AP-GAIED
AN ADVANCED PERSPECTIVE ON THE GENERATIVE AI INTEGRATION INTO EDUCATIONAL SYSTEMS

AP-GAIED: An Advanced Perspective on the Generative AI Integration into Educational Systems

R1 - COLLECTIVE REPORT:
Use Cases and Best Practices Report across countries: Greece, Lithuania, Germany, Poland and Hungary

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1. Summary

This report presents the main findings of an analysis of the implementation of generative AI in higher education systems in Greece, Lithuania, Germany, Poland and Hungary. The study

covered four main areas: ethical and legal regulations, study programmes, training initiatives aimed at staff and students, and applications of AI in research.

In all countries analysed, there is a clear trend towards the integration of AI in education. Actions mainly focus on developing digital competences, supporting innovative teaching methods and ensuring compliance with ethical principles. Among the good practices, the development of ethical frameworks for the use of AI, the creation of interdisciplinary fields of study, the implementation of extensive training programmes for teachers and students, and the conduct of pioneering research projects using AI stand out in particular.

However, the analysis also revealed significant challenges. These include the fragmentation of AI policies, competence gaps among academic staff, resistance to change, insufficient technical infrastructure, lack of coherent regulations, and concerns about privacy, copyright and ethical use of AI technologies.

2. Specific objective 1 of Work Package 2

The aim of this work package is to clearly identify where generative artificial intelligence (AI) can be used in education with a particular focus on the field of pedagogy. The idea is to explore how generative AI tools can support teaching processes, learning and administrative and organisational tasks related to academic work. This includes both the analysis of currently used solutions and the identification of new, as yet untapped possibilities.

The work in this package was based on solid examples (case studies) from partner universities and other educational institutions in Europe. The project team analyzed and compared the experiences of different countries, thus identifying a variety of approaches, tools and strategies. In this way, it will be possible to capture both good practices and specific local conditions that may influence the way AI is used in education.

Expected outcomes of Work Package 2

The outcome of this phase of the work will be a detailed 'opportunity map' of the use of generative AI in education. This document will include:

- specific examples of successful implementations,
- identification of gaps where AI tools could add value,

- a description of the barriers (technical, legal, ethical, organisational) that limit its application.

This map will provide a reference point for university authorities, allowing them to make informed decisions about investments in new technologies and to plan their implementation in a way that is safe and consistent with educational goals. The collected data and recommendations will be the foundation for the next stages of the project, including the development of practical guidelines and curricula and training for academic staff and students.

3. Methodology

The report is based on a use case analysis (PP2) and a review of good practices and guidelines for integrating artificial intelligence into higher education systems. A variety of data sources were used to prepare the study, including official government documents, university resolutions and regulations, descriptions of study programmes and training offers, and academic literature from five countries: Greece, Lithuania, Germany, Poland and Hungary.

The research process involved several stages. First, key issues related to the implementation of AI in education were identified. Then, the potential benefits as well as the challenges that these processes bring to universities and participants in the teaching process were analysed. The final step was to formulate recommendations to support ethical, effective and legally compliant use of AI in higher education.

4. Good practices and use cases of the AI in higher education

As part of Work Package 2 of the AP-GAIED project, examples of actual use of AI tools in different institutional contexts were collected and analyzed. The identified good practices and use cases show how HEIs in Europe are implementing AI-based solutions in a functional, responsible and locally adapted way. This review will provide a basis for drawing conclusions and recommendations for the effective integration of AI in the areas of teaching, research and management in higher education.

4.1 Good practices - regulations and ethical guidelines for the use of AI in higher education

The implementation of generative artificial intelligence (AI) in universities requires a balanced approach, combining innovation with responsibility. Examples from various countries show that successful measures are based on clearly formulated ethical principles, the obligation of transparency and the protection of personal data. Adapting guidelines to local regulations and cultural circumstances is also a key element.

1. Lithuania

- ***University of Applied Sciences*** - has introduced transparency rules, such as the obligation to disclose the use of AI in academic and administrative activities. At the same time, it has introduced a ban on attribution of AI authorship and a ban on sending confidential data to public language models.
- ***Lithuanian University of Health Sciences*** - the university has implemented regulations in line with EU law (RODO, AI Act), including a restriction on the generation of harmful content and an obligation to label AI-generated material.

