FACILITATE-AI

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

Co-funded by the European Union

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

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

C2 Training course:**Verification of training curriculum and developed learning materials**

Result 2 – A3

Module Number and Area/Topic: 3.1 Motivation-Resources-Ethics

Module owners: Doukas School, Ivan Apostolov, UCY

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

This module focuses on integrating artificial intelligence (AI) into education. The goal is to provide educators with the knowledge and skills to effectively use AI in teaching and learning. Educators will explore practical applications of AI in education, learn fundamental AI concepts and tools, and enhance motivation and engagement using digital game elements. They will also develop digital literacy and skills for utilizing digital data and resources in an AI environment.

Educators will adapt their teaching methods and content to introduce and teach AI concepts to students, promoting critical thinking and problem-solving. They will gain an awareness of AI's potential transformation in education, including personalized approaches and data analysis. Ethical considerations and biases in AI development will be explored, emphasizing the importance of transparency and responsible use of AI.

Educators will gain practical knowledge in building AI models and understand the impact of AI on society. The overall goal is to foster an understanding of AI's potential in education, develop AI ethics, and prepare educators to navigate the AI-driven future while empowering their students for success in the digital age.

Learning objectives and **learning outcomes**

1. Describe practical applications of AI in various real-world contexts, including education.
2. Identify of the fundamental AI concepts, algorithms, and tools.
3. Enhance motivation and engagement through the use of digital game elements in teaching AI.
4. Enhance digital literacy and skills for utilizing existing digital data and resources in an AI environment.
5. Adapt teaching methods and content to effectively introduce and teach AI concepts to students.
6. Cultivate an awareness of AI's potential transformation in teaching and learning practices.
7. Explore AI's potential for enhancing teaching and learning experiences through personalized approaches and data analysis.
8. Gain practical knowledge and skills in building AI models, including training, validation, and testing.
9. Promote critical thinking and problem-solving abilities through AI-based real problems.
10. Explore the ethical considerations and potential biases in AI development and implementation.
11. Develop an attitude of AI ethics and the importance of transparency in AI systems.
12. Foster the AI's impact on society and everyday life, including ethical considerations.

Competences

- Adapting accessibility and inclusion
- Adapting differentiation and personalisation
- Adopting new methods of teaching and learning
- Creatively using digital technology
- Enhancing the effectiveness of teaching
- Interacting through digital technologies
- Enhancing the activities for learning
- Exploring information and digital content
- Interacting through digital technologies
- Actively engaging learners
- Collaborating through digital technologies
- Adapting technology to create knowledge
- Awareness of digital division and exclusion
- Awareness of guidelines for ethical systems

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

Teachable Machine Train a computer to recognize your own images, sounds, & poses. A fast, easy way to create machine learning models for your sites, apps, and more – no expertise or coding required.
https://teachablemachine.withgoogle.com/
Which face is Real: Guess if the face is real or AI generated.
https://www.whichfaceisreal.com/
AutoDraw pairs machine learning with drawings from talented artists to help everyone create anything fast.
https://www.autodraw.com/
Animated Drawings: Bring children's drawings to life, by animating characters to move around.
https://sketch.metademolab.com/
Gencraft: Describe your creation in detail.
https://gencraft.com/generate
Shadow Art: Try your hands at the art of shadow puppetry, with a little help from AI.
https://shadowart.withgoogle.com/?lang=en-us
Google Lens: Point your camera at something, and Google Lens tells you what it is.
https://lens.google/intl/en/
Pl@ntNet: a tool to help to identify plants with pictures.
https://identify.plantnet.org/
Bird Sounds: Thousands of bird sounds visualized using machine learning.
https://experiments.withgoogle.com/ai/bird-sounds/view/
Use the *Photomath* app to scan a tricky problem. Get instant solution steps for your exact problem, vetted by a team of math teachers. Use those steps to dig into the nitty-gritty and learn at your own pace.
https://photomath.com/en/
WolframAlpha: Compute expert-level answers using Wolfram's breakthrough algorithms, knowledgebase, and AI technology.
https://www.wolframalpha.com/

