NEXT STEP O2

NEXT STEP SCENARIO

Digital and Non-Digital Coding Educational Scenario

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Short Description:			

You can use these pics to indicate the Disciplines of your Activity in the tables below

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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 thelocal cities, settlements, and communities' physical and built-up environments, while engaging key stakeholders (experts, researchers, local communities, businesses etc.) in theprocess. 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 presentedlater 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

3.1. *Scenario of Use in a… School- General description.*

The 5th Primary School Experimental in Komotini, located in a bustling Greek city, is a vibrant and inclusive urban institution. Its architecture blends classical Greek elements with modern design, creating a timeless yet contemporary atmosphere. The school is home to a diverse group of pupils who are enthusiastic about learning and engaged in various activities. The dedicated staff is committed to providing a high-quality education and creating a nurturing environment. Teachers, support staff, and extracurricular instructors collaborate to foster academic excellence, personal growth, and community involvement. Together, they form a cohesive team that ensures the school's success in providing a well-rounded education for its students.

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3.2 Scenario Identification Card

Category	Description
Title	***Digital and Non-Digital Activities approaches in Learning Programming Concepts***
Teaching theme/problem	***How to teach children programming and coding***
Keywords	***Code week, coding, non digital, digital, scratch, steam education***
Language	***English, Greek***
Thematic classification	**Coding**
Learning/Teaching main objectives:	***Sequences, looping, coding***
Suggested age group	***11-12 years old***
Estimated level of difficulty	***Small to medium***
Material and technical infrastructure needed	***Papers and scissors, computers, internet, projector, STEAM IDEAS' Square place, ICT school infrastructure,one tablet in a group.***
School - Stakeholders Synergies	***With local technical companies***
Typical intervention time	***40-50 minutes at a time***
Teaching level	***High in primary school***
Level of interactivity	***highest***
Type of interactivity	***Verbal, cooperation in teams***
Authors, Publisher name	***Elena Papadopoulou***
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3.3 Scenario Identification Image

3.4 *Digital and Non-Digital Activities approaches in Learning Programming Concepts*

Feel Step

Act #	Description of activities, strategies, methods, means, resources and synergies			Learning goals Learning outcomes - Features	STEAM Disciplines Place and Estimated Duration
A	**Teacher**	**Actions** Students in teams	**Educational Method Introduction to the theme and Socratic dialogue**	Students should try to cooperate in groups and solve a given excercise	***Teamwork Classroom 45 minutes***
		Tools papers, scissors and pencils			
	Students	**Actions work together as a team**		Students should try to cooperate in groups and solve a given exsercise	***Teamwork Classroom 45 minutes***
		Tools papers, scissors and pencils			
STEAM Ideas' Square (SIS) Operation - School Community Synergies					
School-Stakeholders		**No synergy is needed so far because they work inside the classroom to**			

Synergies	**build their team**	

Imagine Step

Act #	Description of activities, strategies, methods, means, resourcesand synergies			Learning goals Learning outcomes - Features	STEAM Disciplines Place and Estimated Duration
A	Teacher	**Actions** Code On paper	**Educational Method** ***Provide a problem and try to find solutions***	***Students should try to solve the given scenario problem in their teams by trying or rejecting solutions***	Classroom 45 minutes
		Tools paper and pencil			
	Students	**Actions work together**		***Students must* be capable tosolve the problem**	
		Tools Tools paper and pencil			
(SIS) - SchoolCommunity Synergies		**Schoolteachers (musicians, artists, historians, scientists) collaborate on creating worksheets, uploading material at online platforms, finding timeslots for using creative spaces (working in and preparing the STEAM Ideas' Square) and agree on the whole procedure and for the time which is needed for daily school activities**			
School-Stakeholders Synergies		**A teacher will collaborate with the local community to provide the tools**			

