# Preparing teachers for the AI Development in Education as
# an Innovative Asset

PAIDEIA

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**Preparing teachers for the AI Development in Education as an Innovative Asset**

# Creation of an AI&Dcomp Framework

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*The PAIDEIA Project is a groundbreaking initiative funded by the European Commission through the European Agency for Education and Culture (EACEA). Our mission is to revolutionize education by integrating Artificial Intelligence (AI) into teaching and learning, empowering educators, and enhancing student outcomes.*

## CONSORTIUM

*FONDAZIONE HALLGARTEN FRANCHETTI CENTRO STUDI VILLA MONTESCA, an Italian high education research center, coordinates PAIDEIA project. It has been historically founded in 1902 (then institutionally renewed) in the place where the Montessori method was experimented and published for the first time in 1909. It has an international vocation in educative and pedagogic research activities and has a very relevant experience in EU projects management and development. FCSVM has strong partnership with schools and other educational organizations, as well as a solid background in research-actions activities, fostering critical thinking, diversity as a value and innovation from the pedagogical and didactic point of view.*

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# 1. INTRODUCTION

This report explains the construction of an AI&ED framework and how it was incorporated into an online teacher training course. This deliverable D3.1 "Creation of an AI&EDcomp framework" is part of the tasks assigned by the PAIDEIA project to Work Package 3.

Work Package 3 has as the main objective the creation of a teacher training curriculum on AI in education. The PAIDEIA project aims to construct an online training course that provides teachers with a comprehensive overview on what they should know about AI in education. The curriculum is based on current research and policy regulations and incorporates the insights from other work packages, such as Work Package 2, which includes a literature review and focus group interviews.

Before one starts to fill in a curriculum with learning materials, however, there needs to be thorough discussion on the structure and framework of the curriculum. This report aims to encapsulate how the overall structure was established and how an AI&EDcomp framework was developed based on two international sources, DigCompEdu and UNESCO AI Frameworks for Teachers and Students.

The first section reports on how the choice for DigCompEdu and UNESCO was made as inspiration sources and theoretical guidelines for the teacher training course. The second section shows how the two frameworks were used to create the structure and learning goals of the curriculum. Finally, the AI&EDcomp framework is presented along with how the framework links back to the two main sources of inspiration.

# 2. THEORETICAL BACKGROUND

This section covers the two frameworks, DigCompEdu and UNESCO, which were chosen as main sources of inspiration for the AI&EDcomp framework of PAIDEIA. First the choice of these two frameworks will be explained, as comparative reviews were made of digital competence frameworks. This section is followed by a short explanation of the two chosen frameworks.

## 2.1 Reviews of digital competence frameworks

It was very interesting to take a look at digital competence frameworks which already exist as inspiration for PAIDEIA's AI&EDcomp framework. As it is, AI is just another (yet very complicated) branch of digital technology. The partners within the PAIDEIA project were asked in May 2024 to look for digital competency frameworks aimed at teachers. They were asked specifically to look for frameworks in their region as EU-frameworks were already taken into consideration. All findings were documented and later discussed during a transnational project meeting with all partners of the PAIDEIA project. Each partner presented their chosen framework(s) during the meeting and discussed how the frameworks might be relevant to PAIDEIA. In total, 14 competency frameworks were reviewed (see Table 1).

*Tabel 1 Digital education competency frameworks analysed bt the PAIDEIA project in May 2024.*

| Country | Framework | Reference (retrieved in May 2024) |
|---|---|---|
| **Europe** | DigcompEdu | https://joint-research-centre.ec.europa.eu/digcompedu_en |
| **Europe** | DigcompEdu D-Paideai | https://www.d-paideia.eu/qualifications-framework/ |
| **Bulgaria** | Competences and frameworks | https://www.mon.bg/nfs/2019/12/iii-book.pdf |
| **Bulgaria** | Manual for implementation of competences approach in the initial teacher training | https://www.mon-nmuciot.bg/?npkp |
| **Bulgaria** | Teacher's practicum | https://www.mon.bg/nfs/2019/12/iv-book.pdf |

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|---|---|---|
| **Spain** | Resolution of May 4, 2022, of the General Directorate of Territorial Evaluation and Cooperation, by which the Agreement of the Education Sector Conference is published, on updating the reference framework for teaching digital competence. | https://www.boe.es/diario_boe/txt.php?id=BOE-A-2022-8042 |
| **Spain** | Framework of Reference for Teaching Digital Competence | https://intef.es/Noticias/marco-de-referencia-de-la-competencia-digital-docente/ |
| **Spain** | Artificial intelligence in education. Guidelines and recommendations for use in centers | https://educacio.gencat.cat/web/.content/home/departament/publicacions/monografies/intelligencia-artificial-educacio/ia-educacio.pdf |
| **Italy** | National Digital School Plan, (PNSD), pillar "La Buona Scuola" (l.107/2015) | https://www.miur.gov.it/documents/20182/50615/Piano+nazionale+scuola+digitale.pdf/5b1a7e34-b678-40c5-8d26-e7b646708d70?version=1.1&t=1496170125686 |
| **Italy** | Digital competencies for AgID (Agenzia per l'Italia Digitale), 2017 | https://www.agid.gov.it/sites/default/files/repository_files/osservatorio_competenze_digitali_2017.pdf |
| **Turkey** | Artificial Intelligence Applications Course Teaching Program | https://mufredat.meb.gov.tr/Dosyalar/2023112493011132-23174117_yapayzekauygulamalaridersiogretimprogrami_3.23.pdf |
| **Turkey** | Digital competences for teachers | https://bilgebt.com/wp-content/uploads/2022/07/MODUL-8-UZMANLIK-DIJITAL-YETKINLIK.pdf |
| **Turkey** | Digital literacy teacher's guide | https://efeler.meb.gov.tr/meb_iys_dosyalar/2020_12/17092903_dijital_okur_yazar.pdf |
| **UK/Ireland** | JISC - Building digital capacity | https://www.jisc.ac.uk/building-digital-capability |

The analysis of various digital education competence frameworks reveals a comprehensive approach to developing digital skills among educators. However, a notable gap is the lack of integration of AI within these frameworks, which is essential for the PAIDEIA project. Frameworks such as DigCompEdu and DigCompEdu D-PAIDEIA provide structured progression paths and emphasise professional engagement, digital content creation, and ongoing professional development. Despite their strengths, these frameworks do not consider AI, which is a significant limitation for modern educational needs. Other frameworks, like the Competences and Frameworks and the Framework of Reference for Teaching Digital Competence, offer holistic approaches and adaptability but also lack AI integration. The inclusion of AI in the AI&EDcomp

framework is crucial to address the evolving technological landscape and ensure relevance. Ultimately, DigCompEdu was chosen for the PAIDEIA project due to its alignment with European standards and the recent supplement that added AI to the framework (Bekiaridis, 2024). This makes it a robust choice for developing digital competencies in educators. Although DigCompEdu D-PAIDEIA incorporates well-being and security into the original DigCompEdu, it was not chosen because the project is still ongoing. Nevertheless, DigCompEdu D-PAIDEIA remains relevant for its emphasis on well-being and security, which are valuable additions to the DigCompEdu framework.

In September 2024, however, UNESCO published its AI Competency Framework for Teachers and Students. A new review of digital competence frameworks was conducted where it was decided that no new AI project could overlook the frameworks by UNESCO (Alexieva, 2024). Thus, the second framework to be considered for the PAIDEIA teacher training course was the one published by UNESCO.