2. Germany

- ***University of Hamburg*** - allows the use of AI in education (e.g. for translation or brainstorming), but prohibits its use during exams without the consent of the instructor. This approach supports the responsible use of AI for supportive purposes.
- ***Moodle.nrw)*** - example of an infrastructural approach: implementation of AI chatbots based on open language models, running on state-owned servers, which ensures full control over data and user security.

3. Hungary

- ***University of Debrecen*** and ***Budapest University of Technology*** - established an obligation to disclose the use of AI in academic work and a ban on the use of AI during examinations. The universities have also established AI Ethics Committees, responsible for monitoring implementations and supporting ethical practices.

4. Poland

- ***University of Warsaw*** - in Resolution No. 98/2023, allows the use of AI in dissertations, as long as the student obtains the consent of the supervisor and clearly indicates AI participation in the content creation process.
- ***Warsaw School of Economics*** - has implemented an internal regulation specifying the acceptable forms of AI support (e.g. text editing, data visualisation) and has introduced the obligation to document the AI prompts and responses used in the teaching process.

The introduction of consistent and ethical regulations for the use of generative artificial intelligence (AI) in higher education is the foundation for the responsible digital transformation of universities. Practices implemented by universities in Lithuania, Germany, Hungary and Poland show that well-designed guidelines bring a range of benefits at institutional, teaching and societal levels.

The new rules support the protection of **academic integrity**, preventing the attribution of AI authorship and promoting students' intellectual independence.

The obligation to **disclose the use of AI** in academic and coursework introduces transparency and increases accountability in the educational process. At the same time, universities ensure **compliance with legal regulations** such as RODO or the EU AI Act, protecting personal data and user rights.

Implemented restrictions on the use of AI - e.g. banning use during exams without consent - **increase security** and control over the impact of new technologies on the assessment process. The establishment of **AI ethics committees** and the introduction of internal resolutions and orders support the development of **responsible standards for** the use of technology in teaching and research.

Importantly, such measures reduce **academic staff resistance** to AI implementation by offering a clear and understandable framework for action. At the same time, they create conditions for the development of **innovative forms of teaching** in which AI can support teachers in content editing, data analysis or information visualization.

Good practices show that effective and ethical implementation of AI requires:

- Clear and enforceable rules on transparency and accountability;
- Data protection in accordance with national and EU regulations;
- Institutional support (e.g. ethics committees, resolutions, ordinances);

- Balance between acceptable technological support and preservation of academic integrity.

4.2 Study programs and educational projects - interdisciplinary AI education programmes

Faced with the dynamic development of artificial intelligence and the need to train skilled professionals, universities in **Greece** and **Hungary** are undertaking ambitious educational initiatives, creating study programs that combine technical knowledge with social, ethical and practical aspects. These programmes are integrated into university strategies, linked to research and development projects and tailored to real market needs.

1. Greece - developing application-oriented interdisciplinary education

- *International Hellenic University* offers English-language master's programmes in AI and Deep Learning and Data Science. These programmes cover machine learning, statistics, data engineering, law and ethics, oriented towards practical applications in the health sector, public administration and Industry 4.0.
- *The University of Macedonia* runs the MSc AIDA (Artificial Intelligence and Data Analysis) course, aimed at STEM graduates. The programme offers advanced modules (ML, NLP, data analysis, statistics) and its free formula increases the accessibility and inclusiveness of education.
- *The University of Piraeus and the National Center for Scientific Research 'Demokritos'* are running a joint MSc programme with SI, which strongly integrates a research and social component. It covers issues of ethics, social responsibility and analysis of the impact of AI on users and institutions.
- *The University of West Attica* updated its MSc in AI programme in 2023 to include elements of industrial design, embedded systems, sustainability, bioethics and equality. Strongly linked to local research projects, the programme responds to the needs of regional labour markets.

2. Hungary - AI as part of digital transformation and Smart University strategy

- ***The University of Pécs*** is implementing a '**Smart University**' strategy, integrating AI in both teaching and administration. It offers specialisations in **data analytics, NLP,**

computer vision and deep learning, oriented towards the health, finance and digital public administration sectors.

