

Didactic Scenario

1. Title

Learning through Digital Games: We Create and Play!

2. Keywords

Digital Games, Learning, Creativity, Technology, Fun, Programming, Game Design, Interactivity, Educational Tools, Collaboration, Critical Thinking

3. Basic information

STEAM Subject: TECHNOLOGY

Typical interaction time with the instructional scenario in teaching hours for in-school work: 2 hours

General description of the scenario:

<u>Phases</u>	<u>Stage</u>	<u>Time</u>
Introduction to Digital Games	Preparatory Stage	30 minutes
Digital Game Design and Creation	Implementation Stage	90 minutes
Presentation and Feedback	Evaluation Stage	30 minutes

Age group: 10-12 years old

Estimated difficulty level:

Very Easy	Easy	Moderate	Challenging	Very Challenging
			X	

Teaching resources

Materials:

- Computers or Tablets: To access online programming tools and create digital games.
- Programming Software: Tools such as Scratch or other similar software suitable for children.
- Internet Access: To use online resources and tools.
- Projector or Screen: For presenting the games to the class and demonstrating the programming tools.
- Headphones or Speakers: For listening to sounds and music tracks that will be used in games.
- Paper and Pencils: For the initial design and organization of ideas before their digital creation.
- Decorative Materials: If students want to create physical templates or promotional materials for their games.
- Guides and Manuals: Material that will provide guidance for using the programming software.

School infrastructure:

- Computers or Tablets: Equipment with sufficient computers or tablets for all students or at least in groups to work on their digital projects.
- Good Internet Connection: Fast and reliable Internet connection to access online programming tools and other educational resources.
- Projector or Screen: For presenting student games and demonstrating programming tools in class.
- Adequate Workspace: Tables or desks that allow students to work in groups or individually comfortably.
- Online Learning Management Platform: If possible, using a platform like Google Classroom to submit projects and share information.
- Sound system: If there is a need for sound during game presentations, a sound system or speakers would be useful.

Additional material from external sources/online tools:

- Scratch (programming language) (<https://scratch.mit.edu/>)
Usage: Simple programming language that allows students to create programs for robots and other projects.
- Tinkercad (design and programming) (<https://www.tinkercad.com/>)
URL: Tinkercad

Usage: Free 3D design tool that can be used to design robot parts and programmed sensor setup.

- Blockly (programming with blocks) (<https://blockly.games/>)

URL: Blockly

Usage: Block programming tool that helps students understand basic programming concepts without writing code.

Differentiated instruction for students with different abilities and learning styles in the same class:

- Custom Activities. Create activities with different levels of difficulty. More advanced students can design more complex games, while beginners can focus on simpler structures.
- Tool Options. Offer various platforms and tools for game development (eg Scratch, Tynker, Kahoot!). Students can choose the tool that suits them best.
- Teamwork. Create groups of different ability levels so that more able students support others, encouraging mutual learning.
- Individual Support. Provide individualized guidance to students who need more help by offering extra material or homework guidance.

Developed by: Development Center of Thessaly

4. Educational Problem

The script solves the problem of students' lack of interest and engagement in technological and mathematical subjects. Many students often find mathematical concepts and technology difficult or abstract, which can prevent them from exploring them. Through the creation of digital games, the script provides a fun and interactive way of learning, allowing students to combine their creativity with technology. This enhances engagement and understanding of math and technology concepts, while promoting collaboration, critical thinking and problem-solving skills, making learning more experiential and enjoyable.

5. Learning Objective (-s)

1. Understanding Digital Games. Students will gain knowledge about the structure and elements that make up a digital game.
2. Programming Skills. They will learn basic programming concepts, such as statements, variables, and loops, and how to put them into practice.
3. Creative Thinking. They will be encouraged to use their imagination to design and create their own digital game.
4. Problem Solving Skills. Students will develop their ability to identify and solve problems that arise during the game creation process.
5. Collaboration and Communication. Through group work, they will learn to cooperate and communicate effectively with their classmates.
6. Self-assessment. They will learn to evaluate their own work and recognize their progress, enhancing their self-awareness.
7. Connecting Mathematics and Technology. They will understand how mathematical concepts are integrated into the process of creating digital games and how technology can support learning.