## 2.2 DigCompEdu

The European Framework for the Digital Competence of Educators (DigCompEdu) describes how educators can be digitally competent (Redecker, 2017). The framework is not specific to a certain level of education, so educators from primary school to post-secondary education can use the framework to see what it means to be digitally competent in the current age. The framework consists of 6 areas and entails 22 competencies. Figure 1 visualises the framework quite nicely.
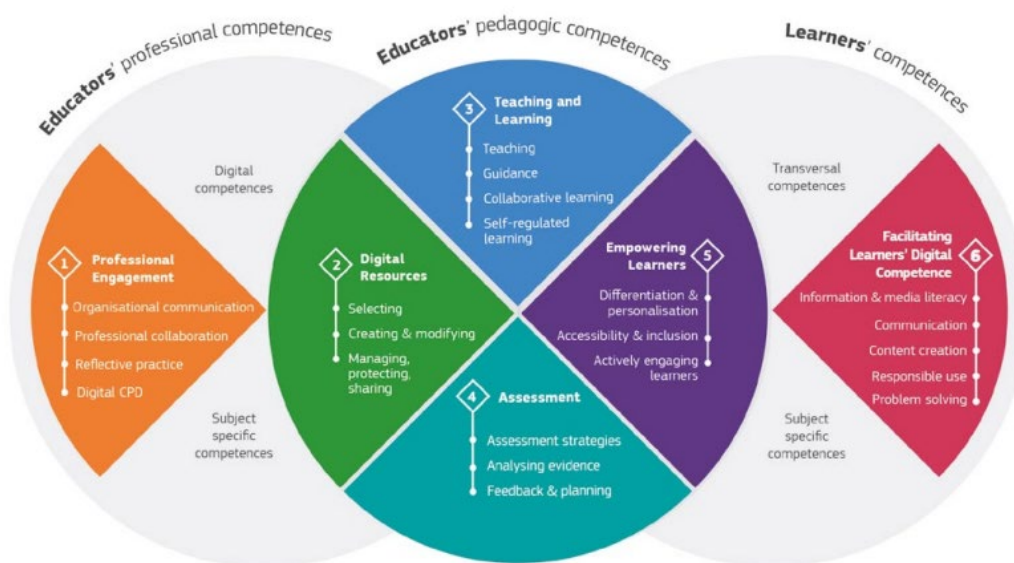
*Figure 1 DigCompEdu (Redecker, 2017, p.15)*

The DigCompEdu framework concerns three overlapping spheres: the educators' professional competences, the learners' competences and the overlapping educators' pedagogic competences. The core of the DigCompEdu framework lies it the last category as it focuses on the digital pedagogic competence and how technology can be incorporated within education in order to help the educator as well as the learner.

An educator can also have different skill levels for each of the different areas. The DigCompEdu framework has thus developed a grading scale so that educators can understand their personal strengths and weaknesses. There are six levels of within each competency going from A1 to C2. The framework makes it clear that the levels are in favour of professional development and it is by no means a way to grade educators on whether they have achieved the right level. Table 2 gives an overview of the different levels and what they entail.

| Newcomer (A1) | Newcomers are aware of the potential of digital technologies for enhancing pedagogical and professional practice. However, they have had very little contact with digital technologies and use them mainly for lesson preparation, administration or organisational communication. Newcomers need guidance and encouragement to expand their repertoire and to apply their existing digital competence in the pedagogical realm. |
|---|---|
| Explorer (A2) | Explorers are aware of the potential of digital technologies and are interested in exploring them to enhance pedagogical and professional practice. They have started using digital technologies in some areas of digital competence, without, however, following a comprehensive or consistent approach. Explorers need encouragement, insight and inspiration, e.g. through the example and guidance of colleagues, embedded in a collaborative exchange of practices. |
| Integrator (B1) | Integrators experiment with digital technologies in a variety of contexts and for a range of purposes, integrating them into many of their practices. They creatively use them to enhance diverse aspects of their professional engagement. They are eager to expand their repertoire of practices. They are, however, still working on understanding which tools work best in which situations and on fitting digital technologies into pedagogic strategies and methods. Integrators just need some more time for experimentation and reflection, complemented by collaborative encouragement and knowledge exchange to become Experts. |
| Expert (B2) | Experts use a range of digital technologies confidently, creatively and critically to enhance their professional activities. They purposefully select digital technologies for particular situations |

| | |
|---|---|
| | and try to understand the benefits and drawbacks of different digital strategies. They are curious and open to new ideas, knowing that there are many things they have not tried out yet. They use experimentation as a means of expanding, structuring and consolidating their repertoire of strategies. Experts are the backbone of any educational organisation when it comes to innovating practice. |
| **Leader (C1)** | Leaders have a consistent and comprehensive approach to using digital technologies to enhance pedagogic and professional practices. They rely on a broad repertoire of digital strategies from which they know how to choose the most appropriate for any given situation. They continuously reflect on and further develop their practices. Exchanging with peers, they keep updated on new developments and ideas. They are a source of inspiration for others, to whom they pass on their expertise. |
| **Pioneer (C2)** | Pioneers question the adequacy of contemporary digital and pedagogical practices, of which they themselves are Leaders. They are concerned about the constraints or drawbacks of these practices and driven by the impulse to innovate education even further. Pioneers experiment with highly innovative and complex digital technologies and/ or develop novel pedagogical approaches. Pioneers are a unique and rare species. They lead innovation and are role models for younger teachers. |

It is to be noted that the DigCompEdu Framework concerns technology in a broader sense, and does not focus specifically on AI. A supplement was designed in order to reconcile the DigCompEdu Framework with competences concerning AI (Bekiaridis, 2024; Bekiaridis & Attwell, 2024). It reimagined DigCompEdu and its levels to create skill levels for teachers concerning AI. The supplement certainly helped to make the translation from DigCompEdu to the PAIDEIA AI training course.

## 2.3 UNESCO Competency frameworks for teachers and students.

Two of the largest frameworks developed concerning AI in education have to be the AI competency frameworks for teachers and students of UNESCO, released in September 2024. UNESCO aims, on the one hand, to guide teachers on how to use AI and integrate AI within curricula. On the other hand, the framework for students shows the competencies students need to attain in order to be responsible citizens in the era of AI. The framework is very concrete and complete compared to other regulatory frameworks at European level concerning AI in education.

# UNESCO AI Competency Framework for Students (CFS)

The AI Competency Framework for Students (CFS), developed by UNESCO, is designed to help educators integrate AI learning objectives into school curricula. This framework outlines 12 competencies across four key dimensions: Human-centred mindset, Ethics of AI, AI techniques and applications, and AI system design. These competencies are structured to ensure students become responsible users and co-creators of AI.

The competencies are divided into three progression levels to cater to different stages of learning. The first level is called Understand and this level is designed for all students who will, in some way or form, interact with AI at a certain point in their lives. The Understand level focuses on getting students familiarised with basic AI concepts, processes and methods as well as some ethical considerations. It aims to lay a foundation of AI knowledge among all students. Apply is the second level which is the intermediate stage. Students will begin to use AI tools and techniques in practical scenarios. They will also apply the knowledge they gained at the Understand level to solve real-life problems while taking the ethical aspect into consideration. The last level, Create, concerns students developing and designing their own AI systems. They engage in complex situations and collaborate with peers. The level is very much advanced and catered towards students with a particular interest in AI. The competency framework can be found in Table 3.

*Tabel 2 AI competency framework for students (UNESCO, Miao, & Shiohira, 2024, p. 19)*

| Competency aspects | Progression levels | | |
|---|---|---|---|
| | **Understand** | **Apply** | **Create** |
| **Human-centred mindset** | Human agency | Human accountability | Citizenship in the era of AI |
| **Ethics of AI** | Embodied ethics | Safe and responsible use | Ethics by design |
| **AI techniques and applications** | AI foundations | Application skills | Creating AI tools |
| **AI system design** | Problem scoping | Architecture design | Iteration and feedback loops |

# UNESCO AI Competency Framework for Teachers (CFT)

The AI Competency Framework for Teachers (CFT) offers another inspiring framework. It focuses on five dimensions or aspects that -each- have three progression levels. Acquire is the basic level where teachers develop essential skills to use AI safely and ethically in education. The second level, Deepen, concerns more advanced skills to integrate AI into teaching practices. It focuses on human responsibility, the safe use of technology, and how teachers can apply AI tools in order to enhance their teaching and support student learning. The Create level prepares teachers to become AI co-creators. Teachers are able to design and implement AI-driven projects while collaborating with colleagues.

