AI4ED

TOWARDS AN AI DRIVEN EDUCATIONAL PROCESS INTEGRATING MODERN CAREERS IN THE EDUCATIONAL SYSTEM

Deliverable

D4.1 - AI4Ed Training programme

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Revision history

Version	Author(s)	Changes	Date
V1	SCSKZ	Document creation, draft	5.8.2023
V2	SCSKZ, ALL partners	Program upgrade- the proposal, 1.-12.	23.09.2023
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Glossary

AI	Artificial Intelligence
DMP	Data management Plan
FAIR	Findability, Accessibility, Interoperability, and Reusability
GDPR	General Data Protection Regulation
IT	Information technology
KPI	Key Performance Indicator
MOODLE	Modular Object-Oriented Dynamic Learning Environment
MS	Microsoft
PDF	Portable Document Format
SCORM	Sharable Content Object Reference Model
VET	Vocational Education and Training

EXECUTIVE SUMMARY / ABSTRACT

Abstract	This working document, constituting a deliverable within Work Package 4 (AI4Ed Capacity building for teachers and students), synthesizes insights gleaned from pre-ceding project phases. Intrinsically tied to the AI4Ed Toolkit, the training program targets educational institutions and pedagogues, fostering a nuanced understanding of AI's contributions to education. Tailored for teachers/lecturers/students/vet students, the program encompasses diverse learning methodologies, AI integration in knowledge acquisition, and ethical contemplations on data and AI applications. Its pertinence extends to corporate entities engaged in educational collaborations.
	This working document is based on the results of the previous phases of the project, on mainly: D 2.1. KPIs on personalized tutoring, active learning, and dropout prevention, D 2.2. AI ethics and transparency requirements, D 2.3. Description of the 3 AI models, D 3.1. Description on data semantic and data format in D 3.2. Data management plan. The training program is directly linked to the Toolkit on AI4Ed (D.5.1.)
	With the program, we want to address educational institutions, teachers who are directly involved in pedagogical practice and thus contribute to a wider understanding of the contribution of artificial intelligence in educational processes.
	This educational program is designed also for students/vet students. Throughout their learning journey, participants will explore diverse learning methods, delve into the integration of AI in knowledge acquisition, and grapple with ethical quandaries surrounding data and AI usage.
	"Embark on a transformative learning experience that goes beyond the conventional, offering a dynamic exploration of cutting-edge topics in education and technology."
Keywords	Training programme, AI in educational process, Ethics, Transparency, data management planning, data processing, KPI indicators, good practices, legal aspects, AI4Teacher, AI4students, digCom, lifelong learning.

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1   Educational program, the aim and goals of the program, target groups

Program Name: **Implementing AI in education and training processes. What to take into account for a smooth transition**

1.1   Program goals:

- Comprehension of the Application of AI in the Educational Process: Develop a profound understanding and technical prowess essential for the integration of Artificial Intelligence into the educational landscape.

- Competence in AI Evaluation and Oversight: Acquire the knowledge and technical skills needed to accurately assess and monitor the effectiveness of Artificial Intelligence systems incorporated into the educational framework.

- Interdisciplinary Collaboration: Foster collaboration among education experts and professionals from relevant fields to facilitate a comprehensive integration of AI into the educational realm.

By participating in this program, individuals will:

- Cultivate Expertise for Responsible AI Use: Hone knowledge, skills, and competencies for the effective and responsible application of artificial intelligence in pedagogical practices.

- Understanding and resolution of Ethical Dilemma when using AI: Gain the ability to identify and address ethical dilemmas arising from artificial intelligence, ensuring an ethically sound educational environment.

- Data-Supported Learning Processes: Learn to plan, implement, and assess data-supported learning processes, leveraging artificial intelligence tools for enhanced educational outcomes.

- Continuous Improvement through Self-Evaluation: Develop the capability to collect and utilize process data, feeding it into AI tools for analysis, allowing for continuous self-evaluation and improvement in teaching methodologies.

- Tailoring Lessons for Diverse Learning Needs: Adapt teaching strategies to cater to the diverse learning needs and styles of students, promoting an inclusive and effective educational experience.

- Mitigating Dropout Risks: Strategically reduce the risk of student disengagement and dropout by leveraging AI insights to enhance participant support and overall educational effectiveness.

1.2   Target groups:

- Students/VET students,
- Teachers/Lecturers,
- IT staff in educational environment

The primary focus of this training program is on educators from vocational and secondary schools, as well as university lecturers with hands-on teaching experience. However, it also holds relevance for managerial and technical staff within the education sector, offering fresh insights into the utilization and impact of AI in the educational landscape.

