ADMIT

Report on the LLM-ed framework for Learning Design

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v2	16/06-72025 & 25/07/25	Lourdes Guàrdia, Marcelo Maina, Nati Cabrera, Ludovica Fanni	UOC	Second draft (Addressing reviewers' comments and making corrections)
v3	15/09/2025	Lourdes Guàrdia, Marcelo Maina, Nati Cabrera, Ludovica Fanni	UOC	Last draft (Handling reviewers' remarks and implementing corrections)
V4	22/09/2025	Alessandra Antonaci	EADTU	Peer review and layout check

Executive Summary

Within WP4 of the ADMIT project, a structured process has led to the development of the LLM-ed Framework. This task aligns with ADMIT's objective to promote the inclusive, ethical, and effective use of Large Language Models (LLMs) in teaching and learning. The framework is designed to support teachers in integrating LLMs into the development of learner-centred educational experiences.

The initial phase of the framework development involved a comparative analysis of five established Learning Design (LD) models: ABC Learning Design (Laurillard), Carpe Diem (Salmon), Iceberg (OU UK), enABLe (Armellini), and ELDeR (University of Edinburgh). While differing in structure and emphasis, these models share common pedagogical characteristics, including constructivist principles, alignment between learning outcomes, activities, and assessment, a learner-centred orientation, and a collaborative, technology-informed approach to design.

From this analysis, several areas were identified where generative AI can contribute, particularly in tasks such as aligning objectives with course content, designing personalised learning pathways, adjusting the tone and complexity of materials, and supporting inclusive design. These areas informed the development of the AI-LD Activity Framework, which presents generative AI as a support tool within the learning design process.

The framework was developed through a participatory process that included three dedicated sessions: a joint ADMIT partner meeting (May 15) and two internal meetings hosted by UOC (May 28) and FernUniversität (June 13). These sessions involved academic staff, researchers, administrators, and technical teams in testing preliminary ideas and collaboratively refining the framework.
Several key considerations emerged from these sessions, which can be synthesised into those four:

- Active learning should remain a core focus, in line with ADMIT's foundational aims.
- The framework should be user-friendly, adaptable, and pedagogically grounded, supporting both novice and experienced teachers.
- The role of AI is framed as complementary, supporting creativity and efficiency while preserving the teacher's professional judgment.
- Ethical and responsible use is a priority, informed by the UNESCO AI Competency Framework for Teachers (2024), with a focus on equity, inclusivity, and digital responsibility.

Discussions also highlighted the importance of flexibility, whether the framework is applied individually by teachers or within collaborative design teams. No single model of use was prioritised, but the need for adaptability across institutional contexts was emphasised.

Following the first cycle of feedback, the framework underwent a further round of revision, during which an updated version was presented to project partners again. This stage focused primarily on enhancing clarity, readability, and accessibility, with suggestions oriented towards ensuring that the framework's structure and language are as comprehensible and usable as possible. The resulting version (v3) reflects these refinements and incorporates adjustments to improve presentation, consistency, and ease of understanding.