UNESCO's framework is designed to ensure educators are well-prepared to navigate the complexities of AI in education. It emphasises a human-centred mindset, encouraging teachers to foster positive values and attitudes towards human-AI interactions. The Ethics of AI aspect highlights the importance of understanding and applying ethical principles, regulations, and practical rules to adapt AI responsibly. AI foundations and applications focus on equipping teachers with the conceptual knowledge and skills needed to select, apply, and customise AI tools. The AI pedagogy aspect integrates AI into teaching strategies, supporting course preparation, teaching, learning, socialisation, and assessment. Lastly, AI for professional development outlines the competencies required for teachers to use AI effectively in their lifelong learning, collaborative professional growth, and exploration of professional transformation. Together, these aspects ensure that teachers can use AI to enhance student learning and their own professional development in a responsible and effective manner.

By crossing the three levels with the five aspects of competency, the AI CFT defines fifteen competency blocks as seen in Table 4. These competency blocks are designed to support all teachers – from those with no knowledge at all about AI, to those with a higher degree of AI experience.

*Tabel 3 The AI competency framework high-level structure: aspects and progression levels (UNESCO, Miao, & Cukurova, 2024, p. 22)*

| Aspects | Progression levels | | |
|---|---|---|---|
| | **Acquire** | **Deepen** | **Create** |
| **Human-centred mindset** | Human agency | Human accountability | Social responsibility |
| **Ethics of AI** | Ethical principles | Safe and responsible use | Co-creating ethical rules |
| **AI foundations and applications** | Basic AI techniques and applications | Application skills | Creating with AI |
| **AI pedagogy** | AI-assisted learning | AI-pedagogy integration | AI-enhanced pedagogical transformation |
| **AI for professional development** | AI enabling lifelong professional learning | AI to enhance organizational learning | AI to support professional transformation |

Three aspects are similar to the competency framework for students while AI pedagogy and AI for professional development were added instead of AI system design. The framework for teachers focuses on how teachers can integrate AI into their teaching practices in an effective and efficient way. This framework wants to ensure that teachers are well-equipped to use AI responsibly in the classroom stressing the model role a teacher can take when it comes to using AI.

# 3. FORMATION OF THE CURRICULUM STRUCTURE

## 3.1 Review of existing AI courses

AI took the world by surprise. However, people were quick act and created training courses concerning the topic. The PAIDEIA project sets out to analyse different AI training courses so we could see which elements were reoccurring and how most training courses were structured. The analysis was made by the different partners and in total, we looked at 35 training courses on AI in education across Europe (see Table 5). The main takeaways were discussed in a project meeting.

| Country | Training Course | Reference (retrieved in May 2024) |
|---|---|---|
| **Belgium** | AI in education (online training course, ITEC/IMEC/KUL) | https://itec.kuleuven-kulak.be/online-training-on-ai-in-education/ |
| **Belgium** | AI in UCLL | Toledo course for academic staff of UCLL |
| **Belgium + international** | Elements of AI (Belgium + also international) | https://www.elementsofai.be/ : MOOC of KULeuven (in collaboration with VAIA, European Commission, University of Helsinki, Finnish Government, MinnaLearn) |
| **The Netherlands** | De nationale AI cursus: AI in het onderwijs | https://www.tech-cursus.nl/app/18-ai-voortgezet-onderwijs/home |
| **The Netherlands** | AI in onderwijs en onderzoek | https://libguides.hanze.nl/onderwijs_ai/onderwijs#s-lg-box-16308750-container |
| **Bulgaria** | Integrating Artificial Intelligence into Today's Classrooms: Techniques and Ethical Considerations | https://rq.mon.bg/programs/approved-programs course ID on the platform: 21800031 |
| **Bulgaria** | Place of artificial intelligence in the classroom. | https://rq.mon.bg/programs/approved-programs course ID on the platform: 96990148 |

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|---|---|---|
| | Teacher training - theory and practice | |
| **Bulgaria** | AI for education | https://bg.khanacademy.org/khan-for-educators/ii-ai-v-obrazovanieto |
| **Spain** | AN AI TO LEARN | https://enlinea.intef.es/courses/course-v1:INTEFMOOC+IAEducacion+2023_T1/about |
| **Spain** | Learning to love AI: A date with Machine Learning | https://doceo.catedu.es/epgfp/portadaInitConsultarActividad?idActividad=14811 |
| **Spain** | Exploring the potential of generative AI as an educational tool: evaluation, feedback and creation of audiovisual content | https://doceo.catedu.es/epgfp/portadaInitConsultarActividad?idActividad=14775 |
| **Spain** | Artificial Intelligence tools for teachers related to entrepreneurship | https://doceo.catedu.es/epgfp/portadaInitConsultarActividad?idActividad=14926 |
| **Spain** | First steps in generative AI: empowering teachers | https://doceo.catedu.es/epgfp/portadaInitConsultarActividad?idActividad=14803 |
| **Italy** | "Scuola Futura" training paths (Ministry of Education) | https://scuolafutura.pubblica.istruzione.it/percorsi |
| **Italy** | Project "AI4T" ("Scuola Futura") | https://scuolafutura.pubblica.istruzione.it/web/scuola-futura/intelligenza-artificiale- |
| **Italy** | "Digital Animator" Course (e-Campus University) | https://corsiemaster.uniecampus.it/master/competenze-metodologie-didattiche-dell-animatore-digitale.asp?_gl=1*1kt94kc*_up*MQ..*_ga*ODgwMTA5NzQ2LjE3MTQzMjIwNjE.*_ga_T3QZE6ZLRE*MTcxNDMyMjA2MS4xLjEuMTcxNDMyMjE0Mi4wLjAuMA..&gclid=CjwKCAjw57exBhAsEiwAaIxaZkDBGup23nFAPYjn8UB17JWisO3jTW_r-yXZULSWHozFG2DEyAGC-BoCpvYQAvD_BwE |
| **Italy** | Digital Animator 4.0 (eipass) | https://it.eipass.com/certificazioni-informatiche/animatore-digitale-4/ |

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| **Italy** | Artificial Intelligence in the Classroom (Zanichelli) | https://formazione.zanichelli.it/formazione-in-rete/seminari-on-line/informaticaia2023/ |
| **Italy** | Artificial intelligence for education (Microsoft) | https://learn.microsoft.com/it-it/training/educator-center/topics/ai-for-education |
| **Italy** | Artificial Intelligence and Machine Learning (DEAScuola Formazione) | https://formazione.deascuola.it/offerta-formativa/evento/intelligenza-artificiale-e-machine-learning/ |
| **Italy** | Artificial Intelligence enters schools. The use of chatbots in education ("Formazione su misura") | https://www.formazionesumisura.it/corso/lintelligenza-artificiale-entra-a-scuola-luso-dei-chatbot-nella-didattica/ |
| **Turkey** | Basic Artificial Intelligence Applications Certificate Program | https://sfk.istanbul.edu.tr/temel-yapay-zeka-uygulamalari-sertifika-programi-e234.html |
| **Turkey** | Introduction to Artificial Intelligence | https://www.btkakademi.gov.tr/portal/course/yapay-zekaya-giris-29193 |
| **Turkey** | Artificial Intelligence Tools Specialization Training | https://www.novarge.com.tr/kurs/yapay-zeka-araclari-uzmanligi-egitimi |
| **Turkey** | Artificial Intelligence Applications Course | https://www.oba.gov.tr/egitim/detay/yapay-zeka-uygulamalari-kursu-601 |
| **Turkey** | Artificial Intelligence Basic Level Teacher Trainings | https://www.robotikegitimakademisi.com/yapay-zeka-temel-seviye-egitimi |
| **Turkey** | Artificial Intelligence and Applications in Education Course | https://etwinningonline.eba.gov.tr/course/egitimde-yapay-zeka-uygulamalari/ |
| **Ireland** | AI for Schools | https://www.oidetechnologyineducation.ie/artificial-intelligence-in-schools/#:~:text=Opening%2013th%20May%2C%202024%2C%20this,benefits%2C%20limitations%20and%20ethical%20considerations. |
| **Ireland** | Introduction to AI for Primary Teachers | https://teachnet.ie/courses/aipt/ |
| **Ireland** | Teaching and Learning with AI: A New Era for Primary Classrooms | https://teachersummercourses.com/course/fsc2465-teaching-and-learning-with-ai-a-new-era-for-primary-classrooms/ |