- ***Eötvös Loránd University*** runs a master's course in computer science with AI modules**,** including **ML, expert systems, data analysis** and **courses in ethics and responsible design of AI systems.** The programme prepares graduates both to work in the private sector and to influence technology policies.

The good practices of universities in Greece and Hungary are based on an interdisciplinary and practical approach to AI education. These programmes combine technical knowledge (ML, data analytics, NLP) with ethical, legal and social aspects, responding to the real needs of the labour market and digital transformation.

Strong links to research projects and regional development strategies (e.g. Smart University) ensure that the content is up-to-date and that students are prepared for AI applications in sectors ranging from health to public administration.

There is a strong emphasis on social responsibility, inclusiveness (e.g. free programmes) and the development of competences to not only use the AI, but also to shape its development in an ethical and sustainable way.

4.3 Training for teaching staff

In response to the rapid development of AI technology and the growing demand for modern, personalised teaching methods, universities in **Greece**, **Germany**, **Poland** and **Hungary** are developing comprehensive training programmes for university teachers. These trainings are multidimensional - combining **technological**, **ethical**, **legal** and **methodological** components - and aim to prepare staff to use AI responsibly and effectively in teaching.

1. Greece - certification and integration of AI in education

- ***The University of West Attica*** offers **a professional certificate** in AI, covering course design, personalisation of learning and evaluation of AI effectiveness. The course also includes an ethics module, addressing topics of algorithmic bias, privacy and academic integrity. (36 ECTS)
- ***International Hellenic University*** is delivering the programme '**Contemporary Education and AI**' (15 ECTS, 400 hrs). The training focuses on the design of teaching

materials using AI, the automation of assessment and the analysis of the cultural and legal contexts of AI use. Format: **online, open enrollment**.

2. Germany - Experimental and implementation environments

- ***Goethe University*** is active in the **AI Working Group** and **the Community of Practice,** organising short workshops (4-12 hrs) focused on prompt development and didactic analysis. A key element is the **AI-ToolLab**, a secure environment for testing AI tools in line with RODO.
- *The Hochschule für Technik und Wirtschaft* (Berlin) is developing the '**KI-Werkstatt**' training model, based on four stages (*Discovery-Scoping-Piloting-Scaling*), involving teachers in real-life implementations in courses and collaboration with SMEs.

3. Poland - variety of formats and open access

- ***Maria Curie-Skłodowska University*** runs **a hybrid training course** on AI in teaching (24 hours), combining lectures, workshops, LLM work and ethical risk analysis. The programme is adapted to different levels of participants.
- ***National online courses*** e.g. "**AI and ChatGPT for university teachers**" as part of the "Worth Training" initiative - Short (6-12 hrs) courses available to all, regardless of university affiliation. Focused on the practical application of AI in lesson planning, text analysis and didactic automation.

4. Hungary - a systemic approach to staff training

- ***The University of Segedin*** has implemented the programme '**AI tools in education**' (60 hrs), aimed at teaching staff and researchers. It covers personalisation of learning, AI lesson design, educational data analysis and data protection in accordance with RODO. More than **200 people** have been trained by mid-2025.

Experiences from universities in Greece, Germany, Poland and Hungary show that effective AI training for teaching staff has several key features that lend themselves to wide application and scaling. Their value lies in the fact that:

1. They combine technology with didactics in a way that is practical and embedded in the educational context. The trainings focus on the real needs of teachers - they teach how to

design lessons using AI, create learning materials, personalise learning and analyse learning data. Participants learn how to use AI as a tool rather than as an end in itself, which significantly increases the effectiveness of teaching.