The LLM-ed Framework is proposed as a conceptual guide for integrating LLMs into LD in Higher Education (HE). It outlines a step-by-step approach that can be tailored to different contexts and expanded through practice. As part of the broader ADMIT project, the framework will continue to be refined through pilot implementations, professional development activities, and engagement with diverse stakeholders.
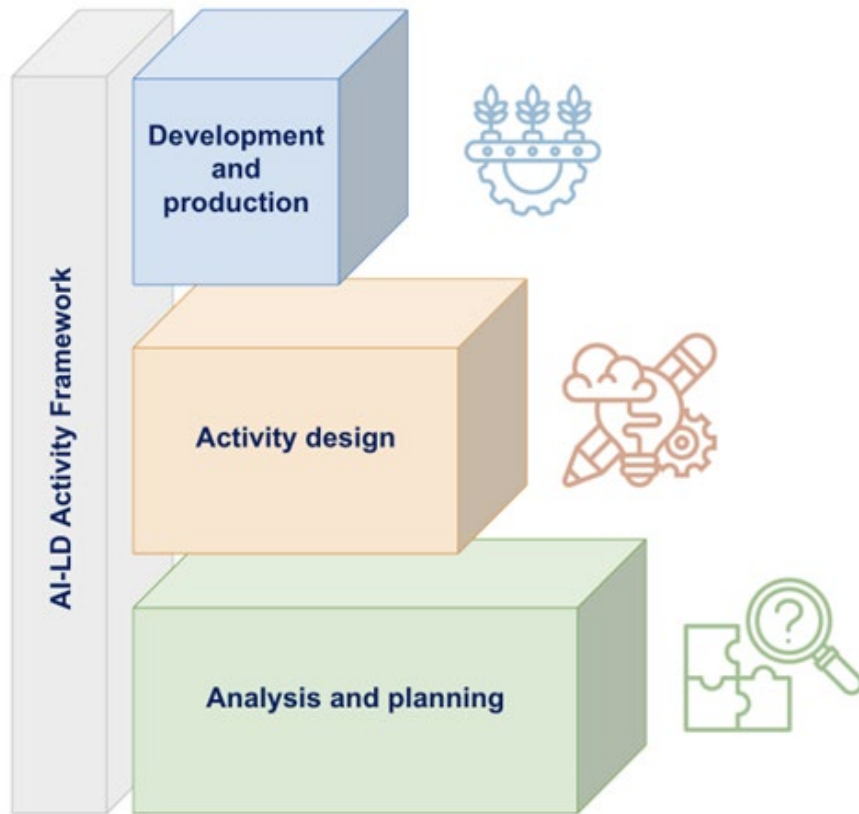
Accordingly, the current version should be considered iterative and open to further improvement as these resources are developed and tested in practice.

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The framework

Purpose and usage

The AI-LD Activity Framework offers a structured perspective on how AI can enhance Learning Design (LD) activities. It provides a layered model to help teachers design AI-supported LD activities, from initial planning to production. Developed through an analysis of evidence, existing LD models, and expert consultations, it also supports practical decision-making regarding when and how AI can be meaningfully applied in everyday teaching practice tasks.

The Framework is built around three core phases:

- *analysis and planning*
- *activity design*
- *development and production*

Each represents a stage or moment in the creation of AI-supported LD activities. By guiding teachers through these stages, the framework helps streamline the integration of AI tools into LD activities, serving as a creative and collaborative assistant.

The framework will be accompanied by tools and guidelines designed to support its adoption.

Background

The LLM-ed framework is developed within the context of EU-funded Cooperation Partnership ADMIT (generative Ai anD large language Model in LM in higher educaTion), which aims at establishing the educational and ethical foundations necessary for the effective integration of Large Language Models (LLMs) and generative AI (GenAI) into teaching and learning in Higher Education (HE). The project responds to the significant impact of tools like ChatGPT on academia. It addresses the opportunities and challenges presented by GenAI, actively monitoring developments in research, innovation, and policy relevant to education.

One of the objectives of ADMIT is to develop the LLM-ed framework and supporting guidelines, offering evidence-based models for incorporating LLMs into instructional design. The project seeks to ensure that the adoption of AI technologies in HE is pedagogically sound, ethically responsible, and aligned with European policy goals[1]. The aim is to enable universities to adopt LLMs in a way that enhances learning while safeguarding academic integrity, inclusion, and critical thinking.

Why does Learning Design matter?

LD is essential because it provides a systematic framework for creating effective, coherent, and learner-centred educational experiences.

It enables teachers to:

- Plan with clarity, aligning objectives, activities, and resources to reduce improvisation and ensure pedagogical consistency;

- Personalise learning by anticipating students' needs, allowing for more targeted and responsive teaching;

- Integrate resources and technologies meaningfully, using them as tools that support learning rather than as ends in themselves;

- Innovate and enhance educational quality, encouraging the exploration of new methods, strategies, and learning environments;

- Support educational decision-making through clearly defined pedagogical and technological criteria, making the process more transparent, replicable, and evaluable;

- Adopt a holistic view of teaching and learning, considering all variables from initial planning to final evaluation.