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| **Ireland** | ENHANCE YOUR TEACHING THROUH THE POWER OF AI - a webinar series for Educators - PERSONALISING LEARNING WITH AI | https://www.wtc.ie/cpd-courses-2/primary-courses/2201-online-enhance-your-teaching-throuh-the-power-of-ai-a-webinar-series-for-educators.html |
| **Ireland** | 101 Great AI Education Prompts | https://www.edcentretralee.ie/cpd-courses-tralee-kerry/online-post-primary/2909-24tra061-101-great-ai-education-prompts.html |
| **Ireland** | AI in Education: Empowering Teachers and Enhancing Learning Experiences | https://blackrockec.ie/cpd-courses-2/post-primary-courses/1358-23lc-10-007-ai-in-education-empowering-teachers-and-enhancing-learning-experiences.html |
| **Ireland** | Webinar: Elevating Teaching and Learning with AI: Advanced Prompting, Image Creation, and Work-Life Balance | https://www.clareed.ie/cpd-courses-2/primary-courses/3261-webinar-elevating-teaching-and-learning-with-ai-advanced-prompting-image-creation-and-work-life-balance-p-pp.html |
| **Ireland** | AI for School Administration, Scheme of Work Design and Beyond: A Toolkit for Teachers, Principals, Deputy Principals and Post Holders | https://www.ecnavan.ie/cpd-courses-ecnavan/online-courses/1785-aut23-201-ai-for-school-administration-scheme-of-work-design-and-beyond-a-toolkit-for-teachers-principals-deputy-principals-and-post-holders.html |

The analysis of different AI curricula reveals several reoccurring themes that are consistently emphasised in training courses, providing a comprehensive understanding of AI's role and application in educational settings. These themes thus seem relevant to incorporate in the PAIDEIA training curriculum.

A foundational theme in AI training courses is the introduction to AI, encompassing fundamental concepts, definitions, and the historical development of AI. Courses typically begin with an overview of what AI is, its evolution over time, and its basic principles. This foundational knowledge is crucial for educators to understand the broader context of AI and its implications. There seems to be particular stress on the concept of machine learning. Knowing the underlying workings of AI can help educators understand how AI tools work and might demystify them in a way.

The application of AI in education is also a central focus in many training courses. Training courses explore how AI can enhance teaching and learning processes through personalised learning, adaptive technologies, and practical integration. AI tools can tailor educational experiences to individual student needs, providing customised feedback and support. Courses often highlight the benefits of AI in creating more engaging and effective learning environments. Educators are trained to leverage AI for curriculum innovation, student assessment, and fostering creativity and interaction in the classroom.

Ethics are frequently addressed in AI training courses as well, involving discussions on the societal impacts of AI, data privacy, bias, and the responsible use of AI tools. Educators are taught to recognise and mitigate ethical challenges associated with AI, ensuring that AI applications are used in a manner that respects student privacy and promotes fairness. Courses often include modules on ethical decision-making, highlighting the importance of transparency and accountability in AI implementations.

Aside from ethical considerations, other challenges of AI in education are highlighted. Courses discuss the limitations of AI technologies, potential risks, and strategies for overcoming obstacles. Educators learn about the complexities of integrating AI into existing educational systems, including stakeholder considerations and the need for continuous professional development. By understanding these challenges, educators can develop more effective and sustainable AI integration strategies.

Lastly, there seems to be a focus on "hands-on" training with practical AI tools and techniques. Many training courses provide educators with tools and very concrete examples. This theme emphasises the importance of practical experience in mastering AI technologies, enabling educators to effectively utilise AI tools to enhance educational outcomes. When it comes to generative AI, prompting is often included in the training courses. Prompting (and providing example prompts in particular) can help educators interact with chatbots more efficiently.

The themes mentioned above were thus imperative to include in the PAIDEIA training course. The analysis helped to narrow the amount of themes one should address in an AI training curriculum. However, it also yielded significant insights concerning absent elements that the PAIDEIA team could incorporate into its teacher training curriculum as it is the ambition of PAIDEIA to offer an innovative teacher training curriculum that is distinct from existing ones.

## 3.2 Competency Levels DigCompEdu in the PAIDEIA training course

When designing the curriculum, the skill gap within the aimed audience was taken into account. As the curriculum tries to speak and cater to the needs of all teachers of all expertise levels, the curriculum needed to be flexible enough. It was decided to add the different competency levels of DigCompEdu to the different units of the curriculum. By choosing a level for each unit, the curriculum increases in difficulty as one progresses. Figure 2 shows the overall structure of the training course.
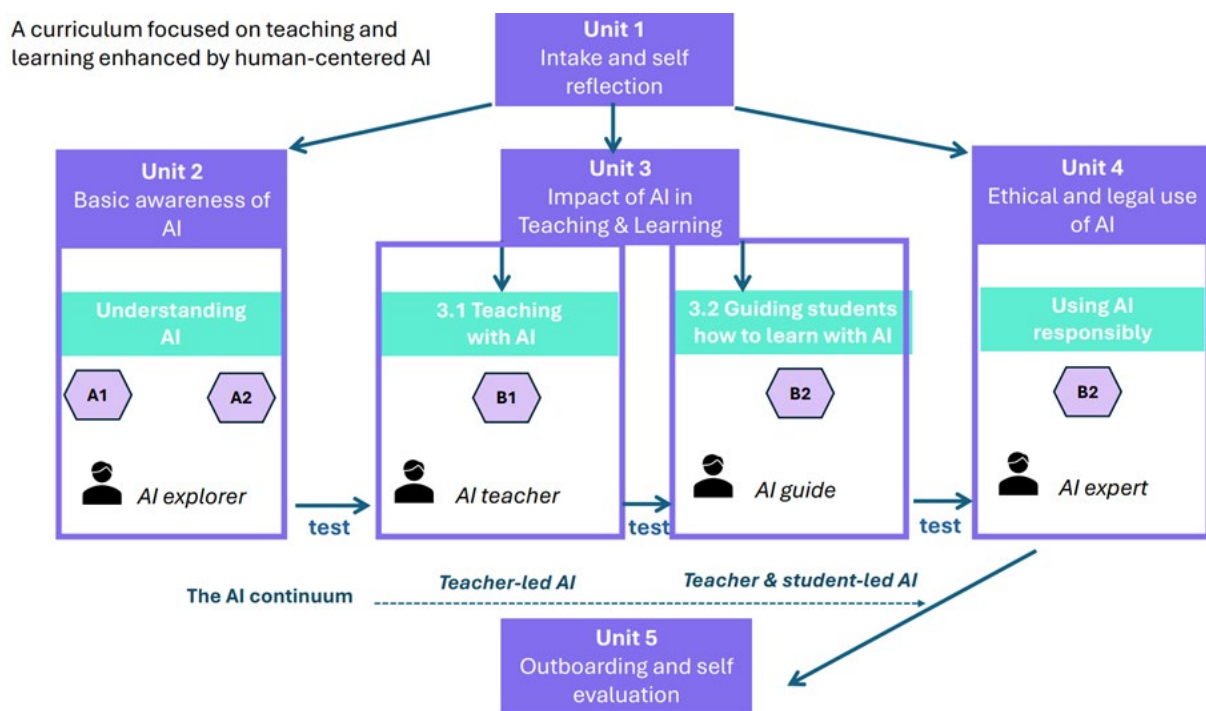
*Figure 2 Overall structure of the PAIDEIA training course*

The curriculum has a total of five units which get more advanced as one progresses in the training course. The themes of each unit also cover the major themes found in the review study of AI courses. The arrows show how a participant can move throughout the training course. Note that Unit 1, 4 and 5 are mandatory for all participants, while Unit 2 and 3 can be skipped depending on the expertise of the participant. To move from one unit to another, participants have to complete an assessment to prove that they have acquired the right skillset to move into a more advanced unit. The order of the units is fixed as the knowledge of an earlier unit is needed in order to complete a following unit.

