NEXT STEP O2

NEXT STEP SCENARIO

Enabled Educational Scenario

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Date:		**Process Owner:**	
Short Description:			

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1. Introduction

Main aim

The NEXT STEP project is proposing a whole school approach to science learning. Building on previous successful European open schooling and STE(Arts)M initiatives, the project will bring about the NEXT STEP in education by providing a roadmap for the transformation of school classrooms into open and creative learning spaces. NEXT STEP methodological approach exceeds the state of the art regarding existing creative approaches and STEAM initiatives. In this framework the NEXT STEP project will design and set in operation the STEAM IDEAS' Square, an innovative learning environment which will be the nucleus of the school's activities. NEXT STEP will demonstrate how these environments a) can offer opportunities for deeper learning of STEAM, b) can improve the innovation and creative capacities of learners, c) can support the new role of teacher as a coach of the learning process, d) can facilitate effective cooperation with external stakeholders and e) can inspire policy-makers, school heads and school staff to imagine the schools of tomorrow.

Vision of the Project

The NEXT STEP vision for a creative and innovative school is the development of the creative and innovative classroom of tomorrow, the STEAM IDEAS' Square, in which education relies on an interdisciplinary, arts-based methodology within an entrepreneurship and design thinking framework.

STEAM IDEAS' Square - **(SIS)** which will be the main core of the school's creative and innovative activities will have two substances: digital and physical. In its premises and via its digital tools in-school interaction between STEM and other disciplines schoolteachers and among all the relative stakeholders (students, educators, parents, artists, scientists, local community authorities, industrial stakeholders, and policy makers) will be established with purpose to run complex and exciting real-life educational world projects. Teams of students (from the same or different classes) can also work and cooperate under SIS umbrella.

By connecting curious minds and specialists and lead them to think "out of the box" will help to speed up the flow of ideas to **transform the school and its classrooms to** a unique creative space for educational innovation and STEAM education.

Through collaboration and the appropriate pedagogies will be established prototyping, pedagogical innovation, creativity (along with distance learning opportunities) and well-being at school.

In addition, the capacity to work with external organizations so as to explore how such partnerships and networks can be built through a long-term strategy-based on trust and common objectives they contribute to key competence development.

A way to implement and use the ideas of NEXT STEP project is through developing a series of scenarios of use that are in line with the proposed approach and involve schools in a series of creative and innovative activities for the improvement of the local cities, settlements, and communities' physical and built-up environments, while engaging key stakeholders (experts, researchers, local communities, businesses etc.) in the process. Different scenarios about different school typologies will be created and these with the help of the right Strategies will help schools to evolve

One of these scenarios that is suitable for a STARTER school (according to our typology) is the one presented later in this document.

2. Essential Features of the STEAM IDEAS' Square

The development of key competences is further facilitated by the provision of context from other disciplines and can:

a. offer opportunities for deeper learning of STEAM,

b. improve the innovation and creative capacities of learners,

c. support the new role as a coach of the learning process,

d. facilitate the effective cooperation with external stakeholders and

e. inspire policy makers, school heads and school staff to imagine the schools of tomorrow.

All the above in total in the context of a functional NEXT STEP STEAM IDEAS' square will drive to overcome the organizational and technical barriers and to integration of creative and innovative culture in every day school practices and to aggregate and create projects and activities customized to the specific needs of schools.