2. They consider ethical, legal and social aspects - including modules on AI ethics, algorithmic bias, privacy and compliance with RODO allow for informed and responsible implementation of the technology, in line with academic values and applicable law. This is an important part of building confidence in AI in education.
3. They are flexible in terms of format and accessibility - from intensive certificate courses (e.g. *University of West Attica*, *International Hellenic University*) to workshops *(Goethe University*, *Hochschule für Technik und Wirtschaft* Berlin) to open online courses (Poland) - allowing content to be adapted to different audiences. Such flexibility fosters inclusivity and enables a wide reach to academic staff regardless of their previous technological competence.
4. They create space for experimentation and implementation in practice - examples such as AI-ToolLab (*Goethe University*) or the KI-Werkstatt model (*Hochschule Für Technik Und Wirtschaft* Berlin) show that teachers need a safe environment to test tools and implement them in their own courses. Practice-oriented training significantly increases the chance of sustainable changes in teaching.
5. They support institutional transformation and build a culture of innovation - training linked to the university's strategy (e.g. *Smart University in Segedin*, KI-Werkstatt in Berlin) contributes to the systemic implementation of IS at the level of entire institutions. They show that the development of staff competences can go hand in hand with the modernisation of curricula and the digitalisation of universities.

4.4 Use of AI in research

The use of generative AI in research is developing intensively in universities in Greece, Lithuania, Germany, Poland and Hungary. AI supports researchers in analysing large data sets, creating predictive models, personalising medical solutions and building interdisciplinary projects that combine technology with social, natural and human sciences.

1. Greece - AI as part of scientific and industrial development

    - ***The University of Piraeus*** **and** *the National Center for Scientific Research 'Demokritos'* MSc programme has research projects in ML, NLP and robotics with close links to the

public sector and industry. Research leads to the construction of prototypes and the testing of predictive models in real-world settings.

- ***The University of West Attica*** runs the MSc AIDL programme, which integrates research into novel AI algorithms, recommender systems, image analysis and demand forecasting and environmental monitoring - oriented towards social and environmental applications.

2. Lithuania - AI in healthcare and biomedical innovation

- ***The Lithuanian University of Health Sciences*** is conducting advanced research into the use of AI in medical data analysis: diagnostic imaging, laboratory results and medical histories. Here, AI supports the personalisation of therapy and the optimisation of clinical processes. The university applies clear ethical principles, including a ban on attributing authorship to AI and an obligation of transparency.
- *Kaunas University of Technology* and ***Lithuanian University of Health Sciences (Lithuania)*** - *ShakeNoMore* project - an interdisciplinary team created a prototype device to support people with Parkinson's disease, using AI to analyse electromyographic signals and stabilise movement in real time.

3. Germany - open environments for experimenting with AI

- ***Bergische Universität Wuppertal (Germany)*** - the **KI-Makerspace** project offers a space for developing and testing AI tools with access to open source infrastructure. It supports the creation of MVPs, the development of startups and science-industry collaborations.

4. Hungary - AI in clinical and diagnostic practice

- ***Semmelweis University (Hungary)*** - application of AI in X-ray, MRI, EEG image analysis and prediction of treatment outcomes. Personalized treatment plans are being developed here, implemented directly in medical practice, while complying with the standards of RODO and clinical ethics.

5. Poland - AI in the humanities, social sciences and education

- *Kazimierz Wielki University in Bydgoszcz* - ***research*** focuses on the use of artificial neural networks in psychological and educational diagnosis. A tool for work-life balance analysis was developed using a *human-in-the-loop* model integrating AI with expert interpretation.
- *Warsaw School of Economics* - the university has formally allowed the use of AI in research - including for data analysis, modelling, language correction and visualization. Documentation of prompts and results has been made mandatory, in line with transparency and research ethics.

In European universities, generative artificial intelligence (AI) is increasingly used in research - from science and medicine to social sciences and humanities. Good practices from Greece, Lithuania, Germany, Hungary and Poland show that AI today not only acts as a tool to support data analysis, but becomes part of systemic research innovation - enabling interdisciplinary work, personalization of solutions and practical implementation of results.

Universities such as *the University of West Attica* (Greece) and *the University of Piraeus*, together with *the National Center for Scientific Research 'Demokritos'* (Greece), integrate AI into research on modern algorithms, recommendation systems or image analysis, in conjunction with industrial and public projects. Similarly, *Lithuanian University of Health Sciences* (Lithuania) uses AI in medical data processing, supporting the creation of personalized therapies and the optimization of clinical processes. In the 'ShakeNoMore' project (*Kaunas University of Technology* and *Lithuanian University of Health Sciences*, Lithuania), innovative neurotechnology solutions are being developed in which AI analyses muscle signals in real time.

