



AI4T  
AI FOR TEACHERS

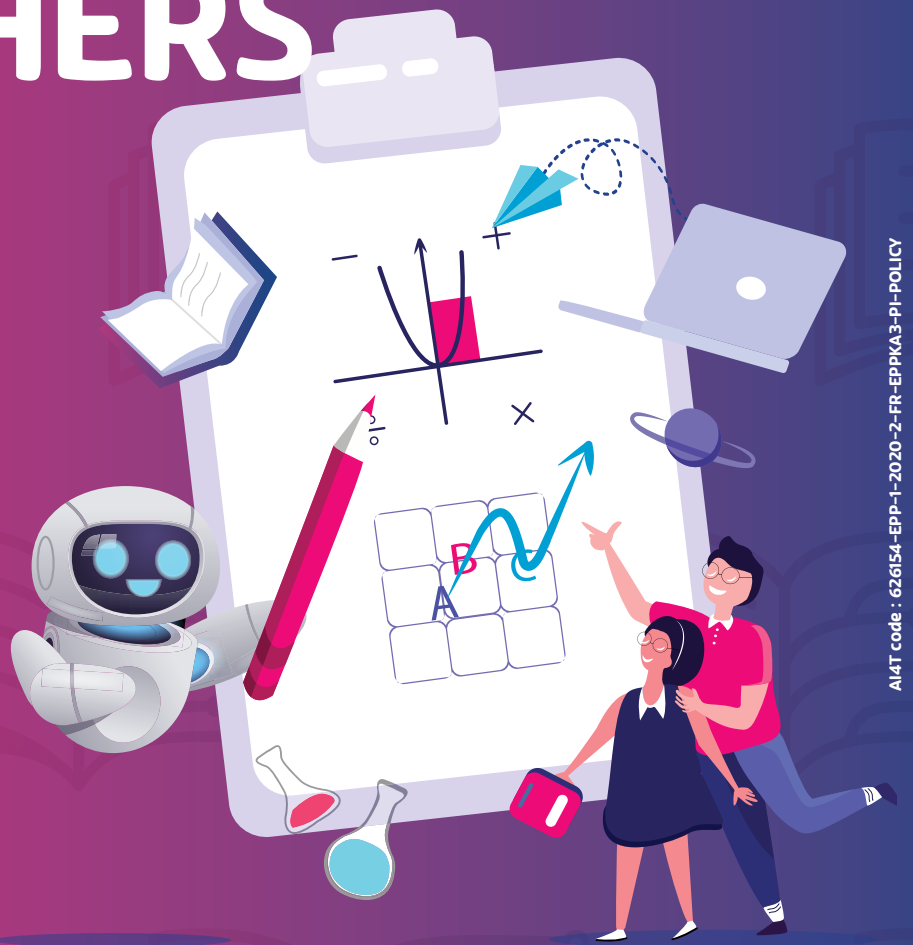
@ai4t\_project



@ai4tproject



# EMPOWERING TEACHERS WITH AI



AI4T code : 626154-EPP-1-2020-2-FR-EPPKA3-PI-POLICY

AI4T, Artificial Intelligence for and by Teachers, is a three-year Erasmus+ project (Key Action 3) developed by France, Ireland, Italy, Luxembourg, and Slovenia to research and support the use of AI by secondary school teachers. It is aimed at teachers of Mathematics, Science and Modern English languages.

The consortium, involving 17 partners (including ministries, universities, educational institutions, and research centres), has developed, tested, and evaluated a professional learning pathway that targets meaningful and relevant use of AI-containing resources while addressing the contextualisation, acceptability, relevance and usefulness of AI in the teaching context.



