture" as methodological approaches to produce real and useful materials.

Learning Outcomes: *What students will learn with this practice*

-To work in teams and collaborate
-To improve abstract reasoning and mathematical competence
-To use Google digital tools
-To use 3D design and printing software
-To use a 3D printer and cutting plotter
-To improve communication
-To share 3D designs in an open community

Time Schedule: *Duration, time organization / needed and place*

-The practice lasts 1 term, 4 hours per week in 2 hour sessions.
-The number of students is 20 in working groups of 3-4 students.
-The lessons are in the technology lab (where the machines are) and in the computer room.

Activities: *Steps followed to implement the practice*

Sequence 1: Students are asked to reflect on toys and games they used or played when children. They are asked to look up information in online toy stores to see how are toys nowadays. They look up for manipulative toys and games for 6-7 year old children.

Sequence 2: Students plan a classroom observation. They go to the primary school and observe how children play. Some of them play with the children, other observe and take pictures. The interview the teacher and ask questions about the toys and games that they use, the kind of games, outdoors games, which games and toys like them most, how children with difficulties play…

Sequence 3: Students think and discuss about which toys and games they could design. They start working with 3D design and the machines they will use (3d printer and cutting plotter). 3-4 student groups are made. Each group designs and makes a toy or a game. Several responsibilities are distributed in each group. The final products are uploaded in an online repository.

Sequence 4: Students visit the primary school with the toys and games they have made. They explain how they work and they play together. They officially give the toys and games to the school.

Sequence 5: Students are self-assessed using a rubric on work organization, collaboration management and communication of results. They reflect on their work to enhance self-regulation.

Impact: *Results, benefits, evaluation and impact of the practice*

-Each term 8 toys or games are produced.
-The challenge is to think about a toy which will be used by specific children they know. This increases engagement, self-confidence, initiative and personal autonomy.
-It is a service-learning project that combines learning objectives with community service.
-There is an improvement of digital competence: retrieve and judge information, manage content and data, communicate and collaborate through digital technologies.
-Students use their own device (BYOD).
-There is an increase and improvement of relationships between secondary students and children and between the primary school and the secondary school.

Regarding the SDG, this school practice
- supplies deprived primary schools with new toys and games
- raises awareness on recycling and the possibility of making lost pieces instead of buying a new product.
- adapts toys and games to students with disabilities
- enables citizens as consumers and producers
- fosters the sharing of the knowledge, uploading the designs to an open repository where any citizen can use them for free

Resources: *Resources and materials used in the practice*

-Open-source software: Tinkercad (3D design) and Cura (3D printing).
-Tools: 3d printer and cutting plotter.
-Gsuite to share files and manage documentation.
-Google classroom as learning environment.
-Thingiverse: community for discovering, making, and sharing 3D printable things.

-Materials: 3D printing filament, timber and vinyl sheets.

Supporting documents: *Link to supporting documents, such as forms, multimedia files, lesson plan, pictures, worksheets...*

A presentation about this practice: https://xavierrosell.com/jpre20/