In Germany, thanks to the KI-Makerspace (*Bergische Universität Wuppertal*), researchers have access to open source tools, computing infrastructure and prototyping capabilities, fostering collaboration with industry and startup development. *Semmelweis University* (Hungary) is implementing AI in clinical practice - from image analysis to treatment prediction - in full compliance with RODO regulations and ethical standards.

In Poland, on the other hand, *Kazimierz Wielki University* in Bydgoszcz is working on the application of AI in psychology and education, based on the human-in-the-loop model and ensuring ethical control over the results, while the Warsaw *School of Economics* has created a

formal framework for the use of AI in research - with clear rules for documentation, transparency and accountability.

The common denominator of these activities is:

- using AI for data mining, modelling and personalization,
- linking research to practice - implementations, prototypes, decision support tools,
- interdisciplinary teams and projects,
- responsible approach to ethics, law and the role of the human being.

5. Conclusions from the analysis of good practices in the application of AI in higher education

The analysis carried out in Work Package 2 of the AP-GAIED project has identified specific areas where generative artificial intelligence (AI) is being used effectively in higher education. The findings are based on case studies from universities in Lithuania, Germany, Hungary, Greece and Poland, and form the basis for further recommendations for the responsible, effective and scalable implementation of AI in education.

5.1 Regulatory and ethical framework as a foundation for AI implementation

Successful introduction of AI into academic practice is not possible without clearly defined rules that ensure transparency and accountability. Universities such as ***the Lithuanian University of Health Sciences*** **(Lithuania)**, ***the University of Hamburg*** **(Germany)**, ***Budapest University of Technology*** **(Hungary)**, and *the* Warsaw *School of Economics* **(Poland)** have developed internal regulations that specify, among other things, the obligation to disclose the use of AI in scientific and teaching work, the prohibition of attribution of authorship to AI, and the need to comply with data protection legislation (e.g. RODO).

In some institutions (e.g. Hungary), special **AI ethics committees** have been established to oversee the compatibility of AI use with academic values and to support the implementation of responsible practices.

5.2 Interdisciplinary education programmes as a response to market needs

The most effective AI-related study programmes are those that integrate knowledge from different areas - technical, social and legal. Universities such as *the International Hellenic University* **(Greece)**, ***the University of West Attica*** **(Greece)** and ***Eötvös Loránd University*** **(Hungary)** have developed interdisciplinary master's degrees that combine machine learning, data analytics, AI law and ethics, and collaborative components with industry. These programmes respond to the growing demand for professionals who understand not just the technology, but also its social and legal impact, and can operate in the diverse environments of the data economy.

5.3 Staff training as a tool to build competence and confidence

The implementation of AI in higher education also requires investment in the development of academic staff competencies. Good practices - such as those implemented by the ***University of West Attica*** **(Greece)**, *Maria Curie-Skłodowska* **University (Poland)**, **University of Segedin (Hungary)** or **Goethe University (Germany)** - show that successful training combines work with AI tools (e.g. large language models, prompting, content personalization) with the analysis of real-life teaching scenarios and ethical and legal issues.

The **'KI-Werkstatt'** model **(*Hochschule Für Technik Und Wirtschaft,* Berlin)** based on a phased implementation (from needs identification to scaling) shows that a practice-reflection approach increases both the effectiveness of training and its acceptance among teachers.

5.4 AI as support for research - while preserving the human role

Generative AI significantly enhances the research capabilities of universities - especially in areas such as data analysis, predictive modelling, diagnostics or personalization. Examples from the ***Lithuanian University of Health Sciences*** **(Lithuania)**, ***Semmelweis University*** **(Hungary)** and *Kazimierz Wielki University* in Bydgoszcz **(Poland)** show how AI can support both medical research (e.g. image analysis, prediction of treatment outcomes) and social research (e.g. identification of factors affecting work-life balance).

