



FACILITATE-AI

GUIDELINES FOR FACILITATING THE LEARNING OF ARTIFICIAL INTELLIGENCE
BY SCHOOL STUDENTS OF GRADES 7-12

Guidelines for facilitating the learning of Artificial Intelligence (AI) by School Students of Grades 7-12

Reference Number: 2021-1-CY01-KA220-SCH-000032567

C1 Training course: **Training on Artificial Intelligence (AI) content for adapting to school curricula**

Result 1 - A1/T1

Module Number and Area/Topic: Module 4 – Teaching through games

Module owners: PT-UNiv, BG-Univ, GR-IASA

Introduction and Broad Description of the Context and Goal of the area/topic addressed

This module will provide teachers with training concerning how digital games and game elements can be used to intrinsically motivate students while making the learning process more enjoyable and engaging. By the end of the module, teachers should be able to autonomously identify useful games for teaching AI, and to adapt both the teaching methodologies and the contents to this new form of teaching. The module will also address the issue of competition vs. cooperation, and how students may be differently motivated by them.

The module is organized into 4 main parts:

1. Gamification & AI: basic concepts and taxonomy
2. Specification of the learning task and identification of suitable digital games
3. Development of digital learning resources and support material
4. Real-time feedback and progress mechanics

Learning objectives and learning outcomes (*from the short description: Competences List of the Training Modules*)

- to select, identify and evaluate appropriate learning games for teaching and learning
- to organize and share the learning resources
- to evaluate digital resources, connected with teaching through games
- to select games developed using various AI-technologies and algorithms
- to interact through a variety of digital technologies
- to understand appropriate digital communication means for a given context
- to share data, information and digital content with other participants in the learning process through appropriate digital technologies
- to use digital tools and technologies for collaborative learning processes, and for co-creation of new data, resources and knowledge
- to use game elements to motivate students to participate in the learning process
- to stimulate interpersonal relationships through collaboration and competition
- to change and add content according to the requirements of the AI algorithm using the most appropriate formats.

Competences (*from the AI Competence Framework*)

- Acquiring specific transferable achievements
- Actively engaging learners
- Actively enabling learners
- Adopting new methods of teaching and learning

- Applying algorithms
- Enhancing the activities for learning
- Enhancing the effectiveness of teaching
- Proposing creative solutions to problems

Instruments/Tools/Supporting Material/Resources to be used:

- <https://machinelearningforkids.co.uk/>
- <https://openprocessing.org/>
- <https://www.moralmachine.net/>
- <http://learnml.eu/games.php>
- <https://education.minecraft.net/>
- <https://robocode.sourceforge.io/>
- <https://www.codemonkey.com/>
- <https://www.ibm.org/activities/machine-learning-for-kids>
- http://ccssgames.com/welcome_to_data_games.html
- <https://slejournal.springeropen.com/articles/10.1186/s40561-019-0106-1>
- <https://www.kaggle.com/competitions>
- <https://openedx.org/>

PART 1	Gamification & AI: basic concepts and taxonomy
Learning Objectives	<ul style="list-style-type: none"> • To know main concepts of gamification and how it can be used in teaching; • To know the pros and cons of different approaches (e.g. cooperation vs. competition, automated feedback vs. teacher-based feedback)
Learning Outcomes	<ul style="list-style-type: none"> • To prepare the teacher to appropriately specify an AI learning task and the desired gamification teaching methodology;
Competences	
Activities	What is gamification? Gamification elements and gamification concepts? Artificial Intelligence and Gamification

PART 2	Specification of the learning task and identification of suitable digital games
Learning Objectives	<ul style="list-style-type: none"> • Specify the AI learning task in terms of the main concepts to be learned and the students' restrictions/characteristics (e.g. prior coding skills, age...); • Being able to identify (and eventually adapt) an appropriate digital game according to the specification;
Learning Outcomes	Understand how design and define gamified tasks, gamification elements in different gamification scenario applied to AI learning.
Activities	How to identify and design gamification tasks for AI learning?

PART 3	
Development of digital learning resources and support material	
Learning Objectives	<ul style="list-style-type: none"> To develop appropriate digital documents and other resources to support students in learning through digital games (e.g. code snippets, examples of using the digital game, language adaptation)
Learning Outcomes	Understand how to use digital tools and technologies for collaborative learning processes, and for co-creation of new resources and support materials
Activities	Development of digital learning Tutorial design interactive tasks in course design

PART 4	
Real-time feedback and progress mechanics	
Learning Objectives	<ul style="list-style-type: none"> To identify and/or develop real-time feedback mechanisms that can, to some extent, minimize the dependence on the presence of the teacher and allow the student to learn autonomously; To identify and/or develop progress mechanics that can motivate students to work harder (e.g. badges, leaderboards, increasing difficulty...)
Learning Outcomes	Understand how to use game elements to motivate students to participate in the learning process and stimulate interpersonal relationships through collaboration and competition
Activities	Application of gamification elements in the learning tasks Implementation of game mechanics and different reinforcement strategies for competition and collaboration Leveraging LMS and learning through games with gamification