PART 1	
Learning Objectives	1. Describe practical applications of AI in various real-world contexts, including education. 2. Identify of the fundamental AI concepts, algorithms, and tools. 3. Adapt teaching methods and content to effectively introduce and teach AI concepts to students. 4. Cultivate an awareness of AI's potential transformation in teaching and learning practices. 5. Explore AI's potential for enhancing teaching and learning experiences through personalized approaches and data analysis.
Learning Outcomes	1. Understand the practical applications of AI in various real-world contexts, including education. 2. Demonstrate knowledge of fundamental AI concepts, algorithms, and tools. 3. Incorporate digital game elements effectively to enhance motivation and engagement in teaching AI. 4. Adapt teaching methods and content to effectively introduce and teach AI concepts to students. 5. Recognize and evaluate the potential transformation of teaching and learning practices through AI.
Competences	● Adopting new methods of teaching and learning ● Creatively using digital technology ● Enhancing the effectiveness of teaching ● Enhancing the activities for learning ● Exploring information and digital content ● Interacting through digital technologies ● Actively engaging learners
Activities	1. What is Intelligent? 2. What is AI (Activity) 3. Definitions of AI (Bibliography) Data-Driven AI vs Knowledge-based or Symbolic AI or Rule-based AI 4. Generative AI 5. Generative AI (Activity) 6. Generative AI Application Landscape Generative AI (LLMs and LDMs) Infographics and Visualisations 7. Challenging Research Questions about AI 8. Facilitate-AI R1 AI Teaching Guide for Teachers

PART 2	
Learning Objectives	1. Enhance motivation and engagement through the use of digital game elements in teaching AI. 2. Enhance digital literacy and skills for utilizing existing digital data and resources in an AI environment. 3. Adapt teaching methods and content to effectively introduce and teach AI concepts to students. 4. Cultivate an awareness of AI's potential transformation in teaching and learning practices. 5. Explore AI's potential for enhancing teaching and learning experiences through personalized approaches and data analysis. 6. Gain practical knowledge and skills in building AI models, including training, validation, and testing. 7. Promote critical thinking and problem-solving abilities through AI-based real problems.

Learning Outcomes	1. Utilize digital data and resources proficiently within an AI environment to enhance digital literacy and skills. 2. Adapt teaching methods and content to effectively introduce and teach AI concepts to students. 3. Recognize and evaluate the potential transformation of teaching and learning practices through AI. 4. Apply AI to personalize teaching and learning experiences and analyze data for insights. 5. Develop practical knowledge and skills in building AI models, including training, validation, and testing. 6. Foster critical thinking and problem-solving abilities through AI-based real-world problems.
Competences	● Adapting accessibility and inclusion ● Adapting differentiation and personalisation ● Adopting new methods of teaching and learning ● Creatively using digital technology ● Enhancing the effectiveness of teaching ● Interacting through digital technologies ● Enhancing the activities for learning ● Exploring information and digital content ● Interacting through digital technologies ● Actively engaging learners
Activities	1. Why introduce AI in Secondary Education, with what objectives? 2. How can AI be integrated into education and be implemented in the classroom? 3. Conceptualizing AI Literacy 4. Data and AI Literacy 5. Competences Framework for Teachers 6. Competences Framework for Students

References & Videos

ChatGPT and Artificial Intelligence in higher education Quick start guide:
https://www.iesalc.unesco.org/wp-content/uploads/2023/04/ChatGPT-and-Artificial-Intelligence-in-higher-education-Quick-Start-guide_EN_FINAL.pdf

What is the DQ Framework? Global Standards for Digital Literacy, Skills, and Readiness (DQ):
https://live.dqinstitute.org/dq-framework/

Digital Education: Educational Data Analytics & Artificial Intelligence:
https://talos-ai4ssh.uoc.gr/wp-content/uploads/2023/05/01.SampsonTALOS2023.pdf

State of the art and practice in AI in education:
https://www.researchgate.net/publication/364994764_State_of_the_art_and_practice_in_AI_in_education

Computers and Education: Artificial Intelligence:
https://www.sciencedirect.com/journal/computers-and-education-artificial-intelligence

The ethical use of AI and data in teaching and learning for Educators:
https://talos-ai4ssh.uoc.gr/wp-content/uploads/2023/05/03.Gkountouma@TALOS2023.pdf