The educational program caters also to secondary school students and students on university. Throughout their learning journey, participants will engage with diverse learning approaches, explore the integration of AI in knowledge acquisition, and grapple with ethical dilemmas surrounding data and AI use. Additionally, the program holds appeal for companies collaborating with schools in education programs, offering valuable insights into the evolving educational landscape.

2   Modules Covered by AI4ED Training Programme

Table 1 shows the list of proposed modules for this training programme.

Table 1 - List of AI4ED training programme modules

Module	Name	Theoretical focus	Practical Focus	∑h
Module 1	Description of the context and objectives of the project	1	-	1
Module 2	Introduction to AI	2	1	3
Module 3	Data management planning and artificial intelligence	2 (4)	1(2)	3 (6)
Module 4	Project KPIs	1	0	1
Module 5	Ethics and artificial intelligence	1	1	2
Module 6	Toolkit	-	1	1
Module 7	Active and personalized teaching, dropout prevention and AI[1]	3	3	6
Module 8	Maintenance and monitoring of AI models. [2] Evaluation of the program	1	1	2

[1] The topic is primary focus on teachers/lecturers   **∑19-22**

[2] The topic is adapted to the role of each participant and offers different material for both students and teachers.

2.1   Skills Targeted by the training programme

Digital Competence, as defined by DigComp, involves the confident, critical, and responsible use of digital technologies for learning, work, and societal participation. It encompasses a combination of knowledge, skills, and attitudes, as outlined in the Council Recommendation on Key Competences for Lifelong Learning (2018).

The DigComp framework identifies five key areas of competence (Dimension 1):

Information and Data Literacy: Articulating information needs, locating and retrieving digital data, and judging the relevance of sources. Managing and organizing digital data, information, and content.

Communication and Collaboration: Interacting, communicating, and collaborating through digital technologies, considering cultural and generational diversity. Participating in society via public and private digital services, practicing participatory citizenship. Managing one's digital presence, identity, and reputation.

Digital Content Creation: Creating and editing digital content. Integrating information into existing knowledge while understanding copyright and licensing. Providing understandable instructions for computer systems.

Safety: Protecting devices, content, personal data, and privacy in digital environments. Safeguarding physical and psychological health, with awareness of digital technologies for social well-being and inclusion. Recognizing the environmental impact of digital technologies.

Problem Solving: Identifying and resolving conceptual problems and situations in digital environments. Using digital tools to innovate processes and products. Staying updated with the ongoing digital evolution.
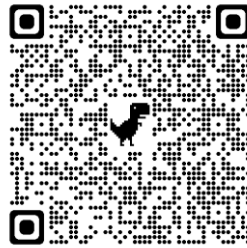
More on: https://joint-research-centre.ec.europa.eu/digcomp/digcomp-framework_en

The DigComp Conceptual Reference Model, including DigComp 2.2 Figures, provides a comprehensive overview of these competence areas.

More on: https://joint-research-centre.ec.europa.eu/digcomp/digcomp-framework_en

Lifelong learning competencies also encourage the individual to acquire personal social, key learning competencies and essential skills for success in today's rapidly developing and interconnected world.

Created in response to a recommendation from the Council of the European Union in May 2018, LifeComp focuses on key competencies essential for personal fulfilment, continuous self-development, effective social interactions, and adaptability in a dynamic environment. LifeComp serves as a comprehensive European competence framework that promotes better living in our uncertain world.

More on: https://joint-research-centre.ec.europa.eu/lifecomp_en

2.2 Detailed module description

In this section we present the content and competences related to each module.

CENFIM is the leader partner for Module 1 Description of the context and objectives of the project shown in Table 2.

Table 2 - Module 1: Description of the context and objectives of the project

	Programme	Duration (h)	
	(Teachers/ Lectures/students/vet students)	Theoretical focus	Practical Focus
Module 1.	*Description of the context and objectives of the project*		
Contents	Introduction to the program. Presentation of the AI4Ed project and partners, key goals and results we want to achieve in the project. Brief presentation, purpose, and advantages of using AI in the educational process, presentation of selected KPIs.	1	-
Competences	*Knowing the project, goals, partners involved,* *Learn about key aspects of AI and its applications.* *Know what the possibilities and advantages are of using AI in educational process.*		

IMH is the leader partner for Module 2 Introduction to AI shown in Table 3.