Deeper Learning Competences, as **defined in the Recommendation of the European Parliament and of the Council of 18 December 2006 on Key Competences for Lifelong Learning (2006/962/EC)** as described by the Hewlett Foundation model (Pellegrino & Hilton, 2013) can be adopted in order to define the exact indicators needed to measure the efficiency of the project's objectives. A selection of certain deeper learning competences that correspond to a range of ages wider than the high school students (which is the main target group of the deeper-learning competences model) can be classified in the following three groups (Frans & Andreotti, 2018):

Group A: Cognitive competencies
(1) Mastering rigorous academic content - A1
(2) Thinking critically - A2
Group B: Interpersonal competencies
(3) Working collaboratively - B3
(4) Communicating effectively - B4
Group C: Intrapersonal competencies
(5) Learning to learn (C5)
(6) Developing academic mindsets - C6

As defined in the Recommendation of the European Parliament and of the Council of 18 December 2006 on Key Competences for Lifelong Learning (2006/962/EC):
F1) Literacy competence (GA1)
F2) Multilingual competence
F3) F3M.Mathematical competence and F3S. competence in science, F3T. technology and F3E.engineering, F3MS, F3ST, (STEM=F3)
F4) Digital competence - F4
F5) F5P.Personal, F5S.social and F5L.learning to learn competence (C5)
F6) Civic competence
F7) Entrepreneurship competence
F8) F8C. Cultural awareness and F8E.expression competence
We use the Competences as Features taxonomy from the European Parliament and the Council's recommendation in our scenario.

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3. NEXT STEP Scenario Identification:

(for the scenario with the title: Noise Pollution: Identify sources of noise pollution)

3.1. *Scenario of Use in an Enabled School - General description.*

On a group trip to a local park or scientific/artistic institution (theatre, concert hall, music hall), or street or public facility, students should identify sources of noise pollution, in various environments, using sound level meters (such as Sound Meter App) and, based on research, critically evaluate the consequences of noise pollution on human beings and nature, proposing prevention and protection measures.

In the classroom reflect and consolidate the acquired knowledge, complementing it with laboratory activities related to sound and sound waves.

This activity should be developed, at least, in collaboration with the following teachers: science, music, visual and art education and physical chemistry teachers.

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3.2 Scenario Identification Card

Category	Description
Title	Noise Pollution: Identify sources of noise pollution
Teaching theme/problem	Sound waves and Noise Pollution
Keywords	Sound waves, Noise
Language	English
Thematic classification	STEAM oriented Education
Learning/Teaching main objectives:	(S)Understanding the sound, sound waves and noise (T)Using technological devices and Applications (E) (A)Representing sound waves and noise in a creative form (making a music, a video, an installation, etc.) (M)Making measurements and calculations
Suggested age group	12-15 YO
Estimated level of difficulty	Medium
Material and technical infrastructure needed	Smartphone, computer, or tablet with Sound Meter App or another similar app STEAM IDEAS´ Square to study sound and sound waves in a creative way, producing a creative result
School - Stakeholders Synergies	Several stakeholders on the school surrounding, such as study noise pollution near some elderly home, hospital or other public facilities
Typical intervention time	3h/4h field trip and collecting data 10h-12h analysis, reflection, creative product
Teaching level	Junior High School
Level of interactivity	Medium
Type of interactivity	Educational Field Trip
Authors, Publisher name	NUCLIO (Sara Anjos, Rosa Doran)
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3.3 Scenario Identification Image

Image1- @www.WHO.int

3.4 Title of Project: Noise Pollution

Can a sound be good or bad? Does noise influence the environment and our quality of life?

Feel Step

Act #	Description of activities, strategies, methods, means, resources and synergies			Learning goals Learning outcomes - Features	STEAM Disciplines Place and Estimated Duration
A1	**Science** **Music** **Arts** **ICT** **Physics Chemistry** **Teacher(s)**	**Actions** Listening to various sounds (showing different sounds, some of them street noises or other)	**Educational Method** Introduction to the theme of sound though IBSE (Inquiry Based Science Education)	The activity will introduce students to the concept of sound and noise. What is sound? (Physics-Chemistry, Music) What is noise?	
		Tools Computer, Power Point			
	Students	**Actions** Raise questions, discuss in groups (of 3 or 4 people) what they know about the topic Annex 1 Go around the school to identify the local sounds of the school environment Discuss in groups		Students should be able to describe sounds and different sources of sounds in the school environment, including noise sources. They should be able to identify that a sound can be harmful or not. Students discuss their findings with colleagues	1h (In classroom 40 m+20 min around the school)
		Tools Tablets, computer, apps			
STEAM Ideas' Square (SIS) Operation - School Community Synergies		To look at the school community to identify ways of collaboration to raise awareness of the problem of noise pollution. Visit https://www.who.int/europe/activities/providing-guidance-for-the-protection-of-human-health-from-harmful-exposure-to-environmental-noise for more information			30 min
School-Stakeholders Synergies		Teachers (Music, Arts, Science, Physics Chemistry, ICT, Maths) and principal. (Involve different subject areas) Involve different physical spaces available to the school community Reflect on specific problems of the community (in this case noise pollution)			1h