This learner-centred and inclusive approach is further reinforced through the integration of the Universal Design for Learning (UDL) framework[2]. UDL provides a scientifically grounded set of principles for designing learning environments that accommodate the variability of all learners. By embedding UDL within LD, the design process ensures multiple means of engagement, representation, and action/expression, thereby promoting accessibility, equity, and participation from the outset.

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[1] European Commission. (2020). *Digital Education Action Plan 2021–2027: Resetting education and training for the digital age.* European Education Area. https://education.ec.europa.eu/focus-topics/digital-education/action-plan

[2] CAST (2024). Universal Design for Learning Guidelines version 3.0. https://udlguidelines.cast.org

As part of the project, LD models[3] were analysed to explore how generative AI and LLMs can be meaningfully integrated into educational design practices.

This analysis identified common elements across established models, focusing on key aspects of learning design that AI could enhance. This approach aligns with UNESCO's *2024 AI Competency Framework for Teachers*[4], which positions AI as a means to support professional ethics, inclusivity, and responsibility in education, and is further reinforced by insights from UNESCO's 2025 *AI and the Future of Education: Disruptions, Dilemmas*[5] *and Directions*, which broadens the perspective on the transformative role of AI in education. The comparative study serves as a foundation for identifying learning design tasks and related competencies that could benefit from AI support, while simultaneously integrating UDL principles as design drivers.

By doing so, the framework ensures that AI tools are used not just to automate or enhance existing practices but to promote broader access, learner variability, and inclusive pedagogical innovation.

The analysis revealed areas of convergence in structure and highlighted, pointing to a strong common framework across the four models considered, and each model was examined according to these three levels:

- Conceptual basis: based on (social) constructivist learning theories; strong alignment (outcomes, activities, assessment); learner-centred and tech-enhanced approach.
- Pedagogical principles: active engagement and collaboration; continuous feedback and assessment; flexible and multimodal learning, focus on learner experience and visible learning.
- Design procedures: collaborative workshops with cross-functional teams; rapid prototyping and iterative development; mapping student journey.

The framework integrates design practices aligned with the *Taxonomy for the Ethical Use of Generative AI in Higher Education* (Carbonel, H., et al., 2024), developed within the ADMIT project. Each phase and component of the framework has been reviewed against the eight core ethical dimensions of the taxonomy: (1) teacher and student agency; (2) educational integrity; (3) data protection; (4) social and environmental impact; (5) fairness and inclusion, (6) accountability; (7) transparency; and (8) technical robustness. Accordingly, the framework includes actionable safeguards (e.g. human oversight of AI-generated content, transparent labelling of AI-assisted outputs, etc.) to support compliance with the GDPR, the EU AI Act[6], and the ethical values of higher education, by safeguarding the teacher's central responsibility, promoting student awareness and agency, and ensuring a critical, responsible, and transparent use of AI. The framework also addresses the challenges and needs expressed by teachers,

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[3] Learning Designer: https://www.ucl.ac.uk/learning-designer/
ABC-LD: https://abc-ld.org/
Carpe Diem: https://www.gillysalmon.com/carpe-diem.html
enABLe: https://sites.google.com/port.ac.uk/enable/home
[4] UNESCO. (2018). *ICT Competency Framework for Teachers (Version 3)*. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000265721

[5] UNESCO. (2025). *AI and the future of education: Disruptions, dilemmas and directions*. UNESCO. https://www.unesco.org/en/articles/ai-and-future-education-disruptions-dilemmas-and-directions
[6] European Union. (2016). *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data (General Data Protection Regulation)*. https://eur-lex.europa.eu/eli/reg/2016/679/oj

such as their responsibility to validate the accuracy and reliability of AI-generated content, which also emerged as a key element during focus groups conducted with teachers.

European Union. (2023). *Proposal for a regulation laying down harmonised rules on artificial intelligence (Artificial Intelligence Act)*. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0206

Introducing the AI-LD Framework

Given that an effective approach to Learning Design must be rigorous, inclusive, and learner-centred, and that the integration of Universal Design for Learning (UDL) and GenAI can expand opportunities for personalisation, accessibility, and educational quality, it becomes essential to adopt a framework that guides the use of AI in pedagogically sound and ethically responsible ways.