[www.ai4t.eu](http://www.ai4t.eu)

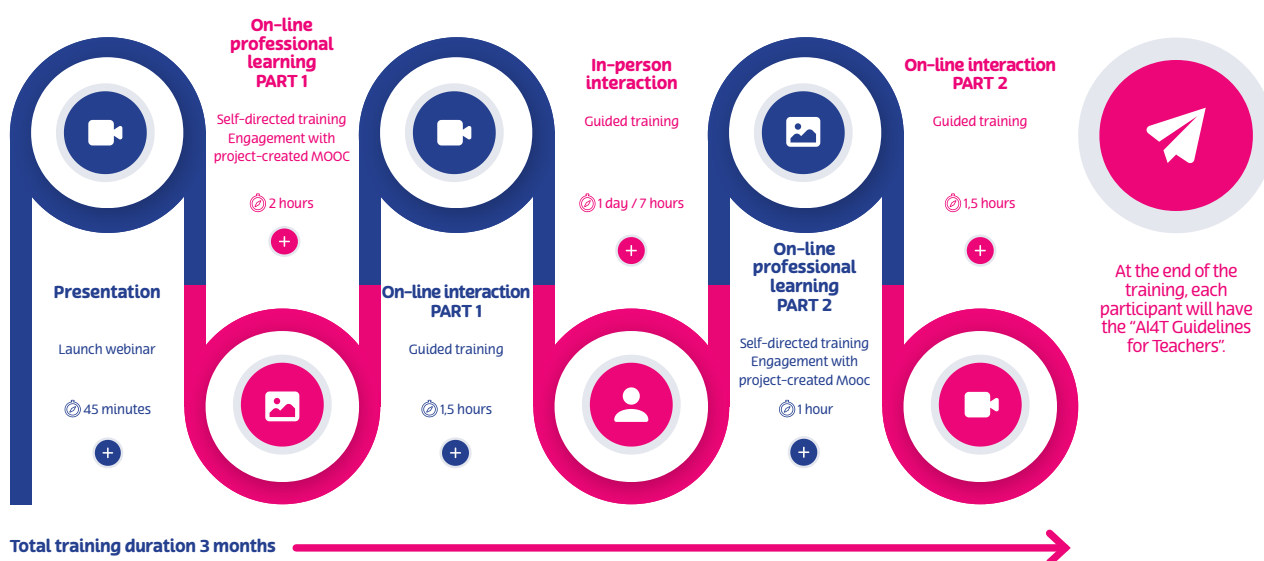
Co-funded by the  
Erasmus+ Programme  
of the European Union



# PROFESSIONAL TRAINING RESOURCES

From the outset, the aim of the project was to sensitise teachers, school leaders and students across Europe to the integration of AI in the classroom. The project's activities were designed to stimulate discussion and foster curiosity by prompting questions about the potential advantages and disadvantages of these tools for different stakeholders in education. Following successful trialling and implementation in five European countries, the project team anticipates that the AI4T professional training pathway and its pedagogical tools will be adopted by teachers worldwide at all levels of education. As a pioneering initiative, AI4T aims to serve as a source of inspiration for subsequent projects, national professional learning programmes and strategies in Europe and beyond. Above all, it aims to empower teachers and teacher educators to use AI as an effective pedagogical tool.

## Example of the professional learning pathway flow



## The AI4T MOOC Teacher Training



The MOOC is organised in **4 modules** and offers a wide range of content formats: texts, videos, activities, practical exercises for a concrete understanding of AI basics and the challenges of AI tools in education.

All resources of the AI4T MOOC are accessible in the **five languages (English, French, German, Italian, and Slovenian)** of the consortium. The aim of the project to provide a coherent set of resources on AI in education has been achieved and the MOOC content is ready to use. The online MOOC can be easily transferred to other environments – national platforms (e.g., the French Fun MOOC platform, the Slovenian ARNES MOOC platform).