Unit 1 is the starting point for all participants as it includes a short introduction of the project. The concept of human-centred AI is central to this unit as the need for human agency will return time and time again in the training course. They will reflect upon their own readiness and identify competency gaps related to the use of AI in educational settings. This self-reflection process is crucial for developing a personalised learning path and ensuring effective integration of AI into their teaching practices. After the participants have completed Unit 1, they will be ushered towards a unit that corresponds with their skill level. If a teacher has no to basic knowledge on AI, they will be oriented towards Unit 2 whereas a teacher with much knowledge on AI might be oriented towards Unit 3 or 4.

Unit 2 covers the skill levels A1 and A2 as defined in DigCompEdu and its supplement (Redecker, 2017; Bekiaridis, 2024). The unit is beginner-friendly and welcomes Newcomers and Explorers of AI. It focuses on the more theoretical part of AI. At the end of the unit the participant should be familiar with AI and its basic concepts as well as the main benefits and limitations of AI. All information will be linked to real-life contexts and educators will learn how to prompt and how to engage with AI effectively. In general, it will provide the participant with the knowledge and skills how and when to use AI in general and in education.

Unit 3 is split into two inseparable parts. One cannot only complete Unit 3.1 or Unit 3.2 as they are intrinsically intertwined with each other. Unit 3 puts the dual implication of AI in education in central stage. On the one hand, teachers can use AI to help their own educational practices. On the other hand, students use AI during their education and teachers need to guide them in their use of AI. It is necessary that a teacher first knows how to use AI before they move onto helping others.

The persona of unit 3.1 is the AI teacher which corresponds with DigCompEdu level B1 (Integrator). At the end of the unit, the teacher knows the ethical and pedagogical affordances of AI for teachers. It aims to help teachers integrate AI into their educational practices. Teachers can use AI to complete administrative tasks, but AI also disrupts the status quo. Unit 3 explores how education can change and how AI can be integrated within curricula. At the end of the unit, educators should know how to use AI as a teacher assistant which much stress on the word assistant. AI will namely never replace teachers and teachers need to critically apply and evaluate AI tools when using them. This is why the persona of the unit was changed from Integrator to AI teacher. The AI teacher persona focuses on the fact that the AI user still has expertise as a teacher while AI is the assistant that can help them.Unit 3.2 signifies the next step for teachers after knowing how to use AI themselves. The curriculum focuses on students next: how can AI help students? What do students need to look out for? How can AI literacy be developed among students? Those kind of questions will be answered in unit 3.1. The teacher in this case transforms from a regular AI user to an AI expert. Through modelling and clear instructions the participant

will learn how to foster AI skills they have developed themselves within students. The persona of AI guide perfectly fits the unit as the AI user moves on from using AI for themselves to teaching and showing the world of AI to others.

Unit 4 emphasises the responsible use of AI in education, covering ethical and legal aspects such as data privacy, intellectual property rights, and legal frameworks. Unit 4 corresponds with DigCompEdu level B2 Expert. Educators will evaluate and reflect on AI's societal impacts and ethical use of AI practices in education. They will understand the relationship between AI and disinformation and learn ways to tackle misuses of AI. The importance of clear communication regarding the responsible use of AI in educational contexts will be highlighted, including developing a clear communication plan and guiding parents in understanding the ethical implications and privacy concerns related to AI. As mentioned above, Unit 4 is mandatory for all participants. This is due to the training materials as it covers very recent developments of AI in education such as the EU AI act.

The very last unit is an outboarding unit where educators will also receive a certificate for finishing the course. Unit 5 is filled with managing uncertainties related to AI developments with a future-oriented human-centred mindset. Educators will again self-evaluate their readiness to see whether they had a mentality shift while completing the course.

DigCompEdu did not only inspire the competency levels used in the training course, it also can help make the learning process a bit more visual. Figure 3 shows the position of each unit on the DigCompEdu Framework.
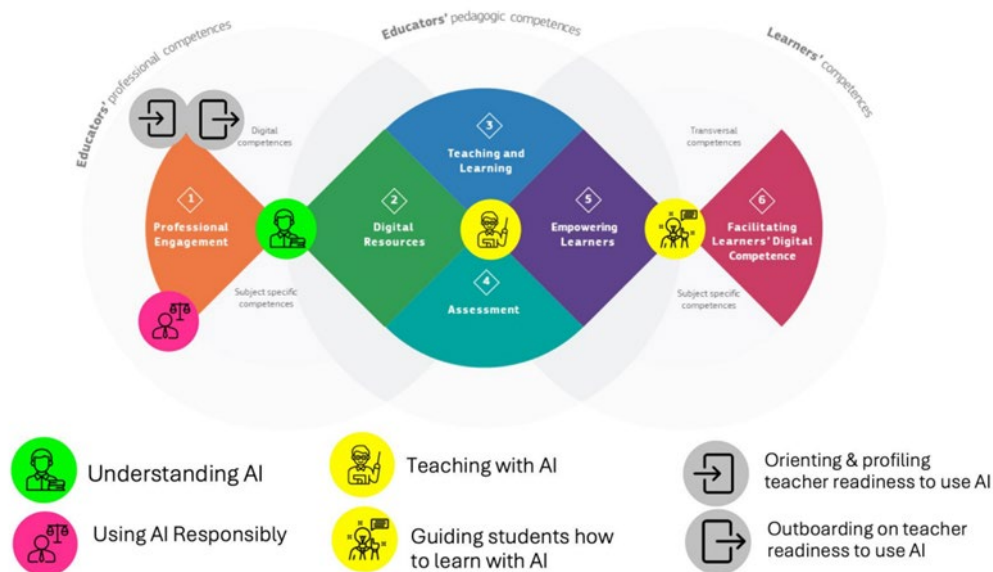
*Figure 3 The training course units' positions on DigCompEdu*

The teacher training curriculum is spread out onto the different areas of the DigCompEdu Framework. It thus shows that all areas are covered by the training course with a particular focus on professional engagement. That is to be expected as the training course aims to educate teachers how to use and implement AI in their educational practices. Teachers first need to know what they are using before they can implement that knowledge into their own teaching and lastly, they can impact learners with the knowledge they gained and are now using.

## 3.3 Learning goals based on UNESCO

The UNESCO AI competency frameworks for Teachers and Students served as a main inspiration for the learning goals attached to each unit. The project team had already defined certain learning goals by the time the two frameworks were published, yet after evaluating the preliminary learning goals, it was decided to cross-reference the initial learning goals to the UNESCO frameworks. It was decided that the last level, Create, defined by UNESCO would not be heavily covered by the teacher training curriculum. Table 6 gives an overview of the learning goals per unit. On the left, you can find the competency level defined by DigCompEdu. On the right, however, you can find which learning goal from UNESCO is related to the learning goal as defined by the PAIDEIA curriculum. There is either a reference to the AI competency teacher framework marked as CFT (UNESCO, Miao, & Cukurova, 2024, pp. 28–42) or to the framework for students which is represented by CFS (UNESCO, Miao, & Shiohira, 2024, pp. 29–52).