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Create Step

Act #	Description of activities, strategies, methods, means, resourcesand synergies			Learning goals Learning outcomes- Features	STEAM Disciplines Place and Estimated Duration
A	Teacher	**Actions code on computer**	**Educational Method** ***Coding blocks, scratch***	Enhanced Creativity: By using Scratch, students are empowered to unleash their creativity and imagination. Development of Computational Thinking: Scratch promotes the development of computational thinking skills, such as problem-solving, logical reasoning, and algorithmic thinking. Collaboration and Communication: Scratch encourages collaboration among students as they can share their projects	Classromm 1-2 hours
		Tools tablets, internet, computer, projector			
	Students	**Actions follow teacher's guidelines to put the code in order** Working with Scratch involves several steps to create interactive projects. Here is a general procedure to get started: 1. Launch Scratch: Open the Scratch software or visit			

		the Scratch website (scratch.mit.edu) to access the online version. Scratch can be used on various devices, including computers, laptops, and tablets. 2. Choose a Project Type: Decide on the type of project you want to create, such as a game, story, animation, or interactive art. This will help you determine the project's structure and design. 3. Familiarize Yourself with the Interface: Take a moment to explore the Scratch interface. It consists of different areas, including the Stage (where the project is displayed) and the Blocks Palette (containing coding blocks). 4. Plan and Design: Before diving into coding, it's helpful to plan and design your project. Outline the main features, characters, and interactions you want to include. Consider the visual elements, sounds, and any user interactions you wish to incorporate. 5. Code with Blocks: Scratch uses a block-based programming language. Select the appropriate blocks from the Blocks Palette and snap them together like puzzle pieces to create scripts. Arrange the blocks in the scripting area to define the behavior and interactions of the project's elements. 6. Customize Sprites and Backdrops: Sprites are the characters or objects in your project, and backdrops are the backgrounds. Use the built-in editor to create or import your own sprites and backdrops. Customize their appearance, size, and costumes to match your project's vision.		

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		Tools tablets		
(SIS) - School Community Synergies		**Community provides the scratch programme and the tutorial to the teacher before the session** Collaborations with local community organizations, businesses, and other external partners can create synergies that extend learning beyond the classroom. Partnerships may include mentorship programs, internships, guest speakers, or joint projects. These synergies enrich students' educational experiences, provide real-world connections, and enhance community engagement.		
School-Stakeholders Synergies		**The school shows in local community of parents the students' work**		

Share Step

Act #	Description of activities, strategies, methods, means, resources and synergies			Learning goals Learning outcomes - Features	STEAM Disciplines Place and Estimated Duration
A	ICT Teacher	**Actions** **Show the process of creating a video, the materials which are needed to create one video of that type.** **Tools IWBS, P.S.**	**Educational Method** ***Inquiry Method***	Using coding blocks as a learning tool provides several key objectives for students. Here are some of the primary learning goals: 1. Computational Thinking: Coding blocks help develop computational thinking skills, which involve breaking down complex problems into smaller, manageable steps. Students learn to analyze problems, identify patterns, and devise logical solutions. They gain a deeper understanding of how algorithms and sequences of instructions can solve problems effectively.	 **In classroom 45m**

			2. Problem-Solving: Working with coding blocks encourages students to think critically and solve problems creatively. They learn to approach challenges systematically, experimenting with different blocks and strategies to achieve desired outcomes. Through trial and error, students develop resilience, perseverance, and the ability to think flexibly when encountering obstacles. 3. Logical Reasoning: Coding blocks promote the development of logical reasoning skills. Students learn to understand cause-and-effect relationships, make logical connections, and anticipate outcomes. They learn to think sequentially, using if-then statements, loops, and conditionals to create dynamic and	

			interactive programs. 4. Algorithmic Thinking: Coding blocks facilitate the development of algorithmic thinking, which involves designing and implementing step-by-step procedures to solve problems. Students learn to organize their thoughts, plan the sequence of actions, and consider efficiency and optimization. They become skilled at designing algorithms to achieve specific goals and develop an appreciation for structured problem-solving.	
	Students	**Actions** **Tools Pcs at Pc Lab, an app like: code.org**		
(SIS) - School Community Synergies		**Structuring of the online platform in order to properly place the photos and the story of the coding creation. Uploading the photos and creations of the students to school's platform**		2 hours
School-Stakeholders		Parents and guardians are key stakeholders who support and advocate for their children's		1 hour

Synergies	education. Collaborating with parents through regular communication, parent-teacher meetings, and involvement in school activities promotes a positive partnership between home and school. This synergy allows for a better understanding of students' needs, enhances parental support, and strengthens the overall educational experience.	

4. References

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5. ANNEXES

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

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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

ELLINOGERMANIKI AGOGI

NUCLIO
Núcleo Interactivo de Astronomia

DUNDALK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA DHÚN DEALGAN

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