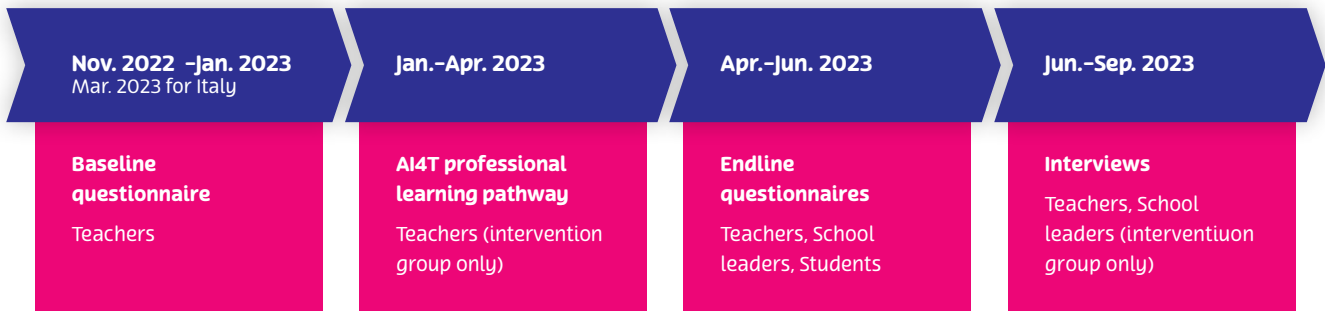
## AI4T, an Open Textbook

The Open Textbook is **complementary to the MOOC** and is designed also for the more **advanced teachers or educators/mentors**. The first edition of the textbook was published in October 2022. Following the arrival of Generative AIs, a second edition was produced with new chapters, graphics, and videos for publication in January 2024. The textbook has already been disseminated in the **five languages of the consortium** and can be easily translated or updated in other languages.

# PRESENTATION OF THE EVALUATION

An independent team of evaluators **assessed the impact of the AI4T professional learning pathways on teachers' knowledge, perceptions, and use of artificial intelligence in the five countries.** The method chosen for the evaluation was the randomised controlled trial, in which a group receiving access to the professional learning pathway was compared to a control group.

The evaluation was conducted through questionnaires for teachers, school leaders and students, and interviews with teachers and school leaders. This mixed-method approach allowed for a comprehensive understanding of teachers' experience in the professional learning pathway, illuminating key factors that illustrate the intervention's influence on teachers. It also provided a thorough picture of the school environment, including schools' technical infrastructure, AI policy within the schools and students' attitude towards AI.



**738 teachers**, mainly mathematics and language teachers with classes of students aged 15 to 17, **204 school leaders** and **7551 students** completed the questionnaires, while **88 teachers** and **18 school leaders** were interviewed.

## Evaluation results

The majority of teachers were satisfied with the online resources (MOOC, textbook) and the guided sessions (webinars and/or face-to-face).

### Common feedback from teachers on the pathways

- “Quality of the content (very instructive),”
- “Quality of the pedagogical teams (expertise, responsiveness),”
- “Appreciation of the peer-to-peer interactions,”
- “Appreciation of blended learning (or interactive webinars in Italy),”
- “Could be more practical and specific to their work,”

“As a first course it was very good and we would now need a practical application, i.e. a course that guides us in actual experimentation in doing something in the classroom.”

### Impact analysis

The impact analysis (conducted only in countries with large samples), revealed that the professional learning pathway was particularly effective to improve teachers' knowledge of AI. In Italy, it also enhanced teachers' perceived ease of use and use of AI. It seemed however limited to testing the tools, as there was no impact on frequent use (using AI at least once a week). In Slovenia, there was also a significant effect on teachers' intention to use AI tools.

	Self-assessment of knowledge of AI	Knowledge of how AI works	Familiarity with AI technologies
France	↗	n.s.*	↗
Italy	↗	↗	↗
Slovenia	↗	↗	↗
	Perceived ease of use of AI	AI anxiety	Perceived usefulness of AI
France	n.s.	n.s.	n.s.
Italy	↗	n.s.	n.s.
Slovenia	n.s.	n.s.	n.s.
	Use of AI	Frequent use of AI	Intention to use AI
France	n.s.	n.s.	n.s.
Italy	↗	n.s.	n.s.
Slovenia	n.s.	n.s.	↗

\* n.s. - non significant

# POLICY RECOMMENDATIONS



## ***Empowering teachers with AI4T resources***

The tools developed as part of the AI4T project serve as foundational resources for understanding and incorporating AI into education. These open-source resources, jointly developed by experts from five countries, represent a major advance in AI education and provide educators with an important starting point.

## ***Comprehensive professional learning pathway***

The practical experience and evaluation of the AI4T project underlines the need for a comprehensive professional learning pathway. This includes facilitating discussion, providing supervision or mentorship and offering concrete tools alongside theoretical content. We strongly recommend adapting this pathway to national contexts and using hybrid formats that address immediate needs and offer practical tools, supported by clear guidance from ministries.