*Table 5 Learning goals per unit in the PAIDEIA teacher training course*

| UNIT 1: INTAKE AND SELF-REFLECTION | | |
|---|---|---|
|  | 1. **Understanding** what human-centred AI means. <br><br> 2. **Exploring** the AI&EDcomp Framework. <br><br> 3. **Reflecting** upon the own readiness and competency gaps related to the use of AI in education. | <br><br><br><br> CFT 5.1.1, 5.1.2 |
| **UNIT 2: BASIC AWARENESS OF AI** | | |
| AI explorer <br><br> (A1/A2) <br><br>  | 1. **Knowing** what AI is, its basic concept(s) and its potential. | CFT 3.1 |
| | 2. **Understanding** how an AI system works. | CFT 3.1 |
| | 3. **Understanding** the benefits and limitations of AI in real-life contexts and in education. | CFT 3.1 |
| | 4. **Understanding** the basic ethical AI-related issues (including protection of human rights, human agency, promotion of | CFT 2.1 |

| | | |
|---|---|---|
| | linguistic and cultural diversity, inclusion and environmental sustainability). | |
| | 5. **Understanding** the need for human agency. | CFT 1.1, 1.2.1 |
| | 6. **Understanding** how to interact with AI. | |
| | 7. **Knowing** how and when to use AI. | |
| | 8. **Exploring and engaging** in self-paced learning through AI-focused platforms and resources available for professional development, communication, and education. | CFT 5.1.3 |

## UNIT 3: IMPACT OF AI IN TEACHING & LEARNING

### UNIT 3.1: TEACHING WITH AI

| | | |
|---|---|---|
| AI teacher (B1) | 1. **Exploring** the ethical affordances and pitfalls of AI for teachers. | |
| | 2. **Exploring** the pedagogical affordances and pitfalls of AI for teachers. | CFT 4.1 |
| | 3. **Understanding** the changing roles and responsibilities of teachers and their accountability in the AI era. | CFT 1.2.3, 1.2.4 |
| | 4. **Understanding** how AI impacts the educational vision, the curriculum & learning goals, the assessment, and the learning activities of specific subject matters. | CFT 4.3 |
| | 5. **Knowing** how to use AI as a teacher assistant (while designing and implementing lessons, assessing, providing feedback, differentiating,...) in specific subject matters. | CFT 4.2 |
| | 6. Critically **applying** and **evaluating** AI tools to enhance teaching (f.i. while designing and implementing lesson plans, for administration goals,… ) in specific subjects, interdisciplinary learning contexts and in administrative tasks. | CFT 3.2 |
| | 7. **Engaging** in continuous professional development to enhance professional learning by expanding knowledge and skills on the use of AI and/or by participating in professional learning communities. | CFT 5.2 |

### UNIT 3.2 GUIDING STUDENTS HOW TO LEARN WITH AI

| | | |
|---|---|---|
| AI guide (B2) | 1. **Exploring** the (ethical/pedagogical) affordances and pitfalls of AI for students. | |
| | 2. **Understanding** the changing roles and responsibilities for students in the AI era. | |
| | 3. **Knowing** how AI literacy can be developed among students through: | |

| | | | |
|---|---|---|---|
|  | | 1. teaching students basic AI concepts, fostering initial digital literacy; | CFS 4.1.3 |
| | | 2. modelling the use of AI in specific subject matters; | CFS 4.1.4 |
| | | 3. providing clear guidelines on the use of AI in assignments, assessments, and learning; | |
| | | 4. coaching/guiding students in enhancing learning strategies with AI; | CFS 4.1.4.2, 4.2.3 |
| | | 5. helping students to apply AI tools offering support for individual and special needs; | CFS 4.1.4.2 |
| | | 6. developing critical thinking with students; | CFS 4.1.1.3, 4.1.4.1 |
| | | 7. reflecting with students on ethical awareness in the use of AI. | CFS 4.1.2, 4.2.1, 4.2.2 |
| | 4. **Engaging** in continuous professional development by interacting with students and learning from their AI learning experience | | |

| UNIT 4: ETHICAL AND LEGAL USE OF AI | | | |
|---|---|---|---|
| AI expert (B2)  | 1. **Understanding and incorporating** ethical and legal responsible use of AI in education (including data privacy, intellectual property rights, legal frameworks,…) | | CFT 2.2 |
| | 2. **Evaluating and reflecting** on AI's societal impacts and ethical use of AI (practices) in education. | | CFT 1.3 |
| | 3. **Knowing** the relationship between AI and disinformation. | | CFT 2.2 |
| | 4. **Applying** ways to tackle misuses of AI. | | CFT 2.2 |
| | 5. **Understanding** the importance of clear communication regarding the responsible use of AI in educational context through: | | |
| | | 1. developing a clear communication plan; | |
| | | 2. guiding parents in understanding the ethical implications and privacy concerns related to the use of AI in educational content. | |
| | 6. **Engaging** in continuous professional development to enhance professional and organizational learning by expanding knowledge and skills on the use of AI and/or by participating in professional learning communities. | | CFT 5.2 |

| UNIT 5: OUTBOARDING AND SELF-EVALUATION | | |
|---|---|---|
| | 1. **Managing** the uncertainties related to AI developments with a future orientated human-centred AI mindset. | |
| | 2. **Self-evaluating** the own readiness and competency gaps related to the use of AI in education (based upon the AI&EDcomp Framework). | CFT 5.1 |
| | In this unit we include guidelines where participants can develop the following learning goals: | |
| | 1. **Applying** appropriate knowledge and skills on data, algorithms, programs and AI models to customize or assemble existing AI tools or semi-finished AI tools to create AI tools or fine-tune open-source AI systems to create relevant and affordable solutions for local settings. | CFT 3.3.2 |
| | 2. **Contributing** to a new or existing repository of user-created or tailored AI tools based on personal or institutional needs. | CFT 3.3.4 |
| | 3. **Contributing** to the co-creation of ethical rules for AI practices in education. | CFT 2.3 |
| | 4. **Leading** discussions and actions addressing ethical, legal and societal concerns in the design and use of AI in education. | CFT 2.3 |
| | 5. **Becoming** agents of change taking up professional and social responsibilities in AI societies (inside or outside their own educational setting). | CFT 5.3 |

As one can see from the learning goals, some themes are reoccurring, e.g. the ethical aspect of AI. The result is a spiral curriculum where each aspect is developed further when progressing within the training course. The curriculum aims to allow teachers to develop their skills further while progressing in the training curriculum. When one progresses within the course, the themes will repeat so that the participants can look back on their learning and add new information to their newly developed knowledge. The spiral aspect of the curriculum will be explained more thoroughly in the last section of this report as it pertains to the AI&EDcomp framework.

## 3.4 Individual unit design

Once the spiral curriculum and structure was finalised, the focus began to lie on the individual structure of each unit. As each unit is quite dense in content materials, it was agreed upon to use a similar structure for each unit so the teacher can know what to expect.

We blended Merrill's instructional design (Merrill, 2002) with principles from explicit direct instruction (Hollingsworth & Ybarra, 2009) in order to create a coherent story within each unit. Figure 4 shows a visualisation of the units' internal design. Figure 4 Visualisation of the different sections within a unit