However, a key prerequisite for the successful integration of AI in research remains **a clear definition of the role of the human** - both as a developer of the methodology and as an interpreter of the results. **Human-in-the-loop** models and the obligation to document AI

participation in the research process (e.g. implemented at the Warsaw *School of Economics*) support transparency, credibility and scientific accountability.

5.5 Successful practices are embedded in the local context, but have the potential to scale up

An analysis of examples of AI implementations in European universities shows that the most effective measures are closely linked to the local context - legal, infrastructural, cultural and organizational. At the same time, many of these solutions have a high potential for adaptation, allowing them to be transferred and developed in other institutions.

Universities in Germany, such as ***the Hochschule Für Technik Und Wirtschaft*** **Berlin** and ***Bergische Universität Wuppertal***, are developing comprehensive AI implementation models based on staging and interuniversity cooperation. For example, the **'KI-Werkstatt'** model comprises four phases: ***Discovery, Scoping, Piloting and Scaling,*** which allows institutions to implement AI in a gradual, controlled manner with the involvement of teaching teams and small and medium-sized enterprises (SMEs).

Similarly, the **Moodle.nrw** project, running on state IT infrastructure, demonstrates how AI (e.g. chatbots based on open language models) can be successfully integrated into an educational ecosystem with full control over data and regulatory compliance.

It is also worth highlighting the importance of **interdisciplinarity and openness to collaboration** - both between departments and between universities and with industry. Examples from Greece, Hungary or Poland show that such an approach increases not only the quality of implementations, but also their sustainability and the possibility of further development.

6. Recommendations of Work Package 2, part 1 for a responsible, coherent and systemic implementation of generative artificial intelligence (AI) in higher education curricula.

Objective 1 of Work Package 2 (PP2)

The first objective of WP2 focuses on identifying current ways of using AI in higher education, both in teaching and research. This includes the collection of good practices, the analysis of implementation examples, as well as the identification of challenges and gaps in the use of AI at institutional, technological and competence levels - with a focus on the field of pedagogy/education. Thus, WP2 acts as a foundation for the development of an effective, relevant and implementable AI curriculum, which is the main outcome of the third phase of the project - R3.

The knowledge gathered in **WP2** - including good practices, current applications, institutional challenges and diverse national approaches - allows the construction of a study programme that is not a theoretical construct, but a viable response to the needs of the higher education sector

WP2 analyzed examples of good practice in AI implementation at universities and explored what obstacles and shortcomings still exist. This provided guidance on how to build rules and regulations to safely use AI in education, and how to develop a curriculum that combines pedagogical knowledge with technological skills.

The recommendations can be gathered into the following areas:

6.1 Developing AI policies based on good practice;

6.2 Fostering collaboration and knowledge exchange;

6.3 Systemic support of AI competence development;

6.4 Investment in infrastructure and secure AI environments;

6.5 Integration of AI in research processes;

6.6 Monitoring and evaluation of implementations.

6.1 Developing national and institutional AI policies based on good practices

The implementation of artificial intelligence in education requires clearly defined policies that protect academic values, ensure transparency of activities and minimize legal and ethical risks. An analysis of a number of codes for the use of AI, included in this report, shows that particular emphasis should be placed on issues of integrity of authors - understood as students, academics and academic researchers - as well as scientific integrity and transparent conditions for acceptable use of AI tools.

Each higher education institution should develop and implement its own code of ethics for the use of AI, including at least:

- **An obligation to disclose the use of AI** - in research papers, teaching, learning materials and other academic content, to ensure full transparency in the process of their creation.
- **Prohibition of attribution of authorship** to AI - making it clear that AI tools can support the creative process, but must not be recognized as authors of works.
- **Data protection** - applying solutions that comply with data protection legislation (e.g. RODO) and controlling what data is entered into AI systems and where it is processed.
- **Maintaining a human presence in teaching and research processes (*human-in-the-loop*)** - ensuring that key decisions, interpretations of results and quality assessments are made by a human and that AI is a supporting tool, not a replacement for the role of the teacher or researcher.
- **Defining the conditions for the use of AI by authors of coursework, dissertations, publications** and **other papers** - clear rules outlining the extent to which students, academics and researchers can use AI (e.g. for data analysis, language correction, idea generation), what elements of the work must be done in-house, how the use of AI should be documented, and what are the consequences of unauthorized use of such tools.