Imagine Step

Act #	Description of activities, strategies, methods, means, resources and synergies			Learning goals Learning outcomes - Features	STEAM Disciplines Place and Estimated Duration
A2	**Science** **Physics** **Chemistry** **Teacher(s)**	**Actions** To help students investigate about sound waves, frequencies and wavelengths and the speed of sound. To show information, videos, news about noise pollution and the relation with quality of air and quality of life https://www.eea.europa.eu/signals/signals-2020/articles/noise-pollution-is-still-widespread https://www.who.int/europe/health-topics/noise#tab=tab_1	**Educational Method** IBSE	To learn about sound and ways sound propagate To learn about sound waves, frequencies and wavelengths To learn about the speed of sound To learn about sound and the relation of sound with the quality of air Imagining situations in which sound can be harmful to the environment and to humans near the school community To learn about noise pollution To imagine solutions to the problem of noise pollution near the school	S Classroom 2h

		https://eurocities.eu/latest/air-quality-and-noise-pollution-are-major-concerns-for-european-cities/ Prepare a field trip to a local place near the school community (places where tools and construction workers' noises are in place, cars in a street, noise near a retirement home, or a hospital or a nursing home, etc.)			
		Tools Textbook (Sound chapter), Powerpoint Presentation, Computer, Smartphone, videos, news, etc.			
	Students	**Actions** Based on what is presented, students start to investigate sound. Students start to think of the problem of noise pollution in their community, by going in a field trip that they prepare in groups Annex 2		Students should be able to identify what is a sound and its means of propagation Students should make relation with the quality of air and sound Students learn about situations in which sound can be harmful to the environment and to humans, and what is noise pollution Students think in groups to imagine solutions to a specific problem of noise pollution in their community	**Classroom 2h** **Field trip 3,5h**
		Tools Computer, Smartphone, videos, news, etc.			

			They should imagine for solutions to a specific problem related to noise pollution in their community F3S F5S F6	
(SIS) - School Community Synergies	To look at the school environment identifying sources of sound and noise. Talking to the school community and going on a field trip. Start thinking about a product (a song, an installation, etc.) to raise awareness of the problem of noise pollution for the overall health and well-being of the community			
School-Stakeholders Synergies	Teachers (Music, Arts, Science, Physics Chemistry, ICT, Maths) and principal and other school surrounding stakeholders Involve different physical spaces available to the school community			

Create Step

Act #	Description of activities, strategies, methods, means, resources and synergies			Learning goals Learning outcomes - Features	STEAM Disciplines Place and Estimated Duration
A	**Science Music Arts ICT Physics Chemistry Teachers**	**Actions** Guide students in their group assignment	**Educational Method** ***IBSE***		
		Tools Computer software, Smartphone app, etc.			
	Students	**Actions** Students think in groups to create solutions to the specific problem of noise pollution that they found on the field trip Create solutions/outcomes to raise awareness on the problem of noise pollution in the community		Students think in groups to create solutions to a specific problem of noise pollution that they found on the field trip They create solutions (a product an outcome, a music, a song, an installation, an art exhibition, etc.) to that specific problem related to noise pollution F3S F5S F6. Each group may create different solutions/outcomes	**2h**
		Tools Several, depending on the outcome that the group of pupils is developing			