6. Phases of the Scenario

Phase 1

Title: Introduction to Digital Games

Indoor	Outdoor	Mixed
X		

Phase duration in minutes: 30 minutes

Detailed description of the scenario phase: In the 1st phase of the scenario, students are introduced to the basic concepts and elements that make up digital games. The instructor begins with a presentation that explains the different types of digital games, their structure, and their basic functions, using examples of games that are popular with students. Students then participate in interactive activities, such as games and quizzes, that help them identify the various mechanics and strategies used in games. This phase aims to spark students' interest in learning through games and prepare them for the process of creating digital games afterwards.

Activity Sheets:

Activity 1: Identifying Types of Games

Directions: Read the descriptions of the game types below and match them with the correct type.

Action games
Strategy games
Role playing games (RPG)
Educational games

Descriptions:

- A) Games that require thinking and strategy to achieve goals.
- B) Games that promote interactive learning.
- C) Games that involve fighting and fast movements.
- D) Games where players take on the roles of characters in fictional stories.

Activity 2: Design a Digital Game

Instructions: Think and design the concept of a digital game you would like to create. Write your ideas below:

Game Title: _____
Purpose of the Game: _____
Characters: _____
Environment: _____
Ground Rules: _____

Activity 3: Class Discussion

Directions: Answer the following questions in class:

What are your favorite types of digital games and why?
How do you think digital games can help us learn?

Phase 2

Title: Digital Game Design and Creation

Indoor	Outdoor	Mixed
X		

Phase duration in minutes: 90 minutes

Detailed description of the scenario phase: In phase 2 of the scenario, students work in teams to develop and program their own digital game. First, the teams discuss their ideas, determining the type of game, characters, scenario and game rules. Then, using programming

tools like Scratch, students create their digital game, adding graphics, sounds, and interactions. As they progress through the process, students are encouraged to experiment with the various features of the software and discover how to incorporate mathematical concepts into their game design. This phase promotes creativity, teamwork, and problem-solving skills while giving students the opportunity to apply their programming knowledge.

Activity Sheets: N/A

Phase 3

Title: Programming and Testing

Indoor	Outdoor	Mixed
X		

Phase duration in minutes: 30 minutes

Detailed description of the scenario phase: In the 3rd phase of the scenario, students complete the development of their digital games and begin the testing process. First, teams review their game code and settings, confirming that all functions work correctly and that the mathematical concepts they have incorporated are correctly implemented. Students then test their games, looking for any bugs or improvements that need to be made. Through this process, they are encouraged to collaborate and provide feedback to each other, enhancing the learning process. Groups record their findings and make necessary adjustments, preparing their games for class presentation. This phase promotes critical thinking and problem-solving skills, allowing students to recognize the importance of testing and improvement in the development process.

Activity Sheets: N/A

7. Evaluation Methodology

For scenario evaluation, a methodology combining observation, presentation and self-evaluation is proposed. The teacher can monitor student participation and interaction during the design and planning phases, using an observation board to note active participation and support among group members. In the presentation of the games, students will be assessed on criteria such as creativity, technical application and connection to mathematical concepts, using a simple scoring column. In addition, students will be given a self-assessment sheet to judge their own participation and the progress they have made, enhancing their self-awareness. This

methodology provides a holistic approach to assessment, focusing on the learning process and skill development.

8. Additional Resources for the teacher

- Master's thesis entitled "The digital game in the educational process". <https://cs-msc.uop.gr/sites/default/files/2024-03/Manou%20.pdf>
- Master's thesis entitled "Game-centered learning using ICT. in Primary". <https://pergamos.lib.uoa.gr/uoa/dl/object/3237611/file.pdf>