The Code should also set out the **consequences of violations** of these rules, so that all authors are aware of the consequences of dishonest or prohibited use of AI, including violations regarding plagiarism, data manipulation or falsification of research results.

In addition to actions at the institutional level, it is recommended to harmonize rules at national and EU level to ensure consistent, safe and responsible implementation of the AI in education and to facilitate international cooperation.

6.2 Fostering networking and knowledge exchange

One of the key prerequisites for the successful and responsible implementation of artificial intelligence in education is the ongoing cooperation between people and institutions involved in its practical use. Within the framework of the **AP-GAIED** project, it is particularly important to create and maintain channels for the systematic exchange of knowledge.

Recommendations are:

- **Create and develop Communities of Practice (CoPs)** around artificial intelligence in education. Such communities should include academics, researchers, IT specialists,

university administration representatives and students. Their aim is to share experiences, tools, teaching methods and examples of AI implementations in teaching and learning processes. CoPs can operate both in the form of stationary workshop meetings and in an online space, which will increase their accessibility and inclusiveness.

- **Promote the international exchange of experiences** between universities participating in the AP-GAIED project and other institutions interested in the ethical and effective use of AI in education. This exchange should include, inter alia, study visits, joint seminars, webinars, as well as open repositories of teaching materials and lesson plans based on AI.
- **Transfer of knowledge and good practices** - using cooperation networks to adapt good solutions in new contexts, taking into account local legal, cultural and organizational conditions. A special role can be played here by project partners representing different educational systems in order to develop recommendations and training materials that can be implemented in a wide range of institutions.

Building such networks for collaboration and knowledge exchange is directly related to the project's aim, as it allows combining pedagogical and technological perspectives and creating interdisciplinary resources that will be the foundation for the future curriculum on the ethical and effective use of AI in education.

6.3 Systemic support for AI competence development

In order for AI to be effectively and ethically implemented in education - in line with the objective of the AP-GAIED project - it is necessary to provide coherent, systemic support in improving the competences of all groups involved in the teaching and research process: academic staff, researchers and students.

It is recommended to design **training and study programmes** that could include the following modules:

1. **Practical use of AI tools**
    - handling *Large Language Models* (*LLM*) and integrating them with other academic tools,
    - the design of effective *prompts* for reliable and relevant results,

- personalization of learning materials (e.g. adapting content to the level and needs of specific student groups),
- automating assessment, providing personalized feedback and generating progress reports.

2. **Design and analysis of learning scenarios**
   - adaptation of courses to hybrid and fully digital environments,
   - integration of AI tools in different academic disciplines (e.g. pedagogy, psychology, sciences),
   - integration of AI in project assignments and student teamwork, including evaluation of the effectiveness of such activities.

3. **Ethical and legal aspects**
   - Principles of academic responsibility and integrity when using AI,
   - identification and counteraction of algorithmic biases,
   - protection of personal data in accordance with RODO,
   - guidelines on transparency of AI use, including the obligation to document *prompts* and results.
4. **AI-supported teaching methodology**
   - Use of AI to analyze educational data (e.g. trend analysis of learning outcomes),
   - tracking student progress and designing personalized learning paths,
   - evaluation of the effectiveness of AI-supported teaching activities in an *evidence-based teaching* approach.
5. **Pedagogical reflection and soft competences**
   - redefinition of the teacher's role in the AI era and adaptation of professional identity,
   - development of communication skills, interdisciplinary collaboration and critical thinking,
   - ethical teaching decision-making in AI-supported processes.

Form and levels of training:

Courses should be available in a variety of forms - desktop workshops, online courses and ECTS-credited programmes - and at different levels (from basic to expert). To increase efficiency, it is worthwhile to use a modular approach that allows participants to choose a pathway according to their role and needs.

6.4 Investment in infrastructure and secure AI environments

Effective and responsible implementation of AI in education requires that universities have access to adequate technological resources and environments that guarantee data security and regulatory compliance.