(SIS) - School Community Synergies	Create a product (a song, a music, an installation, etc.) to raise awareness of the problem of noise pollution for the overall health and well-being of the community			
School-Stakeholders Synergies	Teachers (Music, Arts, Science, Physics Chemistry, ICT, Maths) and principal and other school surrounding stakeholders Involve different physical spaces available to the school community			

Share Step

<table>
<tr><td colspan="5"> 
</td></tr>
<tr><td>Act #</td><td colspan="2">Description of activities, strategies, methods, means, resources and synergies</td><td>Learning goals

Learning outcomes - Features</td><td>STEAM Disciplines

Place and Estimated Duration</td></tr>
<tr><td rowspan="2">A</td><td>Science
Music
Arts
ICT
Physics
Chemistry

Teachers</td><td>Actions
Help students present their outcomes/results/products to the community

Tools
Depends</td><td>Educational Method</td><td></td><td>  </td></tr>
<tr><td>Students</td><td colspan="2">Actions
Students present their outcomes/results/products to the community (internal and external)

Tools
Depends</td><td>Students should be able to organize an event (Art exhibit, Music concert, Film session, etc.) to the community
F5 F6 F7 F8</td><td>3h</td></tr>
<tr><td colspan="2">(SIS) - School Community Synergies</td><td colspan="2">Organize an event to share the products created (songs, installations, etc.) to raise awareness of the problem of noise pollution to the overall health and well-being of the community</td><td></td></tr>
<tr><td colspan="2">School-Stakeholders Synergies</td><td colspan="2">Teachers (Music, Arts, Science, Physics Chemistry, ICT, Maths) and principal and other school surrounding stakeholders
Involve different physical spaces available to the school community
Share with other schools</td><td></td></tr>
</table>

4. References

https://www.who.int/europe/activities/providing-guidance-for-the-protection-of-human-health-from-harmful-exposure-to-environmental-noise

https://www.eea.europa.eu/signals/signals-2020/articles/noise-pollution-is-still-widespread

https://www.who.int/europe/health-topics/noise#tab=tab_1

https://eurocities.eu/latest/air-quality-and-noise-pollution-are-major-concerns-for-european-cities/

5. ANNEXES

Annex 1- Questions for reflection and debate that may arise after showing different sounds (music, people walking, birds singing, tools and construction workers' noises, cars in a street, etc.)
What is a sound? Can a sound be good or bad? Does noise influence our environment and our quality of life? In what way? Students discuss in groups of three or four (10 minutes)

Annex 2 – Prepare a field trip

Based on the information and content students are investigating, they decide and prepare a field trip to a local place near the school community (places where tools and construction workers' noises are in place, cars in a street, noise near a retirement home, or a hospital or a nursing home, etc.).
Groups identify different places near the school to visit
A voting takes place
A field trip is prepared. Each group prepare different aspects of the visit (what to visit, when, what to investigate on the visit, what data to collect and tools and apps to collect data are necessary, what do they expect from the visit, etc.)

6. Abbreviations, short terms, apps used in Scenario of Use

Sound Meter: https://play.google.com/store/apps/details?id=com.splendapps.decibel&hl=en&gl=US
Audacity: https://www.audacityteam.org/

Competences

- F1. Literacy competence
- F2. Multilingual competence
- F3. F3M.Mathematical competence and F3S. competence in science, F3T. technology and F3E.engineering //or/ F3MS, F3ST , (STEM=F3)
- F4. Digital competence
- F5. F5P.Personal, F5S.social and F5L.learning to learn competence
- F6. Civic competence
- F7. Entrepreneurship competence
- F8. F8C. Cultural awareness and F8E.expression competence

NEXT STEP Partnership

Western Norway University of Applied Sciences

SCIENCE VIEW

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INSTITIÚID TEICNEOLAÍOCHTA DHÚN DEALGAN

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