Table 3 - Module 2: Introduction to AI

	Programme	**Duration (h)**	
	(Teachers/ Lectures/students/vet students)	Theoretical focus	Practical Focus
Module 2.	***Introduction to AI***		
Contents	What is AI? AI foundations General applications of AI Approach to machine learning and deep learning AI4Ed study case: transforming teaching and learning. Real examples from different sectors.	2	1
Competences	*Learning about AI foundations* *Approach to the different kind of applications for AI* *Understanding of changes to come and challenges.* *Understanding AI, Types of AI,* *Real-world examples.*		

UBREMEN is the leader partner for Module 3 Data management planning and artificial intelligence shown in Table 4.

Table 4 - Module 3: Data management planning and artificial intelligence

	Programme	Duration (h)	
	(Teachers/ Lectures/students/vet students)	Theoretical focus	Practical Focus
Module 3.	*Data management planning and artificial intelligence*		
Contents	What is a DMP and why is it important?	2	1
	The importance of making data FAIR.	(4)	(2)
	Benefits of having a DMP: efficiency, compliance, data reuse, etc.		
	Types of data that will be collected or generated.		
	Formats and standards to be used.		
	Where and how will the data be stored during and after the project?		
	Tests to check if participants have understood the data management bases		
Competences	Learning about data management, different data forms		
	Potentials of semantic learning analytics.		
	Planning, collecting, processing, analysing, and sharing data generated or used by AI in education.		
	Tools and methods for data management.		
	Evaluate the data quality and relevance.		

UNIZAR is the leader partner for Module 4 Project KPIs shown in Table 5.

Table 5 - Module 4: Project KPIs

	Programme	Duration (h)	
	(Teachers/ Lectures/students/vet students)	Theoretical focus	Practical Focus
Module 4.	***Project KPIs***		
Contents	Introduction to Key Performance Indicators (KPIs), importance of KPIs Key considerations in selecting KPIs Characteristics of effective KPIs KPI classification and implementation Evaluation	1	Integrated into theory.
Competences	Learn about KPI and its taxonomy in relation with the project. Key aspects of use and quantification of KPI Know what the possibilities of AI in educational aspects are, KPI selection. Evaluate the KPI after analysing the results		

UNIZAR is the leader partner for Module 5 Ethics and artificial intelligence shown in Table 6.

Table 6 - Module 5: Ethics and artificial intelligence

	Programme	Duration (h)	
	(Teachers/ Lectures/students/vet students)	Theoretical focus	Practical Focus
Module 5.	*Ethics and artificial intelligence*		
Contents	Transparency, accountability, and fairness in the use of artificial intelligence. Identify and deal with ethical dilemmas that can be caused using artificial intelligence in education. How to respect the rights and interests of students, parents, colleagues, and other stakeholders. Encouraging critical thinking and ethical awareness in students. EU ethics standards, ethical guidelines, general principles of AI ethics for specific goals and activities, and effective safeguards for the protection of human rights. Examples of good practices in the use of AI in education.	1	1
Competences	Theoretical framework about ethics and laws related to AI. Rights in educational processes, regulations. Ethical sensitivity, Ethical decision-making, Ethical action, techniques to handle data respecting ethical and egal procedures.		

UNIZAR is the leader partner for Module 6 Toolkit (pending decision on whether this module is required) shown in Table 7.

Table 7 - Module 6: Toolkit

	Programme (Students/vet students/teachers)	Duration (h)	
		Theoretical focus	Practical Focus
Module 6.	*Toolkit*		
Contents	The Toolkit presentation Structure of the Toolkit Connection of the Toolkit and rest of modules Guidelines Presentation of the AI4ED toolkit and examples of good practices	-	1
Competences	Relation between Toolkit and rest of modules. Key aspects of the modules for users. Practical computer skills.		

IMH is the leader partner for Module 7 Active and personalized teaching, dropout prevention and AI as shown in Table 8.

Table 8 - Module 7: Active and personalized teaching, dropout prevention and AI

	Programme	Duration (h)	
	(Teachers/ Lectures/students/vet students)	Theoretical focus	Practical Focus
Module 7.	*Active and personalized teaching, dropout prevention and AI*		
Contents	Provide an overview of the strategies we have employed to implement the artificial intelligence systems to improve active and personalized teaching and prevent dropout. How to design a course that employs AI for active and personalized teaching and prevent dropout.	3	3
Competences	Basic knowledge of active teaching methods. How to apply AI in teaching method. Developing higher cognitive skills in students using AI.		

ALCHEMY is the leader partner for Module 8 Maintenance and monitoring of AI models as shown in Table 9.

Table 9 - Module 8: Maintenance and monitoring of AI models.