## ***Cross-national cooperation for EU sovereignty***

Initiatives such as AI4T play a pivotal role in strengthening the European Union's autonomy in steering discussions on AI in education. These projects highlight the benefits of collaboration between nations by emphasising policy sharing and global feedback. The collaborative approach involving five countries is more influential than the independent efforts of individual ministries.



## ***Ethical and legal considerations***

We argue for a thorough examination of ethical and legal considerations in AI discussions and education. It is critical that ministries provide clear positions and guidance on the ethical use of AI tools.



## ***Guidance from authorities***

It is essential that local, national and transnational authorities support teachers. While teachers are curious and actively seek knowledge in this area, institutional support is of utmost importance. The evaluation and interviews conducted show that there is a need for a local or national framework to support teachers in their enquiries.



## ***Targeted training for inspectors and teacher trainers***

We propose that it is essential to initiate professional learning for inspectors and teacher educators/mentors to enable them to guide teachers effectively. As teachers are the gatekeepers, professional learning should start at system levels to create a cascading effect.




## ***Evaluating student outcomes and dealing with concerns***

While privacy issues are widely recognised, equal attention should be given to critical issues such as AI transparency, accountability and the risk of discrimination. We advocate educational initiatives aimed at raising students' awareness of these issues.



# KEY LESSONS LEARNED FROM EXPERIMENTATION

\*Number of  
teachers 

## Luxembourg 20

National policies need to emphasise the legal and ethical aspects of AI in education and strengthen educators' confidence in the safe use of AI, both as a subject and as a tool. AI reinforces both strengths and weaknesses in education but does not necessarily cause them. Policies must ensure its responsible use and utilise AI as a positive force in learning environments.

## Slovenia 269

Teachers need a comprehensive view and knowledge of AI in education to remain curious, confident and appropriately distrustful so they will thoughtfully and effectively develop the necessary students' knowledge and competencies. Comprehensive school approaches to using AI must be developed, evaluated, and shared with others.

## France 270

AI4T's educational resources are valuable for teaching and learning with AI, their impact can be maximised through guided sessions emphasising practical applications and fostering interactions. Free access to digital resources and GDPR-compliant AI tools is crucial for practical training. Teachers desire tools aiding personalisation, understanding students' difficulties, evaluation/correction, and course preparation. National authorities should take a lead in ensuring the ethical use of AI tools in schools. This integrated approach ensures effective AI knowledge dissemination and ethical implementation in education.

## Italy 432

The project highlighted the need for AI professional learning in education, emphasising scalable approaches. Prioritising ethical considerations and data protection in AI discussions should rely on both a national and European-wide framework to guide responsible and ethical tool usage in the classroom. Tailoring supports to diverse teacher AI knowledge, prioritising digital literacy, and sharing best practices were key outcomes for future developments.

## Ireland 22

The need for oversight of AI in education at the government level is critical to support schools in developing a coordinated approach to the use of AI tools. It is essential teachers are supported through contextual professional learning pathways to empower them to effectively use existing and future AI powered tools for teaching, learning and assessment.



*" We have young people who, even if they're struggling, seek solutions. I discovered a student trying to solve a math problem using ChatGPT during my class. So, it's good I think that we are trained on this so we can address it with students, and instead of saying 'no, absolutely not,' rather engage in discussions about it. "*

*" When we thought about how to present it (the learning pathway), we found that the best way was to use an active method. That we learn together, the whole teaching team. That we think together that we are together and that the starting point is the same for everyone. We started with that. "*

*" I also appreciated the opportunity to collaborate with colleagues at national level, a dialogue that was engaging and productive. I was included in a group with colleagues from other regions, and this dialogue is definitely something that needs to be continued and carried on. "*

*" And I know that it was quite a different spread of interests and experience. But also it was very good to have a different subject as well, and understanding how a humanities subject would bring in this technology, and their concerns. So having colleagues there from different schools and different experiences, focused the learning on all classes. Not just your own specific context. "*

*" I found the exchange of practical experiences among the participants particularly interesting ... how colleagues deal with the topic of AI in their classes, what they experiment with and how it is received by the students. "*

## PROJECT PARTNERS



The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Co-funded by the Erasmus+ Programme of the European Union