*Figure 4  Visualisation of the different sections within a unit*
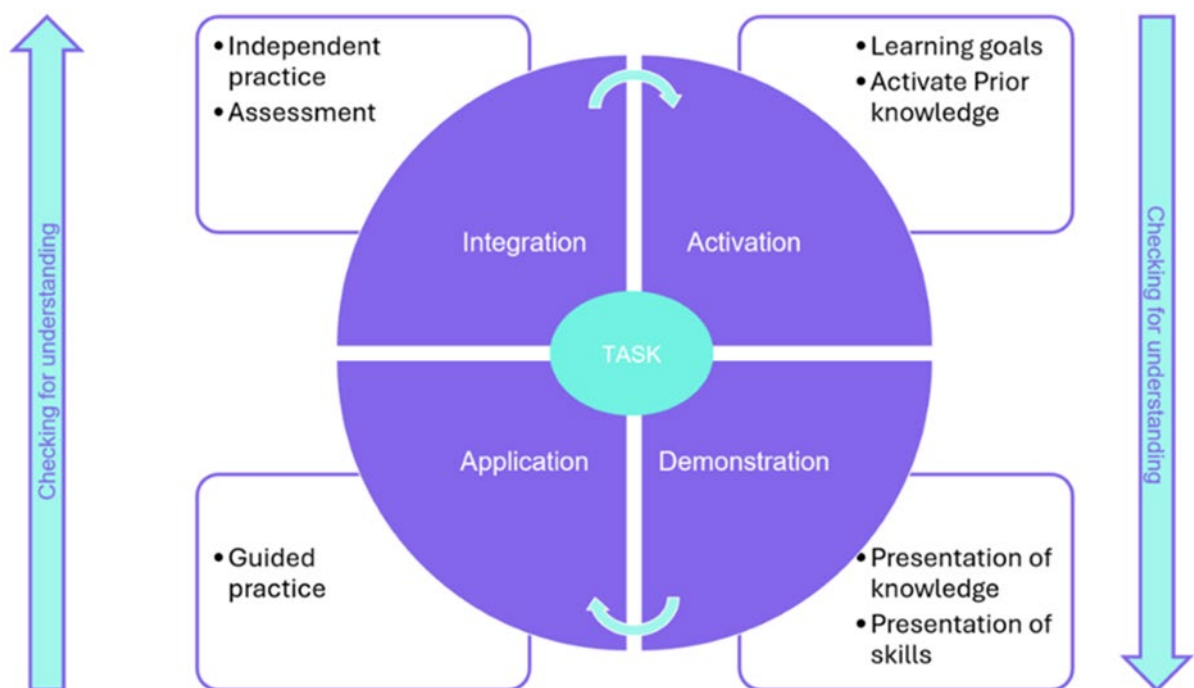


Each unit thus comprises of four sections. The four sections might flow from one to another, but every section is present in each unit.

The first section is activation where the learning goals of the units are announced and participants' prior knowledge is activated. By clearly defining what participants need to know by the end of the unit, they will have an idea what is expected of them. However, before diving headfirst into a new topic, the course recalls what participants already know the topic. This might involve a brainstorming session or a quick review of key concepts they have learned in earlier units. By connecting new information to existing knowledge, participants are better equipped to tackle the new topic.

Next, we move into the demonstration section. Here all the knowledge and skills one might need to handle the topic are presented. This knowledge will be presented in many different forms such as videos, texts, testimonies and so on. We strive to incorporate interactive elements into the training course during this section as it might be monotonous if the participant only engages passively with the material. This section will thus contain interactive quizzes, infographics and other interactive elements.

The third section concerns application of the material. The participants are given the opportunity to apply what they have learned. We will use real-life examples where a participant will help a teacher in need. They will complete this case study where they will see that they have attained most of the learning goals presented in the first section of the unit. This guided practice will take participants by the hand and will break the problem down in smaller, manageable steps. Each step will be explicitly instructed ensuring that participants understand each step before moving onto the next step.

In the integration section, participants are invited to integrate their newly attained knowledge into their broader understanding of education and AI. We have called this section 'independent practice' as we will provide the participants with as many resources as possible in order for them to deepen their understanding on the topic if they desire to do so. This section serves as the final part of a unit before they move onto the assessment.

Lastly, participants will complete an assessment. This assessment is a prerequisite to move onto the next unit. During the assessment, participants will be tested whether or not they have achieved the learning goals of the unit. It also serves as a way to show how much one has learned throughout the unit. Note that the final assessment is not the only check-points within a unit. During the unit, participants will be checked whether they have understood all the information to make sure they are following along and grasping the material presented.

In general, there is a focus on solving real-world problems and providing participants with theoretical as well as practical knowledge in order to tackle AI in education.

# 4. AI&EDCOMP FRAMEWORK

The AI CFT provides an operational framework for the design and planning of training courses and support programmes for teachers. Inspired by the clear visual two-dimensional matrix, the project team decided to create one for the PAIDEIA teacher training curriculum. The five dimensions proposed by the AI CFT were adopted and were positioned in the outline of the teacher training curriculum. This leads to the following matrix, presented in Table 7, making the spiral component of the curriculum very visual and clear.

*Table 6 AI&EDcomp framework for the PAIDEIA training course*

| | Unit 1 | Unit 2 | Unit 3 | | Unit 4 | Unit 5 |
|---|---|---|---|---|---|---|
| | **Intake and self-reflection** | **Basic awareness of AI** | **Impact of AI in Teaching and Learning** | | **Ethical and legal use of AI** | **Outboarding and self-evaluation** |
| | | *AI explorer (A1/A2)* | *AI teacher (B1)* | *AI guide (B2)* | *AI expert (B2)* | |
| 1. Human-centred AI mindset | Human-centred AI | Human agency | Human accountability | | Social responsibility | |
| 2. Ethics of AI | | Basic AI ethical principles | AI ethics in the classroom | | Responsible use in education | |
| 3. AI foundations and applications | | Basic AI techniques and applications | AI techniques and applications in the classroom | | | Creating with AI |
| 4. AI pedagogy | | Basic AI skills | AI continuum | | Communication about AI | |
| 5. AI for professional development | Self-reflection | AI enabling lifelong professional learning | AI to enhance educational learning | | AI to enhance organizational learning | Self-evaluation<br><br>AI to support professional transformation |

As one can see, all teacher competencies of the AI CFT are partially and/or fully addressed in the learning objectives of the units. As said before, however, the Create level is not really addressed in the training curriculum for the topics Ethics of AI, AI foundations and applications and AI for professional development. They are integrated in the training course as guidelines for those teachers who want to professionalise further after completing the teacher training curriculum.

Additionally, the competency levels of DigCompEdu can be found at the top of the table. These levels provide a structured progression of skills and knowledge, ensuring that educators can develop their competencies systematically. By incorporating DigCompEdu competency levels, the matrix offers a clear pathway for professional growth, aligning with the overarching goals of the AI&ED framework.

Table 7 thus shows the AI&EDcomp framework as proposed by PAIDEIA. If one were to compare the PAIDEIA framework to UNESCO it becomes clear that both frameworks emphasise a human-centred mindset, incorporating terms such as Human agency, Human accountability, and social responsibility. These terms highlight the importance of using AI responsibly and critically, ensuring that AI practices promote human-centred values. Another commonality is the theme Ethics of AI. Both include competencies related to ethical principles and the safe use of AI. This emphasis ensures that educators understand and apply ethical considerations in their AI practices inside and outside of the classroom. Additionally, AI foundations and applications are very similar in the two frameworks. Both aim to equip educators with the knowledge and skills to use AI tools effectively in educational settings, addressing basic AI techniques and their practical applications.

There are, however, three major differences, to be noted between PAIDEIA and UNESCO. One major difference lies in the theme AI pedagogy. UNESCO defines AI pedagogy as competencies a teacher need to acquire in order to implement AI into their teaching practices such as course preparation and learning assessments. PAIDEIA, however, needed a broader definition of the theme. The teacher training course namely covers not only how a teacher can use AI but also trains teachers to teach students about AI. There is thus a focus on the teacher as well as the students which is why PAIDEIA uses the term AI continuum. This term stand for how a teacher can use AI to support their teaching and how teachers can use AI during classes. A paper concerning the latter element was already published as a white paper explaining how a teacher can go from modelling AI use in class to students using AI independently (Dewaele, 2025).

Another significant difference is the focus on communication in the PAIDEIA AI&EDcomp framework within the theme AI pedagogy. There seemed to be little focus in the UNESCO frameworks on how a teacher can communicate AI use in a transparent matter. As there seems to be a need for examples and applications of current regulations, the choice was made to focus on communication. The training course will cover how teachers can communicate AI use to students, parents and third parties. It will also give guidelines how to instruct students to report their AI use when using AI to complete assignments.