	Programme (Students/vet students)	Duration (h)		Programme (Teachers/vet teachers)	Duration (h)	
		Theoretical focus	Practical Focus		Theoretical focus	Practical Focus
Module 8.	*Maintenance and monitoring of AI models.*					
Contents	Introduction: • Importance of maintenance and monitoring. Maintenance process: • Description of the maintenance process. • Data updating and retraining. Real-time monitoring: • Real-time monitoring tools. • Recommended actions for deviations in model performance. The practice of maintenance and monitoring AI models will be based on showcasing a Python Notebook, executing its cells, and explaining what is happening.	1	1*	Introduction: • Importance of maintenance and monitoring. Maintenance Process: • Description of the maintenance process. • Data updating and retraining. Real-Time Monitoring: • Advanced tools for real-time monitoring and their applicability in educational scenarios. • Recommended actions for deviations in model performance. The practice of maintenance and monitoring AI models will be based on showcasing a Python Notebook, executing its cells, and explaining what is happening.	1	1*
Competences	Understanding the significance of maintenance and monitoring:					

	• Appreciation of why maintenance and monitoring are crucial in AI model management. • Recognition of the impact of outdated or inaccurate models. Maintenance process: • Familiarity with the step-by-step approach to maintaining AI models. • Proficiency in updating data and retraining models to ensure relevance and accuracy. Real-time monitoring: • Knowledge of real-time monitoring tools and their functionalities. • Skill in interpreting monitoring results and understanding their implications. Recommended actions for deviations in model performance: • Understanding of the various actions to take when deviations in model performance occur. Implementation: • Understanding of how AI models' maintenance and monitoring tools are implemented in Python.

Evaluation of the training programme: at the end of the programme, an evaluation of the training process will be carried out.

3   Work frame of curriculum

Table 10 shows the template to be used for the curriculum work frame.

Table 10 - Template describing the curriculum work frame

Module No:	Module name:		
Time frame for the module: Theory (h): Use case (h):	MODULE CONTENTS:		
MODULE COMPETENCIES:			
METHODS:			
PERFORMER:			
Time (h).	CONTENTS and		

4   Materials for participants

Training programme material:

Digital content including videos, visual summaries, graphs, Powerpoint presentations and PDFs tailored to each module.

Interactive elements facilitated by quizzes, infographics, quizzes and video content.

Additional resources such as the AI-powered tools document and additional information resources (including books, articles and websites) to encourage in-depth exploration of the modules.

Learning materials and materials that respond to verbal and visual communication channels, using generative artificial intelligence to create images and videos, user interactivity.

5   Implementation method, work methods

The pedagogical strategy integrates an active learning methodology, guaranteeing a participatory and vibrant educational encounter for attendees. The programme is executed through an online platform (Moodle).

Each module operates as a self-contained unit, providing participants the liberty to select topics according to their preferences. Nevertheless, to attain certification, participants must meet predetermined criteria, which could encompass successfully passing assessments, actively engaging in discussions, or fulfilling other benchmarks established to validate a comprehensive and well-rounded grasp of the content.

6   Entry conditions for participation in the AI4ED training programme

Interested/enthusiastic participants within the education sector—teachers, lecturers, and students/vet students are encouraged to enrol in the program.

Prerequisites for participation include a fundamental proficiency in office software (word processing, spreadsheet applications), internet navigation, and email usage. Additionally, a basic understanding of the English language is required.

Necessary equipment: participants should have access to essential equipment, namely a multimedia computer connected to the internet, to facilitate their engagement with the program.

7   Conditions for successful completion of education

Participants are empowered to either complete all modules or focus solely on specific ones aligned with their interests. Each module functions independently, offering participants the flexibility to choose topics based on their preferences.

7.1   Certificate of Attendance

After completing the training program (full program or modular approach), the participant receives a certificate of participation.

Participants register for the programme with their first name, last name, e-mail address, company/institution from which they come, or with the required information for registration and issuance of a certificate.

7.2   Data management

The data will be used for registration in the educational program and, in the case of successful completion of the educational program, also for issuing a certificate.

Data storage: IMH, in accordance with GDPR.

8   References

https://joint-research-centre.ec.europa.eu/lifecomp_en

https://joint-research-centre.ec.europa.eu/digcomp/digcomp-framework_en

Reference to other documents in the framework of the I4Ed project capacity building for teachers and students:

D 2.1. KPIs on personalized mentoring, active learning, and dropout prevention,

D 2.2. AI ethics and transparency requirements,

D 2.3. Description of 3 models AI,

D 3.1 Description of data semantics and data format v

D 3.2. Data Management Plan.

D 5.1. The training program is directly linked to the toolkit on AI4Ed.

D 5.2. Detailed Use Cases Specification