It is recommended to:

1. **Ensuring access to AI tools and environments**
    - locally hosted, *open-source* language models (*open-source LLM*), allowing full control over data and processes,
    - RODO-compliant teaching and research environments, e.g. Moodle platform with secure integration of AI tools,
    - powerful computing resources (servers, GPU, cloud computing) to enable testing, training and deployment of AI models in an academic setting.
2. **Creation of specialised AI workspaces**
    - **AI Labs** - laboratories dedicated to experimenting with AI tools, analysing teaching and research cases and developing new teaching methods,
    - **Makerspace** - open labs that support interdisciplinary collaboration, where students, researchers and IT professionals can work together to create and test solutions, from application prototypes to complex AI-supported educational systems.
3. **Security and compliance**
    - Implementation of procedures to minimize the risk of data leakage or unauthorized processing,
    - regular security audits of the AI infrastructure,
    - use of tools to anonymize and encrypt data used in AI models.

The infrastructure designed in this way will allow universities to conduct research, implement teaching innovations and develop interdisciplinary projects in a secure manner, and will create conditions for the implementation of the AI curriculum as envisaged by the AP-GAIED project.

6.5 Integrating AI into research processes

In order to fully exploit the potential of AI in research, universities should create technical, organizational and ethical conditions for conducting work that is transparent, in line with academic values and legal regulations.

Recommendations include:

1. **Provision of research resources and tools**
    - Access to licensed and open-source AI tools for data analysis, predictive modelling, natural language processing (NLP), image and signal analysis,
    - powerful computing infrastructure (servers, GPU clusters, research clouds) to train and test AI models,
    - secure research data repositories, compliant with FAIR (Findable, Accessible, Interoperable, Reusable) principles and RODO requirements.
2. **Supporting *a human-in-the-loop* model**
    - Active involvement of the researcher in every stage of the AI work: from study design, model selection and training, to analysis of results,
    - ensuring that the final interpretation of the data and the formulation of conclusions always belong to the human being,
    - documenting the researcher's contribution to AI-supported processes for full transparency.
3. **Standardization and ethics of research using AI**
    - Developing university guidelines for the responsible use of AI in research,
    - obligation to document the tools used, parameters of models and prompts, so that research is reproducible,
    - training for academic staff and doctoral students in the ethical design of AI experiments and risk management (e.g. algorithmic bias, data errors).

This approach will increase the credibility of the research, facilitate international replication and ensure that AI supports the scientific process rather than replacing the key role of the researcher.

6.6 Monitoring and evaluation of deployments

Successful use of AI in education requires continuous evaluation of its impact on the educational process and the functioning of the university. It is recommended to create internal AI and ethics units, such as AI Ethics **Committees**, which will be responsible for:

1. **Monitoring the effects of AI implementations**
    - Collecting and analyzing data on the effectiveness of AI solutions in teaching,
    - identifying technical, organizational and ethical problems during the use of AI tools,
    - reporting progress to university authorities and the academic community.
2. **Analyzing the impact on the didactic process**
    - assessing how AI influences the quality of education, teaching methods and student engagement,
    - examination of whether AI implementations support equality of access to education, especially in the context of students with diverse learning needs,
    - analysis of the compatibility of AI use with the learning objectives of pedagogical courses.
3. **Assessment of compliance with legal and ethical regulations**
    - Monitoring compliance with data protection legislation (RODO), transparency and academic accountability principles,
    - monitoring the documentation of the use of AI in coursework, dissertations, publications and teaching materials,
    - Suggesting adjustments to university policies when irregularities are identified.

The continuous evaluation of the implementations will allow not only the ongoing correction of activities, but also the accumulation of knowledge needed to develop educational programmes that will prepare future teachers and educators for the responsible use of AI in professional practice.

The recommendations collected in the **AP-GAIED** project show that the successful implementation of AI in education requires simultaneous action in several areas: from creating clear rules for the use of the technology and developing the competences of the staff, through investment in infrastructure, to monitoring the effects and adjusting the processes. Pedagogy is of particular importance here - preparing future teachers and educators to use AI consciously,

critically and creatively with students. Implementing these recommendations will enable universities not only to keep up with the development of technology, but also to shape its ethical and responsible applications in education.

Project partners:

Project Website:

https://ap-gaied.eu/