Regarding professional development, UNESCO includes a dimension on AI for professional development, focusing on lifelong learning and organisational learning. PAIDEIA also addresses professional development but adds the step of using AI to enhance educational learning. This step includes training teachers to become better educators through AI and helping students become better learners using AI. This approach bridges professional learning and organisational learning which are both addressed in UNESCO.

Lastly, in order to make the AI&EDcomp framework more concrete, the learning goals of the individual units are integrated into the AI&EDcomp framework. Table 8 provides a comprehensive overview of the learning goals, demonstrating how they align with the various competencies defined in Table 7. This alignment ensures that each unit's learning goals are directly connected to the competencies outlined in the AI&ED framework, thereby reinforcing the framework's objectives.

*Table 7 Learning goals PAIDEIA training course on the AI&EDcomp framework*

| | Unit 1 | Unit 2 | Unit 3 | | Unit 4 | Unit 5 |
|---|---|---|---|---|---|---|
| | **Intake and self-reflection** | **Basic awareness of AI** | **Impact of AI in Teaching and Learning** | | **Ethical and legal use of AI** | **Outboarding and self-evaluation** |
| | | *AI explorer (A1/A2)* | *AI teacher (B1)* | *AI guide (B2)* | *AI expert (B2)* | |
| **1. Human-centred AI mindset** | 1.1 Understanding what a human-centred AI means. | 2.1 Understanding the need for human agency. | 3.1.1 Understanding the changing roles and responsibilities of teachers and their accountability in the AI era. | 3.2.1 Understanding the changing roles and responsibilities for students in the AI era. | 4.1 Evaluating and reflecting on AI's societal impacts and ethical use of AI (practices) in education. | 5.1 Managing the uncertainties related to AI developments with a future orientated human-centred AI mindset. |
| **2. Ethics of AI** | | 2.2 Understanding the basic ethical AI-related issues (including protection of human rights, human agency, promotion of linguistic and cultural diversity, inclusion and environmental sustainability). | 3.1.2 Exploring the ethical affordances and pitfalls of AI for teachers. | 3.2.2 Exploring the (ethical/pedagogical) affordances and pitfalls of AI for students. | 4.2 Understanding and incorporating ethical and legal responsible use of AI in education (including data privacy, intellectual property rights, legal frameworks,) 4.3. Knowing the relationship between AI and disinformation. 4.4 Applying ways to tackle misuses of AI. | 5.2a Leading discussions and actions addressing ethical, legal and societal concerns in the design and use of AI in education. 5.2b Contributing to the co-creation of ethical rules for AI practices in education. |
| **3. AI foundations and applications** | | 2.3a Knowing what AI is, its basic concept(s) and its potential | 3.1.3 Critically applying and evaluating AI tools to enhance teaching (f.i. while designing and implementing lesson | 3.2.3 Knowing how to teach students basic AI concepts, fostering initial digital literacy. | | 5.3a Applying appropriate knowledge and skills on data, algorithms, programs and AI models to customize or assemble existing AI |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | 2.3b Understanding how an AI system works.<br><br>2.3c Understanding the benefits and limitations of AI in real-life contexts and in education. | plans, for administration goals, ) in specific subjects, interdisciplinary learning contexts and in administrative tasks. | | | tools or semi-finished AI tools to create AI tools or fine-tune open-source AI systems to create relevant and affordable solutions for local settings 5.3b Contributing to a new or existing repository of user-created or tailored AI tools based on personal of institutional needs. |
| 4. AI pedagogy | | 2.4a Knowing how and when to use AI.<br><br>2.4b Understanding how to interact with AI. | 3.1.4a Exploring the pedagogical affordances and pitfalls of AI for teachers.<br><br>3.1.4b Understanding how AI impacts the educational vision, the curriculum & learning goals, the assessment, and the learning activities of specific subject matters.<br><br>3.1.4c Knowing how to use AI as a teacher assistant (while designing and implementing lessons, assessing, providing feedback, differentiating,.) in specific subject matters. | 3.2.4a Exploring the pedagogical affordances and pitfalls of AI for students<br><br>3.2.4b Knowing how AI literacy can be developed among students through:<br><br>- modelling the use of AI in specific subject matters.<br><br>- coaching/guiding students in enhancing learning strategies with AI.<br><br>- helping students to apply AI tools offering support for individual and special needs.<br><br>- developing critical thinking with students. | 4.4a Understanding the importance of clear communication regarding the responsible use of AI in educational context through:<br><br>a. developing a clear communication plan.<br><br>b. guiding parents in understanding the ethical implications and privacy concerns related to the use of AI in educational content. | |

| | | | | - reflecting with students on ethical awareness in the use of AI;<br><br>- providing clear guidelines on the use of AI in assignments, assessments, and learning. | | |
|---|---|---|---|---|---|---|
| 5. AI for professional development | 1.5.a Exploring the AI&EDcomp Framework.<br><br>1.5b Reflecting upon the own readiness and competency gaps related to the use of AI in education. | 2.5 Exploring and engaging in self-paced learning through AI-focused platforms and resources available for professional development, communication, and education. | 3.1.5 Engaging in continuous professional development to enhance professional learning by expanding knowledge and skills on the use of AI and/or by participating in professional learning communities. | 3.2.5. Engaging in continuous professional development by interacting with students and learning from their AI learning experiences. | 4.5 Engaging in continuous professional development to enhance professional and organizational learning by expanding knowledge and skills on the use of AI and/or by participating in professional learning communities. | 5.5a Self-evaluating the own readiness and competency gaps related to the use of AI in education based upon the AI&EDcomp Framework.<br><br>5.5b Becoming agents of change taking up professional and social responsibilities in AI societies (inside or outside their own educational setting). |

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Table 8 highlights that all competencies are addressed within the learning goals, ensuring a holistic approach to AI education. By mapping the learning goals to the competencies, it becomes clear that the framework covers a wide range of essential skills and knowledge areas, promoting a well-rounded understanding of AI in education.

Furthermore, Table 8 illustrates the spiral aspect of the learning goals, showing how they build upon each other over time. This spiral approach ensures that learners revisit and deepen their understanding of key concepts as they progress through the units. The table provides an overview per theme, indicating which learning goals are linked to the AI&EDcomp framework. This thematic organisation helps to clarify how each goal contributes to the overall educational objectives and supports the continuous development of AI competencies.

In summary, Table 8 not only aligns the learning goals with the AI&EDcomp framework but also demonstrates the comprehensive and iterative nature of the educational process, ensuring that all competencies are thoroughly addressed and reinforced throughout the learning journey.

# 5. Report summary

This report is part of the studies and publications of the PAIDEIA project Work Package 3 and it focuses on the creation of an AI&EDcomp framework for a teacher training curriculum. A primary objective of the work package was to develop a comprehensive curriculum that fosters AI literacy among teachers. The two main sources of inspiration for the construction of the competency framework were DigCompEdu and the UNESCO AI Competency Frameworks.

The report provides a detailed analysis of the theoretical foundations, including the selection of DigCompEdu and UNESCO frameworks as the basis for the curriculum. It then outlines the formation of the curriculum structure, highlighting the competency levels, learning goals, and unit designs.

The study began with an explanation of the DigCompEdu framework, detailing its six areas and 22 competencies, and how it was adapted to include AI-specific skills. It also reviewed the UNESCO AI Competency Frameworks for both teachers and students, emphasising the importance of ethical and responsible AI use in education.

Subsequently, the report focused on the design of the curriculum, which includes five units that progressively build on each other. The curriculum is designed to cater to teachers of all expertise levels, incorporating a spiral approach to ensure continuous development of AI competencies.

The final section presents the AI&EDcomp framework, illustrating how it integrates the theoretical foundations into a practical training course. The framework emphasises the ethical and pedagogical implications of AI, aiming to prepare teachers to effectively integrate AI into their educational practices.

In conclusion, this report provides the theoretical background for the AI&EDcomp framework, laying the foundation for the development of a comprehensive curriculum. The actual curriculum is currently in construction and aims to equip teachers with the necessary skills and knowledge to navigate AI in education responsibly.

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