Therefore, this context sets the stage for introducing the proposed framework, which recognises the teacher's central role as designer and decision-maker and provides tools for crafting coherent, inclusive, and technology-enhanced learning experiences.

Teacher as Designer and Decision-Maker

The framework centres on the core principle of LD, which serves as a quality assurance mechanism grounded in established pedagogical models and theories, offering a structured method for creating meaningful and inclusive learning experiences. Rooted in (social) constructivist approaches and drawing on influential models, the framework supports a learner-centred, technology-enhanced pedagogy that values active engagement, collaboration, formative feedback, and visible learning. In the context of integrating Large Language Models (LLMs) and generative AI tools, the framework provides a structure to ensure these technologies are used in pedagogically sound and critically reflective ways. By embedding AI within a principled LD approach, teachers can harness its potential to enrich teaching, while retaining responsibility for upholding educational rigour, ethical standards, and learner agency in all AI-mediated practices.

Anchored in this view and, more importantly, in literature, teachers are designers and decision-makers, shaping learning experiences that respond to their students' specific needs. They select effective methods, ensure alignment between goals and materials, and craft meaningful paths through the learning process.

AI as a Creative, Collaborative Assistant

From this perspective, the AI assistant does not replace teachers but provides support to enhance their work. It acts as a collaborative and supportive tool in Learning Design activities, helping teachers align objectives with content, suggesting appropriate strategies, and facilitating the tailoring of experiences for different learners.

The AI assistant adjusts the content difficulty and personalises resources to make them more relevant and engaging, while complementing the unique human elements of teaching. It serves as a support that makes the design process richer and more dynamic, without replacing the teacher's role.

1. Analysis and Planning

This initial moment is crucial for laying a solid foundation for teaching with the support of AI. It involves careful thinking about what the students need to learn, how best to teach it, and how to make sure everything is done responsibly and legally. At this point, the teacher takes the lead in shaping the educational and ethical direction of the course, while AI can provide useful support by helping to analyse information and flag up issues early on.
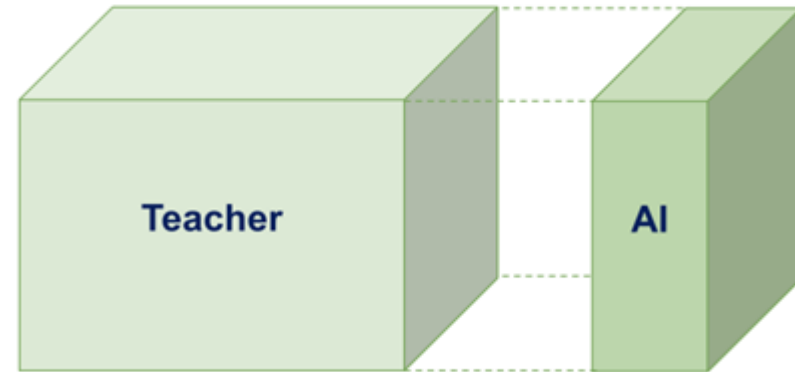
Roles

Teacher	AI
Strategic	Collaborative

Define course objectives suited to the context and learner profiles.	Analyse data about learners and context to uncover patterns or challenges.
Analyse the learning environment, taking into account student diversity, needs, and constraints.	Assist in aligning learning objectives with content and teaching strategies.
Choose appropriate teaching models and strategies to achieve desired outcomes.	Suggest effective methods based on previous outcomes or student needs.
Embed ethical and legal safeguards from the beginning (e.g. identify personal data, get informed consent, ensure AI use is GDPR-compliant)	Identify early-stage ethical and legal risks (e.g. data gaps, compliance issues, etc.)
Address bias and inclusion early on (e.g. check for bias in data/tools, ensure accessibility for all students)	