Generative AI Tools in the Creative Domains: The Power and Pressure Game Is On:
https://www.rapidops.com/blog/generative-ai-tools/

Facilitate-AI R1 AI Teaching Guide for Teachers:
https://facilitate-ai.eu/wp-content/uploads/2023/03/R1-AI-Teaching-Guide-for-teachers-facilitating-the-learning-of-students-in-grades-7-12_Final.pdf

Artificial Intelligence and the Future of Teaching and Learning Insights and Recommendations:
https://www2.ed.gov/documents/ai-report/ai-report.pdf

Videos:
The Top 5 Ways to Use AI in Education:
https://www.youtube.com/watch?v=nhI5g2hRVKA&ab_channel=AnalyticsInsight

How AI Could Save (Not Destroy) Education | Sal Khan | TED:
https://www.youtube.com/watch?v=hJP5GqnTrNo&ab_channel=TED

Google Duplex: A.I. Assistant Calls Local Businesses to Make Appointments:
https://www.youtube.com/watch?v=D5VN56jQMWM&t=181s&ab_channel=JeffGrubb%27sGameMess

What is a digital assistant:
https://www.youtube.com/watch?v=dqmJRScuZnE&ab_channel=SwissRe

How AI works in everyday life | Google AI:
https://www.youtube.com/watch?v=oJC8VIDSx_Q&ab_channel=Google

DALL·E 2 Explained:
https://www.youtube.com/watch?v=qTgPSKKjfVg&ab_channel=OpenAI

AI Ethics Awareness Video:
https://www.youtube.com/watch?v=hM9ziCAHI1o&ab_channel=SingaporeComputerSociety

Artificial Intelligence: The Ethical and Legal Debate:
https://www.youtube.com/watch?v=5pM6NFb4tqU&ab_channel=EuropeanParliament

What is an Ethical Artificial Intelligence? Mozilla Explains:
https://www.youtube.com/watch?v=xoue4-ohk1Y&ab_channel=Mozilla

7 Ethical Issues with AI That YOU Should Know About:
https://www.youtube.com/watch?v=KyB7NSWEODE&ab_channel=ArunaPattam

Trustworthy AI: Overview of the 7 requirements for Trustworthy AI:
https://www.youtube.com/watch?v=v1qbym61atI&t=46s&ab_channel=TrustworthyAIProject

Innovation and Best Teaching Practices Day:
https://www.youtube.com/watch?v=C7dFjcU6eHk&t=8715s&ab_channel=DoukasSchool

Introduction to Generative AI:
https://www.youtube.com/watch?v=G2fqAlgmoPo&t=673s&ab_channel=GoogleCloudTech

Simple and Quick Activities

Teachable Machine Train a computer to recognize your own images, sounds, & poses. A fast, easy way to create machine learning models for your sites, apps, and more – no expertise or coding required.
https://teachablemachine.withgoogle.com/

Which face is Real: Guess if the face is real or AI generated.
https://www.whichfaceisreal.com/

AutoDraw pairs machine learning with drawings from talented artists to help everyone create anything fast.
https://www.autodraw.com/

Animated Drawings: Bring children's drawings to life, by animating characters to move around.
https://sketch.metademolab.com/

Gencraft: Describe your creation in detail.
https://gencraft.com/generate

Shadow Art: Try your hands at the art of shadow puppetry, with a little help from AI.
https://shadowart.withgoogle.com/?lang=en-us

Google Lens Point your camera at something, and Google Lens tells you what it is.
https://lens.google/intl/en/

Pl@ntNet: a tool to help to identify plants with pictures.
https://identify.plantnet.org/

Bird Sounds: Thousands of bird sounds visualized using machine learning.
https://experiments.withgoogle.com/ai/bird-sounds/view/

Use the **Photomath** app to scan a tricky problem. Get instant solution steps for your exact problem, vetted by a team of math teachers. Use those steps to dig into the nitty-gritty and learn at your own pace.
https://photomath.com/en/

WolframAlpha: Compute expert-level answers using Wolfram's breakthrough algorithms, knowledgebase, and AI technology.
https://www.wolframalpha.com/

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