2. Activity Design

This phase involves designing a meaningful learning experience, where activities and assessments are aligned with the intended learning outcomes. The focus is on constructive alignment, ensuring that what students are asked to do, how their learning is assessed, and what they are expected to achieve are coherently integrated. The teacher leads this process, making sure each element supports deep learning and inclusion. AI acts as a creative design assistant, suggesting activities, proposing assessment formats, and helping check for alignment across the course
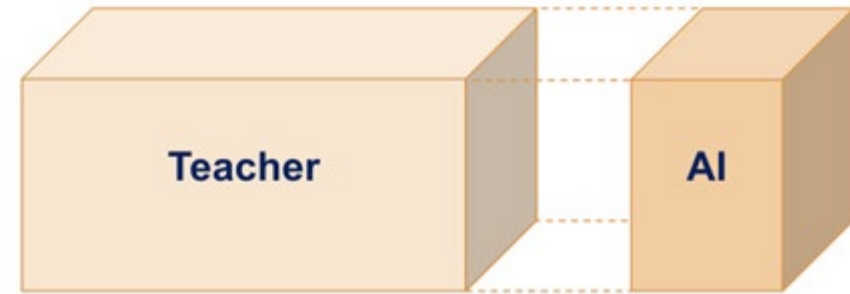
Roles

Teacher	AI
Instructional & Constructive	Creative co-designer

| Teacher	AI
Ensure that all learning activities and assessments are directly linked to the intended learning outcomes.	Co-designing evaluation and assessment ideas, and rubrics aligned with learning outcomes.
Plan formative and summative assessments that are fair, valid, and varied (e.g. use assessments also to promote learning through feedback and reflection, opportunities for self- & peer-assessment where appropriate, etc.).	Support constructive alignment checks by suggesting ways to link tasks more tightly to outcomes.
Sequence activities meaningfully to scaffold learning and gradually increase complexity.	Flag potential issues (e.g. misalignment, bias, or unintended difficulty gaps in activities or assessments).
Integrate digital and AI tools intentionally, ensuring each serves a clear pedagogical function.	

3. Development and Production

The teacher leads the final creation and integration of resources, ensuring everything is accurate, inclusive, and legally sound. AI contributes as a powerful tool for content generation and quality control, supporting both personalisation and technical robustness. While AI can help accelerate production, human oversight remains essential for ensuring educational integrity and legal compliance.

Roles

Teacher	AI
Quality Lead and Integrator	Content Developer and Technical Assistant
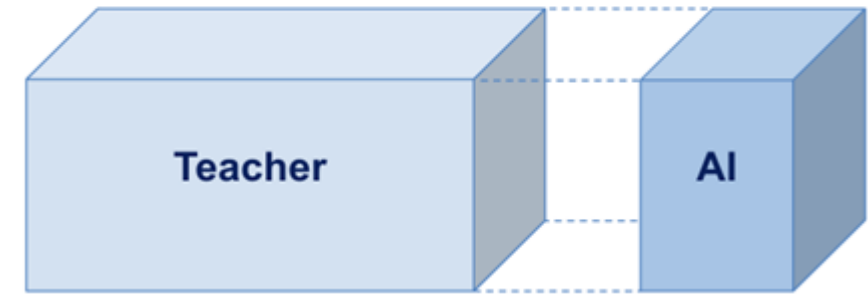
Teacher	AI
Create and assemble course materials from various sources, integrating them into a coherent whole.	Speed up multimedia content production.
Develop inclusive and adaptive resources that can adjust to different learner levels, abilities and preferences.	Adapt course content to suit different learner profiles and adjust difficulty levels.
Verify content quality and accuracy.	Support personalisation.
Check the quality and appropriateness of datasets in AI-supported components.	Contribute to system security and reliability (e.g. detect data breaches, align content with standards for accuracy, cybersecurity, etc.).
Implement governance mechanisms to prevent bias in AI-supported processes.	

Concrete examples of the Framework's application

Economics & Law

Phase 1. Analysis and planning

Teacher	For a module on contract breaches, it defines a specific learning objective: "Students must be able to analyse and evaluate real-world case studies of contract breaches, identifying the legal grounds for breach and quantifying potential damages".
AI	Assists by suggesting specific historical contract breach cases from various industries that align with the defined objective, offering diverse scenarios for student analysis and highlighting their economic impact.

Phase 2. Activity design

Teacher	Designs a simulated negotiation activity where students draft a settlement agreement for a contract dispute, ensuring the activity explicitly requires them to apply concepts of legal remedies and economic valuation of damages. This focuses on constructive alignment between what students do and what they are expected to achieve.
AI	Supports constructive alignment checks by analysing the proposed negotiation scenario and its associated rubric, flagging any potential misalignment between the expected learning outcome (applying legal remedies and economic valuation) and the assessment criteria or activity steps.

Phase 3. Development and production

Teacher	Curates and assembles a collection of authentic legal case excerpts, sample contract clauses, and relevant economic data sets from court records and financial reports, integrating them into a coherent digital course packet for the simulated negotiation. Human oversight remains essential in this phase.
AI	Adapts the difficulty levels of the economic data sets and legal jargon within the course packet, simplifying complex financial statements for introductory learners or providing advanced economic models for students with a stronger background.

Psychology & Education

Phase 1. Analysis and planning

Teacher	Defines a specific learning objective: "Participants will be able to design a lesson plan for a diverse K-12 classroom that effectively integrates at least two UDL guidelines to address varied learning needs." This step involves careful consideration of what students need to learn.
AI	Assists by analysing existing data on common K-12 classroom demographics (e.g., prevalence of learning differences, linguistic diversity) to help the teacher refine the learning objective, ensuring it is highly relevant to typical student variability and challenges.

Phase 2. Activity design

Teacher	Plans a peer-review activity where students evaluate each other's UDL-infused lesson plans, ensuring the rubric for evaluation explicitly assesses the application of UDL principles and their potential impact on accessibility and engagement. Leading this process to ensure deep learning and inclusion.
AI	Co-design evaluation ideas for the peer review, suggesting specific criteria and examples for how to assess the "multiple means of engagement, representation, and action/expression" aspects of the UDL principles within the lesson plans, ensuring strong alignment with the stated learning objective.

Phase 3. Development and production

Teacher	Creates a digital resource library comprising exemplar UDL lesson plans, adaptable templates, and short video explanations of key UDL guidelines, ensuring diverse examples relevant to different subject areas and grade levels. Ensuring materials are accurate and inclusive.
AI	Generates alternative versions of the UDL lesson plan templates with varied complexity and scaffolds and provides quick summaries or extended explanations for the video content based on learner preferences or prior knowledge, supporting content personalisation.

Data Science

Phase 1. Analysis and planning

Teacher	Defines a specific learning objective: "Students must be able to design and implement a privacy-preserving data collection strategy for a given social science research question, adhering to GDPR principles and minimising re-identification risks." This includes embedding ethical and legal safeguards from the beginning.
AI	Assists by identifying potential ethical and legal risks associated with common data collection methods in social science (e.g., challenges with informed consent for sensitive data, potential for unintentional bias) to help the teacher refine the objective for robust ethical integration.

Phase 2. Activity design

Teacher	Designs a hands-on coding assignment where students apply differential privacy techniques to a synthetic dataset, ensuring the assessment measures both technical implementation correctness and the rationale behind their chosen privacy parameters. Make sure each element supports deep learning.
AI	Supports constructive alignment checks by flagging potential issues in the coding assignment, such as if the dataset's complexity inadvertently creates difficulty gaps that obscure the assessment of privacy parameter rationale, or if technical instructions are misaligned with the ethical objectives of privacy preservation.

Phase 3. Development and production

Teacher	Compiles a curated dataset of synthetic social science data, along with relevant legal frameworks (e.g., GDPR articles about data anonymisation), and provides curated code snippets for various privacy-preserving techniques, integrating them into an interactive Jupyter Notebook environment. Verifies content quality and accuracy.
AI	Adapts the difficulty levels of the code snippets and provides an alternative, more complex or simplified versions of the Jupyter Notebook exercises based on individual student progress and demonstrated understanding of privacy concepts, thus supporting personalisation.

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Further readings

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